Merced High School Stadium Project
Environmental Impact Report

Prepared in Compliance with
California Environmental Quality Act

Volume II:
Draft Environmental Impact Report Appendices

State Clearinghouse No. 2019060008

Lead Agency and Project Sponsor:

Merced Union High School District
Merced, California

Environmental Impact Report Consultant:

ODELL *Planning & Research, Inc.*
Oakhurst, California

December 2019

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For the Proposed

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Air Quality & Greenhouse Gas Impact Analysis

AIR QUALITY & GREENHOUSE GAS IMPACT ANALYSIS

FOR

MERCED HIGH SCHOOL STADIUM PROJECT

MERCED UNION HIGH SCHOOL DISTRICT
MERCED, CA

NOVEMBER 2019

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LIST OF COMMON TERMS & ACRONYMS

AAM	Annual Arithmetic Mean
AHERA	Asbestos Hazard Emergency Response Act
ASHAA	Asbestos School Hazard Abatement Act
ASHARA	Asbestos School Hazard Abatement and Reauthorization Act
ATCM	Airborne Toxic Control Measure
CAAQS	California Ambient Air Quality Standards
ARB	California Air Resources Board
CCAA	California Clean Air Act
CCAR	California Climate Action Registry
CEQA	California Environmental Quality Act
CH_4	Methane
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent
DPM	Diesel-Exhaust Particulate Matter or Diesel-Exhaust PM
DRRP	Diesel Risk Reduction Plan
FCAA	Federal Clean Air Act
GHG	Greenhouse Gases
HAP	Hazardous Air Pollutant
IPCC	Intergovernmental Panel on Climate Change
LOS	Level of Service
N_2O	Nitrous Oxide
NAAQS	National Ambient Air Quality Standards
NESHAPs	National Emission Standards for HAPs
NO_x	Oxides of Nitrogen
O_3	Ozone
Pb	Lead
PM	Particulate Matter
PM_{10}	Particulate Matter (less than 10 µm)
$PM_{2.5}$	Particulate Matter (less than 2.5 µm)
ppb	Parts per Billion
ppm	Parts per Million
ROG	Reactive Organic Gases
SIP	State Implementation Plan
SJVAB	San Joaquin Valley Air Basin
SJVAPCD	San Joaquin Valley Air Pollution Control District
SO_2	Sulfur Dioxide
SRTS	Safe Routes to School
TAC	Toxic Air Contaminant
TSCA	Toxic Substances Control Act
$\mu g/m^3$	Micrograms per cubic meter
U.S. EPA	United State Environmental Protection Agency

INTRODUCTION

This report describes the existing environment in the project vicinity and identifies potential air quality and greenhouse gas impacts associated with the proposed project. Project impacts are evaluated relative to applicable thresholds of significance. Mitigation measures have been identified for significant impacts.

PROPOSED PROJECT SUMMARY

Construction of a high school football stadium with a seating capacity for 3,100. The first 2,000 seats will be constructed in the first phase with an additional 1,100 seats completed in a future phase. Grandstands will be located on the south, east and north sides of the stadium, connected by concrete walkways around the perimeter of the football field to an entry gate structure located at the southeast corner of the stadium. The project includes the construction of walking paths connecting the stadium to existing parking on the southern portion of the high school campus. Construction of the stadium is anticipated to begin in early 2020.

The project site has been used as a campus football field since 1986. The stadium project will utilize the existing lights at the football field, which have been in place since 2009.

PROPOSED PROJECT LOCATION

The project is located on the northern portion of the Merced High School campus in the City of Merced. Figure 1 identifies the regional location of the project. Figure 2 identifies the specific location of the project on the Merced High School campus.

AIR QUALITY

EXISTING SETTING

The project is located within the San Joaquin Valley Air Basin (SJVAB). The SJVAB is within the jurisdiction of the San Joaquin Valley Air Pollution Control District (SJVAPCD). Air quality in the SJVAB is influenced by a variety of factors, including topography, local and regional meteorology. Factors affecting regional and local air quality are discussed below.

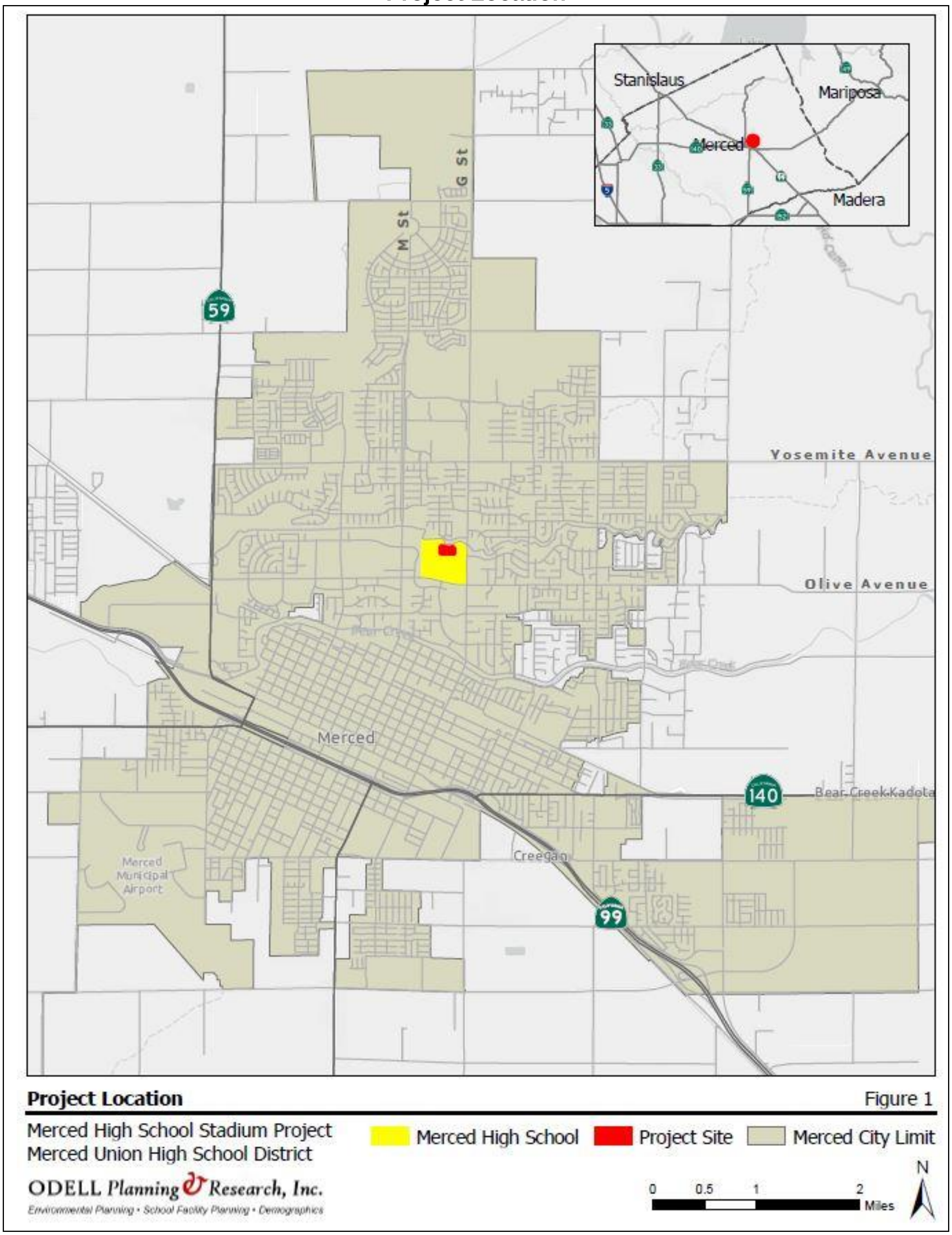
TOPOGRAPHY, METEOROLOGY, AND POLLUTANT DISPERSION

The dispersion of air pollution in an area is determined by such natural factors as topography, meteorology, and climate, coupled with atmospheric stability conditions and the presence of inversions. The factors affecting the dispersion of air pollution with respect to the SJVAB are discussed below.

Topography

The SJVAB occupies the southern half of the Central Valley. The SJVAB is open to the north and is surrounded by mountain ranges on all other sides. The Coast Ranges, which have an average elevation of 3,000 feet, are along on the western boundary of the SJVAB, while the Sierra Nevada Mountains (8,000 to 14,000 feet in elevation) are along the eastern border. The San Emigdio Mountains, which are part of the

Figure 1
Project Location



Source: OPR 2019a

Figure 2
Project Site Boundaries and Proposed Facilities

Source: OPR 2019a

Coast Ranges, and the Tehachapi Mountains, which are part of the Sierra Nevada, form the southern boundary, and have an elevation of 6,000 to 8,000 feet. The SJVAB is mostly flat with a downward gradient in terrain to the northwest.

Meteorology and Climate

The SJVAB has an inland Mediterranean climate that is strongly influenced by the presence of mountain ranges. The mountain ranges to the west and south induce winter storms from the Pacific Ocean to release precipitation on the western slopes producing a partial rain shadow over the valley. In addition, the mountain ranges block the free circulation of air to the east, trapping stable air in the valley for extended periods during the cooler half of the year.

Winter in the SJVAB is characterized as mild and fairly humid, while the summer is typically hot, dry, and cloudless. The climate is a result of the topography and the strength and location of a semi permanent, subtropical high-pressure cell. During the summer months, the Pacific high-pressure cell is centered over the northeastern Pacific Ocean, resulting in stable meteorological conditions and a steady northwesterly wind flow. Upwelling of cold ocean water from below to the surface as a result of the northwesterly flow produces a band of cold water off the California coast. In winter, the Pacific high-pressure cell weakens and shifts southward, resulting in wind flow offshore, the absence of upwelling, and the occurrence of storms.

The annual temperature, humidity, precipitation, and wind patterns reflect the topography of the SJVAB and the strength and location of the semi permanent, subtropical high-pressure cell. Summer temperatures that often exceed 100 degrees Fahrenheit (°F) and clear sky conditions are favorable to ozone formation. Most of the precipitation in the valley occurs as rainfall during winter storms. The winds and unstable atmospheric conditions associated with the passage of winter storms result in periods of low air pollution and excellent visibility. However, between winter storms, high pressure and light winds lead to the creation of low-level temperature inversions and stable atmospheric conditions, which can result in higher pollutant concentrations. The orientation of the wind flow pattern in the SJVAB is parallel to the valley and mountain ranges. Summer wind conditions promote the transport of ozone and precursors from the San Francisco Bay Area through the Carquinez Strait, a gap in the Coast Ranges, and low-mountain passes such as Altamont Pass and Pacheco Pass. During the summer, predominant wind direction is from the northwest. During the winter, the predominant wind direction is from the southeast. Calm conditions are also predominant during the winter (ARB 1992).

The climate in the project area is semi-arid, with an annual normal precipitation of approximately 12.21 inches. Temperatures in the project area range from an average minimum of approximately 36 degrees Fahrenheit (°F), in January, to an average maximum of 97°F, in July (WRCC 2017).

Atmospheric Stability and Inversions

Stability describes the resistance of the atmosphere to vertical motion. The stability of the atmosphere is dependent on the vertical distribution of temperature with height. Stability categories range from "Extremely Unstable" (Class A), through Neutral (Class D), to "Stable" (Class F). Unstable conditions often occur during daytime hours when solar heating warms the lower atmospheric layers sufficiently. Under Class A stability conditions, large fluctuations in horizontal wind direction occur coupled with large vertical mixing depths. Under Class B stability conditions, wind direction fluctuations and the vertical mixing depth are less pronounced because of a decrease in the amount of solar heating. Under Class C stability conditions, solar heating is weak along with horizontal and vertical fluctuations because of a combination of thermal and mechanical turbulence. Under Class D stability conditions, vertical motions are primarily generated by mechanical turbulence. Under Class E and Class F stability conditions, air pollution emitted into the atmosphere travels downwind with poor dispersion. The dispersive power of the atmosphere decreases with progression through the categories from A to F.

With respect to the SJVAB, Classes D through F are predominant during the late fall and winter because of cool temperatures and entrapment of cold air near the surface. March and August are transition months with equally occurring percentages of Class F and Class A. During the spring months of April and May and the summer months of June and July, Class A is predominant. The fall months of September, October, and November have comparable percentages of Class A and Class F.

An inversion is a layer of warmer air over a layer of cooler air. Inversions influence the mixing depth of the atmosphere, which is the vertical depth available for diluting air pollution near the ground, thus significantly affecting air quality conditions. The SJVAB experiences both surface-based and elevated inversions. The shallow surface-based inversions are present in the morning but are often broken by daytime heating of the air layers near the ground. The deep elevated inversions occur less frequently than the surface-based inversions but generally result in more severe stagnation. The surface-based inversions occur more frequently in the fall, and the stronger elevated inversions usually occur during December and January.

AIR POLLUTANTS OF CONCERN

Criteria Air Pollutants

For the protection of public health and welfare, the Federal Clean Air Act (FCAA) required that the United States Environmental Protection Agency (U.S. EPA) establish National Ambient Air Quality Standards (NAAQS) for various pollutants. These pollutants are referred to as "criteria" pollutants because the U.S. EPA publishes criteria documents to justify the choice of standards. These standards define the maximum amount of an air pollutant that can be present in ambient air. An ambient air quality standard is generally specified as a concentration averaged over a specific time period, such as one hour, eight hours, 24 hours, or one year. The different averaging times and concentrations are meant to protect against different exposure effects. Standards established for the protection of human health are referred to as primary standards; whereas, standards established for the prevention of environmental and property damage are called secondary standards. The FCAA allows states to adopt additional or more health-protective standards. The air quality regulatory framework and ambient air quality standards are discussed in greater detail later in this report.

The following provides a summary discussion of the primary and secondary criteria air pollutants of primary concern. In general, primary pollutants are directly emitted into the atmosphere, and secondary pollutants are formed by chemical reactions in the atmosphere.

Ozone (O_3) is a reactive gas consisting of three atoms of oxygen. In the troposphere, it is a product of the photochemical process involving the sun's energy. It is a secondary pollutant that is formed when NO_X and volatile organic compounds (VOC) react in the presence of sunlight. Ozone at the earth's surface causes numerous adverse health effects and is a criteria pollutant. It is a major component of smog. In the stratosphere, ozone exists naturally and shields Earth from harmful incoming ultraviolet radiation.

High concentrations of ground level ozone can adversely affect the human respiratory system and aggravate cardiovascular disease and many respiratory ailments. Ozone also damages natural ecosystems such as forests and foothill communities, agricultural crops, and some man-made materials, such as rubber, paint, and plastics.

Reactive Organic Gas (ROG) is a reactive chemical gas, composed of hydrocarbon compounds that may contribute to the formation of smog by their involvement in atmospheric chemical reactions. No separate health standards exist for ROG as a group. Because some compounds that make up ROG are also toxic, like the carcinogen benzene, they are often evaluated as part of a toxic risk assessment. Total Organic Gases (TOGs) includes all of the ROGs, in addition to low reactivity organic compounds like methane and acetone. ROGs and VOC are subsets of TOG.

Volatile Organic Compounds (VOC) are hydrocarbon compounds that exist in the ambient air. VOCs contribute to the formation of smog and may also be toxic. VOC emissions are a major precursor to the formation of ozone. VOCs often have an odor, and some examples include gasoline, alcohol, and the solvents used in paints.

Oxides of Nitrogen (NO_X) are a family of gaseous nitrogen compounds and is a precursor to the formation of ozone and particulate matter. The major component of NO_X, nitrogen dioxide (NO_2), is a reddish-brown gas that is toxic at high concentrations. NO_X results primarily from the combustion of fossil fuels under high temperature and pressure. On-road and off-road motor vehicles and fuel combustion are the major sources of this air pollutant.

Particulate Matter (PM), also known as particle pollution, is a complex mixture of extremely small particles and liquid droplets. Particle pollution is made up of a number of components, including acids (such as nitrates and sulfates), organic chemicals, metals, and soil or dust particles. The size of particles is directly linked to their potential for causing health problems. U.S. EPA is concerned about particles that are 10 micrometers in diameter or smaller because those are the particles that generally pass through the throat and nose and enter the lungs. Once inhaled, these particles can affect the heart and lungs and cause serious health effects. U.S. EPA groups particle pollution into three categories based on their size and where they are deposited:

- "Inhalable coarse particles ($PM_{2.5}$- PM_{10})," such as those found near roadways and dusty industries, are between 2.5 and 10 micrometers in diameter. $PM_{2.5-10}$ is deposited in the thoracic region of the lungs.
- "Fine particles ($PM_{2.5}$)," such as those found in smoke and haze, are 2.5 micrometers in diameter and smaller. These particles can be directly emitted from sources such as forest fires, or they can form when gases emitted from power plants, industries and automobiles react in the air. They penetrate deeply into the thoracic and alveolar regions of the lungs.
- "Ultrafine particles (UFP)," are very small particles less than 0.1 micrometers in diameter largely resulting from the combustion of fossils fuels, meat, wood and other hydrocarbons. While UFP mass is a small portion of $PM_{2.5}$, its high surface area, deep lung penetration, and transfer into the bloodstream can result in disproportionate health impacts relative to their mass.

PM_{10}, $PM_{2.5}$, and UFP include primary pollutants (emitted directly to the atmosphere) as well as secondary pollutants (formed in the atmosphere by chemical reactions among precursors). Generally speaking, $PM_{2.5}$ and UFP are emitted by combustion sources like vehicles, power generation, industrial processes, and wood burning, while PM_{10} sources include these same sources plus roads and farming activities. Fugitive windblown dust and other area sources also represent a source of airborne dust.

Numerous scientific studies have linked both long- and short-term particle pollution exposure to a variety of health problems. Long-term exposures, such as those experienced by people living for many years in areas with high particle levels, have been associated with problems such as reduced lung function and the development of chronic bronchitis and even premature death. Short-term exposures to particles (hours or days) can aggravate lung disease, causing asthma attacks and also acute (short-term) bronchitis, and may also increase susceptibility to respiratory infections. In people with heart disease, short-term exposures have been linked to heart attacks and arrhythmias. Healthy children and adults have not been reported to suffer serious effects from short term exposures, although they may experience temporary minor irritation when particle levels are elevated.

Carbon Monoxide (CO) is an odorless, colorless gas that is highly toxic. It is formed by the incomplete combustion of fuels and is emitted directly into the air (unlike ozone). The main source of CO is on-road motor vehicles. Other CO sources include other mobile sources, miscellaneous processes, and fuel combustion from stationary sources. Because of the local nature of CO problems, the California Air Resources Board (ARB) and U.S. EPA designate urban areas as CO nonattainment areas instead of the entire basin as with ozone and PM_{10}. Motor vehicles are by far the largest source of CO emissions. Emissions from motor vehicles have been declining since 1985, despite increases in vehicle miles traveled, with the introduction of new automotive emission controls and fleet turnover.

Sulfur Dioxide (SO_2) is a colorless, irritating gas with a "rotten egg" smell formed primarily by the combustion of sulfur-containing fossil fuels. However, like airborne NO_X, suspended SO_X particles contribute to the poor visibility. These SO_X particles can also combine with other pollutants to form $PM_{2.5}$. The prevalence of low-sulfur fuel use has minimized problems from this pollutant.

Lead (Pb) is a metal that is a natural constituent of air, water, and the biosphere. Lead is neither created nor destroyed in the environment, so it essentially persists forever. The health effects of lead poisoning include loss of appetite, weakness, apathy, and miscarriage. Lead can also cause lesions of the neuromuscular system, circulatory system, brain, and gastrointestinal tract. Gasoline-powered automobile engines were a major source of airborne lead through the use of leaded fuels. The use of leaded fuel has been mostly phased out, with the result that ambient concentrations of lead have dropped dramatically.

Hydrogen Sulfide (H_2S) is associated with geothermal activity, oil and gas production, refining, sewage treatment plants, and confined animal feeding operations. Hydrogen sulfide is extremely hazardous in high concentrations; especially in enclosed spaces (800 ppm can cause death). OSHA regulates workplace exposure to H_2S.

Other Pollutants

The State of California has established air quality standards for some pollutants not addressed by Federal standards. The ARB has established State standards for hydrogen sulfide, sulfates, vinyl chloride, and visibility reducing particles. The following section summarizes these pollutants and provides a description of the pollutants' physical properties, health and other effects, sources, and the extent of the problems.

Sulfates (SO_4^{2-}) are the fully oxidized ionic form of sulfur. Sulfates occur in combination with metal and/or hydrogen ions. In California, emissions of sulfur compounds occur primarily from the combustion of petroleum-derived fuels (e.g., gasoline and diesel fuel) that contain sulfur. This sulfur is oxidized to SO_2 during the combustion process and subsequently converted to sulfate compounds in the atmosphere. The conversion of SO_2 to sulfates takes place comparatively rapidly and completely in urban areas of California due to regional meteorological features.

The ARB sulfates standard is designed to prevent aggravation of respiratory symptoms. Effects of sulfate exposure at levels above the standard include a decrease in ventilator function, aggravation of asthmatic symptoms, and an increased risk of cardio-pulmonary disease. Sulfates are particularly effective in degrading visibility, and, due to the fact that they are usually acidic, can harm ecosystems and damage materials and property.

Visibility Reducing Particles: Are a mixture of suspended particulate matter consisting of dry solid fragments, solid cores with liquid coatings, and small droplets of liquid. The standard is intended to limit the frequency and severity of visibility impairment due to regional haze and is equivalent to a 10-mile nominal visual range.

Vinyl Chloride (C_2H_3Cl or VCM) is a colorless gas that does not occur naturally. It is formed when other substances such as trichloroethane, trichloroethylene, and tetrachloro-ethylene are broken down. Vinyl chloride is used to make polyvinyl chloride (PVC) which is used to make a variety of plastic products, including pipes, wire and cable coatings, and packaging materials.

Odors

Typically 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 the psychological (i.e. irritation, anger, or anxiety) to the physiological, including circulatory and respiratory effects, nausea, vomiting, and headache.

The ability to detect odors varies considerably among the population and overall is quite subjective. Some individuals have the ability to 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 and in fact 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.

Quality and intensity are two properties present in any odor. The quality of an odor indicates the nature of the smell experience. For instance, if a person describes an odor as flowery or sweet, then the person is describing the quality of the odor. Intensity refers to the strength of the odor. For example, a person may use the word strong to describe the intensity of an odor. Odor intensity depends on the odorant concentration in the air. When an odorous sample is progressively diluted, the odorant concentration decreases. As this occurs, the odor intensity weakens and eventually becomes so low that the detection or recognition of the odor is quite difficult. At some point during dilution, the concentration of the odorant reaches a detection threshold. An odorant concentration below the detection threshold means that the concentration in the air is not detectable by the average human.

Neither the state nor the federal governments have adopted rules or regulations for the control of odor sources. The SJVAPCD does not have an individual rule or regulation that specifically addresses odors; however, odors would be subject to SJVAPCD *Rule 4102, Nuisance*. Any actions related to odors would be based on citizen complaints to local governments and the SJVAPCD.

Toxic Air Contaminants

Toxic air contaminants (TACs) are air pollutants that may cause or contribute to an increase in mortality or serious illness, or which may pose a hazard to human health. TACs are usually present in minute quantities in the ambient air, but due to their high toxicity, they may pose a threat to public health even at very low concentrations. Because there is no threshold level below which adverse health impacts are not expected to occur, TACs differ from criteria pollutants for which acceptable levels of exposure can be determined and for which state and federal governments have set ambient air quality standards. TACs, therefore, are not considered “criteria pollutants” under either the FCAA or the California Clean Air Act (CCAA), and are thus not subject to National or California ambient air quality standards (NAAQS and CAAQS, respectively). Instead, the U.S. EPA and the ARB regulate Hazardous Air Pollutants (HAPs) and TACs, respectively, through statutes and regulations that generally require the use of the maximum or best available control technology to limit emissions. In conjunction with SJVAPCD rules, these federal and state statutes and regulations establish the regulatory framework for TACs. At the national levels, the U.S. EPA has established National Emission Standards for HAPs (NESHAPs), in accordance with the requirements of the FCAA and subsequent amendments. These are technology-based source-specific regulations that limit allowable emissions of HAPs.

Within California, TACs are regulated primarily through the Tanner Air Toxics Act (AB 1807) and the Air Toxics Hot Spots Information and Assessment Act of 1987 (AB 2588). The Tanner Act sets forth a formal procedure for ARB to designate substances as TACs. The following provides a summary of the primary TACs of concern within the State of California and related health effects:

Diesel Particulate Matter (DPM) was identified as a TAC by the ARB in August 1998. DPM is emitted from both mobile and stationary sources. In California, on-road diesel-fueled vehicles contribute approximately 40% of the statewide total, with an additional 57 percent attributed to other mobile sources such as construction and mining equipment, agricultural equipment, and transport refrigeration units. Stationary sources, contributing about 3 percent of emissions, include shipyards, warehouses, heavy equipment repair yards, and oil and gas production operations. Emissions from these sources are from diesel-fueled internal combustion engines. Stationary sources that report DPM emissions also include heavy construction, manufacturers of asphalt paving materials and blocks, and diesel-fueled electrical generation facilities (ARB 2013).

In October 2000, the ARB issued a report entitled: “Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles”, which is commonly referred to as the Diesel Risk Reduction Plan (DRRP). The DRRP provides a mechanism for combating the DPM problem. The goal of the DRRP is to reduce concentrations of DPM by 85 percent by the year 2020, in comparison to year 2000 baseline emissions. The key elements of the DRRP are to clean up existing engines through engine retrofit emission control devices, to adopt stringent standards for new diesel engines, and to lower the sulfur content of diesel fuel to protect new, and very effective, advanced technology emission control devices on diesel engines. When fully implemented, the DRPP will significantly reduce emissions from both old and new diesel fueled motor vehicles and from stationary sources that burn diesel fuel. In addition to these strategies, the ARB continues to promote the use of alternative fuels and electrification. As a result of these actions, DPM concentrations and associated health risks in future years are projected to decline (ARB 2013, ARB 2000).

Exposure to DPM can have immediate health effects. DPM can irritate the eyes, nose, throat, and lungs, and it can cause coughs, headaches, lightheadedness, and nausea. In studies with human volunteers, Exposure to DPM also causes inflammation in the lungs, which may aggravate chronic respiratory symptoms and increase the frequency or intensity of asthma attacks. The elderly and people with emphysema, asthma, and chronic heart and lung disease are especially sensitive to fine-particle pollution. Because children's lungs and respiratory systems are still developing, they are also more susceptible than healthy adults to fine particles. Exposure to fine particles is associated with increased frequency of childhood illnesses and can also reduce lung function in children. In California, DPM has been identified as a carcinogen.

Acetaldehyde is a federal hazardous air pollutant. The ARB identified acetaldehyde as a TAC in April 1993. Acetaldehyde is both directly emitted into the atmosphere and formed in the atmosphere as a result of photochemical oxidation. Sources of acetaldehyde include emissions from combustion processes such as exhaust from mobile sources and fuel combustion from stationary internal combustion engines, boilers, and process heaters. A majority of the statewide acetaldehyde emissions can be attributed to mobile sources, including on-road motor vehicles, construction and mining equipment, aircraft, recreational boats, and agricultural equipment. Area sources of emissions include the burning of wood in residential fireplaces and wood stoves. The primary stationary sources of acetaldehyde are from fuel combustion from the petroleum industry (ARB 2013).

Acute exposure to acetaldehyde results in effects including irritation of the eyes, skin, and respiratory tract. Symptoms of chronic intoxication of acetaldehyde resemble those of alcoholism. The U.S. EPA has classified acetaldehyde as a probable human carcinogen. In California, acetaldehyde was classified on April 1, 1988, as a chemical known to the state to cause cancer (U.S. EPA 2014; ARB 2013).

Benzene is highly carcinogenic and occurs throughout California. The ARB identified benzene as a TAC in January 1985. A majority of benzene emitted in California (roughly 88 percent) comes from motor vehicles, including evaporative leakage and unburned fuel exhaust. These sources include on-road motor vehicles, recreational boats, off-road recreational vehicles, and lawn and garden equipment. Benzene is also formed as a partial combustion product of larger aromatic fuel components. To a lesser extent, industry-related stationary sources are also sources of benzene emissions. The primary stationary sources of reported benzene emissions are crude petroleum and natural gas mining, petroleum refining, and electric generation that involves the use of petroleum products. The primary area sources include residential combustion of various types such as cooking and water heating (ARB 2013).

Acute inhalation exposure of humans to benzene may cause drowsiness, dizziness, headaches, as well as eye, skin, and respiratory tract irritation, and, at high levels, unconsciousness. Chronic inhalation exposure has caused various disorders in the blood, including reduced numbers of red blood cells and aplastic anemia, in occupational settings. Reproductive effects have been reported for women exposed by inhalation to high levels, and adverse effects on the developing fetus have been observed in animal tests. Increased incidences of leukemia (cancer of the tissues that form white blood cells) have been observed in humans occupationally exposed to benzene. The U.S. EPA has classified benzene as known human carcinogen for all routes of exposure (U.S. EPA 2014).

1,3-butadiene was identified by the ARB as a TAC in 1992. Most of the emissions of 1,3-butadiene are from incomplete combustion of gasoline and diesel fuels. Mobile sources account for a majority of the total statewide emissions. Additional sources include agricultural waste burning, open burning associated with forest management, petroleum refining, manufacturing of synthetics and man-made materials, and oil and gas extraction. The primary natural sources of 1,3-butadiene emissions are wildfires (ARB 2013).

Acute exposure to 1,3-butadiene by inhalation in humans results in irritation of the eyes, nasal passages, throat, and lungs. Epidemiological studies have reported a possible association between 1,3-butadiene exposure and cardiovascular diseases. Epidemiological studies of workers in rubber plants have shown an association between 1,3-butadiene exposure and increased incidence of leukemia. Animal studies have reported tumors at various sites from 1,3-butadiene exposure. In California, 1,3-butadiene has been identified as a carcinogen.

Carbon Tetrachloride was identified by the ARB as a TAC in 1987 under California's TAC program (ARB 2013). The primary stationary sources reporting emissions of carbon tetrachloride include chemical and allied product manufacturers and petroleum refineries. In the past, carbon tetrachloride was used for dry cleaning and as a grain-fumigant. Usage for these purposes is no longer allowed in the United States. Carbon tetrachloride has not been registered for pesticidal use in California since 1987. Also, the use of carbon tetrachloride in products to be used indoors has been discontinued in the United States. The statewide emissions of carbon tetrachloride are small (about 1.96 tons per year), and background concentrations account for most of the health risk (ARB 2013).

The primary effects of carbon tetrachloride in humans are on the liver, kidneys, and central nervous system. Human symptoms of acute inhalation and oral exposures to carbon tetrachloride include headache, weakness, lethargy, nausea, and vomiting. Acute exposures to higher levels and chronic (long-term) inhalation or oral exposure to carbon tetrachloride produces liver and kidney damage in humans. Human data on the carcinogenic effects of carbon tetrachloride are limited. Studies in animals have shown that ingestion of carbon tetrachloride increases the risk of liver cancer. In California, carbon tetrachloride has been identified as a carcinogen.

Hexavalent chromium was identified as a TAC in 1986. Sources of Hexavalent chromium include industrial metal finishing processes, such as chrome plating and chromic acid anodizing, and firebrick lining of glass furnaces. Other sources include mobile sources, including gasoline motor vehicles, trains, and ships (ARB 2013).

The respiratory tract is the major target organ for hexavalent chromium toxicity, for acute and chronic inhalation exposures. Shortness of breath, coughing, and wheezing were reported from a case of acute exposure to hexavalent chromium, while perforations and ulcerations of the septum, bronchitis, decreased pulmonary function, pneumonia, and other respiratory effects have been noted from chronic exposure. Human studies have clearly established that inhaled hexavalent chromium is a human carcinogen, resulting in an increased risk of lung cancer. In California, hexavalent chromium has been identified as a carcinogen.

Para-Dichlorobenzene was identified by the ARB as a TAC in April 1993. The primary area-wide sources that have reported emissions of para-dichlorobenzene include consumer products such as non-aerosol insect repellants and solid/gel air fresheners. These sources contribute nearly all of the statewide para-dichlorobenzene emissions (ARB 2013).

Acute exposure to paradichlorobenzene via inhalation results in irritation to the eyes, skin, and throat in humans. In addition, long-term inhalation exposure may affect the liver, skin, and central nervous system in humans. The U.S. EPA has classified para-dichlorobenzene as a possible human carcinogen.

Formaldehyde was identified by the ARB as a TAC in 1992. Formaldehyde is both directly emitted into the atmosphere and formed in the atmosphere as a result of photochemical oxidation. Photochemical oxidation is the largest source of formaldehyde concentrations in California ambient air. Directly emitted formaldehyde is a product of incomplete combustion. One of the primary sources of directly-emitted formaldehyde is vehicular exhaust. Formaldehyde is also used in resins, can be found in many consumer products as an antimicrobial agent, and is also used in fumigants and soil disinfectants. The primary area sources of formaldehyde emissions include wood burning in residential fireplaces and wood stoves (ARB 2013).

Exposure to formaldehyde may occur by breathing contaminated indoor air, tobacco smoke, or ambient urban air. Acute and chronic inhalation exposure to formaldehyde in humans can result in respiratory symptoms, and eye, nose, and throat irritation. Limited human studies have reported an association between formaldehyde exposure and lung and nasopharyngeal cancer. Animal inhalation studies have reported an increased incidence of nasal squamous cell cancer. Formaldehyde is classified as a probable human carcinogen.

Methylene Chloride was identified by the ARB as a TAC in 1987. Methylene chloride is used as a solvent, a blowing and cleaning agent in the manufacture of polyurethane foam and plastic fabrication, and as a solvent in paint stripping operations. Paint removers account for the largest use of methylene chloride in California, where methylene chloride is the main ingredient in many paint stripping formulations. Plastic product manufacturers, manufacturers of synthetics, and aircraft and parts manufacturers are stationary sources reporting emissions of methylene chloride (ARB 2013).

The acute effects of methylene chloride inhalation in humans consist mainly of nervous system effects including decreased visual, auditory, and motor functions, but these effects are reversible once exposure ceases. The effects of chronic exposure to methylene chloride suggest that the central nervous system is a potential target in humans and animals. Human data are inconclusive regarding methylene chloride and cancer. Animal studies have shown increases in liver and lung cancer and benign mammary gland tumors following the inhalation of methylene chloride. In California, methylene chloride has been identified as a carcinogen.

Perchloroethylene was identified by the ARB as a TAC in 1991. Perchloroethylene is used as a solvent, primarily in dry cleaning operations. Perchloroethylene is also used in degreasing operations, paints and coatings, adhesives, aerosols, specialty chemical production, printing inks, silicones, rug shampoos, and laboratory solvents. In California, the stationary sources that have reported emissions of perchloroethylene are dry cleaning plants, aircraft part and equipment manufacturers, and fabricated metal product manufacturers. The primary area sources include consumer products such as automotive brake cleaners and tire sealants and inflators (ARB 2013).

Acute inhalation exposure to perchloroethylene vapors can result in irritation of the upper respiratory tract and eyes, kidney dysfunction, and at lower concentrations, neurological effects, such as reversible mood and behavioral changes, impairment of coordination, dizziness, headaches sleepiness, and unconsciousness. Chronic inhalation exposure can result in neurological effects, including sensory symptoms such as headaches, impairments in cognitive and motor neurobehavioral functioning, and color vision decrements. Cardiac arrhythmia, liver damage, and possible kidney damage may also occur. In California, perchloroethylene has been identified as a carcinogen.

ASBESTOS

Asbestos is a term used for several types of naturally-occurring fibrous minerals found in many parts of California. The most common type of asbestos is chrysotile, but other types are also found in California. Serpentine rock often contains chrysotile asbestos. Serpentine rock, and its parent material, ultramafic rock, is abundant in the Sierra foothills, the Klamath Mountains, and Coast Ranges. The project site, however, is not located in an area of known ultramafic rock.

Asbestos is commonly found in ultramafic rock, including serpentine, and near fault zones. The amount of asbestos that is typically present in these rocks range from less than 1 percent up to about 25 percent, and sometimes more. Asbestos is released from ultramafic and serpentine rock when it is broken or crushed. This can happen when cars drive over unpaved roads or driveways which are surfaced with these rocks, when land is graded for building purposes, or at quarrying operations. It is also released naturally through weathering and erosion. Once released from the rock, asbestos can become airborne and may stay in the air for long periods of time.

Additional sources of asbestos include building materials and other manmade materials. The most common sources are heat-resistant insulators, cement, furnace or pipe coverings, inert filler material, fireproof gloves and clothing, and brake linings. Asbestos has been used in the United States since the early 1900's; however, asbestos is no longer allowed as a constituent in most home products and materials. Many older buildings, schools, and homes still have asbestos containing products.

Naturally-occurring asbestos was identified by ARB as a TAC in 1986. The ARB has adopted two statewide control measures which prohibits the use of serpentine or ultramafic rock for unpaved surfacing and controls dust emissions from construction, grading, and surface mining in areas with these rocks. Various other laws have also been adopted, including laws related to the control of asbestos-containing materials during the renovation and demolition of buildings.

All types of asbestos are hazardous and may cause lung disease and cancer. Health risks to people are dependent upon their exposure to asbestos. The longer a person is exposed to asbestos and the greater the intensity of the exposure, the greater the chances for a health problem. Asbestos-related disease, such as lung cancer, may not occur for decades after breathing asbestos fibers. Cigarette smoking increases the risk of lung cancer from asbestos exposure.

Valley Fever

Valley fever is an infection caused by the fungus Coccidioides. The scientific name for valley fever is "coccidioidomycosis," and it's also sometimes called "desert rheumatism." The term "valley fever" usually refers to Coccidioides infection in the lungs, but the infection can spread to other parts of the body in severe cases.

Coccidioides spores circulate in the air after contaminated soil and dust are disturbed by humans, animals, or the weather. The spores are too small to see without a microscope. When people breathe in the spores, they are at risk for developing valley fever. After the spores enter the lungs, the person's body temperature allows the spores to change shape and grow into spherules. When the spherules get large enough, they break open and release smaller pieces (called endospores) which can then potentially spread within the lungs or to other organs and grow into new spherules. In extremely rare cases, the fungal spores can enter the skin through a cut, wound, or splinter and cause a skin infection.

Symptoms of valley fever may appear between 1 and 3 weeks after exposure. Symptoms commonly include fatigue, coughing, fever, shortness of breath, headaches, night sweats, muscle aches and joint pain, and rashes on the upper body or legs.

Approximately 5 to 10 percent of people who get valley fever will develop serious or long-term problems in their lungs. In an even smaller percent of people (about 1 percent), the infection spreads from the lungs to other parts of the body, such as the central nervous system (brain and spinal cord), skin, or bones and joints. Certain groups of people may be at higher risk for developing the severe forms of valley fever, such as people who have weakened immune systems. The fungus that causes valley fever, Coccidioides, can't spread from the lungs between people or between people and animals. However, in extremely rare instances, a wound infection with Coccidioides can spread valley fever to someone else, or the infection can be spread through an organ transplant with an infected organ.

For many people, the symptoms of valley fever will go away within a few months without any treatment. Healthcare providers choose to prescribe antifungal medication for some people to try to reduce the severity of symptoms or prevent the infection from getting worse. Antifungal medication is typically given to people who are at higher risk for developing severe valley fever. The treatment typically occurs over a period of roughly 3 to 6 months. In some instances, longer treatment may be required. If valley fever develops into meningitis life-long antifungal treatment is typically necessary.

Scientists continue to study how weather and climate patterns affect the habitat of the fungus that causes valley fever. Coccidioides is thought to grow best in soil after heavy rainfall and then disperse into the air most effectively during hot, dry conditions. For example, hot and dry weather conditions have been shown to correlate with an increase in the number of valley fever cases in Arizona and in California. The ways in which climate change may be affecting the number of valley fever infections, as well as the geographic range of Coccidioides, isn't known yet, but is a subject for further research (CDC 2016).

REGULATORY FRAMEWORK

Air quality within the SJVAB is regulated by several jurisdictions including the U.S. EPA, ARB, and the SJVAPCD. Each of these jurisdictions develops rules, regulations, and policies to attain the goals or directives imposed upon them through legislation. Although U.S. EPA regulations may not be superseded, both state and local regulations may be more stringent.

FEDERAL

U.S. Environmental Protection Agency

At the federal level, the U.S. EPA has been charged with implementing national air quality programs. The U.S. EPA's air quality mandates are drawn primarily from the FCAA, which was signed into law in 1970. Congress substantially amended the FCAA in 1977 and again in 1990.

Federal Clean Air Act

The FCAA required the U.S. EPA to establish National Ambient Air Quality Standards (NAAQS), and also set deadlines for their attainment. Two types of NAAQS have been established: primary standards, which protect public health, and secondary standards, which protect public welfare from non-health-related adverse effects, such as visibility restrictions. NAAQS are summarized in Table 1.

The FCAA also required each state to prepare an air quality control plan referred to as a State Implementation Plan (SIP). The FCAA Amendments of 1990 added requirements for states with nonattainment areas to revise their SIPs to incorporate additional control measures to reduce air pollution. The SIP is periodically modified to reflect the latest emissions inventories, planning documents, and rules and regulations of the air basins as reported by their jurisdictional agencies. The U.S. EPA has responsibility to review all state SIPs to determine conformance with the mandates of the FCAA, and the amendments thereof, and determine if implementation will achieve air quality goals. If the U.S. EPA determines a SIP to be inadequate, a Federal Implementation Plan (FIP) may be prepared for the nonattainment area that imposes additional control measures.

Toxic Substances Control Act

The Toxic Substances Control Act (TSCA) first authorized the U.S. EPA to regulate asbestos in schools and Public and Commercial buildings under Title II of the law, which is also known as the Asbestos Hazard Emergency Response Act (AHERA). AHERA requires Local Education Agencies (LEAs) to inspect their schools for ACBM and prepare management plans to reduce the asbestos hazard. The Act also established a program for the training and accreditation of individuals performing certain types of asbestos work.

National Emission Standards for Hazardous Air Pollutants

Pursuant to the FCAA of 1970, the U.S. EPA established the National Emission Standards for Hazardous Air Pollutants. These are technology-based source-specific regulations that limit allowable emissions of HAPs.

STATE

California Air Resources Board

The ARB 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 of 1988. Other ARB duties include monitoring air quality (in conjunction with air monitoring networks maintained by air pollution control districts and air quality management districts, establishing California Ambient Air Quality Standards (CAAQS), which in many cases are more stringent than the NAAQS, and setting emissions standards for new motor vehicles. The CAAQS are summarized in Table 1. The emission standards established for motor vehicles differ depending on various factors including the model year, and the type of vehicle, fuel and engine used.

Table 1
Summary of Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards	National Standards (Primary)
Ozone (O_3)	1-hour	0.09 ppm	–
	8-hour	0.070 ppm	0.070 ppm
Particulate Matter (PM_{10})	AAM	20 µg/m^3	–
	24-hour	50 µg/m^3	150 µg/m^3
Fine Particulate Matter ($PM_{2.5}$)	AAM	12 µg/m^3	12 µg/m^3
	24-hour	No Standard	35 µg/m^3
Carbon Monoxide (CO)	1-hour	20 ppm	35 ppm
	8-hour	9 ppm	9 ppm
	8-hour (Lake Tahoe)	6 ppm	–
Nitrogen Dioxide (NO_2)	AAM	0.030 ppm	53 ppb
	1-hour	0.18 ppm	100 ppb
Sulfur Dioxide (SO_2)	AAM	–	0.03 ppm
	24-hour	0.04 ppm	0.14 ppm
	3-hour	–	–
	1-hour	0.25 ppm	75 ppb
Lead	30-day Average	1.5 µg/m^3	–
	Calendar Quarter	–	1.5 µg/m^3
	Rolling 3-Month Average	–	0.15 µg/m^3
Sulfates	24-hour	25 µg/m^3	No Federal Standards
Hydrogen Sulfide	1-hour	0.03 ppm (42 µg/m^3)	
Vinyl Chloride	24-hour	0.01 ppm (26 µg/m^3)	
Visibility-Reducing Particle Matter	8-hour	Extinction coefficient: 0.23/kilometer-visibility of 10 miles or more (0.07-30 miles or more for Lake Tahoe) due to particles when the relative humidity is less than 70%.	

** For more information on standards visit : https://ww3.arb.ca.gov/research/aaqs/aaqs2.pdf*
Source: ARB 2019a

California Clean Air Act

The CCAA requires that all air districts in the state endeavor to achieve and maintain CAAQS for Ozone, CO, SO_2, and NO_2 by the earliest practical date. The CCAA specifies that districts focus particular attention on reducing the emissions from transportation and area-wide emission sources, and the act provides districts with authority to regulate indirect sources. Each district plan is required to either (1) achieve a five percent annual reduction, averaged over consecutive 3-year periods, in district-wide emissions of each non-attainment pollutant or its precursors, or (2) to provide for implementation of all feasible measures to reduce emissions. Any planning effort for air quality attainment would thus need to consider both state and federal planning requirements.

California Assembly Bill 170

Assembly Bill 170, Reyes (AB 170), was adopted by state lawmakers in 2003 creating Government Code Section 65302.1 which requires cities and counties in the San Joaquin Valley to amend their general plans to include data and analysis, comprehensive goals, policies and feasible implementation strategies designed to improve air quality.

Assembly Bills 1807 & 2588 - Toxic Air Contaminants

Within California, TACs are regulated primarily through AB 1807 (Tanner Air Toxics Act) and AB 2588 (Air Toxics Hot Spots Information and Assessment Act of 1987). The Tanner Air Toxics Act sets forth a formal procedure for ARB to designate substances as TACs. This includes research, public participation, and scientific peer review before ARB designates a substance as a TAC. Existing sources of TACs that are subject to the Air Toxics Hot Spots Information and Assessment Act are required to: (1) prepare a toxic emissions inventory; (2) prepare a risk assessment if emissions are significant; (3) notify the public of significant risk levels; and (4) prepare and implement risk reduction measures.

California Air Resources Board's Truck and Bus Regulation

This regulation requires fleets that operate in California to reduce diesel truck and bus emissions by retrofitting or replacing existing engines. Amendments were adopted in December 2010 to provide more time for fleets to comply. The amended regulation required installation of PM retrofits beginning January 1, 2012 and replacement of older trucks starting January 1, 2015. By January 1, 2023, nearly all vehicles would need to have 2010 model year engines or equivalent.

The regulation applies to nearly all privately and federally owned diesel fueled trucks and buses and privately and publicly owned school buses with a gross vehicle weight rating greater than 14,000 pounds. The regulation has provisions to provide extra credit for PM filters installed prior to July 2011, has delayed requirements for fleets with 3 or fewer vehicles, provisions for agricultural vehicles and other situations.

Airborne Toxic Control Measure to Limit School Bus Idling at Schools

ARB has approved an airborne toxic control measure (ATCM) that limits school bus idling and idling at or near schools to only when necessary for safety or operational concerns. The ATCM requires a driver of a school bus or vehicle, transit bus, or other commercial motor vehicle to manually turn off the bus or vehicle engine upon arriving at a school and to restart no more than 30 seconds before departing. A driver of a school bus or vehicle is subject to the same requirement when operating within 100 feet of a school and is prohibited from idling more than five minutes at each stop beyond schools, such as parking or maintenance facilities, school bus stops, or school activity destinations. A driver of a transit bus or other commercial motor vehicle is prohibited from idling more than five minutes at each stop within 100 feet of a school. Idling necessary for health, safety, or operational concerns is exempt from these restrictions. In addition, the ATCM requires a motor carrier of an affected bus or vehicle to ensure that drivers are informed of the idling requirements, track complaints and enforcement actions, and keep records of these driver education and tracking activities. This ATCM became effective in July 2003.

SAN JOAQUIN VALLEY AIR POLLUTION CONTROL DISTRICT

The SJVAPCD is the agency primarily responsible for ensuring that NAAQS and CAAQS are not exceeded and that air quality conditions are maintained in the SJVAB, within which the proposed project is located. Responsibilities of the SJVAPCD include, but are not limited to, preparing plans for the attainment of ambient air quality standards, adopting and enforcing rules and regulations concerning sources of air pollution, issuing permits for stationary sources of air pollution, inspecting stationary sources of air pollution and responding to citizen complaints, monitoring ambient air quality and meteorological conditions, and implementing programs and regulations required by the FCAA and the CCAA. The SJVAPCD Rules and Regulations that are applicable to the proposed project include, but are not limited to, the following:

- *Regulation VIII (Fugitive Dust Prohibitions). Regulation VIII (Rules 8011-8081).* This regulation is a series of rules designed to reduce particulate emissions generated by human activity, including construction and demolition activities, carryout and trackout, paved and unpaved roads, bulk material handling and storage, unpaved vehicle/traffic areas, open space areas, etc.

- *Rule 4002 (National Emissions Standards for Hazardous Air Pollutants)*. This rule may apply to projects in which portions of an existing building would be renovated, partially demolished or removed. With regard to asbestos, the NESHAP specifies work practices to be followed during renovation, demolition or other abatement activities when friable asbestos is involved. Prior to demolition activity, an asbestos survey of the existing structure may be required to identify the presence of any asbestos containing building materials (ACBM). Removal of identified ACBM must be removed by a certified asbestos contractor in accordance with CAL-OSHA requirements.
- *Rule 4102 (Nuisance)*. Applies to any source operation that emits or may emit air contaminants or other materials.
- *Rule 4103 (Open Burning)*. This rule regulates the use of open burning and specifies the types of materials that may be open burned. Section 5.1 of this rule prohibits the burning of trees and other vegetative (non-agricultural) material whenever the land is being developed for non-agricultural purposes.
- *Rule 4601 (Architectural Coatings)*. Limits volatile organic compounds from architectural coatings.
- *Rule 4641 (Cutback, Slow Cure, and Emulsified Asphalt, Paving and Maintenance Operations)*. This rule applies to the manufacture and use of cutback, slow cure, and emulsified asphalt during paving and maintenance operations.
- *Rule 9510 (Indirect Source Review - ISR)*. Requires developers of larger residential, commercial, recreational, and industrial projects to reduce smog-forming and particulate emissions from their projects' baselines. If project emissions still exceed the minimum baseline reductions, a project's developer will be required to mitigate the difference by paying an off-site fee to the District, which would then be used to fund clean-air projects. For projects subject to this rule, the ISR rule requires developers to mitigate and/or offset emissions sufficient to achieve: (1) 20-percent reduction of construction equipment exhaust NOx; (2) 45-percent reduction of construction equipment exhaust PM_{10}; (3) 33-percent reduction of operational NOx over 10 years; and (4) 50-percent reduction of operational PM_{10} over 10 years. SJVAPCD ISR applications must be filed "no later than applying for a final discretionary approval with a public agency."

REGULATORY ATTAINMENT DESIGNATIONS

Under the CCAA, ARB is required to designate areas of the state as attainment, nonattainment, or unclassified with respect to applicable standards. An "attainment" designation for an area signifies that pollutant concentrations did not violate the applicable standard in that area. A "nonattainment" designation indicates that a pollutant concentration violated the applicable standard at least once, excluding those occasions when a violation was caused by an exceptional event, as defined in the criteria. Depending on the frequency and severity of pollutants exceeding applicable standards, the nonattainment designation can be further classified as serious nonattainment, severe nonattainment, or extreme nonattainment, with extreme nonattainment being the most severe of the classifications. An "unclassified" designation signifies that the data does not support either an attainment or nonattainment designation. The CCAA divides districts into moderate, serious, and severe air pollution categories, with increasingly stringent control requirements mandated for each category.

The U.S. EPA designates areas for ozone, CO, and NO_2 as "does not meet the primary standards," "cannot be classified," or "better than national standards." For SO_2, areas are designated as "does not meet the primary standards," "does not meet the secondary standards," "cannot be classified," or "better than national standards." However, ARB terminology of attainment, nonattainment, and unclassified is more frequently used. The U.S. EPA uses the same sub-categories for nonattainment status: serious, severe, and extreme. In 1991, U.S. EPA assigned new nonattainment designations to areas that had previously been classified as Group I, II, or III for PM_{10} based on the likelihood that they would violate national PM_{10} standards. All other areas are designated "unclassified."

The state and national attainment status designations pertaining to the SJVAB are summarized in Table 2. The SJVAB is currently designated as a nonattainment area with respect to the state PM_{10} standard, ozone, and $PM_{2.5}$ standards. The SJVAB is designated nonattainment for the national 8-hour ozone and $PM_{2.5}$ standards. On September 25, 2008, the U.S. EPA redesignated the San Joaquin Valley to attainment for the PM_{10} NAAQS and approved the PM_{10} Maintenance Plan (SJVAPCD 2019).

Table 2
SJVAB Attainment Status Designations

Pollutant	National Designation	State Designation
Ozone, 1 hour	No Standard	Nonattainment/Severe
Ozone, 8 hour	Nonattainment/Extreme	Nonattainment
PM_{10}	Attainment	Nonattainment
$PM_{2.5}$	Nonattainment	Nonattainment
Carbon Monoxide	Attainment/Unclassified	Attainment/Unclassified
Nitrogen dioxide	Attainment/Unclassified	Attainment
Sulfur dioxide	Attainment/Unclassified	Attainment
Lead (particulate)	No Designation/Classification	Attainment
Hydrogen sulfide	No Federal Standard	Unclassified
Sulfates	No Federal Standard	Attainment
Visibility-reducing particulates	No Federal Standard	Unclassified
Vinyl Chloride	No Federal Standard	Attainment

For more information visit website URL: https://www.valleyair.org/aqinfo/attainment.htm.
Source: SJVAPCD 2019

AMBIENT AIR QUALITY

Air pollutant concentrations are measured at several monitoring stations throughout the SJVAB. The Merced – S Coffee Avenue and Merced – 2334 M Street Monitoring Stations are the closest representative monitoring sites to the proposed project site with sufficient data to meet U.S. EPA and/or ARB criteria for quality assurance. This monitoring station monitors ambient concentrations of ozone, nitrogen dioxide, and PM_{10}. Ambient $PM_{2.5}$ monitoring data was obtained from the Merced – S Coffee Avenue and Merced – 2334 M Street Monitoring Stations. Ambient monitoring data was obtained for the last three years of available measurement data (i.e., 2016 through 2018) and are summarized in Table 3. As depicted, the state and national ozone, national $PM_{2.5}$, and state PM_{10} standards were exceeded on numerous occasions during the past 3 years.

SENSITIVE RECEPTORS

One of the most important reasons for air quality standards is the protection of those members of the population who are most sensitive to the adverse health effects of air pollution, termed "sensitive receptors." The term sensitive receptors refer to specific population groups, as well as the land uses where individuals would reside for long periods. Commonly identified sensitive population groups are children, the elderly, the acutely ill, and the chronically ill. Commonly identified sensitive land uses would include facilities that house or attract children, the elderly, people with illnesses, or others who are especially sensitive to the effects of air pollutants. Residential dwellings, schools, parks, playgrounds, childcare centers, convalescent homes, and hospitals are examples of sensitive land uses.

Table 3
Summary of Ambient Air Quality Monitoring Data[1]

	2016	2017	2018
Ozone			
Maximum concentration (1-hour/8-hour average)	0.097/0.087	0.093/0.085	0.104/0.084
Number of days state/national 1-hour standard exceeded	2/0	0/0	4/0
Number of days state/national 8-hour standard exceeded	29/28	17/16	23/21
Nitrogen Dioxide (NO_2)			
Maximum concentration (1-hour average)	35.4	38.9	45.8
Annual average	6	7	7
Number of days state/federal standard exceeded	0/0	0/0	0/0
Suspended Particulate Matter (PM_{10})			
Maximum concentration (state/national)	64.5/64.3	144.0/146.6	142.7/137.0
Number of days state standard exceeded (measured/calculated[2])	6/38.9	12/76.6	10/59.6
Number of days national standard exceeded (measured/calculated[2])	0/0	0/0	0/0
Suspended Particulate Matter ($PM_{2.5}$)			
Maximum concentration (state/national)	43.0	69.3	88.2
Annual Average (state/national)	11.9	13.2	15.1
Number of days national standard exceeded	5	18	21

ppm = parts per million by volume, μg/m³ = micrograms per cubic meter, NA=Not Available

1 *Ambient ozone, NO_2, and $PM_{2.5}$ data was obtained from the Merced - S Coffee Avenue Monitoring Station. Ambient PM_{10} data was obtained from the Merced – 2334 M Street Monitoring Station.*

2 *Measured days are those days that an actual measurement was greater than the standard. Calculated days are the estimated number of days that a measurement would have been greater than the level of the standard had measurements been collected every day.*

Source: ARB 2019b

Sensitive land uses located in the vicinity of the proposed project site consist predominantly of residential land uses. The nearest residential land uses are generally located to the north of the project site along Campus Drive. In addition, a preschool is located west of the project site along Collins Drive.

IMPACTS & MITIGATION MEASURES

METHODOLOGY

Short-term Impacts

Short-term construction emissions associated with the proposed project were calculated using the CalEEMod computer program. Emissions were quantified for site preparation, grading, building construction, and paving. Demolition and architectural coating were assumed to not occur with project implementation. Detailed construction information, including construction schedules and equipment requirements, have not been identified for the proposed project. As a result, default construction phases and equipment assumptions contained in the CalEEMod model were, therefore, relied upon for the calculation of construction-generated emissions. Modeling assumptions and output files are included in Appendix A of this report.

Long-term Impacts

Long-term operational GHG emissions associated with the proposed project were calculated using the CalEEMod computer program. Emissions were quantified for area sources, energy use, water use, waste generation, and mobile sources. Mobile-source emissions were based on a maximum daily trip rate of 2,294 and a trip length of 1.19 miles (JLB 2019). All other modeling assumptions were based on the default parameters contained in the CalEEMod computer model. Annual emissions were quantified based on a maximum of 20 operational days per year (OPR 2019b). Due to anticipated reductions in future fleet-average mobile-source and energy emission rates, emissions for post-year 2021 operational conditions would be less. It is also important to note that, in comparison to existing conditions, implementation of the proposed project is anticipated to result in an overall net reduction in VMT (JLB 2019). However, to ensure a conservative analysis, vehicle trips associated with the proposed stadium were modeled as new trips, taking into account estimated reductions in vehicle trip lengths identified in the traffic analysis prepared for this project. As a result, actual operational emissions would be lower. Modeling assumptions and output files are included in Appendix A of this report.

Localized pollutant concentrations of mobile-source CO were quantified using the Caline4 computer program for signalized intersections projected to operate at unacceptable levels of service (LOS) E, or worse. Predicted 1-hour and 8-hour CO concentrations were modeled at distances of 3 and 7 meters from the roadway edge, respectively. Predicted 1-hour CO concentrations were converted to 8-hour concentrations based on a persistence factor of 0.8. Ambient background CO concentrations were based on the highest measured CO concentrations obtained from the nearest monitoring stations for the last three years of available data. Exposure to localized pollutant concentrations of fugitive dust and odors were qualitatively assessed.

THRESHOLDS OF SIGNIFICANCE

In accordance with Appendix G of the CEQA Guidelines Initial Study Checklist, a project would be considered to have a significant impact to climate change if it would:

a) Conflict with or obstruct implementation of the applicable air quality plan.

b) 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) Expose sensitive receptors to substantial pollutant concentrations.

d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

To assist local jurisdictions in the evaluation of air quality impacts, the SJVAPCD has published the Guide for Assessing and Mitigating Air Quality Impacts (SJVAPCD 2015). This guidance document includes recommended thresholds of significance to be used for the evaluation of short-term construction, long-term operational, odor, toxic air contaminant, and cumulative air quality impacts. Accordingly, the SJVAPCD-recommended thresholds of significance are used to determine whether implementation of the proposed project would result in a significant regional or local air quality impact and related public-health concerns. The thresholds of significance are summarized below.

- Short-term Emissions—Construction impacts associated with the proposed project would be considered significant if project-generated emissions would exceed 100 tons per year (TPY) of CO, 10 TPY of ROG or NO_X, 27 TPY of SO_X, or 15 TPY of PM_{10} or $PM_{2.5}$.
- Long-term Emissions—Operational impacts associated with the proposed project would be considered significant if project generated emissions would exceed 100 TPY of CO, 10 TPY of ROG or NO_X, 27 TPY of SO_X, or 15 TPY of PM_{10} or $PM_{2.5}$.
- Conflict with or Obstruct Implementation of Applicable Air Quality Plan—Due to the region's non-attainment status for ozone, $PM_{2.5}$, and PM_{10}, if project-generated emissions of ozone precursor pollutants (i.e., ROG and NO_x) or PM would exceed the SJVAPCD's significance thresholds, then the project would be considered to conflict with the attainment plans.
- Local Mobile-Source CO Concentrations—Local mobile source impacts associated with the proposed project would be considered significant if the project contributes to CO concentrations at receptor locations in excess of the CAAQS (i.e., 9.0 ppm for 8 hours or 20 ppm for 1 hour).

- Exposure to toxic air contaminants (TAC) would be considered significant if the probability of contracting cancer for the Maximally Exposed Individual (i.e., maximum individual risk) would exceed 20 in 1 million or would result in a Hazard Index greater than 1.
- Odor impacts associated with the proposed project would be considered significant if the project has the potential to frequently expose members of the public to objectionable odors.

In addition to the above thresholds, the SJVAPCD also recommends the use of daily emissions thresholds for the evaluation of project impacts on localized ambient air quality conditions. Accordingly, the proposed project would also be considered to result in a significant contribution to localized ambient air quality if emissions of ROG, NO_X, PM_{10}, $PM_{2.5}$, CO, or SO_2 associated with either short-term construction or long-term operational activities would exceed a daily average of 100 pounds per day (lbs/day) for each of the pollutants evaluated (SJVAPCD 2015).

PROJECT IMPACTS

Impact AQ-A.	***Would the project conflict with or obstruct implementation of the applicable air quality plan?***

In accordance with SJVAPCD-recommended methodology for the assessment of air quality impacts, projects that result in significant air quality impacts at the project level are also considered to have a significant cumulative air quality impact. As noted in Impact AQ-B, short-term construction and long-term operational emissions would not exceed applicable thresholds. In addition, the proposed project's contribution to localized concentrations of emissions, including emissions of CO, TACs, PM, and odors, are considered less than significant. For this reason, implementation of the proposed project would not conflict with air quality attainment or maintenance planning efforts. This impact would be considered ***less than significant***.

Impact AQ-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?***

The proposed project is located in the City of Merced, which is within the SJVAB. The SJVAB is designated nonattainment for the national 8-hour ozone and $PM_{2.5}$ standards. On September 25, 2008, the U.S. EPA redesignated the San Joaquin Valley to attainment for the PM_{10} NAAQS and approved the PM_{10} Maintenance Plan (SJVAPCD 2019). Potential air quality impacts associated with the proposed project could potentially occur during project construction or operational phases. Short-term construction and long-term air quality impacts associated with the proposed project are discussed, as follows:

<u>Short-term Construction Emissions</u>

Short-term increases in emissions would occur during the construction phase. Construction-generated emissions are temporary, lasting only as long as construction activities occur, but have the potential to represent a significant air quality impact. The construction of the proposed project would result in the temporary generation of emissions associated with site preparation, grading, building construction, and paving. Short-term construction emissions would result in increased emissions of ozone-precursor pollutants (i.e., ROG and NO_X), CO, and emissions of PM. Emissions of ozone-precursors would result from the operation of on-road and off-road motorized vehicles and equipment. Emissions of airborne PM are largely dependent on the amount of ground disturbance associated with site grading activities and can result in increased concentrations of PM that can adversely affect nearby sensitive land uses. Estimated construction-generated annual emissions associated with the proposed project are summarized in Table 4.

As noted in Table 4, construction of the proposed project would generate maximum annual emissions of approximately 0.28 tons/year of ROG, 2.51 tons/year of NO_x, 2.20 tons/year of CO, 0.20 tons/year of PM_{10}, and 0.14 tons/year of $PM_{2.5}$. Estimated annual construction-generated emissions would not exceed the

SJVAPCD's significance thresholds of 10 tons/year of ROG, 10 tons/year of NO_x, 100 tons/year of CO, 27 tons/year of SOx, 15 tons/year PM_{10}, or 15 tons/year $PM_{2.5}$.

Table 4
Annual Construction Emissions

Construction Phase	Uncontrolled Maximum Annual Emissions (tons/year) [1]					
	ROG	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
Construction Year 1						
Site Preparation	0.01	0.11	0.06	0.00	0.05	0.03
Grading	0.01	0.11	0.07	0.00	0.03	0.02
Building Construction	0.28	2.51	2.20	0.00	0.20	0.14
Total:	0.30	2.72	2.32	0.00	0.28	0.19
Construction Year 2						
Building Construction	0.00	0.02	0.02	0.00	0.00	0.00
Paving	0.01	0.10	0.12	0.00	0.01	0.01
Total:	0.01	0.12	0.13	0.00	0.01	0.01
Maximum Annual Emissions[2]:	0.28	2.51	2.20	0.00	0.20	0.14
Significance Thresholds:	*10*	*10*	*100*	*27*	*15*	*15*
Exceeds Thresholds/Significant Impact?	*No*	*No*	*No*	*No*	*No*	*No*

1. Based on CalEEMod computer modeling. Totals may not sum due to rounding. Does not include emission control measures. Construction would begin in 2020. Future year emissions would be less.

2. Maximum annual emissions assume building construction and paving could potentially occur simultaneously.

Refer to Appendix A for modeling results and assumptions.

Estimated daily construction emissions are summarized in Table 5. As noted in Table 5, construction of the proposed project would generate maximum daily emissions of approximately 3.41 lbs/day of ROG, 30.94 lbs/day of NO_x, 31.67 lbs/day of CO, 0.06 lbs/day of SO_2, 2.32 lbs/day of PM_{10}, and 1.66 lbs/day of $PM_{2.5}$. Daily construction emissions would not exceed the SJVAPCD's recommended localized ambient air quality significance thresholds of 100 lbs/day for each of the criteria air pollutants evaluated.

Short-term construction of the proposed project would not result in a significant impact to regional or local air quality conditions. Furthermore, it is important to note that project construction, including grading activities, would be required to comply with SJVPACD Regulation VIII (Fugitive PM_{10} Prohibitions). Mandatory compliance with SJVAPCD Regulation VIII would further reduce emissions of fugitive dust from the project site and minimize the project's potential to adversely affect nearby sensitive receptors. With compliance with SJVAPCD Regulation VIII, emissions of PM would be further reduced. For these reasons, construction-generated emissions would not be anticipated to result in a substantial increase in localized or regional pollutant concentrations that would have a significant adverse impact to public health. Given that project-generated emissions would not exceed applicable SJVAPCD significance thresholds, this impact would be considered ***less than significant***.

Table 5
Daily Construction Emissions

Construction Phase	Uncontrolled Maximum Daily Emissions (lbs/day) [1]					
	ROG	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
Construction Year 1						
Site Preparation	4.16	42.48	22.11	0.04	20.41	11.99
Grading	2.50	26.44	16.55	0.03	7.95	4.57
Building Construction	2.49	22.06	19.34	0.04	1.74	1.23
Total:	9.15	90.98	57.99	0.11	30.11	17.80
Construction Year 2						
Building Construction	2.23	20.04	18.81	0.04	1.58	1.08
Paving	1.18	10.90	12.86	0.02	0.74	0.58
Total:	3.41	30.94	31.67	0.06	2.32	1.66
Maximum Daily Emissions[2]:	3.41	30.94	31.67	0.06	2.32	1.66
Significance Thresholds:	*100*	*100*	*100*	*100*	*100*	*100*
Exceeds Thresholds/Significant Impact?	*No*	*No*	*No*	*No*	*No*	*No*

1. Based on CalEEMod computer modeling. Totals may not sum due to rounding. Does not include emission control measures. Construction would begin in 2020. Future year emissions would be less.

2. Maximum daily emissions assume building construction and paving could potentially occur simultaneously.

Refer to Appendix A for modeling results and assumptions.

Long-term Operational Emissions

Estimated annual operational emissions for the proposed project are summarized in Table 6. As depicted, the proposed project would result in annual emissions of approximately 0.60 tons/year of ROG, 0.42 tons/year of NO_X, 0.23 tons/year of CO, 0.02 tons/year of PM_{10}, and 0.01 tons/year of $PM_{2.5}$ during the initial year of operation. Operational emissions would be projected to decline in future years, with improvements in fuel-consumption emissions standards. Annual operational emissions would not exceed SJVAPCD's mass-emissions significance thresholds.

Estimated daily operational emissions are summarized in Table 7. As depicted, the proposed project would result in daily operational emissions of approximately 3.37 lbs/day of ROG, 2.95 lbs/day of NO_X, 1.47 lbs/day of CO, 0.01 lbs/day of SO_2, 0.14 lbs/day of PM_{10}, and 0.08 lbs/day of $PM_{2.5}$. Operational emissions would be largely associated with area sources (e.g., landscape maintenance activities). Daily operational emissions would not exceed the SJVAPCD's recommended localized ambient air quality significance thresholds of 100 lbs/day for each of the criteria air pollutants evaluated.

It is important to note that estimated operational emissions are based on the default vehicle fleet distribution assumptions contained in the model, which include contributions from medium and heavy-duty trucks. As a result, actual mobile source emissions would likely be less than estimated. Long-term operation of the proposed project would not result in a significant impact to regional or local air quality conditions. For these reasons, operational emissions would not be anticipated to result in a significant adverse impact to public health. This impact is considered ***less than significant***.

Table 6
Annual Operational Emissions

Operational Category	Uncontrolled Annual Emissions (tons/year)[1]					
	ROG	NO_x	CO	SO_2	PM_{10}	$PM_{2.5}$
Area Source	0.56	0.00	0.00	0.00	0.00	0.00
Energy Use	0.01	0.12	0.10	0.00	0.01	0.01
Mobile Source[2]	0.02	0.29	0.13	0.00	0.01	0.00
Total:	0.60	0.42	0.23	0.00	0.02	0.01
Significance Thresholds:	*10*	*10*	*100*	*27*	*15*	*15*
Exceeds Thresholds/Significant Impact?	*No*	*No*	*No*	*No*	*No*	*No*

1. Emissions were calculated using the CalEEMod computer program. Does not include implementation of emissions control measures.
2. Fleet distribution data for the project is not available. Mobile-source emissions are based on default vehicle fleet distribution for Merced County, which includes all vehicle types/classifications, including medium and heavy-duty vehicles. Does not include reductions in VMT anticipated to occur with project implementation. Actual emissions would be lower.
Refer to Appendix A for modeling assumptions and results.

Table 7
Daily Operational Emissions

Operational Category	Uncontrolled Daily Emissions (lbs/day)[1]					
	ROG	NO_x	CO	SO_2	PM_{10}	$PM_{2.5}$
Area Source	3.06	0.00	0.00	0.00	0.00	0.00
Energy Use	0.07	0.68	0.57	0.00	0.05	0.05
Mobile Source[2]	0.24	2.27	0.90	0.00	0.09	0.03
Total:	3.37	2.95	1.47	0.01	0.14	0.08
Significance Thresholds:	*100*	*100*	*100*	*100*	*100*	*100*
Exceeds Thresholds/Significant Impact?	*No*	*No*	*No*	*No*	*No*	*No*

1. Emissions were calculated using the CalEEMod computer program. Does not include implementation of emissions control measures.
2. Fleet distribution data for the project is not available. Mobile-source emissions are based on default vehicle fleet distribution for Merced County, which includes all vehicle types/classifications, including medium and heavy-duty vehicles. Does not include reductions in VMT anticipated to occur with project implementation. Actual emissions would be lower.
Refer to Appendix A for modeling assumptions and results.

Impact AQ-C. Would the project expose sensitive receptors to substantial pollutant concentrations?

Sensitive land uses located in the vicinity of the proposed project site consist predominantly of residential land uses. The nearest residential land uses are generally located to the north of the project site along Campus Drive. In addition, a preschool is located west of the project site along Collins Drive. Long-term operational and short-term construction activities and emission sources that could adversely impact these nearest sensitive receptors are discussed, as follows:

Long-term Operation

Localized Mobile-Source CO Emissions

Carbon monoxide is the primary criteria air pollutant of local concern associated with the proposed project. Under specific meteorological and operational conditions, such as near areas of heavily congested vehicle traffic, CO concentrations may reach unhealthy levels. If inhaled, CO can be adsorbed easily by the bloodstream and can inhibit oxygen delivery to the body, which can cause significant health effects ranging from slight headaches to death. The most serious effects are felt by individuals susceptible to oxygen deficiencies, including people with anemia and those suffering from chronic lung or heart disease.

Mobile-source emissions of CO are a direct function of traffic volume, speed, and delay. Transport of CO is extremely limited because it disperses rapidly with distance from the source under normal meteorological conditions. For this reason, modeling of mobile-source CO concentrations is typically recommended for sensitive land uses located near signalized roadway intersections that are projected to operate at unacceptable levels of service (i.e., LOS E or F). Localized CO concentrations associated with the proposed project would be considered less-than-significant impact if: (1) traffic generated by the proposed project would not result in deterioration of a signalized intersection to a LOS of E or F; or (2) the project would not contribute additional traffic to a signalized intersection that already operates at LOS of E or F.

Based on the traffic analysis prepared for this project, the project would result in or contribute to unacceptable levels of service (i.e., LOS E or F) at one primarily affected signalized intersection (JBL 2019). The affected signalized intersection includes "G" Street/Olive Avenue. Localized 1-hour and 8-hour CO concentrations at this intersection were modeled using the Caline4 computer program in accordance with Caltrans-recommended methodologies (Caltrans 1996). Predicted CO concentrations at the primarily affected signalized intersection are summarized in Table 8. As depicted in Table 8, the highest predicted 1-hour and 8-hour CO concentrations at this intersection would be 3.4 and 2.5 parts per million (ppm), respectively. Predicted CO concentrations at these intersections would not exceed the 1-hour and 8-hour CAAQS of 20 and 9 ppm, respectively. As a result, the project's contribution to localized CO concentrations and potential health-related impacts on nearby receptors would be considered **less than significant**.

Table 8
Localized Mobile-Source CO Concentrations

Signalized Roadway Intersection	Predicted CO Concentration (ppm)	
	1-Hour	8-Hour
"G" Street / Olive Avenue	3.4	2.5
California Ambient Air Quality Standards (CAAQS):	20	9
Exceeds CAAQS/Significant Impact	No	No

Localized mobile-source CO concentrations were calculated using the Caline4 computer program based on PM peak-hour traffic volumes derived from the traffic analysis prepared for this project. Predicted 1-hour CO concentrations were converted to 8-hour concentrations assuming a persistence factor of 0.8. Modeled 1-hour and 8-hour receiver locations were placed at 3 and 7 meters from the roadway edge, respectively. Ambient background 8-hour CO concentration (2.1) was based on the highest measured CO concentrations obtained from the nearest monitoring stations for the last three years of available data (2016-2018). Refer to Appendix B for emissions modeling assumptions and results.

Toxic Air Contaminants

Implementation of the proposed project would not result in the long-term operation of any major onsite stationary sources of TACs, nor would project implementation result in a significant increase in diesel-fueled vehicles traveling along area roadways. No major stationary sources of TACs were identified in the project vicinity that would result in increased exposure of residences, students, or staff to TACs. For these reasons, long-term increases in exposure to TACs would be considered ***less than significant***.

Short-term Construction

Naturally Occurring Asbestos

Naturally-occurring asbestos, which was identified by ARB as a TAC in 1986, is located in many parts of California and is commonly associated with ultramafic rock. The project site is not located near any areas that are likely to contain ultramafic rock (DOC 2000). As a result, risk of exposure to asbestos during the construction process would be considered ***less than significant***.

Asbestos-Containing Materials

Demolition activities can have potential negative air quality impacts, including issues surrounding proper handling, demolition, and disposal of asbestos containing material (ACM). Asbestos containing materials could be encountered during the demolition of existing buildings, particularly older structures constructed prior to 1970. Asbestos can also be found in various building products, including (but not limited to) utility pipes/pipelines (transit pipes or insulation on pipes). If a project will involve the disturbance or potential disturbance of ACM, various regulatory requirements may apply, including the requirements stipulated in the National Emission Standard for Hazardous Air Pollutants (40CFR61, Subpart M-Asbestos NESHAP). These requirements include but are not limited to: 1) notification, within at least 10 business days of activities commencing, to the APCD, 2) an asbestos survey conducted by a Certified Asbestos Consultant, and, 3) applicable removal and disposal requirements of identified ACM.

The proposed project would not include the demolition of existing onsite structures. This impact is considered ***less than significant***.

Lead-Coated Materials

Demolition of structures coated with lead based paint can have potential negative air quality impacts and may adversely affect the health of nearby individuals. Lead-based paints could be encountered during the demolition of existing buildings, particularly older structures constructed prior to 1978. Improper demolition can result in the release of lead containing particles from the site. Sandblasting or removal of paint by heating with a heat gun can result in significant emissions of lead. In such instances, proper abatement of lead before demolition of these structures must be performed in order to prevent the release of lead from the site. Federal and State lead regulations, including the Lead in Construction Standard (29CFR1926.62) and California Code of Regulations (CCR Title 8, Section 1532.1, Lead) regulate disturbance of lead containing materials during construction, demolition, and maintenance-related activities. Depending on removal method, a SJVAPCD permit may be required.

The proposed project would not include the demolition of existing onsite structures. This impact is considered ***less than significant***.

Diesel-Exhaust Emissions

Implementation of the proposed project would result in the generation of DPM emissions during construction associated with the use of off-road diesel equipment for site grading, paving and other construction activities. Health-related risks associated with diesel-exhaust emissions are primarily associated with long-term exposure and associated risk of contracting cancer. For work-sites and residential land uses, the calculation of cancer risk associated with exposure to TACs are typically calculated based on a 25-year and 30-year period of exposure, respectively. The use of diesel-powered construction equipment, however, would be temporary and episodic and would occur over a relatively large area. Assuming that construction activities involving the use of diesel-fueled equipment would occur over an approximately 12-month period, project-related construction activities would constitute less than five percent of the typical exposure period. As a result, exposure to construction-generated DPM would not be anticipated to exceed applicable thresholds (i.e., incremental increase in cancer risk of 20 in one million). For these reasons, this impact would be considered ***less than significant***.

Localized PM Concentrations

Fugitive dust emissions would be primarily associated with site preparation, grading, and vehicle travel on unpaved and paved surfaces. On-site off-road equipment and trucks would also result in short-term emissions of diesel-exhaust PM, which could contribute to elevated localized concentration at nearby receptors. However, project construction activities would be required to comply with SJVAPCD Regulation VIII, which includes measures to be implemented during project construction for the control of fugitive dust. In addition, as noted in Table 5, daily construction emissions of PM would not exceed the SJVAPCD's recommended localized ambient air quality significance thresholds of 100 lbs/day. For these reasons, localized uncontrolled concentrations of construction-generated PM would be considered to have a ***less than significant*** impact.

Impact AQ-D.	***Would the project result in other emissions (such as those leading to odors) affecting a substantial number of people?***

Other emissions potentially associated with the proposed project would be predominantly associated to the generation of odors during project construction. The occurrence and severity of odor impacts depend on numerous factors, including: the nature, frequency, and intensity of the source; wind speed and direction; and the sensitivity of the receptors. While offensive odors rarely cause any physical harm, they still can be very unpleasant, leading to considerable distress among the public and often generating citizen complaints to local governments and regulatory agencies.

Construction of the proposed project would involve the use of a variety of gasoline or diesel-powered equipment that would emit exhaust fumes. Exhaust fumes, particularly diesel-exhaust, may be considered objectionable by some people. In addition, pavement coatings used during project construction would also emit temporary odors. However, construction-generated emissions would occur intermittently throughout the workday and would dissipate rapidly within increasing distance from the source. As a result, short-term construction activities would not expose a substantial number of people to frequent odorous emissions. In addition, no major sources of odors have been identified in the project area. This impact would be considered ***less than significant***.

GREENHOUSE GASES AND CLIMATE CHANGE

EXISTING SETTING

To fully understand global climate change, it is important to recognize the naturally occurring "greenhouse effect" and to define the greenhouse gases (GHGs) that contribute to this phenomenon. Various gases in the earth's atmosphere, classified as atmospheric GHGs, play a critical role in determining the earth's surface temperature. Solar radiation enters the earth's atmosphere from space and a portion of the radiation is absorbed by the earth's surface. The earth emits this radiation back toward space, but the properties of the radiation change from high-frequency solar radiation to lower-frequency infrared radiation. Greenhouse gases, which are transparent to solar radiation, are effective in absorbing infrared radiation. As a result, this radiation that otherwise would have escaped back into space is now retained, resulting in a warming of the atmosphere. This phenomenon is known as the greenhouse effect. Among the prominent GHGs contributing to the greenhouse effect are carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Primary GHGs attributed to global climate change, are discussed, as follows:

- **Carbon Dioxide**. Carbon dioxide (CO_2) is a colorless, odorless gas. CO_2 is emitted in a number of ways, both naturally and through human activities. The largest source of CO_2 emissions globally is the combustion of fossil fuels such as coal, oil, and gas in power plants, automobiles, industrial facilities, and other sources. A number of specialized industrial production processes and product uses such as mineral production, metal production, and the use of petroleum-based products can also lead to CO_2 emissions. The atmospheric lifetime of CO_2 is variable because it is so readily exchanged in the atmosphere (U.S. EPA 2018).

- **Methane**. Methane (CH_4) is a colorless, odorless gas that is not flammable under most circumstances. CH_4 is the major component of natural gas, about 87 percent by volume. It is also formed and released to the atmosphere by biological processes occurring in anaerobic environments. Methane is emitted from a variety of both human-related and natural sources. Human-related sources include fossil fuel production, animal husbandry (enteric fermentation in livestock and manure management), rice cultivation, biomass burning, and waste management. These activities release significant quantities of methane to the atmosphere. Natural sources of methane include wetlands, gas hydrates, permafrost, termites, oceans, freshwater bodies, non-wetland soils, and other sources such as wildfires. Methane's atmospheric lifetime is about 12 years (U.S. EPA 2018).

- **Nitrous Oxide**. Nitrous oxide (N_2O) is a clear, colorless gas with a slightly sweet odor. N_2O is produced by both natural and human-related sources. Primary human-related sources of N_2O are agricultural soil management, animal manure management, sewage treatment, mobile and stationary combustion of fossil fuels, acid production, and nitric acid production. N_2O is also produced naturally from a wide variety of biological sources in soil and water, particularly microbial action in wet tropical forests. The atmospheric lifetime of N_2O is approximately 114 years (U.S. EPA 2018).

- **Hydrofluorocarbons.** Hydrofluorocarbons (HFCs) are man-made chemicals, many of which have been developed as alternatives to ozone-depleting substances for industrial, commercial, and consumer products. The only significant emissions of HFCs before 1990 were of the chemical HFC-23, which is generated as a byproduct of the production of HCFC-22 (or Freon 22, used in air conditioning applications). The atmospheric lifetime for HFCs varies from just over a year for HFC-152a to 270 years for HFC-23. Most of the commercially used HFCs have atmospheric lifetimes of less than 15 years (e.g., HFC-134a, which is used in automobile air conditioning and refrigeration, has an atmospheric life of 14 years) (U.S. EPA 2018).

- **Perfluorocarbons.** Perfluorocarbons (PFCs) are colorless, highly dense, chemically inert, and nontoxic. There are seven PFC gases: perfluoromethane (CF_4), perfluoroethane (C_2F_6), perfluoropropane (C_3F_8), perfluorobutane (C_4F_{10}), perfluorocyclobutane (C_4F_8), perfluoropentane (C_5F_{12}), and perfluorohexane (C_6F_{14}). Natural geological emissions have been responsible for the PFCs that have accumulated in the atmosphere in the past; however, the largest current source is aluminum production, which releases CF_4 and C_2F_6 as byproducts. The estimated atmospheric lifetimes for PFCs ranges from 2,600 to 50,000 years (U.S. EPA 2018).

- **Nitrogen Trifluoride**. Nitrogen trifluoride (NF_3) is an inorganic, colorless, odorless, toxic, nonflammable gas used as an etchant in microelectronics. Nitrogen trifluoride is predominantly employed in the cleaning of the plasma-enhanced chemical vapor deposition chambers in the production of liquid crystal displays and silicon-based thin film solar cells. It has a global warming potential of 16,100 carbon dioxide equivalents (CO_2e). While NF_3 may have a lower global warming potential than other chemical etchants, it is still a potent GHG. In 2009, NF_3 was listed by California as a high global warming potential GHG to be listed and regulated under Assembly Bill (AB) 32 (Section 38505 Health and Safety Code).

- **Sulfur Hexafluoride**. Sulfur hexafluoride (SF_6) is an inorganic compound that is colorless, odorless, nontoxic, and generally nonflammable. SF_6 is primarily used as an electrical insulator in high voltage equipment. The electric power industry uses roughly 80 percent of all SF_6 produced worldwide. Leaks of SF_6 occur from aging equipment and during equipment maintenance and servicing. SF_6 has an atmospheric life of 3,200 years (U.S. EPA 2018).

- **Black Carbon**. Black carbon is the strongest light-absorbing component of particulate matter (PM) emitted from burning fuels such as coal, diesel, and biomass. Black carbon contributes to climate change both directly by absorbing sunlight and indirectly by depositing on snow and by interacting with clouds and affecting cloud formation. Black carbon is considered a short-lived species, which can vary spatially and, consequently, it is very difficult to quantify associated global-warming potentials. The main sources of black carbon in California are wildfires, off-road vehicles (locomotives, marine vessels, tractors, excavators, dozers, etc.), on-road vehicles (cars, trucks, and buses), fireplaces, agricultural waste burning, and prescribed burning (planned burns of forest or wildlands) (CCAC 2018, U.S. EPA 2018).

Each GHG differs in its ability to absorb heat in the atmosphere based on the lifetime, or persistence, of the gas molecule in the atmosphere. Often, estimates of GHG emissions are presented in CO_2e, which weight each gas by its global warming potential (GWP). Expressing GHG emissions in CO_2e takes the contribution of all GHG emissions to the greenhouse effect and converts them to a single unit equivalent to the effect that would occur if only CO_2 were being emitted. Table 9 provides a summary of the GWP for GHG emissions of typical concern with regard to community development projects, based on a 100-year time horizon. As indicated, Methane traps over 25 times more heat per molecule than CO_2, and N_2O absorbs roughly 298 times more heat per molecule than CO_2. Additional GHG with high GWP include Nitrogen trifluoride, Sulfur hexafluoride, Perfluorocarbons, and black carbon.

Table 9
Global Warming Potential for Greenhouse Gases

Greenhouse Gas	Global Warming Potential (100-year)
Carbon Dioxide (CO_2)	1
Methane (CH_4)	25
Nitrous Dioxide (N_2O)	298

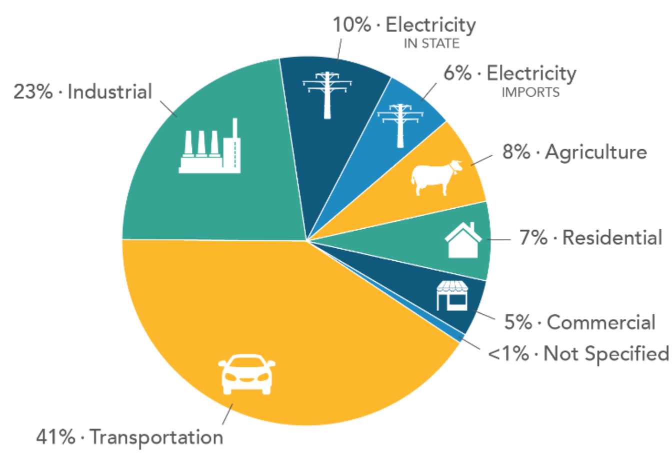
**Based on IPCC GWP values for 100-year time horizon*
Source: IPCC 2007

SOURCES OF GHG EMISSIONS

On a global scale, GHG emissions are predominantly associated with activities related to energy production; changes in land use, such as deforestation and land clearing; industrial sources; agricultural activities; transportation; waste and wastewater generation; and commercial and residential land uses. World-wide, energy production including the burning of coal, natural gas, and oil for electricity and heat are typically considered the largest single sources of global GHG emissions.

In 2016, GHG emissions within California totaled 429.4 million metric tons of carbon dioxide equivalents ($MMTCO_2e$). Within California, the transportation sector is the largest contributor, accounting for roughly 41 percent of the total state-wide GHG emissions. Emissions associated with the industrial sector are the second largest contributor, totaling approximately 23 percent. Emissions from in-state electricity generation, imported electricity, agriculture, residential, and commercial uses constitute the remaining major sources on GHG emissions. In comparison to the year 2014 emissions inventory, overall GHG emissions in California decreased by 12 MMTCO2e. The State of California GHG emissions inventory for year 2016, by main economic sector, is depicted in Figure 3 (ARB 2019c).

Figure 3
State of California Greenhouse Gases Emissions Inventory by Main Economic Sector



Emissions inventory is categorized based on main economic sector. "Not Specified" includes sources that could not be attributed to an individual sector, such as evaporative losses and emissions from use of ozone-depleting substances.
Source: ARB 2019c

Short-Lived Climate Pollutants

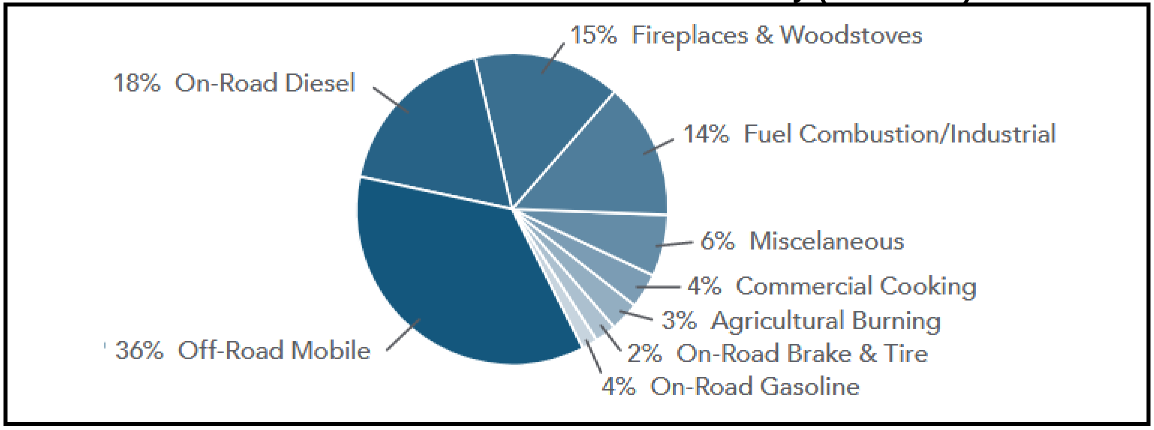
Short-lived climate pollutants (SLCPs), such as black carbon, fluorinated gases, and methane also have a dramatic effect on climate change. Though short lived, these pollutants create a warming influence on the climate that is many times more potent than that of carbon dioxide.

As part of the ARB's efforts to address SLCPs, the ARB has developed a statewide emission inventory for black carbon. The black carbon inventory will help support implementation of the SLCP Strategy, but it is not part of the State's GHG Inventory that tracks progress towards the State's climate targets. The most recent inventory for year 2013 conditions is depicted in Figure 4. As depicted, off-road mobile sources account for a majority of black carbon emissions totaling roughly 36 percent of the inventory. Other major anthropogenic sources of black carbon include on-road transportation, residential wood burning, fuel combustion, and industrial processes (ARB 2017).

EFFECTS OF GLOBAL CLIMATE CHANGE

There are uncertainties as to exactly what the climate changes will be in various local areas of the earth. There are also uncertainties associated with the magnitude and timing of other consequences of a warmer planet: sea level rise, spread of certain diseases out of their usual geographic range, the effect on agricultural production, water supply, sustainability of ecosystems, increased strength and frequency of storms, extreme heat events, increased air pollution episodes, and the consequence of these effects on the economy.

Figure 4
California Black Carbon Emissions Inventory (Year 2013)



Source: ARB 2017

Within California, climate changes would likely alter the ecological characteristics of many ecosystems throughout the state. Such alterations would likely include increases in surface temperatures and changes in the form, timing, and intensity of precipitation. For instance, historical records are depicting an increasing trend toward earlier snowmelt in the Sierra Nevada. This snowpack is a principal supply of water for the state, providing roughly 50 percent of state's annual runoff. If this trend continues, some areas of the state may experience an increased danger of floods during the winter months and possible exhaustion of the snowpack during spring and summer months. An earlier snowmelt would also impact the State's energy resources. Currently, approximately 20 percent of California's electricity comes from hydropower. An early exhaustion of the Sierra snowpack, may force electricity producers to switch to more costly or non-renewable forms of electricity generation during spring and summer months. A changing climate may also impact agricultural crop yields, coastal structures, and biodiversity. As a result, resultant changes in climate will likely have detrimental effects on some of California's largest industries, including agriculture, wine, tourism, skiing, recreational and commercial fishing, and forestry (ARB 2017).

REGULATORY FRAMEWORK

FEDERAL

Executive Order 13514

Executive Order 13514 is focused on reducing GHGs internally in federal agency missions, programs, and operations. In addition, the executive order directs federal agencies to participate in the Interagency Climate Change Adaptation Task Force, which is engaged in developing a national strategy for adaptation to climate change.

On April 2, 2007, in Massachusetts v. U.S. EPA, 549 U.S. 497 (2007), the Supreme Court found that GHGs are air pollutants covered by the FCAA and that the U.S. EPA has the authority to regulate GHG. The Court held that the U.S. EPA Administrator must determine whether or not emissions of GHGs from new motor vehicles cause or contribute to air pollution which may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision.

On December 7, 2009, the U.S. EPA Administrator signed two distinct findings regarding GHGs under section 202(a) of the Clean Air Act:

- Endangerment Finding: The Administrator found that the current and projected concentrations of the six key well-mixed GHGs (CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6) in the atmosphere threaten the public health and welfare of current and future generations.

- Cause or Contribute Finding: The Administrator found that the combined emissions of these well-mixed GHGs from new motor vehicles and new motor vehicle engines contribute to the GHG pollution which threatens public health and welfare.

Although these findings did not themselves impose any requirements on industry or other entities, this action was a prerequisite to finalizing the U.S. EPA's Proposed Greenhouse Gas Emission Standards for Light-Duty Vehicles, which was published on September 15, 2009. On May 7, 2010 the final Light-Duty Vehicle Greenhouse Gas Emissions Standards and Corporate Average Fuel Economy Standards was published in the Federal Register.

U.S. EPA and the National Highway Traffic Safety Administration (NHTSA) are taking coordinated steps to enable the production of a new generation of clean vehicles with reduced GHG emissions and improved fuel efficiency from on-road vehicles and engines. These next steps include developing the first-ever GHG regulations for heavy-duty engines and vehicles, as well as additional light-duty vehicle GHG regulations. These steps were outlined by President Obama in a Presidential Memorandum on May 21, 2010.

The final combined U.S. EPA and NHTSA standards that make up the first phase of this national program apply to passenger cars, light-duty trucks, and medium-duty passenger vehicles, covering model years 2012 through 2016. The standards require these vehicles to meet an estimated combined average emissions level of 250 grams of CO_2 per mile (the equivalent to 35.5 miles per gallon if the automobile industry were to meet this CO_2 level solely through fuel economy improvements). Together, these standards will cut GHG emissions by an estimated 960 MMT and 1.8 billion barrels of oil over the lifetime of the vehicles sold under the program (model years 2012-2016). On August 28, 2012, U.S. EPA and NHTSA issued their joint rule to extend this national program of coordinated GHG and fuel economy standards to model years 2017 through 2025 passenger vehicles.

State

Assembly Bill 1493

AB 1493 (Pavley) of 2002 (Health and Safety Code Sections 42823 and 43018.5) requires the ARB to develop and adopt the nation's first GHG emission standards for automobiles. These standards are also known as Pavley I. The California Legislature declared in AB 1493 that global warming is a matter of increasing concern for public health and the environment. It cites several risks that California faces from climate change, including a reduction in the state's water supply; an increase in air pollution caused by higher temperatures; harm to agriculture; an increase in wildfires; damage to the coastline; and economic losses caused by higher food, water, energy, and insurance prices. The bill also states that technological solutions to reduce GHG emissions would stimulate California's economy and provide jobs. In 2004, the State of California submitted a request for a waiver from federal clean air regulations, as the State is authorized to do under the FCAA, to allow the State to require reduced tailpipe emissions of CO_2. In late 2007, the U.S. EPA denied California's waiver request and declined to promulgate adequate federal regulations limiting GHG emissions. In early 2008, the State brought suit against the U.S. EPA related to this denial.

In January 2009, President Obama instructed the U.S. EPA to reconsider the Bush Administration's denial of California's and 13 other states' requests to implement global warming pollution standards for cars and trucks. In June 2009, the U.S. EPA granted California's waiver request, enabling the State to enforce its GHG emissions standards for new motor vehicles beginning with the current model year.

In 2009, President Obama announced a national policy aimed at both increasing fuel economy and reducing GHG pollution for all new cars and trucks sold in the US. The new standards would cover model years 2012 to 2016 and would raise passenger vehicle fuel economy to a fleet average of 35.5 miles per gallon by 2016. When the national program takes effect, California has committed to allowing automakers who show compliance with the national program to also be deemed in compliance with state requirements. California is committed to further strengthening these standards beginning in 2017 to obtain a 45 percent GHG reduction from the 2020 model year vehicles.

Executive Order No. S-3-05

Executive Order S-3-05 (State of California) proclaims that California is vulnerable to the impacts of climate change. It declares that increased temperatures could reduce the Sierra's snowpack, further exacerbate California's air quality problems, and potentially cause a rise in sea levels. To combat those concerns, the Executive Order established total GHG emission targets. Specifically, emissions are to be reduced to the 2000 level by 2010, to the 1990 level by 2020, and to 80 percent below the 1990 level by 2050.

The Executive Order directed the secretary of the California Environmental Protection Agency (CalEPA) to coordinate a multi-agency effort to reduce GHG emissions to the target levels. The secretary will also submit biannual reports to the governor and state legislature describing (1) progress made toward reaching the emission targets, (2) impacts of global warming on California's resources, and (3) mitigation and adaptation plans to combat these impacts. To comply with the Executive Order, the secretary of CalEPA created a Climate Action Team made up of members from various state agencies and commissions. The Climate Action Team released its first report in March 2006 and continues to release periodic reports on progress. The report proposed to achieve the targets by building on voluntary actions of California businesses, local government and community actions, as well as through state incentive and regulatory programs.

Assembly Bill 32 - California Global Warming Solutions Act of 2006

AB 32 (Health and Safety Code Sections 38500, 38501, 28510, 38530, 38550, 38560, 38561–38565, 38570, 38571, 38574, 38580, 38590, 38592–38599) requires that statewide GHG emissions be reduced to 1990 levels by the year 2020. The gases that are regulated by AB 32 include CO_2, CH_4, N_2O, HFCs, PFCs, NF_3, and SF_6. The reduction to 1990 levels will be accomplished through an enforceable statewide cap on GHG emissions that will be phased in starting in 2012. To effectively implement the cap, AB 32 directs ARB to develop and implement regulations to reduce statewide GHG emissions from stationary sources. AB 32 specifies that regulations adopted in response to AB 1493 should be used to address GHG emissions from vehicles. However, AB 32 also includes language stating that if the AB 1493 regulations cannot be implemented, then ARB should develop new regulations to control vehicle GHG emissions under the authorization of AB 32.

AB 32 requires that ARB adopt a quantified cap on GHG emissions representing 1990 emissions levels and disclose how it arrives at the cap, institute a schedule to meet the emissions cap, and develop tracking, reporting, and enforcement mechanisms to ensure that the state achieves reductions in GHG emissions necessary to meet the cap. AB 32 also includes guidance to institute emissions reductions in an economically efficient manner and conditions to ensure that businesses and consumers are not unfairly affected by the reductions.

Climate Change Scoping Plan

In October 2008, ARB published its *Climate Change Proposed Scoping Plan*, which is the State's plan to achieve GHG reductions in California required by AB 32. This initial Scoping Plan contained the main strategies to be implemented in order to achieve the target emission levels identified in AB 32. The Scoping Plan included ARB-recommended GHG reductions for each emissions sector of the state's GHG inventory. The largest proposed GHG reduction recommendations were associated with improving emissions standards for light-duty vehicles, implementing the Low Carbon Fuel Standard program, implementation of energy efficiency measures in buildings and appliances, and the widespread development of combined heat and power systems, and developing a renewable portfolio standard for electricity production.

The Scoping Plan states that land use planning and urban growth decisions will play important roles in the state's GHG reductions because local governments have primary authority to plan, zone, approve, and permit how land is developed to accommodate population growth and the changing needs of their jurisdictions. ARB further acknowledges that decisions on how land is used will have large impacts on the GHG emissions that will result from the transportation, housing, industry, forestry, water, agriculture, electricity, and natural gas emissions sectors. With regard to land use planning, the Scoping Plan expects approximately 5.0 MMT CO_2e will be achieved associated with implementation of Senate Bill 375, which is discussed further below.

The initial Scoping Plan was first approved by ARB on December 11, 2008 and is updated every five years. The first update of the Scoping Plan was approved by the ARB on May 22, 2014, which looked past 2020 to set mid-term goals (2030-2035) on the road to reaching the 2050 goals., The most recent update released by ARB is the *2017 Climate Change Scoping Plan*, which was released In November 2017. The *2017 Climate Change Scoping Plan* incorporates strategies for achieving the 2030 GHG-reduction target established in SB 32 and EO B-30-15.

Senate Bill 1078 and Governor's Order S-14-08 (California Renewables Portfolio Standards)

Senate Bill 1078 (Public Utilities Code Sections 387, 390.1, 399.25 and Article 16) addresses electricity supply and requires that retail sellers of electricity, including investor-owned utilities and community choice aggregators, provide a minimum 20 percent of their supply from renewable sources by 2017. This Senate Bill will affect statewide GHG emissions associated with electricity generation. In 2008, Governor Schwarzenegger signed Executive Order S-14-08, which set the Renewables Portfolio Standard target to 33 percent by 2020. It directed state government agencies and retail sellers of electricity to take all appropriate actions to implement this target. Executive Order S-14-08 was later superseded by Executive Order S-21-09 on September 15, 2009. Executive Order S-21-09 directed the ARB to adopt regulations requiring 33 percent of electricity sold in the State come from renewable energy by 2020. Statute SB X1-2 superceded this Executive Order in 2011, which obligated all California electricity providers, including investor-owned utilities and publicly owned utilities, to obtain at least 33 percent of their energy from renewable electrical generation facilities by 2020.

ARB is required by current law, AB 32 of 2006, to regulate sources of GHGs to meet a state goal of reducing GHG emissions to 1990 levels by 2020 and an 80 percent reduction of 1990 levels by 2050. The California Energy Commissions and California Public Utilities Commission serve in advisory roles to help ARB develop the regulations to administer the 33 percent by 2020 requirement. ARB is also authorized to increase the target and accelerate and expand the time frame.

Mandatory Reporting of GHG Emissions

The California Global Warming Solutions Act (AB 32, 2006) requires the reporting of GHGs by major sources to the ARB. Major sources required to report GHG emissions include industrial facilities, suppliers of transportation fuels, natural gas, natural gas liquids, liquefied petroleum gas, and carbon dioxide, operators of petroleum and natural gas systems, and electricity retail providers and marketers.

Cap-and-Trade Regulation

The cap-and-trade regulation is a key element in California's climate plan. It sets a statewide limit on sources responsible for 85 percent of California's GHG emissions and establishes a price signal needed to drive long-term investment in cleaner fuels and more efficient use of energy. The cap-and-trade rules came into effect on January 1, 2013, and apply to large electric power plants and large industrial plants. In 2015, fuel distributors, including distributors of heating and transportation fuels, also became subject to the cap-and-trade rules. At that stage, the program will encompass around 360 businesses throughout California and nearly 85 percent of the state's total GHG emissions.

Under the cap-and-trade regulation, companies must hold enough emission allowances to cover their emissions and are free to buy and sell allowances on the open market. California held its first auction of GHG allowances on November 14, 2012. California's GHG cap-and-trade system is projected to reduce GHG emissions to 1990 levels by the year 2020 and would achieve an approximate 80 percent reduction from 1990 levels by 2050.

Senate Bill 32

SB 32 was signed by Governor Brown on September 8, 2016. SB 32 effectively extends California's GHG emission-reduction goals from year 2020 to year 2030. This new emission-reduction target of 40 percent below 1990 levels by 2030 is intended to promote further GHG-reductions in support of the State's ultimate goal of reducing GHG emissions by 80 percent below 1990 levels by 2050. SB 32 also directs the ARB to update the Climate Change Scoping Plan to address this interim 2030 emission-reduction target.

Senate Bill 375

SB 375 requires Metropolitan Planning Organizations (MPOs) to adopt a sustainable communities strategy (SCS) or alternative planning strategy (APS) that will address land use allocation in that MPOs regional transportation plan. ARB, in consultation with MPOs, establishes regional reduction targets for GHGs emitted by passenger cars and light trucks for the years 2020 and 2035. These reduction targets will be updated every eight years but can be updated every four years if advancements in emissions technologies affect the reduction strategies to achieve the targets. ARB is also charged with reviewing each MPO's SCS or APS for consistency with its assigned targets. If MPOs do not meet the GHG reduction targets, funding for transportation projects may be withheld.

California Building Code

The California Building Code (CBC) contains standards that regulate the method of use, properties, performance, or types of materials used in the construction, alteration, improvement, repair, or rehabilitation of a building or other improvement to real property. The California Building Code is adopted every three years by the Building Standards Commission (BSC). In the interim, the BSC also adopts annual updates to make necessary mid-term corrections. The CBC standards apply statewide; however, a local jurisdiction may amend a CBC standard if it makes a finding that the amendment is reasonably necessary due to local climatic, geological, or topographical conditions.

Green Building Standards

In essence, green buildings standards are indistinguishable from any other building standards. Both standards are contained in the California Building Code and regulate the construction of new buildings and improvements. The only practical distinction between the two is that whereas the focus of traditional building standards has been protecting public health and safety, the focus of green building standards is to improve environmental performance.

AB 32, which mandates the reduction of GHG emissions in California to 1990 levels by 2020, increased the urgency around the adoption of green building standards. In its scoping plan for the implementation of AB 32, ARB identified energy use as the second largest contributor to California's GHG emissions, constituting roughly 25 percent of all such emissions. In recommending a green building strategy as one element of the scoping plan, ARB estimated that green building standards would reduce GHG emissions by approximately 26 MMT of CO_2e by 2020. The green buildings standards were most recently updated in 2016.

Senate Bill 97

Senate Bill 97 (SB 97) was enacted in 2007. SB 97 required OPR to develop, and the Natural Resources Agency to adopt, amendments to the CEQA Guidelines addressing the analysis and mitigation of GHG emissions. Those CEQA Guidelines amendments clarified several points, including the following:

- Lead agencies must analyze the GHG emissions of proposed projects and must reach a conclusion regarding the significance of those emissions.
- When a project's GHG emissions may be significant, lead agencies must consider a range of potential mitigation measures to reduce those emissions.
- Lead agencies must analyze potentially significant impacts associated with placing projects in hazardous locations, including locations potentially affected by climate change.
- Lead agencies may significantly streamline the analysis of GHGs on a project level by using a programmatic GHG emissions reduction plan meeting certain criteria.
- CEQA mandates analysis of a proposed project's potential energy use (including transportation-related energy), sources of energy supply and ways to reduce energy demand, including through the use of efficient transportation alternatives.

Short-Lived Climate Pollutant Reduction Strategy

In March 2017, the ARB adopted the *Short-Lived Climate Pollutant Reduction Strategy* (*SLCP Strategy*) establishing a path to decrease GHG emissions and displace fossil-based natural gas use. Strategies include avoiding landfill methane emissions by reducing the disposal of organics through edible food recovery, composting, in-vessel digestion, and other processes; and recovering methane from wastewater treatment facilities, and manure methane at dairies, and using the methane as a renewable source of natural gas to fuel vehicles or generate electricity. The *SLCP Strategy* also identifies steps to reduce natural gas leaks from oil and gas wells, pipelines, valves, and pumps to improve safety, avoid energy losses, and reduce methane emissions associated with natural gas use. Lastly, the *SLCP Strategy* also identifies measures that can reduce hydrofluorocarbon (HFC) emissions at national and international levels, in addition to State-level action that includes an incentive program to encourage the use of low-Global Warming Potential (GWP) refrigerants, and limitations on the use of high-GWP refrigerants in new refrigeration and air-conditioning equipment (ARB 2017).

SAN JOAQUIN VALLEY AIR POLLUTION CONTROL DISTRICT

SJVAPCD Climate Change Action Plan

On August 21, 2008, the SJVAPCD Governing Board approved the SJVAPCD's *Climate Change Action Plan* with the following goals and actions:

Goals:

- Assist local land-use agencies with California Environmental Quality Act (CEQA) issues relative to projects with GHG emissions increases.
- Assist Valley businesses in complying with mandates of AB 32.
- Ensure that climate protection measures do not cause increase in toxic or criteria pollutants that adversely impact public health or environmental justice communities.

Actions:

- Authorize the Air Pollution Control Officer to develop GHG significance threshold(s) or other mechanisms to address CEQA projects with GHG emissions increases. Begin the requisite public process, including public workshops, and develop recommendations for Governing Board consideration in the spring of 2009.
- Authorize the Air Pollution Control Officer to develop necessary regulations and instruments for establishment and administration of the San Joaquin Valley Carbon Exchange Bank for voluntary GHG reductions created in the Valley. Begin the requisite public process, including public workshops, and develop recommendations for Governing Board consideration in spring 2009.
- Authorize the Air Pollution Control Officer to enhance the SJVAPCD's existing criteria pollutant emissions inventory reporting system to allow businesses subject to AB32 emission reporting requirements to submit simultaneous streamlined reports to the SJVAPCD and the state of California with minimal duplication.
- Authorize the Air Pollution Control Officer to develop and administer voluntary GHG emission reduction agreements to mitigate proposed GHG increases from new projects.
- Direct the Air Pollution Control Officer to support climate protection measures that reduce GHG emissions as well as toxic and criteria pollutants. Oppose measures that result in a significant increase in toxic or criteria pollutant emissions in already impacted area.

SJVAPCD CEQA Greenhouse Gas Guidance.

On December 17, 2009, the SJVAPCD Governing Board adopted "Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA" and the policy, "District Policy—Addressing GHG Emission Impacts for Stationary Source Projects Under CEQA When Serving as the Lead Agency." The SJVAPCD concluded that the existing science is inadequate to support quantification of the impacts that project specific greenhouse gas emissions have on global climatic change. The SJVAPCD found the effects of project-specific emissions to be cumulative, and without mitigation, that their incremental contribution to global climatic change could be considered cumulatively considerable. The SJVAPCD found that this cumulative impact is best addressed by requiring all projects to reduce their greenhouse gas emissions, whether through project design elements or mitigation.

The SJVAPCD's approach is intended to streamline the process of determining if project-specific greenhouse gas emissions would have a significant effect. Projects exempt from the requirements of CEQA, and projects complying with an approved plan or mitigation program would be determined to have a less than significant cumulative impact. Such plans or programs must be specified in law or adopted by the public agency with jurisdiction over the affected resources and have a certified final CEQA document.

Best performance standards (BPS) would be established according to performance-based determinations. Projects complying with BPS would not require specific quantification of greenhouse gas emissions and would be determined to have a less than significant cumulative impact for greenhouse gas emissions. Projects not complying with BPS would require quantification of greenhouse gas emissions and demonstration that greenhouse gas emissions have been reduced or mitigated by 29 percent, as targeted by ARB's AB 32 Scoping Plan. Furthermore, quantification of greenhouse gas emissions would be required for all projects for which the lead agency has determined that an Environmental Impact Report is required, regardless of whether the project incorporates Best Performance Standards.

For stationary source permitting projects, best performance standards are "the most stringent of the identified alternatives for control of greenhouse gas emissions, including type of equipment, design of equipment and operational and maintenance practices, which are achieved-in-practice for the identified service, operation, or emissions unit class." For development projects, best performance standards are "any combination of identified greenhouse gas emission reduction measures, including project design elements and land use decisions that reduce project specific greenhouse gas emission reductions by at least 29 percent compared with business as usual." The SJVAPCD proposes to create a list of all approved Best Performance Standards to help in the determination as to whether a proposed project has reduced its GHG emissions by 29 percent.

IMPACTS & MITIGATION MEASURES

METHODOLOGY

Short-term Impacts

Short-term construction emissions associated with the proposed project were calculated using the CalEEMod computer program. Modeling includes emissions generated during site preparation, grading, building construction, and paving. Demolition and architectural coating were assumed to not occur with project implementation. Detailed construction information, including construction schedules and equipment, has not been identified for the proposed project. As a result, default construction phases and equipment assumptions contained in the CalEEMod model were, therefore, relied upon for the calculation of construction-generated emissions. Modeling assumptions and output files are included in Appendix A of this report.

Long-term Impacts

Long-term operational GHG emissions associated with the proposed project were calculated using the CalEEMod computer program. Emissions were quantified for area sources, energy use, water use, waste generation, and mobile sources. Mobile-source emissions were based on a maximum daily trip rate of 2,294 and a trip length of 1.19 miles (JLB 2019). All other modeling assumptions were based on the default parameters contained in the CalEEMod computer model. Annual emissions were quantified based on a maximum of 20 operational days per year (OPR 2019b). It is also important to note that, in comparison to existing conditions, implementation of the proposed project is anticipated to result in an overall net reduction in VMT (JLB 2019). However, to ensure a conservative analysis, vehicle trips associated with the proposed stadium were modeled as new trips, taking into account estimated reductions in vehicle trip lengths identified in the traffic analysis prepared for this project. As a result, actual operational GHG emissions would be lower. Modeling assumptions and output files are included in Appendix A of this report.

THRESHOLDS OF SIGNIFICANCE

In accordance with Appendix G of the CEQA Guidelines Initial Study Checklist, a project would be considered to have a significant impact to climate change if it would:

a) Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment; or,

b) Conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of GHGs.

San Joaquin Valley Air Pollution Control District

In accordance with the SJVAPCD's *Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects Under CEQA* (SJVAPCD 2009), a project would be considered to have a less than significant impact on climate change if it would comply with at least one of the following criteria:

- Comply 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. 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, or
- Implement approved best performance standards, or
- Quantify project GHG emissions and reduce those emissions by at least 29 percent compared to "business as usual" (BAU).

The City of Merced has adopted a GHG-reduction plan for emissions generated by activities under the control or influence of the City, the City's GHG-reduction plan does not specifically address the development of schools or related recreational uses. The SJVAPCD has not yet adopted best performance standards for development projects. The quantification of project-generated GHG emissions in comparison to BAU conditions to determine consistency with AB 32's reduction goals is considered appropriate in some instances. However, based on the California Supreme Court's decision in *Center for Biological Diversity v. California Department of Fish and Wildlife and Newhall Land and Farming (2015) 224 Cal.App.4th 1105 (CBD vs. CDFW;* also known as the *"Newhall Ranch case")*, substantial evidence would need to be provided to document that project-level reductions in comparison to a BAU approach would be consistent with achieving AB 32's overall statewide reduction goal. Given that AB 32's statewide goal includes reductions that are not necessarily related to an individual development project, the use of this approach may be difficult to support given the lack of substantial evidence to adequately demonstrate a link between the data contained in the AB 32 Scoping Plan and individual development projects.

The SJVAPCD has not adopted a recommended mass-emissions significance threshold for GHG emissions. However, other air districts in the State have adopted recommended GHG significance thresholds that address short-term construction and long-term operational GHG emissions. For instance, the Sacramento Metropolitan Air Quality Management District (SMAQMD) has adopted a recommended annual significance threshold of 1,100 $MTCO_2e$ (SMAQMD 2015). The San Luis Obispo County Air Pollution Control District (SLOAPCD) recommends that construction emissions be amortized over the life of the project and included with the project's estimated annual operation emissions for comparison to the recommended annual GHG significance threshold. The SLOAPCD currently recommends an annual GHG significance threshold of 1,150 $MTCO_2e$ (SLOAPCD 2012). On December 5, 2008 the South Coast Air Quality Management District (SCAQMD) adopted *Interim CEQA GHG Significance Thresholds for Stationary Sources, Rules and Plans*. This document also addressed interim GHG significance thresholds for construction activities, including those associated with industrial and residential/commercial uses. Similar to the SLOAPCD's recommended guidance, the SCAQMD also recommends that construction-generated GHG emissions be amortized over the life of the project and included with the estimated annual operational emissions when comparing to the interim significance thresholds. The SCAQMD's interim thresholds range from a screening threshold of 3,000 $MTCO_2e$/year for residential and commercial uses to 10,000 $MTCO_2e$/year for industrial uses (SCAQMD 2008). Based on this information and to be conservative, project-generated GHG emissions would be considered to have a potentially significant impact on the environment and conflict with GHG-reduction efforts if either construction or operational emissions were to exceed 1,100 $MTCO_2e$/year. This threshold is consistent with the threshold currently recommended by SMAQMD and less than the corresponding thresholds recommended by the SLOAPCD and the SCAQMD.

PROJECT IMPACTS

Impact GHG-A. Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment? and

Implementation of the proposed project would contribute to increases of GHG emissions that are associated with global climate change. Short-term and long-term GHG emissions associated with the development of the proposed project are discussed in greater detail, as follows:

Short-term Greenhouse Gas Emissions

Short-term annual GHG emissions are summarized in Table 10. Based on the modeling conducted, annual emissions of GHGs associated with construction of the proposed project would total approximately 419.6 $MTCO_2e$. There would also be a small amount of GHG emissions from waste generated during construction; however, this amount is speculative. Actual emissions would vary, depending on various factors including construction schedules, equipment required, and activities conducted. Assuming an average project life of 30 years, amortized construction-generated GHG emissions would total approximately 14.0 $MTCO_2e$/yr. Annual construction-generated GHG emissions would not exceed the GHG significance threshold of 1,100 $MTCO_2e$/yr. As a result, short-term construction GHG emissions would not have a significant impact on the environment nor be anticipated to conflict with GHG-reduction efforts. As a result, this impact is considered ***less than significant.***

Table 10
Annual Construction GHG Emissions

Construction Year	GHG Emissions ($MTCO_2e$)
Year 1	400.1
Year 2	19.4
Total:	419.6
Amortized Construction Emissions:	14.0
GHG Significance Threshold ($MTCO_2e$/SP/yr):	1,100
Exceeds Threshold/Significant Impact?	No

Based on CalEEMod computer modeling. Amortized construction-generated GHG emissions assume a 30-year project life. Refer to Appendix A for modeling results and assumptions.

Long-term Greenhouse Gas Emissions

Estimated long-term increases in GHG emissions associated with the proposed project are summarized in Table 11. Based on the modeling conducted, operational GHG emissions would total approximately 421.8 $MTCO_2e$/year in 2021 and approximately 358.9 $MTCO_2e$/year in 2030. With the inclusion of amortized construction emissions, operational GHG emissions would total approximately 435.8 $MTCO_2e$/year in 2021 and approximately 372.9 $MTCO_2e$/year in 2030. Total project-generated GHG emissions would not exceed the GHG significance threshold of 1,100 $MTCO_2e$/yr. As a result, operational GHG emissions would not have a significant impact on the environment nor be anticipated to conflict with GHG-reduction efforts. As a result, this impact is considered ***less than significant.***

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Table 11
Annual Operational GHG Emissions

Emissions Source	GHG Emissions ($MTCO_2e$/year) [1]	
	Year 2021	Year 2030
Area Source	0.0	0.0
Energy Use	372.4	316.9
Mobile Source[2]	49.1	41.7
Waste Generation	0.1	0.1
Water Use	0.2	0.1
Total Project Operational Emissions:	421.8	358.9
Amortized Construction Emissions:	14.0	14.0
Total with Amortized Construction Emissions:	435.8	372.9
GHG Significance Threshold ($MTCO_2e$/SP/yr):	1,100	1,100
Exceeds Threshold/Significant Impact?	No	No

1. Project-generated emissions were quantified using the CalEEMod computer program.

2. Fleet distribution data for the project is not available. Mobile-source emissions are based on default vehicle fleet distribution for Merced County, which includes all vehicle types/classifications, including medium and heavy-duty vehicles. Does not reflect reductions in VMT anticipated to occur with project implementation. Actual emissions would be lower.

Refer to Appendix A for modeling results and assumptions.

Impact GHG-B. Would the project conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases?

The City of Merced has adopted a GHG-reduction plan for emissions generated by activities under the control or influence of the City. However, the City's GHG-reduction plan does not specifically address the development of schools or recreational land uses. However, the proposed project would be designed to meet current building energy-efficiency standards, which includes measures to reduce overall energy use, as well as, reductions in water use and waste generation. These improvements would help to further reduce the project's GHG emissions and would also help to reduce community-wide GHG emissions. Furthermore, as noted in Impact GHG-A, the proposed project would not result in increased GHG emissions that would exceed the GHG significance thresholds. For these reasons, this impact would be considered ***less than significant***.

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Greenhouse Gas

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APPENDIX A

EMISSIONS MODELING & DOCUMENTATION

Merced High School Stadium Project

Merced County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	0.28	Acre	0.28	12,196.80	0
Arena	2.78	Acre	2.78	121,096.80	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	49
Climate Zone	3			**Operational Year**	2021
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	486.98	**CH4 Intensity (lb/MWhr)**	0.022	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Renewable portfolio standards adjustment to operation year 2021.

Land Use -

Construction Phase - Demolition and architectural coating would not occur.

Trips and VMT -

Architectural Coating -

Vehicle Trips - Maximum of 2,294 daily trips and 1.19 miles trip length.

Energy Use -

Water And Wastewater - No indoor water use would occur at the stadium.

Construction Off-road Equipment Mitigation - Soil stabilizer for unpaved roads; 50% PM reduction. Water exposed area; 61% PM reduction. Unpaved road mitigation; vehicle speed limit 15mph.

Area Mitigation -

Energy Mitigation -

Water Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	11.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00

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
tblConstEquipMitigation	Tier	No Change	Tier 3
tblProjectCharacteristics	CH4IntensityFactor	0.029	0.022
tblProjectCharacteristics	CO2IntensityFactor	641.35	486.98
tblProjectCharacteristics	N2OIntensityFactor	0.006	0.004
tblVehicleTrips	CC_TL	7.30	1.19
tblVehicleTrips	CC_TL	7.30	0.00
tblVehicleTrips	CNW_TL	7.30	1.19
tblVehicleTrips	CNW_TL	7.30	0.00
tblVehicleTrips	CW_TL	9.50	1.19
tblVehicleTrips	CW_TL	9.50	0.00
tblVehicleTrips	WD_TR	33.33	45.27
tblWater	IndoorWaterUseRate	3,742,315.40	0.00

2.0 Emissions Summary

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					
2020	0.3017	2.7246	2.3218	4.5200e-003	0.1397	0.1400	0.2797	0.0569	0.1314	0.1883	0.0000	398.1635	398.1635	0.0788	0.0000	400.1338
2021	0.0128	0.1181	0.1346	2.2000e-004	2.0300e-003	6.1900e-003	8.2200e-003	5.4000e-004	5.7300e-003	6.2700e-003	0.0000	19.3057	19.3057	5.3000e-003	0.0000	19.4381
Maximum	**0.3017**	**2.7246**	**2.3218**	**4.5200e-003**	**0.1397**	**0.1400**	**0.2797**	**0.0569**	**0.1314**	**0.1883**	**0.0000**	**398.1635**	**398.1635**	**0.0788**	**0.0000**	**400.1338**

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					
2020	0.1222	2.0546	2.4540	4.5200e-003	0.0962	0.1105	0.2066	0.0335	0.1104	0.1438	0.0000	398.1632	398.1632	0.0788	0.0000	400.1334
2021	5.6900e-003	0.0991	0.1473	2.2000e-004	2.0300e-003	5.6500e-003	7.6700e-003	5.4000e-004	5.6500e-003	6.1900e-003	0.0000	19.3057	19.3057	5.3000e-003	0.0000	19.4381
Maximum	**0.1222**	**2.0546**	**2.4540**	**4.5200e-003**	**0.0962**	**0.1105**	**0.2066**	**0.0335**	**0.1104**	**0.1438**	**0.0000**	**398.1632**	**398.1632**	**0.0788**	**0.0000**	**400.1334**

	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	**59.33**	**24.24**	**-5.90**	**0.00**	**30.71**	**20.58**	**25.57**	**40.70**	**15.43**	**22.89**	**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)
1	1-2-2020	4-1-2020	0.6263	0.4026
2	4-2-2020	7-1-2020	0.7961	0.5879
3	7-2-2020	10-1-2020	0.8048	0.5944
4	10-2-2020	1-1-2021	0.8055	0.5958
5	1-2-2021	4-1-2021	0.1274	0.1021
		Highest	0.8055	0.5958

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	0.5582	0.0000	3.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	5.0000e-005	5.0000e-005	0.0000	0.0000	6.0000e-005
Energy	0.0136	0.1239	0.1041	7.4000e-004		9.4200e-003	9.4200e-003		9.4200e-003	9.4200e-003	0.0000	370.7931	370.7931	0.0132	4.4100e-003	372.4385
Mobile	0.0245	0.2920	0.1289	5.2000e-004	0.0110	4.0000e-004	0.0114	2.9500e-003	3.8000e-004	3.3300e-003	0.0000	48.7536	48.7536	0.0127	0.0000	49.0710
Waste						0.0000	0.0000		0.0000	0.0000	0.0487	0.0000	0.0487	2.8800e-003	0.0000	0.1207
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.1847	0.1847	1.0000e-005	0.0000	0.1853
Total	**0.5963**	**0.4159**	**0.2330**	**1.2600e-003**	**0.0110**	**9.8200e-003**	**0.0208**	**2.9500e-003**	**9.8000e-003**	**0.0128**	**0.0487**	**419.7314**	**419.7801**	**0.0288**	**4.4100e-003**	**421.8156**

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	0.5582	0.0000	3.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	5.0000e-005	5.0000e-005	0.0000	0.0000	6.0000e-005
Energy	0.0136	0.1239	0.1041	7.4000e-004		9.4200e-003	9.4200e-003		9.4200e-003	9.4200e-003	0.0000	370.7931	370.7931	0.0132	4.4100e-003	372.4385
Mobile	0.0245	0.2920	0.1289	5.2000e-004	0.0110	4.0000e-004	0.0114	2.9500e-003	3.8000e-004	3.3300e-003	0.0000	48.7536	48.7536	0.0127	0.0000	49.0710
Waste						0.0000	0.0000		0.0000	0.0000	0.0487	0.0000	0.0487	2.8800e-003	0.0000	0.1207
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.1847	0.1847	1.0000e-005	0.0000	0.1853
Total	**0.5963**	**0.4159**	**0.2330**	**1.2600e-003**	**0.0110**	**9.8200e-003**	**0.0208**	**2.9500e-003**	**9.8000e-003**	**0.0128**	**0.0487**	**419.7314**	**419.7801**	**0.0288**	**4.4100e-003**	**421.8156**

	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	Site Preparation	Site Preparation	1/30/2020	2/5/2020	5	5	
2	Grading	Grading	2/6/2020	2/17/2020	5	8	
3	Building Construction	Building Construction	2/18/2020	1/4/2021	5	230	
4	Paving	Paving	1/5/2021	1/28/2021	5	18	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 4

Acres of Paving: 0.28

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

<u>OffRoad Equipment</u>

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	1	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Cement and Mortar Mixers	2	6.00	9	0.56
Paving	Pavers	1	8.00	130	0.42
Paving	Paving Equipment	2	6.00	132	0.36
Paving	Rollers	2	6.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37

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
Site Preparation	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	56.00	22.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Site Preparation - 2020

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					0.0452	0.0000	0.0452	0.0248	0.0000	0.0248	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0102	0.1060	0.0538	1.0000e-004		5.4900e-003	5.4900e-003		5.0500e-003	5.0500e-003	0.0000	8.3577	8.3577	2.7000e-003	0.0000	8.4253
Total	**0.0102**	**0.1060**	**0.0538**	**1.0000e-004**	**0.0452**	**5.4900e-003**	**0.0507**	**0.0248**	**5.0500e-003**	**0.0299**	**0.0000**	**8.3577**	**8.3577**	**2.7000e-003**	**0.0000**	**8.4253**

3.2 Site Preparation - 2020

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	2.0000e-004	1.5000e-004	1.5000e-003	0.0000	3.6000e-004	0.0000	3.6000e-004	1.0000e-004	0.0000	1.0000e-004	0.0000	0.3265	0.3265	1.0000e-005	0.0000	0.3268
Total	**2.0000e-004**	**1.5000e-004**	**1.5000e-003**	**0.0000**	**3.6000e-004**	**0.0000**	**3.6000e-004**	**1.0000e-004**	**0.0000**	**1.0000e-004**	**0.0000**	**0.3265**	**0.3265**	**1.0000e-005**	**0.0000**	**0.3268**

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					0.0176	0.0000	0.0176	9.6800e-003	0.0000	9.6800e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.3300e-003	0.0477	0.0574	1.0000e-004		2.3700e-003	2.3700e-003		2.3700e-003	2.3700e-003	0.0000	8.3577	8.3577	2.7000e-003	0.0000	8.4252
Total	**2.3300e-003**	**0.0477**	**0.0574**	**1.0000e-004**	**0.0176**	**2.3700e-003**	**0.0200**	**9.6800e-003**	**2.3700e-003**	**0.0121**	**0.0000**	**8.3577**	**8.3577**	**2.7000e-003**	**0.0000**	**8.4252**

3.2 Site Preparation - 2020

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	2.0000e-004	1.5000e-004	1.5000e-003	0.0000	3.6000e-004	0.0000	3.6000e-004	1.0000e-004	0.0000	1.0000e-004	0.0000	0.3265	0.3265	1.0000e-005	0.0000	0.3268
Total	**2.0000e-004**	**1.5000e-004**	**1.5000e-003**	**0.0000**	**3.6000e-004**	**0.0000**	**3.6000e-004**	**1.0000e-004**	**0.0000**	**1.0000e-004**	**0.0000**	**0.3265**	**0.3265**	**1.0000e-005**	**0.0000**	**0.3268**

3.3 Grading - 2020

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					0.0262	0.0000	0.0262	0.0135	0.0000	0.0135	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	9.7200e-003	0.1055	0.0642	1.2000e-004		5.0900e-003	5.0900e-003		4.6900e-003	4.6900e-003	0.0000	10.4235	10.4235	3.3700e-003	0.0000	10.5078
Total	**9.7200e-003**	**0.1055**	**0.0642**	**1.2000e-004**	**0.0262**	**5.0900e-003**	**0.0313**	**0.0135**	**4.6900e-003**	**0.0182**	**0.0000**	**10.4235**	**10.4235**	**3.3700e-003**	**0.0000**	**10.5078**

3.3 Grading - 2020

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	2.7000e-004	1.9000e-004	2.0000e-003	0.0000	4.8000e-004	0.0000	4.8000e-004	1.3000e-004	0.0000	1.3000e-004	0.0000	0.4354	0.4354	1.0000e-005	0.0000	0.4357
Total	**2.7000e-004**	**1.9000e-004**	**2.0000e-003**	**0.0000**	**4.8000e-004**	**0.0000**	**4.8000e-004**	**1.3000e-004**	**0.0000**	**1.3000e-004**	**0.0000**	**0.4354**	**0.4354**	**1.0000e-005**	**0.0000**	**0.4357**

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					0.0102	0.0000	0.0102	5.2500e-003	0.0000	5.2500e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.9100e-003	0.0594	0.0760	1.2000e-004		3.0200e-003	3.0200e-003		3.0200e-003	3.0200e-003	0.0000	10.4235	10.4235	3.3700e-003	0.0000	10.5078
Total	**2.9100e-003**	**0.0594**	**0.0760**	**1.2000e-004**	**0.0102**	**3.0200e-003**	**0.0132**	**5.2500e-003**	**3.0200e-003**	**8.2700e-003**	**0.0000**	**10.4235**	**10.4235**	**3.3700e-003**	**0.0000**	**10.5078**

3.3 Grading - 2020

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	2.7000e-004	1.9000e-004	2.0000e-003	0.0000	4.8000e-004	0.0000	4.8000e-004	1.3000e-004	0.0000	1.3000e-004	0.0000	0.4354	0.4354	1.0000e-005	0.0000	0.4357
Total	**2.7000e-004**	**1.9000e-004**	**2.0000e-003**	**0.0000**	**4.8000e-004**	**0.0000**	**4.8000e-004**	**1.3000e-004**	**0.0000**	**1.3000e-004**	**0.0000**	**0.4354**	**0.4354**	**1.0000e-005**	**0.0000**	**0.4357**

3.4 Building Construction - 2020

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	0.2417	2.1872	1.9207	3.0700e-003		0.1273	0.1273		0.1197	0.1197	0.0000	264.0354	264.0354	0.0644	0.0000	265.6458
Total	**0.2417**	**2.1872**	**1.9207**	**3.0700e-003**		**0.1273**	**0.1273**		**0.1197**	**0.1197**	**0.0000**	**264.0354**	**264.0354**	**0.0644**	**0.0000**	**265.6458**

3.4 Building Construction - 2020

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	0.0106	0.3049	0.0667	7.2000e-004	0.0166	1.6600e-003	0.0183	4.8000e-003	1.5900e-003	6.3800e-003	0.0000	68.2627	68.2627	6.7700e-003	0.0000	68.4319
Worker	0.0291	0.0206	0.2129	5.1000e-004	0.0509	4.0000e-004	0.0513	0.0135	3.7000e-004	0.0139	0.0000	46.3224	46.3224	1.5300e-003	0.0000	46.3605
Total	**0.0397**	**0.3255**	**0.2795**	**1.2300e-003**	**0.0675**	**2.0600e-003**	**0.0696**	**0.0183**	**1.9600e-003**	**0.0203**	**0.0000**	**114.5851**	**114.5851**	**8.3000e-003**	**0.0000**	**114.7925**

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	0.0768	1.6218	2.0376	3.0700e-003		0.1030	0.1030		0.1030	0.1030	0.0000	264.0351	264.0351	0.0644	0.0000	265.6455
Total	**0.0768**	**1.6218**	**2.0376**	**3.0700e-003**		**0.1030**	**0.1030**		**0.1030**	**0.1030**	**0.0000**	**264.0351**	**264.0351**	**0.0644**	**0.0000**	**265.6455**

3.4 Building Construction - 2020

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	0.0106	0.3049	0.0667	7.2000e-004	0.0166	1.6600e-003	0.0183	4.8000e-003	1.5900e-003	6.3800e-003	0.0000	68.2627	68.2627	6.7700e-003	0.0000	68.4319
Worker	0.0291	0.0206	0.2129	5.1000e-004	0.0509	4.0000e-004	0.0513	0.0135	3.7000e-004	0.0139	0.0000	46.3224	46.3224	1.5300e-003	0.0000	46.3605
Total	**0.0397**	**0.3255**	**0.2795**	**1.2300e-003**	**0.0675**	**2.0600e-003**	**0.0696**	**0.0183**	**1.9600e-003**	**0.0203**	**0.0000**	**114.5851**	**114.5851**	**8.3000e-003**	**0.0000**	**114.7925**

3.4 Building Construction - 2021

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	1.9000e-003	0.0174	0.0166	3.0000e-005		9.6000e-004	9.6000e-004		9.0000e-004	9.0000e-004	0.0000	2.3164	2.3164	5.6000e-004	0.0000	2.3303
Total	**1.9000e-003**	**0.0174**	**0.0166**	**3.0000e-005**		**9.6000e-004**	**9.6000e-004**		**9.0000e-004**	**9.0000e-004**	**0.0000**	**2.3164**	**2.3164**	**5.6000e-004**	**0.0000**	**2.3303**

3.4 Building Construction - 2021

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	8.0000e-005	2.4400e-003	5.1000e-004	1.0000e-005	1.5000e-004	1.0000e-005	1.5000e-004	4.0000e-005	1.0000e-005	5.0000e-005	0.0000	0.5932	0.5932	6.0000e-005	0.0000	0.5946
Worker	2.3000e-004	1.6000e-004	1.7000e-003	0.0000	4.5000e-004	0.0000	4.5000e-004	1.2000e-004	0.0000	1.2000e-004	0.0000	0.3945	0.3945	1.0000e-005	0.0000	0.3948
Total	**3.1000e-004**	**2.6000e-003**	**2.2100e-003**	**1.0000e-005**	**6.0000e-004**	**1.0000e-005**	**6.0000e-004**	**1.6000e-004**	**1.0000e-005**	**1.7000e-004**	**0.0000**	**0.9877**	**0.9877**	**7.0000e-005**	**0.0000**	**0.9894**

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	6.7000e-004	0.0142	0.0179	3.0000e-005		9.0000e-004	9.0000e-004		9.0000e-004	9.0000e-004	0.0000	2.3164	2.3164	5.6000e-004	0.0000	2.3303
Total	**6.7000e-004**	**0.0142**	**0.0179**	**3.0000e-005**		**9.0000e-004**	**9.0000e-004**		**9.0000e-004**	**9.0000e-004**	**0.0000**	**2.3164**	**2.3164**	**5.6000e-004**	**0.0000**	**2.3303**

3.4 Building Construction - 2021

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	8.0000e-005	2.4400e-003	5.1000e-004	1.0000e-005	1.5000e-004	1.0000e-005	1.5000e-004	4.0000e-005	1.0000e-005	5.0000e-005	0.0000	0.5932	0.5932	6.0000e-005	0.0000	0.5946
Worker	2.3000e-004	1.6000e-004	1.7000e-003	0.0000	4.5000e-004	0.0000	4.5000e-004	1.2000e-004	0.0000	1.2000e-004	0.0000	0.3945	0.3945	1.0000e-005	0.0000	0.3948
Total	**3.1000e-004**	**2.6000e-003**	**2.2100e-003**	**1.0000e-005**	**6.0000e-004**	**1.0000e-005**	**6.0000e-004**	**1.6000e-004**	**1.0000e-005**	**1.7000e-004**	**0.0000**	**0.9877**	**0.9877**	**7.0000e-005**	**0.0000**	**0.9894**

3.5 Paving - 2021

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	9.8500e-003	0.0976	0.1103	1.7000e-004		5.2100e-003	5.2100e-003		4.8100e-003	4.8100e-003	0.0000	14.7336	14.7336	4.6300e-003	0.0000	14.8493
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**9.8500e-003**	**0.0976**	**0.1103**	**1.7000e-004**		**5.2100e-003**	**5.2100e-003**		**4.8100e-003**	**4.8100e-003**	**0.0000**	**14.7336**	**14.7336**	**4.6300e-003**	**0.0000**	**14.8493**

3.5 Paving - 2021

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	7.5000e-004	5.2000e-004	5.4600e-003	1.0000e-005	1.4400e-003	1.0000e-005	1.4500e-003	3.8000e-004	1.0000e-005	3.9000e-004	0.0000	1.2681	1.2681	4.0000e-005	0.0000	1.2691
Total	**7.5000e-004**	**5.2000e-004**	**5.4600e-003**	**1.0000e-005**	**1.4400e-003**	**1.0000e-005**	**1.4500e-003**	**3.8000e-004**	**1.0000e-005**	**3.9000e-004**	**0.0000**	**1.2681**	**1.2681**	**4.0000e-005**	**0.0000**	**1.2691**

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	3.9500e-003	0.0818	0.1218	1.7000e-004		4.7200e-003	4.7200e-003		4.7200e-003	4.7200e-003	0.0000	14.7335	14.7335	4.6300e-003	0.0000	14.8493
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**3.9500e-003**	**0.0818**	**0.1218**	**1.7000e-004**		**4.7200e-003**	**4.7200e-003**		**4.7200e-003**	**4.7200e-003**	**0.0000**	**14.7335**	**14.7335**	**4.6300e-003**	**0.0000**	**14.8493**

3.5 Paving - 2021

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	7.5000e-004	5.2000e-004	5.4600e-003	1.0000e-005	1.4400e-003	1.0000e-005	1.4500e-003	3.8000e-004	1.0000e-005	3.9000e-004	0.0000	1.2681	1.2681	4.0000e-005	0.0000	1.2691
Total	**7.5000e-004**	**5.2000e-004**	**5.4600e-003**	**1.0000e-005**	**1.4400e-003**	**1.0000e-005**	**1.4500e-003**	**3.8000e-004**	**1.0000e-005**	**3.9000e-004**	**0.0000**	**1.2681**	**1.2681**	**4.0000e-005**	**0.0000**	**1.2691**

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	0.0245	0.2920	0.1289	5.2000e-004	0.0110	4.0000e-004	0.0114	2.9500e-003	3.8000e-004	3.3300e-003	0.0000	48.7536	48.7536	0.0127	0.0000	49.0710
Unmitigated	0.0245	0.2920	0.1289	5.2000e-004	0.0110	4.0000e-004	0.0114	2.9500e-003	3.8000e-004	3.3300e-003	0.0000	48.7536	48.7536	0.0127	0.0000	49.0710

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Arena	125.85	0.00	0.00	28,621	28,621
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Total	125.85	0.00	0.00	28,621	28,621

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
Arena	1.19	1.19	1.19	0.00	81.00	19.00	66	28	6
Other Non-Asphalt Surfaces	0.00	0.00	0.00	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
Arena	0.492060	0.030872	0.155167	0.115051	0.019669	0.004846	0.015607	0.153483	0.002388	0.002252	0.006351	0.001584	0.000670
Other Non-Asphalt Surfaces	0.492060	0.030872	0.155167	0.115051	0.019669	0.004846	0.015607	0.153483	0.002388	0.002252	0.006351	0.001584	0.000670

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	235.9273	235.9273	0.0107	1.9400e-003	236.7712
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	235.9273	235.9273	0.0107	1.9400e-003	236.7712
NaturalGas Mitigated	0.0136	0.1239	0.1041	7.4000e-004		9.4200e-003	9.4200e-003		9.4200e-003	9.4200e-003	0.0000	134.8658	134.8658	2.5800e-003	2.4700e-003	135.6673
NaturalGas Unmitigated	0.0136	0.1239	0.1041	7.4000e-004		9.4200e-003	9.4200e-003		9.4200e-003	9.4200e-003	0.0000	134.8658	134.8658	2.5800e-003	2.4700e-003	135.6673

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					
Arena	2.52729e+006	0.0136	0.1239	0.1041	7.4000e-004		9.4200e-003	9.4200e-003		9.4200e-003	9.4200e-003	0.0000	134.8658	134.8658	2.5800e-003	2.4700e-003	135.6673
Other Non-Asphalt Surfaces	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		**0.0136**	**0.1239**	**0.1041**	**7.4000e-004**		**9.4200e-003**	**9.4200e-003**		**9.4200e-003**	**9.4200e-003**	**0.0000**	**134.8658**	**134.8658**	**2.5800e-003**	**2.4700e-003**	**135.6673**

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					
Arena	2.52729e+006	0.0136	0.1239	0.1041	7.4000e-004		9.4200e-003	9.4200e-003		9.4200e-003	9.4200e-003	0.0000	134.8658	134.8658	2.5800e-003	2.4700e-003	135.6673
Other Non-Asphalt Surfaces	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		**0.0136**	**0.1239**	**0.1041**	**7.4000e-004**		**9.4200e-003**	**9.4200e-003**		**9.4200e-003**	**9.4200e-003**	**0.0000**	**134.8658**	**134.8658**	**2.5800e-003**	**2.4700e-003**	**135.6673**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Arena	1.06807e +006	235.9273	0.0107	1.9400e-003	236.7712
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**235.9273**	**0.0107**	**1.9400e-003**	**236.7712**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Arena	1.06807e +006	235.9273	0.0107	1.9400e-003	236.7712
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**235.9273**	**0.0107**	**1.9400e-003**	**236.7712**

6.0 Area Detail

6.1 Mitigation Measures Area

	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	0.5582	0.0000	3.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	5.0000e-005	5.0000e-005	0.0000	0.0000	6.0000e-005
Unmitigated	0.5582	0.0000	3.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	5.0000e-005	5.0000e-005	0.0000	0.0000	6.0000e-005

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	0.0845					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.4737					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	3.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	5.0000e-005	5.0000e-005	0.0000	0.0000	6.0000e-005
Total	**0.5582**	**0.0000**	**3.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**5.0000e-005**	**5.0000e-005**	**0.0000**	**0.0000**	**6.0000e-005**

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	0.0845					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.4737					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	3.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	5.0000e-005	5.0000e-005	0.0000	0.0000	6.0000e-005
Total	**0.5582**	**0.0000**	**3.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**5.0000e-005**	**5.0000e-005**	**0.0000**	**0.0000**	**6.0000e-005**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.1847	1.0000e-005	0.0000	0.1853
Unmitigated	0.1847	1.0000e-005	0.0000	0.1853

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Arena	0 / 0.238871	0.1847	1.0000e-005	0.0000	0.1853
Other Non-Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.1847**	**1.0000e-005**	**0.0000**	**0.1853**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Arena	0 / 0.238871	0.1847	1.0000e-005	0.0000	0.1853
Other Non-Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.1847**	**1.0000e-005**	**0.0000**	**0.1853**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0487	2.8800e-003	0.0000	0.1207
Unmitigated	0.0487	2.8800e-003	0.0000	0.1207

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Arena	0.24	0.0487	2.8800e-003	0.0000	0.1207
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0487**	**2.8800e-003**	**0.0000**	**0.1207**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Arena	0.24	0.0487	2.8800e-003	0.0000	0.1207
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0487**	**2.8800e-003**	**0.0000**	**0.1207**

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

Equipment Type	Number

11.0 Vegetation

Merced High School Stadium Project

Merced County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	0.28	Acre	0.28	12,196.80	0
Arena	2.78	Acre	2.78	121,096.80	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	49
Climate Zone	3			**Operational Year**	2021
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	486.98	**CH4 Intensity (lb/MWhr)**	0.022	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Renewable portfolio standards adjustment to operation year 2021.

Land Use -

Construction Phase - Demolition and architectural coating would not occur.

Trips and VMT -

Architectural Coating -

Vehicle Trips - Maximum of 2,294 daily trips and 1.19 miles trip length.

Energy Use -

Water And Wastewater - No indoor water use would occur at the stadium.

Construction Off-road Equipment Mitigation - Soil stabilizer for unpaved roads; 50% PM reduction. Water exposed area; 61% PM reduction. Unpaved road mitigation; vehicle speed limit 15mph.

Area Mitigation -

Energy Mitigation -

Water Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	11.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00

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
tblConstEquipMitigation	Tier	No Change	Tier 3
tblProjectCharacteristics	CH4IntensityFactor	0.029	0.022
tblProjectCharacteristics	CO2IntensityFactor	641.35	486.98
tblProjectCharacteristics	N2OIntensityFactor	0.006	0.004
tblVehicleTrips	CC_TL	7.30	1.19
tblVehicleTrips	CC_TL	7.30	0.00
tblVehicleTrips	CNW_TL	7.30	1.19
tblVehicleTrips	CNW_TL	7.30	0.00
tblVehicleTrips	CW_TL	9.50	1.19
tblVehicleTrips	CW_TL	9.50	0.00
tblVehicleTrips	WD_TR	33.33	45.27
tblWater	IndoorWaterUseRate	3,742,315.40	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

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	lb/day										lb/day					
2020	4.1701	42.4711	22.2049	0.0396	18.2141	2.1985	20.4127	9.9699	2.0227	11.9926	0.0000	3,842.5603	3,842.5603	1.1971	0.0000	3,872.4876
2021	2.2451	19.9899	19.0109	0.0380	0.6092	0.9694	1.5786	0.1650	0.9115	1.0765	0.0000	3,691.8719	3,691.8719	0.6906	0.0000	3,709.1365
Maximum	**4.1701**	**42.4711**	**22.2049**	**0.0396**	**18.2141**	**2.1985**	**20.4127**	**9.9699**	**2.0227**	**11.9926**	**0.0000**	**3,842.5603**	**3,842.5603**	**1.1971**	**0.0000**	**3,872.4876**

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	lb/day										lb/day					
2020	1.0571	19.1194	23.6513	0.0396	7.1937	0.9473	8.1410	3.9122	0.9472	4.8594	0.0000	3,842.5603	3,842.5603	1.1971	0.0000	3,872.4876
2021	1.0181	16.7838	20.3094	0.0380	0.6092	0.9143	1.5235	0.1650	0.9137	1.0787	0.0000	3,691.8719	3,691.8719	0.6906	0.0000	3,709.1365
Maximum	**1.0571**	**19.1194**	**23.6513**	**0.0396**	**7.1937**	**0.9473**	**8.1410**	**3.9122**	**0.9472**	**4.8594**	**0.0000**	**3,842.5603**	**3,842.5603**	**1.1971**	**0.0000**	**3,872.4876**

	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	**67.65**	**42.52**	**-6.66**	**0.00**	**58.55**	**41.24**	**56.05**	**59.77**	**36.58**	**54.56**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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	lb/day										lb/day					
Area	3.0586	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.7000e-004	6.7000e-004	0.0000		7.1000e-004
Energy	0.0747	0.6788	0.5702	4.0700e-003		0.0516	0.0516		0.0516	0.0516		814.5980	814.5980	0.0156	0.0149	819.4387
Mobile	0.2350	2.2705	0.9034	4.2000e-003	0.0868	2.9300e-003	0.0897	0.0233	2.7700e-003	0.0261		435.5465	435.5465	0.1018		438.0910
Total	**3.3682**	**2.9493**	**1.4739**	**8.2700e-003**	**0.0868**	**0.0545**	**0.1413**	**0.0233**	**0.0544**	**0.0777**		**1,250.1452**	**1,250.1452**	**0.1174**	**0.0149**	**1,257.5304**

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	lb/day										lb/day					
Area	3.0586	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.7000e-004	6.7000e-004	0.0000		7.1000e-004
Energy	0.0747	0.6788	0.5702	4.0700e-003		0.0516	0.0516		0.0516	0.0516		814.5980	814.5980	0.0156	0.0149	819.4387
Mobile	0.2350	2.2705	0.9034	4.2000e-003	0.0868	2.9300e-003	0.0897	0.0233	2.7700e-003	0.0261		435.5465	435.5465	0.1018		438.0910
Total	**3.3682**	**2.9493**	**1.4739**	**8.2700e-003**	**0.0868**	**0.0545**	**0.1413**	**0.0233**	**0.0544**	**0.0777**		**1,250.1452**	**1,250.1452**	**0.1174**	**0.0149**	**1,257.5304**

	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	Site Preparation	Site Preparation	1/30/2020	2/5/2020	5	5	
2	Grading	Grading	2/6/2020	2/17/2020	5	8	
3	Building Construction	Building Construction	2/18/2020	1/4/2021	5	230	
4	Paving	Paving	1/5/2021	1/28/2021	5	18	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 4

Acres of Paving: 0.28

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
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	1	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Cement and Mortar Mixers	2	6.00	9	0.56
Paving	Pavers	1	8.00	130	0.42
Paving	Paving Equipment	2	6.00	132	0.36
Paving	Rollers	2	6.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37

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
Site Preparation	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	56.00	22.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Site Preparation - 2020

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	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	4.0765	42.4173	21.5136	0.0380		2.1974	2.1974		2.0216	2.0216		3,685.1016	3,685.1016	1.1918		3,714.8975
Total	**4.0765**	**42.4173**	**21.5136**	**0.0380**	**18.0663**	**2.1974**	**20.2637**	**9.9307**	**2.0216**	**11.9523**		**3,685.1016**	**3,685.1016**	**1.1918**		**3,714.8975**

3.2 Site Preparation - 2020

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	lb/day										lb/day					
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
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
Worker	0.0937	0.0538	0.6913	1.5800e-003	0.1479	1.1200e-003	0.1490	0.0392	1.0300e-003	0.0403		157.4588	157.4588	5.2600e-003		157.5902
Total	**0.0937**	**0.0538**	**0.6913**	**1.5800e-003**	**0.1479**	**1.1200e-003**	**0.1490**	**0.0392**	**1.0300e-003**	**0.0403**		**157.4588**	**157.4588**	**5.2600e-003**		**157.5902**

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	lb/day										lb/day					
Fugitive Dust					7.0458	0.0000	7.0458	3.8730	0.0000	3.8730			0.0000			0.0000
Off-Road	0.9312	19.0656	22.9600	0.0380		0.9462	0.9462		0.9462	0.9462	0.0000	3,685.1016	3,685.1016	1.1918		3,714.8975
Total	**0.9312**	**19.0656**	**22.9600**	**0.0380**	**7.0458**	**0.9462**	**7.9920**	**3.8730**	**0.9462**	**4.8191**	**0.0000**	**3,685.1016**	**3,685.1016**	**1.1918**		**3,714.8975**

3.2 Site Preparation - 2020

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	lb/day										lb/day					
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
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
Worker	0.0937	0.0538	0.6913	1.5800e-003	0.1479	1.1200e-003	0.1490	0.0392	1.0300e-003	0.0403		157.4588	157.4588	5.2600e-003		157.5902
Total	**0.0937**	**0.0538**	**0.6913**	**1.5800e-003**	**0.1479**	**1.1200e-003**	**0.1490**	**0.0392**	**1.0300e-003**	**0.0403**		**157.4588**	**157.4588**	**5.2600e-003**		**157.5902**

3.3 Grading - 2020

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	lb/day										lb/day					
Fugitive Dust					6.5523	0.0000	6.5523	3.3675	0.0000	3.3675			0.0000			0.0000
Off-Road	2.4288	26.3859	16.0530	0.0297		1.2734	1.2734		1.1716	1.1716		2,872.4851	2,872.4851	0.9290		2,895.7106
Total	**2.4288**	**26.3859**	**16.0530**	**0.0297**	**6.5523**	**1.2734**	**7.8258**	**3.3675**	**1.1716**	**4.5390**		**2,872.4851**	**2,872.4851**	**0.9290**		**2,895.7106**

3.3 Grading - 2020

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	lb/day										lb/day					
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
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
Worker	0.0780	0.0448	0.5761	1.3200e-003	0.1232	9.4000e-004	0.1242	0.0327	8.6000e-004	0.0336		131.2156	131.2156	4.3800e-003		131.3251
Total	**0.0780**	**0.0448**	**0.5761**	**1.3200e-003**	**0.1232**	**9.4000e-004**	**0.1242**	**0.0327**	**8.6000e-004**	**0.0336**		**131.2156**	**131.2156**	**4.3800e-003**		**131.3251**

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	lb/day										lb/day					
Fugitive Dust					2.5554	0.0000	2.5554	1.3133	0.0000	1.3133			0.0000			0.0000
Off-Road	0.7263	14.8397	18.9906	0.0297		0.7555	0.7555		0.7555	0.7555	0.0000	2,872.4851	2,872.4851	0.9290		2,895.7106
Total	**0.7263**	**14.8397**	**18.9906**	**0.0297**	**2.5554**	**0.7555**	**3.3110**	**1.3133**	**0.7555**	**2.0689**	**0.0000**	**2,872.4851**	**2,872.4851**	**0.9290**		**2,895.7106**

3.3 Grading - 2020

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	lb/day										lb/day					
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
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
Worker	0.0780	0.0448	0.5761	1.3200e-003	0.1232	9.4000e-004	0.1242	0.0327	8.6000e-004	0.0336		131.2156	131.2156	4.3800e-003		131.3251
Total	**0.0780**	**0.0448**	**0.5761**	**1.3200e-003**	**0.1232**	**9.4000e-004**	**0.1242**	**0.0327**	**8.6000e-004**	**0.0336**		**131.2156**	**131.2156**	**4.3800e-003**		**131.3251**

3.4 Building Construction - 2020

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	lb/day										lb/day					
Off-Road	2.1198	19.1860	16.8485	0.0269		1.1171	1.1171		1.0503	1.0503		2,553.0631	2,553.0631	0.6229		2,568.6345
Total	**2.1198**	**19.1860**	**16.8485**	**0.0269**		**1.1171**	**1.1171**		**1.0503**	**1.0503**		**2,553.0631**	**2,553.0631**	**0.6229**		**2,568.6345**

3.4 Building Construction - 2020

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	lb/day										lb/day					
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
Vendor	0.0919	2.6381	0.5470	6.4000e-003	0.1492	0.0144	0.1636	0.0430	0.0138	0.0568		669.1512	669.1512	0.0621		670.7029
Worker	0.2914	0.1672	2.1506	4.9200e-003	0.4600	3.4900e-003	0.4635	0.1220	3.2200e-003	0.1252		489.8717	489.8717	0.0164		490.2805
Total	**0.3832**	**2.8053**	**2.6976**	**0.0113**	**0.6092**	**0.0179**	**0.6271**	**0.1650**	**0.0170**	**0.1820**		**1,159.0228**	**1,159.0228**	**0.0784**		**1,160.9834**

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	lb/day										lb/day					
Off-Road	0.6739	14.2261	17.8738	0.0269		0.9036	0.9036		0.9036	0.9036	0.0000	2,553.0631	2,553.0631	0.6229		2,568.6345
Total	**0.6739**	**14.2261**	**17.8738**	**0.0269**		**0.9036**	**0.9036**		**0.9036**	**0.9036**	**0.0000**	**2,553.0631**	**2,553.0631**	**0.6229**		**2,568.6345**

3.4 Building Construction - 2020

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	lb/day										lb/day					
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
Vendor	0.0919	2.6381	0.5470	6.4000e-003	0.1492	0.0144	0.1636	0.0430	0.0138	0.0568		669.1512	669.1512	0.0621		670.7029
Worker	0.2914	0.1672	2.1506	4.9200e-003	0.4600	3.4900e-003	0.4635	0.1220	3.2200e-003	0.1252		489.8717	489.8717	0.0164		490.2805
Total	**0.3832**	**2.8053**	**2.6976**	**0.0113**	**0.6092**	**0.0179**	**0.6271**	**0.1650**	**0.0170**	**0.1820**		**1,159.0228**	**1,159.0228**	**0.0784**		**1,160.9834**

3.4 Building Construction - 2021

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	lb/day										lb/day					
Off-Road	1.9009	17.4321	16.5752	0.0269		0.9586	0.9586		0.9013	0.9013		2,553.3639	2,553.3639	0.6160		2,568.7643
Total	**1.9009**	**17.4321**	**16.5752**	**0.0269**		**0.9586**	**0.9586**		**0.9013**	**0.9013**		**2,553.3639**	**2,553.3639**	**0.6160**		**2,568.7643**

3.4 Building Construction - 2021

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	lb/day										lb/day					
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
Vendor	0.0760	2.4089	0.4735	6.3400e-003	0.1492	7.3900e-003	0.1566	0.0430	7.0600e-003	0.0500		662.8700	662.8700	0.0598		664.3659
Worker	0.2682	0.1489	1.9621	4.7800e-003	0.4600	3.4000e-003	0.4634	0.1220	3.1300e-003	0.1252		475.6380	475.6380	0.0147		476.0063
Total	**0.3442**	**2.5578**	**2.4357**	**0.0111**	**0.6092**	**0.0108**	**0.6200**	**0.1650**	**0.0102**	**0.1752**		**1,138.5080**	**1,138.5080**	**0.0746**		**1,140.3723**

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	lb/day										lb/day					
Off-Road	0.6739	14.2261	17.8738	0.0269		0.9036	0.9036		0.9036	0.9036	0.0000	2,553.3639	2,553.3639	0.6160		2,568.7643
Total	**0.6739**	**14.2261**	**17.8738**	**0.0269**		**0.9036**	**0.9036**		**0.9036**	**0.9036**	**0.0000**	**2,553.3639**	**2,553.3639**	**0.6160**		**2,568.7643**

3.4 Building Construction - 2021

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	lb/day										lb/day					
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
Vendor	0.0760	2.4089	0.4735	6.3400e-003	0.1492	7.3900e-003	0.1566	0.0430	7.0600e-003	0.0500		662.8700	662.8700	0.0598		664.3659
Worker	0.2682	0.1489	1.9621	4.7800e-003	0.4600	3.4000e-003	0.4634	0.1220	3.1300e-003	0.1252		475.6380	475.6380	0.0147		476.0063
Total	**0.3442**	**2.5578**	**2.4357**	**0.0111**	**0.6092**	**0.0108**	**0.6200**	**0.1650**	**0.0102**	**0.1752**		**1,138.5080**	**1,138.5080**	**0.0746**		**1,140.3723**

3.5 Paving - 2021

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	lb/day										lb/day					
Off-Road	1.0940	10.8399	12.2603	0.0189		0.5788	0.5788		0.5342	0.5342		1,804.5523	1,804.5523	0.5670		1,818.7270
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0940**	**10.8399**	**12.2603**	**0.0189**		**0.5788**	**0.5788**		**0.5342**	**0.5342**		**1,804.5523**	**1,804.5523**	**0.5670**		**1,818.7270**

3.5 Paving - 2021

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	lb/day										lb/day					
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
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
Worker	0.0958	0.0532	0.7008	1.7100e-003	0.1643	1.2100e-003	0.1655	0.0436	1.1200e-003	0.0447		169.8707	169.8707	5.2600e-003		170.0023
Total	**0.0958**	**0.0532**	**0.7008**	**1.7100e-003**	**0.1643**	**1.2100e-003**	**0.1655**	**0.0436**	**1.1200e-003**	**0.0447**		**169.8707**	**169.8707**	**5.2600e-003**		**170.0023**

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	lb/day										lb/day					
Off-Road	0.4389	9.0888	13.5323	0.0189		0.5246	0.5246		0.5246	0.5246	0.0000	1,804.552 3	1,804.552 3	0.5670		1,818.727 0
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.4389**	**9.0888**	**13.5323**	**0.0189**		**0.5246**	**0.5246**		**0.5246**	**0.5246**	**0.0000**	**1,804.552 3**	**1,804.552 3**	**0.5670**		**1,818.727 0**

3.5 Paving - 2021

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	lb/day										lb/day					
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
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
Worker	0.0958	0.0532	0.7008	1.7100e-003	0.1643	1.2100e-003	0.1655	0.0436	1.1200e-003	0.0447		169.8707	169.8707	5.2600e-003		170.0023
Total	**0.0958**	**0.0532**	**0.7008**	**1.7100e-003**	**0.1643**	**1.2100e-003**	**0.1655**	**0.0436**	**1.1200e-003**	**0.0447**		**169.8707**	**169.8707**	**5.2600e-003**		**170.0023**

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	lb/day										lb/day					
Mitigated	0.2350	2.2705	0.9034	4.2000e-003	0.0868	2.9300e-003	0.0897	0.0233	2.7700e-003	0.0261		435.5465	435.5465	0.1018		438.0910
Unmitigated	0.2350	2.2705	0.9034	4.2000e-003	0.0868	2.9300e-003	0.0897	0.0233	2.7700e-003	0.0261		435.5465	435.5465	0.1018		438.0910

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Arena	125.85	0.00	0.00	28,621	28,621
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Total	125.85	0.00	0.00	28,621	28,621

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
Arena	1.19	1.19	1.19	0.00	81.00	19.00	66	28	6
Other Non-Asphalt Surfaces	0.00	0.00	0.00	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
Arena	0.492060	0.030872	0.155167	0.115051	0.019669	0.004846	0.015607	0.153483	0.002388	0.002252	0.006351	0.001584	0.000670
Other Non-Asphalt Surfaces	0.492060	0.030872	0.155167	0.115051	0.019669	0.004846	0.015607	0.153483	0.002388	0.002252	0.006351	0.001584	0.000670

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	lb/day										lb/day					
NaturalGas Mitigated	0.0747	0.6788	0.5702	4.0700e-003		0.0516	0.0516		0.0516	0.0516		814.5980	814.5980	0.0156	0.0149	819.4387
NaturalGas Unmitigated	0.0747	0.6788	0.5702	4.0700e-003		0.0516	0.0516		0.0516	0.0516		814.5980	814.5980	0.0156	0.0149	819.4387

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	lb/day										lb/day					
Arena	6924.08	0.0747	0.6788	0.5702	4.0700e-003		0.0516	0.0516		0.0516	0.0516		814.5980	814.5980	0.0156	0.0149	819.4387
Other Non-Asphalt Surfaces	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
Total		**0.0747**	**0.6788**	**0.5702**	**4.0700e-003**		**0.0516**	**0.0516**		**0.0516**	**0.0516**		**814.5980**	**814.5980**	**0.0156**	**0.0149**	**819.4387**

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	lb/day										lb/day					
Arena	6.92408	0.0747	0.6788	0.5702	4.0700e-003		0.0516	0.0516		0.0516	0.0516		814.5980	814.5980	0.0156	0.0149	819.4387
Other Non-Asphalt Surfaces	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
Total		**0.0747**	**0.6788**	**0.5702**	**4.0700e-003**		**0.0516**	**0.0516**		**0.0516**	**0.0516**		**814.5980**	**814.5980**	**0.0156**	**0.0149**	**819.4387**

6.0 Area Detail

6.1 Mitigation Measures Area

	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	lb/day										lb/day					
Mitigated	3.0586	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.7000e-004	6.7000e-004	0.0000		7.1000e-004
Unmitigated	3.0586	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.7000e-004	6.7000e-004	0.0000		7.1000e-004

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	lb/day										lb/day					
Architectural Coating	0.4627					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	2.5958					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	3.0000e-005	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.7000e-004	6.7000e-004	0.0000		7.1000e-004
Total	**3.0586**	**0.0000**	**3.1000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**6.7000e-004**	**6.7000e-004**	**0.0000**		**7.1000e-004**

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	lb/day										lb/day					
Architectural Coating	0.4627					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	2.5958					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	3.0000e-005	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.7000e-004	6.7000e-004	0.0000		7.1000e-004
Total	**3.0586**	**0.0000**	**3.1000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**6.7000e-004**	**6.7000e-004**	**0.0000**		**7.1000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

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

Equipment Type	Number

11.0 Vegetation

Merced High School Stadium Project

Merced County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	0.28	Acre	0.28	12,196.80	0
Arena	2.78	Acre	2.78	121,096.80	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	49
Climate Zone	3			**Operational Year**	2021
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	486.98	**CH4 Intensity (lb/MWhr)**	0.022	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Renewable portfolio standards adjustment to operation year 2021.

Land Use -

Construction Phase - Demolition and architectural coating would not occur.

Trips and VMT -

Architectural Coating -

Vehicle Trips - Maximum of 2,294 daily trips and 1.19 miles trip length.

Energy Use -

Water And Wastewater - No indoor water use would occur at the stadium.

Construction Off-road Equipment Mitigation - Soil stabilizer for unpaved roads; 50% PM reduction. Water exposed area; 61% PM reduction. Unpaved road mitigation; vehicle speed limit 15mph.

Area Mitigation -

Energy Mitigation -

Water Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	11.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00

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
tblConstEquipMitigation	Tier	No Change	Tier 3
tblProjectCharacteristics	CH4IntensityFactor	0.029	0.022
tblProjectCharacteristics	CO2IntensityFactor	641.35	486.98
tblProjectCharacteristics	N2OIntensityFactor	0.006	0.004
tblVehicleTrips	CC_TL	7.30	1.19
tblVehicleTrips	CC_TL	7.30	0.00
tblVehicleTrips	CNW_TL	7.30	1.19
tblVehicleTrips	CNW_TL	7.30	0.00
tblVehicleTrips	CW_TL	9.50	1.19
tblVehicleTrips	CW_TL	9.50	0.00
tblVehicleTrips	WD_TR	33.33	45.27
tblWater	IndoorWaterUseRate	3,742,315.40	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

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	lb/day										lb/day					
2020	4.1632	42.4813	22.1087	0.0394	18.2141	2.1985	20.4127	9.9699	2.0227	11.9926	0.0000	3,824.2373	3,824.2373	1.1965	0.0000	3,854.1494
2021	2.2289	20.0398	18.8120	0.0373	0.6092	0.9697	1.5789	0.1650	0.9117	1.0767	0.0000	3,615.0284	3,615.0284	0.6967	0.0000	3,632.4464
Maximum	**4.1632**	**42.4813**	**22.1087**	**0.0394**	**18.2141**	**2.1985**	**20.4127**	**9.9699**	**2.0227**	**11.9926**	**0.0000**	**3,824.2373**	**3,824.2373**	**1.1965**	**0.0000**	**3,854.1494**

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	lb/day										lb/day					
2020	1.0398	19.1295	23.5551	0.0394	7.1937	0.9473	8.1410	3.9122	0.9472	4.8594	0.0000	3,824.2373	3,824.2373	1.1965	0.0000	3,854.1494
2021	1.0019	16.8338	20.1106	0.0373	0.6092	0.9146	1.5238	0.1650	0.9140	1.0790	0.0000	3,615.0284	3,615.0284	0.6967	0.0000	3,632.4464
Maximum	**1.0398**	**19.1295**	**23.5551**	**0.0394**	**7.1937**	**0.9473**	**8.1410**	**3.9122**	**0.9472**	**4.8594**	**0.0000**	**3,824.2373**	**3,824.2373**	**1.1965**	**0.0000**	**3,854.1494**

	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	**68.06**	**42.48**	**-6.71**	**0.00**	**58.55**	**41.23**	**56.05**	**59.77**	**36.57**	**54.56**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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	lb/day										lb/day					
Area	3.0586	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.7000e-004	6.7000e-004	0.0000		7.1000e-004
Energy	0.0747	0.6788	0.5702	4.0700e-003		0.0516	0.0516		0.0516	0.0516		814.5980	814.5980	0.0156	0.0149	819.4387
Mobile	0.1785	2.2119	1.1542	3.7700e-003	0.0868	3.2900e-003	0.0901	0.0233	3.1100e-003	0.0264		390.2975	390.2975	0.1161		393.2004
Total	**3.3117**	**2.8907**	**1.7248**	**7.8400e-003**	**0.0868**	**0.0549**	**0.1417**	**0.0233**	**0.0547**	**0.0780**		**1,204.8962**	**1,204.8962**	**0.1317**	**0.0149**	**1,212.6398**

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	lb/day										lb/day					
Area	3.0586	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.7000e-004	6.7000e-004	0.0000		7.1000e-004
Energy	0.0747	0.6788	0.5702	4.0700e-003		0.0516	0.0516		0.0516	0.0516		814.5980	814.5980	0.0156	0.0149	819.4387
Mobile	0.1785	2.2119	1.1542	3.7700e-003	0.0868	3.2900e-003	0.0901	0.0233	3.1100e-003	0.0264		390.2975	390.2975	0.1161		393.2004
Total	**3.3117**	**2.8907**	**1.7248**	**7.8400e-003**	**0.0868**	**0.0549**	**0.1417**	**0.0233**	**0.0547**	**0.0780**		**1,204.8962**	**1,204.8962**	**0.1317**	**0.0149**	**1,212.6398**

	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	Site Preparation	Site Preparation	1/30/2020	2/5/2020	5	5	
2	Grading	Grading	2/6/2020	2/17/2020	5	8	
3	Building Construction	Building Construction	2/18/2020	1/4/2021	5	230	
4	Paving	Paving	1/5/2021	1/28/2021	5	18	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 4

Acres of Paving: 0.28

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
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	1	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Cement and Mortar Mixers	2	6.00	9	0.56
Paving	Pavers	1	8.00	130	0.42
Paving	Paving Equipment	2	6.00	132	0.36
Paving	Rollers	2	6.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37

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
Site Preparation	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	56.00	22.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Site Preparation - 2020

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	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	4.0765	42.4173	21.5136	0.0380		2.1974	2.1974		2.0216	2.0216		3,685.1016	3,685.1016	1.1918		3,714.8975
Total	**4.0765**	**42.4173**	**21.5136**	**0.0380**	**18.0663**	**2.1974**	**20.2637**	**9.9307**	**2.0216**	**11.9523**		**3,685.1016**	**3,685.1016**	**1.1918**		**3,714.8975**

3.2 Site Preparation - 2020

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	lb/day										lb/day					
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
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
Worker	0.0867	0.0639	0.5951	1.4000e-003	0.1479	1.1200e-003	0.1490	0.0392	1.0300e-003	0.0403		139.1358	139.1358	4.6500e-003		139.2519
Total	**0.0867**	**0.0639**	**0.5951**	**1.4000e-003**	**0.1479**	**1.1200e-003**	**0.1490**	**0.0392**	**1.0300e-003**	**0.0403**		**139.1358**	**139.1358**	**4.6500e-003**		**139.2519**

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	lb/day										lb/day					
Fugitive Dust					7.0458	0.0000	7.0458	3.8730	0.0000	3.8730			0.0000			0.0000
Off-Road	0.9312	19.0656	22.9600	0.0380		0.9462	0.9462		0.9462	0.9462	0.0000	3,685.1016	3,685.1016	1.1918		3,714.8975
Total	**0.9312**	**19.0656**	**22.9600**	**0.0380**	**7.0458**	**0.9462**	**7.9920**	**3.8730**	**0.9462**	**4.8191**	**0.0000**	**3,685.1016**	**3,685.1016**	**1.1918**		**3,714.8975**

3.2 Site Preparation - 2020

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	lb/day										lb/day					
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
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
Worker	0.0867	0.0639	0.5951	1.4000e-003	0.1479	1.1200e-003	0.1490	0.0392	1.0300e-003	0.0403		139.1358	139.1358	4.6500e-003		139.2519
Total	**0.0867**	**0.0639**	**0.5951**	**1.4000e-003**	**0.1479**	**1.1200e-003**	**0.1490**	**0.0392**	**1.0300e-003**	**0.0403**		**139.1358**	**139.1358**	**4.6500e-003**		**139.2519**

3.3 Grading - 2020

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	lb/day										lb/day					
Fugitive Dust					6.5523	0.0000	6.5523	3.3675	0.0000	3.3675			0.0000			0.0000
Off-Road	2.4288	26.3859	16.0530	0.0297		1.2734	1.2734		1.1716	1.1716		2,872.4851	2,872.4851	0.9290		2,895.7106
Total	**2.4288**	**26.3859**	**16.0530**	**0.0297**	**6.5523**	**1.2734**	**7.8258**	**3.3675**	**1.1716**	**4.5390**		**2,872.4851**	**2,872.4851**	**0.9290**		**2,895.7106**

3.3 Grading - 2020

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	lb/day										lb/day					
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
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
Worker	0.0723	0.0533	0.4959	1.1700e-003	0.1232	9.4000e-004	0.1242	0.0327	8.6000e-004	0.0336		115.9465	115.9465	3.8700e-003		116.0433
Total	**0.0723**	**0.0533**	**0.4959**	**1.1700e-003**	**0.1232**	**9.4000e-004**	**0.1242**	**0.0327**	**8.6000e-004**	**0.0336**		**115.9465**	**115.9465**	**3.8700e-003**		**116.0433**

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	lb/day										lb/day					
Fugitive Dust					2.5554	0.0000	2.5554	1.3133	0.0000	1.3133			0.0000			0.0000
Off-Road	0.7263	14.8397	18.9906	0.0297		0.7555	0.7555		0.7555	0.7555	0.0000	2,872.4851	2,872.4851	0.9290		2,895.7106
Total	**0.7263**	**14.8397**	**18.9906**	**0.0297**	**2.5554**	**0.7555**	**3.3110**	**1.3133**	**0.7555**	**2.0689**	**0.0000**	**2,872.4851**	**2,872.4851**	**0.9290**		**2,895.7106**

3.3 Grading - 2020

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	lb/day										lb/day					
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
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
Worker	0.0723	0.0533	0.4959	1.1700e-003	0.1232	9.4000e-004	0.1242	0.0327	8.6000e-004	0.0336		115.9465	115.9465	3.8700e-003		116.0433
Total	**0.0723**	**0.0533**	**0.4959**	**1.1700e-003**	**0.1232**	**9.4000e-004**	**0.1242**	**0.0327**	**8.6000e-004**	**0.0336**		**115.9465**	**115.9465**	**3.8700e-003**		**116.0433**

3.4 Building Construction - 2020

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	lb/day										lb/day					
Off-Road	2.1198	19.1860	16.8485	0.0269		1.1171	1.1171		1.0503	1.0503		2,553.0631	2,553.0631	0.6229		2,568.6345
Total	**2.1198**	**19.1860**	**16.8485**	**0.0269**		**1.1171**	**1.1171**		**1.0503**	**1.0503**		**2,553.0631**	**2,553.0631**	**0.6229**		**2,568.6345**

3.4 Building Construction - 2020

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	lb/day										lb/day					
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
Vendor	0.0961	2.6701	0.6353	6.1900e-003	0.1492	0.0147	0.1639	0.0430	0.0141	0.0571		647.5109	647.5109	0.0701		649.2621
Worker	0.2698	0.1989	1.8514	4.3500e-003	0.4600	3.4900e-003	0.4635	0.1220	3.2200e-003	0.1252		432.8668	432.8668	0.0145		433.2283
Total	**0.3659**	**2.8690**	**2.4866**	**0.0105**	**0.6092**	**0.0182**	**0.6274**	**0.1650**	**0.0173**	**0.1823**		**1,080.3777**	**1,080.3777**	**0.0845**		**1,082.4904**

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	lb/day										lb/day					
Off-Road	0.6739	14.2261	17.8738	0.0269		0.9036	0.9036		0.9036	0.9036	0.0000	2,553.0631	2,553.0631	0.6229		2,568.6345
Total	**0.6739**	**14.2261**	**17.8738**	**0.0269**		**0.9036**	**0.9036**		**0.9036**	**0.9036**	**0.0000**	**2,553.0631**	**2,553.0631**	**0.6229**		**2,568.6345**

3.4 Building Construction - 2020

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	lb/day										lb/day					
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
Vendor	0.0961	2.6701	0.6353	6.1900e-003	0.1492	0.0147	0.1639	0.0430	0.0141	0.0571		647.5109	647.5109	0.0701		649.2621
Worker	0.2698	0.1989	1.8514	4.3500e-003	0.4600	3.4900e-003	0.4635	0.1220	3.2200e-003	0.1252		432.8668	432.8668	0.0145		433.2283
Total	**0.3659**	**2.8690**	**2.4866**	**0.0105**	**0.6092**	**0.0182**	**0.6274**	**0.1650**	**0.0173**	**0.1823**		**1,080.3777**	**1,080.3777**	**0.0845**		**1,082.4904**

3.4 Building Construction - 2021

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	lb/day										lb/day					
Off-Road	1.9009	17.4321	16.5752	0.0269		0.9586	0.9586		0.9013	0.9013		2,553.3639	2,553.3639	0.6160		2,568.7643
Total	**1.9009**	**17.4321**	**16.5752**	**0.0269**		**0.9586**	**0.9586**		**0.9013**	**0.9013**		**2,553.3639**	**2,553.3639**	**0.6160**		**2,568.7643**

3.4 Building Construction - 2021

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	lb/day										lb/day					
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
Vendor	0.0800	2.4308	0.5552	6.1300e-003	0.1492	7.6600e-003	0.1569	0.0430	7.3300e-003	0.0503		641.3961	641.3961	0.0677		643.0889
Worker	0.2480	0.1769	1.6816	4.2200e-003	0.4600	3.4000e-003	0.4634	0.1220	3.1300e-003	0.1252		420.2684	420.2684	0.0130		420.5932
Total	**0.3280**	**2.6077**	**2.2368**	**0.0104**	**0.6092**	**0.0111**	**0.6203**	**0.1650**	**0.0105**	**0.1754**		**1,061.6645**	**1,061.6645**	**0.0807**		**1,063.6822**

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	lb/day										lb/day					
Off-Road	0.6739	14.2261	17.8738	0.0269		0.9036	0.9036		0.9036	0.9036	0.0000	2,553.3639	2,553.3639	0.6160		2,568.7643
Total	**0.6739**	**14.2261**	**17.8738**	**0.0269**		**0.9036**	**0.9036**		**0.9036**	**0.9036**	**0.0000**	**2,553.3639**	**2,553.3639**	**0.6160**		**2,568.7643**

3.4 Building Construction - 2021

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	lb/day										lb/day					
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
Vendor	0.0800	2.4308	0.5552	6.1300e-003	0.1492	7.6600e-003	0.1569	0.0430	7.3300e-003	0.0503		641.3961	641.3961	0.0677		643.0889
Worker	0.2480	0.1769	1.6816	4.2200e-003	0.4600	3.4000e-003	0.4634	0.1220	3.1300e-003	0.1252		420.2684	420.2684	0.0130		420.5932
Total	**0.3280**	**2.6077**	**2.2368**	**0.0104**	**0.6092**	**0.0111**	**0.6203**	**0.1650**	**0.0105**	**0.1754**		**1,061.6645**	**1,061.6645**	**0.0807**		**1,063.6822**

3.5 Paving - 2021

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	lb/day										lb/day					
Off-Road	1.0940	10.8399	12.2603	0.0189		0.5788	0.5788		0.5342	0.5342		1,804.5523	1,804.5523	0.5670		1,818.7270
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0940**	**10.8399**	**12.2603**	**0.0189**		**0.5788**	**0.5788**		**0.5342**	**0.5342**		**1,804.5523**	**1,804.5523**	**0.5670**		**1,818.7270**

3.5 Paving - 2021

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	lb/day										lb/day					
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
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
Worker	0.0886	0.0632	0.6006	1.5100e-003	0.1643	1.2100e-003	0.1655	0.0436	1.1200e-003	0.0447		150.0958	150.0958	4.6400e-003		150.2119
Total	**0.0886**	**0.0632**	**0.6006**	**1.5100e-003**	**0.1643**	**1.2100e-003**	**0.1655**	**0.0436**	**1.1200e-003**	**0.0447**		**150.0958**	**150.0958**	**4.6400e-003**		**150.2119**

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	lb/day										lb/day					
Off-Road	0.4389	9.0888	13.5323	0.0189		0.5246	0.5246		0.5246	0.5246	0.0000	1,804.5523	1,804.5523	0.5670		1,818.7270
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.4389**	**9.0888**	**13.5323**	**0.0189**		**0.5246**	**0.5246**		**0.5246**	**0.5246**	**0.0000**	**1,804.5523**	**1,804.5523**	**0.5670**		**1,818.7270**

3.5 Paving - 2021

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	lb/day										lb/day					
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
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
Worker	0.0886	0.0632	0.6006	1.5100e-003	0.1643	1.2100e-003	0.1655	0.0436	1.1200e-003	0.0447		150.0958	150.0958	4.6400e-003		150.2119
Total	**0.0886**	**0.0632**	**0.6006**	**1.5100e-003**	**0.1643**	**1.2100e-003**	**0.1655**	**0.0436**	**1.1200e-003**	**0.0447**		**150.0958**	**150.0958**	**4.6400e-003**		**150.2119**

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	lb/day										lb/day					
Mitigated	0.1785	2.2119	1.1542	3.7700e-003	0.0868	3.2900e-003	0.0901	0.0233	3.1100e-003	0.0264		390.2975	390.2975	0.1161		393.2004
Unmitigated	0.1785	2.2119	1.1542	3.7700e-003	0.0868	3.2900e-003	0.0901	0.0233	3.1100e-003	0.0264		390.2975	390.2975	0.1161		393.2004

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Arena	125.85	0.00	0.00	28,621	28,621
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Total	125.85	0.00	0.00	28,621	28,621

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
Arena	1.19	1.19	1.19	0.00	81.00	19.00	66	28	6
Other Non-Asphalt Surfaces	0.00	0.00	0.00	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
Arena	0.492060	0.030872	0.155167	0.115051	0.019669	0.004846	0.015607	0.153483	0.002388	0.002252	0.006351	0.001584	0.000670
Other Non-Asphalt Surfaces	0.492060	0.030872	0.155167	0.115051	0.019669	0.004846	0.015607	0.153483	0.002388	0.002252	0.006351	0.001584	0.000670

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	lb/day										lb/day					
NaturalGas Mitigated	0.0747	0.6788	0.5702	4.0700e-003		0.0516	0.0516		0.0516	0.0516		814.5980	814.5980	0.0156	0.0149	819.4387
NaturalGas Unmitigated	0.0747	0.6788	0.5702	4.0700e-003		0.0516	0.0516		0.0516	0.0516		814.5980	814.5980	0.0156	0.0149	819.4387

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	lb/day										lb/day					
Arena	6924.08	0.0747	0.6788	0.5702	4.0700e-003		0.0516	0.0516		0.0516	0.0516		814.5980	814.5980	0.0156	0.0149	819.4387
Other Non-Asphalt Surfaces	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
Total		**0.0747**	**0.6788**	**0.5702**	**4.0700e-003**		**0.0516**	**0.0516**		**0.0516**	**0.0516**		**814.5980**	**814.5980**	**0.0156**	**0.0149**	**819.4387**

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	lb/day										lb/day					
Arena	6.92408	0.0747	0.6788	0.5702	4.0700e-003		0.0516	0.0516		0.0516	0.0516		814.5980	814.5980	0.0156	0.0149	819.4387
Other Non-Asphalt Surfaces	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
Total		**0.0747**	**0.6788**	**0.5702**	**4.0700e-003**		**0.0516**	**0.0516**		**0.0516**	**0.0516**		**814.5980**	**814.5980**	**0.0156**	**0.0149**	**819.4387**

6.0 Area Detail

6.1 Mitigation Measures Area

	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	lb/day										lb/day					
Mitigated	3.0586	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.7000e-004	6.7000e-004	0.0000		7.1000e-004
Unmitigated	3.0586	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.7000e-004	6.7000e-004	0.0000		7.1000e-004

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	lb/day										lb/day					
Architectural Coating	0.4627					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	2.5958					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	3.0000e-005	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.7000e-004	6.7000e-004	0.0000		7.1000e-004
Total	**3.0586**	**0.0000**	**3.1000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**6.7000e-004**	**6.7000e-004**	**0.0000**		**7.1000e-004**

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	lb/day										lb/day					
Architectural Coating	0.4627					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	2.5958					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	3.0000e-005	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.7000e-004	6.7000e-004	0.0000		7.1000e-004
Total	**3.0586**	**0.0000**	**3.1000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**6.7000e-004**	**6.7000e-004**	**0.0000**		**7.1000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

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

Equipment Type	Number

11.0 Vegetation

Merced High School Stadium Project

Merced County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	0.28	Acre	0.28	12,196.80	0
Arena	2.78	Acre	2.78	121,096.80	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	49
Climate Zone	3			**Operational Year**	2030
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	372.88	**CH4 Intensity (lb/MWhr)**	0.013	**N2O Intensity (lb/MWhr)**	0.003

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Renewable portfolio standards adjustment to operation year 2030.

Land Use -

Construction Phase - Demolition and architectural coating would not occur.

Trips and VMT -

Architectural Coating -

Vehicle Trips - Maximum of 2,294 daily trips and 1.19 miles trip length.

Energy Use -

Water And Wastewater - No indoor water use would occur at the stadium.

Construction Off-road Equipment Mitigation - Soil stabilizer for unpaved roads; 50% PM reduction. Water exposed area; 61% PM reduction. Unpaved road mitigation; vehicle speed limit 15mph.

Area Mitigation -

Energy Mitigation -

Water Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	11.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00

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
tblConstEquipMitigation	Tier	No Change	Tier 3
tblProjectCharacteristics	CH4IntensityFactor	0.029	0.013
tblProjectCharacteristics	CO2IntensityFactor	641.35	372.88
tblProjectCharacteristics	N2OIntensityFactor	0.006	0.003
tblVehicleTrips	CC_TL	7.30	1.19
tblVehicleTrips	CC_TL	7.30	0.00
tblVehicleTrips	CNW_TL	7.30	1.19
tblVehicleTrips	CNW_TL	7.30	0.00
tblVehicleTrips	CW_TL	9.50	1.19
tblVehicleTrips	CW_TL	9.50	0.00
tblVehicleTrips	WD_TR	33.33	45.27
tblWater	IndoorWaterUseRate	3,742,315.40	0.00

2.0 Emissions Summary

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					
2020	0.3017	2.7246	2.3218	4.5200e-003	0.1397	0.1400	0.2797	0.0569	0.1314	0.1883	0.0000	398.1635	398.1635	0.0788	0.0000	400.1338
2021	0.0128	0.1181	0.1346	2.2000e-004	2.0300e-003	6.1900e-003	8.2200e-003	5.4000e-004	5.7300e-003	6.2700e-003	0.0000	19.3057	19.3057	5.3000e-003	0.0000	19.4381
Maximum	**0.3017**	**2.7246**	**2.3218**	**4.5200e-003**	**0.1397**	**0.1400**	**0.2797**	**0.0569**	**0.1314**	**0.1883**	**0.0000**	**398.1635**	**398.1635**	**0.0788**	**0.0000**	**400.1338**

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					
2020	0.1222	2.0546	2.4540	4.5200e-003	0.0962	0.1105	0.2066	0.0335	0.1104	0.1438	0.0000	398.1632	398.1632	0.0788	0.0000	400.1334
2021	5.6900e-003	0.0991	0.1473	2.2000e-004	2.0300e-003	5.6500e-003	7.6700e-003	5.4000e-004	5.6500e-003	6.1900e-003	0.0000	19.3057	19.3057	5.3000e-003	0.0000	19.4381
Maximum	**0.1222**	**2.0546**	**2.4540**	**4.5200e-003**	**0.0962**	**0.1105**	**0.2066**	**0.0335**	**0.1104**	**0.1438**	**0.0000**	**398.1632**	**398.1632**	**0.0788**	**0.0000**	**400.1334**

	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	**59.33**	**24.24**	**-5.90**	**0.00**	**30.71**	**20.58**	**25.57**	**40.70**	**15.43**	**22.89**	**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)
1	1-2-2020	4-1-2020	0.6263	0.4026
2	4-2-2020	7-1-2020	0.7961	0.5879
3	7-2-2020	10-1-2020	0.8048	0.5944
4	10-2-2020	1-1-2021	0.8055	0.5958
5	1-2-2021	4-1-2021	0.1274	0.1021
		Highest	0.8055	0.5958

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	0.5582	0.0000	3.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	5.0000e-005	5.0000e-005	0.0000	0.0000	6.0000e-005
Energy	0.0136	0.1239	0.1041	7.4000e-004		9.4200e-003	9.4200e-003		9.4200e-003	9.4200e-003	0.0000	315.5151	315.5151	8.8800e-003	3.9300e-003	316.9071
Mobile	0.0131	0.2189	0.0638	4.4000e-004	0.0109	1.5000e-004	0.0111	2.9400e-003	1.4000e-004	3.0800e-003	0.0000	41.4479	41.4479	0.0107	0.0000	41.7145
Waste						0.0000	0.0000		0.0000	0.0000	0.0487	0.0000	0.0487	2.8800e-003	0.0000	0.1207
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.1414	0.1414	0.0000	0.0000	0.1419
Total	**0.5849**	**0.3428**	**0.1679**	**1.1800e-003**	**0.0109**	**9.5700e-003**	**0.0205**	**2.9400e-003**	**9.5600e-003**	**0.0125**	**0.0487**	**357.1044**	**357.1531**	**0.0224**	**3.9300e-003**	**358.8842**

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	0.5582	0.0000	3.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	5.0000e-005	5.0000e-005	0.0000	0.0000	6.0000e-005
Energy	0.0136	0.1239	0.1041	7.4000e-004		9.4200e-003	9.4200e-003		9.4200e-003	9.4200e-003	0.0000	315.5151	315.5151	8.8800e-003	3.9300e-003	316.9071
Mobile	0.0131	0.2189	0.0638	4.4000e-004	0.0109	1.5000e-004	0.0111	2.9400e-003	1.4000e-004	3.0800e-003	0.0000	41.4479	41.4479	0.0107	0.0000	41.7145
Waste						0.0000	0.0000		0.0000	0.0000	0.0487	0.0000	0.0487	2.8800e-003	0.0000	0.1207
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.1414	0.1414	0.0000	0.0000	0.1419
Total	**0.5849**	**0.3428**	**0.1679**	**1.1800e-003**	**0.0109**	**9.5700e-003**	**0.0205**	**2.9400e-003**	**9.5600e-003**	**0.0125**	**0.0487**	**357.1044**	**357.1531**	**0.0224**	**3.9300e-003**	**358.8842**

	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	Site Preparation	Site Preparation	1/30/2020	2/5/2020	5	5	
2	Grading	Grading	2/6/2020	2/17/2020	5	8	
3	Building Construction	Building Construction	2/18/2020	1/4/2021	5	230	
4	Paving	Paving	1/5/2021	1/28/2021	5	18	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 4

Acres of Paving: 0.28

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
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	1	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Cement and Mortar Mixers	2	6.00	9	0.56
Paving	Pavers	1	8.00	130	0.42
Paving	Paving Equipment	2	6.00	132	0.36
Paving	Rollers	2	6.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37

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
Site Preparation	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	56.00	22.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Site Preparation - 2020

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					0.0452	0.0000	0.0452	0.0248	0.0000	0.0248	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0102	0.1060	0.0538	1.0000e-004		5.4900e-003	5.4900e-003		5.0500e-003	5.0500e-003	0.0000	8.3577	8.3577	2.7000e-003	0.0000	8.4253
Total	**0.0102**	**0.1060**	**0.0538**	**1.0000e-004**	**0.0452**	**5.4900e-003**	**0.0507**	**0.0248**	**5.0500e-003**	**0.0299**	**0.0000**	**8.3577**	**8.3577**	**2.7000e-003**	**0.0000**	**8.4253**

3.2 Site Preparation - 2020

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	2.0000e-004	1.5000e-004	1.5000e-003	0.0000	3.6000e-004	0.0000	3.6000e-004	1.0000e-004	0.0000	1.0000e-004	0.0000	0.3265	0.3265	1.0000e-005	0.0000	0.3268
Total	**2.0000e-004**	**1.5000e-004**	**1.5000e-003**	**0.0000**	**3.6000e-004**	**0.0000**	**3.6000e-004**	**1.0000e-004**	**0.0000**	**1.0000e-004**	**0.0000**	**0.3265**	**0.3265**	**1.0000e-005**	**0.0000**	**0.3268**

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					0.0176	0.0000	0.0176	9.6800e-003	0.0000	9.6800e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.3300e-003	0.0477	0.0574	1.0000e-004		2.3700e-003	2.3700e-003		2.3700e-003	2.3700e-003	0.0000	8.3577	8.3577	2.7000e-003	0.0000	8.4252
Total	**2.3300e-003**	**0.0477**	**0.0574**	**1.0000e-004**	**0.0176**	**2.3700e-003**	**0.0200**	**9.6800e-003**	**2.3700e-003**	**0.0121**	**0.0000**	**8.3577**	**8.3577**	**2.7000e-003**	**0.0000**	**8.4252**

3.2 Site Preparation - 2020

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	2.0000e-004	1.5000e-004	1.5000e-003	0.0000	3.6000e-004	0.0000	3.6000e-004	1.0000e-004	0.0000	1.0000e-004	0.0000	0.3265	0.3265	1.0000e-005	0.0000	0.3268
Total	**2.0000e-004**	**1.5000e-004**	**1.5000e-003**	**0.0000**	**3.6000e-004**	**0.0000**	**3.6000e-004**	**1.0000e-004**	**0.0000**	**1.0000e-004**	**0.0000**	**0.3265**	**0.3265**	**1.0000e-005**	**0.0000**	**0.3268**

3.3 Grading - 2020

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					0.0262	0.0000	0.0262	0.0135	0.0000	0.0135	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	9.7200e-003	0.1055	0.0642	1.2000e-004		5.0900e-003	5.0900e-003		4.6900e-003	4.6900e-003	0.0000	10.4235	10.4235	3.3700e-003	0.0000	10.5078
Total	**9.7200e-003**	**0.1055**	**0.0642**	**1.2000e-004**	**0.0262**	**5.0900e-003**	**0.0313**	**0.0135**	**4.6900e-003**	**0.0182**	**0.0000**	**10.4235**	**10.4235**	**3.3700e-003**	**0.0000**	**10.5078**

3.3 Grading - 2020

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	2.7000e-004	1.9000e-004	2.0000e-003	0.0000	4.8000e-004	0.0000	4.8000e-004	1.3000e-004	0.0000	1.3000e-004	0.0000	0.4354	0.4354	1.0000e-005	0.0000	0.4357
Total	**2.7000e-004**	**1.9000e-004**	**2.0000e-003**	**0.0000**	**4.8000e-004**	**0.0000**	**4.8000e-004**	**1.3000e-004**	**0.0000**	**1.3000e-004**	**0.0000**	**0.4354**	**0.4354**	**1.0000e-005**	**0.0000**	**0.4357**

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					0.0102	0.0000	0.0102	5.2500e-003	0.0000	5.2500e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.9100e-003	0.0594	0.0760	1.2000e-004		3.0200e-003	3.0200e-003		3.0200e-003	3.0200e-003	0.0000	10.4235	10.4235	3.3700e-003	0.0000	10.5078
Total	**2.9100e-003**	**0.0594**	**0.0760**	**1.2000e-004**	**0.0102**	**3.0200e-003**	**0.0132**	**5.2500e-003**	**3.0200e-003**	**8.2700e-003**	**0.0000**	**10.4235**	**10.4235**	**3.3700e-003**	**0.0000**	**10.5078**

3.3 Grading - 2020

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	2.7000e-004	1.9000e-004	2.0000e-003	0.0000	4.8000e-004	0.0000	4.8000e-004	1.3000e-004	0.0000	1.3000e-004	0.0000	0.4354	0.4354	1.0000e-005	0.0000	0.4357
Total	**2.7000e-004**	**1.9000e-004**	**2.0000e-003**	**0.0000**	**4.8000e-004**	**0.0000**	**4.8000e-004**	**1.3000e-004**	**0.0000**	**1.3000e-004**	**0.0000**	**0.4354**	**0.4354**	**1.0000e-005**	**0.0000**	**0.4357**

3.4 Building Construction - 2020

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	0.2417	2.1872	1.9207	3.0700e-003		0.1273	0.1273		0.1197	0.1197	0.0000	264.0354	264.0354	0.0644	0.0000	265.6458
Total	**0.2417**	**2.1872**	**1.9207**	**3.0700e-003**		**0.1273**	**0.1273**		**0.1197**	**0.1197**	**0.0000**	**264.0354**	**264.0354**	**0.0644**	**0.0000**	**265.6458**

3.4 Building Construction - 2020

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	0.0106	0.3049	0.0667	7.2000e-004	0.0166	1.6600e-003	0.0183	4.8000e-003	1.5900e-003	6.3800e-003	0.0000	68.2627	68.2627	6.7700e-003	0.0000	68.4319
Worker	0.0291	0.0206	0.2129	5.1000e-004	0.0509	4.0000e-004	0.0513	0.0135	3.7000e-004	0.0139	0.0000	46.3224	46.3224	1.5300e-003	0.0000	46.3605
Total	**0.0397**	**0.3255**	**0.2795**	**1.2300e-003**	**0.0675**	**2.0600e-003**	**0.0696**	**0.0183**	**1.9600e-003**	**0.0203**	**0.0000**	**114.5851**	**114.5851**	**8.3000e-003**	**0.0000**	**114.7925**

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	0.0768	1.6218	2.0376	3.0700e-003		0.1030	0.1030		0.1030	0.1030	0.0000	264.0351	264.0351	0.0644	0.0000	265.6455
Total	**0.0768**	**1.6218**	**2.0376**	**3.0700e-003**		**0.1030**	**0.1030**		**0.1030**	**0.1030**	**0.0000**	**264.0351**	**264.0351**	**0.0644**	**0.0000**	**265.6455**

3.4 Building Construction - 2020

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	0.0106	0.3049	0.0667	7.2000e-004	0.0166	1.6600e-003	0.0183	4.8000e-003	1.5900e-003	6.3800e-003	0.0000	68.2627	68.2627	6.7700e-003	0.0000	68.4319
Worker	0.0291	0.0206	0.2129	5.1000e-004	0.0509	4.0000e-004	0.0513	0.0135	3.7000e-004	0.0139	0.0000	46.3224	46.3224	1.5300e-003	0.0000	46.3605
Total	**0.0397**	**0.3255**	**0.2795**	**1.2300e-003**	**0.0675**	**2.0600e-003**	**0.0696**	**0.0183**	**1.9600e-003**	**0.0203**	**0.0000**	**114.5851**	**114.5851**	**8.3000e-003**	**0.0000**	**114.7925**

3.4 Building Construction - 2021

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	1.9000e-003	0.0174	0.0166	3.0000e-005		9.6000e-004	9.6000e-004		9.0000e-004	9.0000e-004	0.0000	2.3164	2.3164	5.6000e-004	0.0000	2.3303
Total	**1.9000e-003**	**0.0174**	**0.0166**	**3.0000e-005**		**9.6000e-004**	**9.6000e-004**		**9.0000e-004**	**9.0000e-004**	**0.0000**	**2.3164**	**2.3164**	**5.6000e-004**	**0.0000**	**2.3303**

3.4 Building Construction - 2021

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	8.0000e-005	2.4400e-003	5.1000e-004	1.0000e-005	1.5000e-004	1.0000e-005	1.5000e-004	4.0000e-005	1.0000e-005	5.0000e-005	0.0000	0.5932	0.5932	6.0000e-005	0.0000	0.5946
Worker	2.3000e-004	1.6000e-004	1.7000e-003	0.0000	4.5000e-004	0.0000	4.5000e-004	1.2000e-004	0.0000	1.2000e-004	0.0000	0.3945	0.3945	1.0000e-005	0.0000	0.3948
Total	**3.1000e-004**	**2.6000e-003**	**2.2100e-003**	**1.0000e-005**	**6.0000e-004**	**1.0000e-005**	**6.0000e-004**	**1.6000e-004**	**1.0000e-005**	**1.7000e-004**	**0.0000**	**0.9877**	**0.9877**	**7.0000e-005**	**0.0000**	**0.9894**

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	6.7000e-004	0.0142	0.0179	3.0000e-005		9.0000e-004	9.0000e-004		9.0000e-004	9.0000e-004	0.0000	2.3164	2.3164	5.6000e-004	0.0000	2.3303
Total	**6.7000e-004**	**0.0142**	**0.0179**	**3.0000e-005**		**9.0000e-004**	**9.0000e-004**		**9.0000e-004**	**9.0000e-004**	**0.0000**	**2.3164**	**2.3164**	**5.6000e-004**	**0.0000**	**2.3303**

3.4 Building Construction - 2021

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	8.0000e-005	2.4400e-003	5.1000e-004	1.0000e-005	1.5000e-004	1.0000e-005	1.5000e-004	4.0000e-005	1.0000e-005	5.0000e-005	0.0000	0.5932	0.5932	6.0000e-005	0.0000	0.5946
Worker	2.3000e-004	1.6000e-004	1.7000e-003	0.0000	4.5000e-004	0.0000	4.5000e-004	1.2000e-004	0.0000	1.2000e-004	0.0000	0.3945	0.3945	1.0000e-005	0.0000	0.3948
Total	**3.1000e-004**	**2.6000e-003**	**2.2100e-003**	**1.0000e-005**	**6.0000e-004**	**1.0000e-005**	**6.0000e-004**	**1.6000e-004**	**1.0000e-005**	**1.7000e-004**	**0.0000**	**0.9877**	**0.9877**	**7.0000e-005**	**0.0000**	**0.9894**

3.5 Paving - 2021

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	9.8500e-003	0.0976	0.1103	1.7000e-004		5.2100e-003	5.2100e-003		4.8100e-003	4.8100e-003	0.0000	14.7336	14.7336	4.6300e-003	0.0000	14.8493
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**9.8500e-003**	**0.0976**	**0.1103**	**1.7000e-004**		**5.2100e-003**	**5.2100e-003**		**4.8100e-003**	**4.8100e-003**	**0.0000**	**14.7336**	**14.7336**	**4.6300e-003**	**0.0000**	**14.8493**

3.5 Paving - 2021

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	7.5000e-004	5.2000e-004	5.4600e-003	1.0000e-005	1.4400e-003	1.0000e-005	1.4500e-003	3.8000e-004	1.0000e-005	3.9000e-004	0.0000	1.2681	1.2681	4.0000e-005	0.0000	1.2691
Total	**7.5000e-004**	**5.2000e-004**	**5.4600e-003**	**1.0000e-005**	**1.4400e-003**	**1.0000e-005**	**1.4500e-003**	**3.8000e-004**	**1.0000e-005**	**3.9000e-004**	**0.0000**	**1.2681**	**1.2681**	**4.0000e-005**	**0.0000**	**1.2691**

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	3.9500e-003	0.0818	0.1218	1.7000e-004		4.7200e-003	4.7200e-003		4.7200e-003	4.7200e-003	0.0000	14.7335	14.7335	4.6300e-003	0.0000	14.8493
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**3.9500e-003**	**0.0818**	**0.1218**	**1.7000e-004**		**4.7200e-003**	**4.7200e-003**		**4.7200e-003**	**4.7200e-003**	**0.0000**	**14.7335**	**14.7335**	**4.6300e-003**	**0.0000**	**14.8493**

3.5 Paving - 2021

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	7.5000e-004	5.2000e-004	5.4600e-003	1.0000e-005	1.4400e-003	1.0000e-005	1.4500e-003	3.8000e-004	1.0000e-005	3.9000e-004	0.0000	1.2681	1.2681	4.0000e-005	0.0000	1.2691
Total	**7.5000e-004**	**5.2000e-004**	**5.4600e-003**	**1.0000e-005**	**1.4400e-003**	**1.0000e-005**	**1.4500e-003**	**3.8000e-004**	**1.0000e-005**	**3.9000e-004**	**0.0000**	**1.2681**	**1.2681**	**4.0000e-005**	**0.0000**	**1.2691**

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	0.0131	0.2189	0.0638	4.4000e-004	0.0109	1.5000e-004	0.0111	2.9400e-003	1.4000e-004	3.0800e-003	0.0000	41.4479	41.4479	0.0107	0.0000	41.7145
Unmitigated	0.0131	0.2189	0.0638	4.4000e-004	0.0109	1.5000e-004	0.0111	2.9400e-003	1.4000e-004	3.0800e-003	0.0000	41.4479	41.4479	0.0107	0.0000	41.7145

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Arena	125.85	0.00	0.00	28,621	28,621
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Total	125.85	0.00	0.00	28,621	28,621

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
Arena	1.19	1.19	1.19	0.00	81.00	19.00	66	28	6
Other Non-Asphalt Surfaces	0.00	0.00	0.00	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
Arena	0.534827	0.027180	0.159779	0.085696	0.010184	0.003355	0.014433	0.153313	0.002347	0.001594	0.005527	0.001331	0.000436
Other Non-Asphalt Surfaces	0.534827	0.027180	0.159779	0.085696	0.010184	0.003355	0.014433	0.153313	0.002347	0.001594	0.005527	0.001331	0.000436

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	180.6492	180.6492	6.3000e-003	1.4500e-003	181.2398
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	180.6492	180.6492	6.3000e-003	1.4500e-003	181.2398
NaturalGas Mitigated	0.0136	0.1239	0.1041	7.4000e-004		9.4200e-003	9.4200e-003		9.4200e-003	9.4200e-003	0.0000	134.8658	134.8658	2.5800e-003	2.4700e-003	135.6673
NaturalGas Unmitigated	0.0136	0.1239	0.1041	7.4000e-004		9.4200e-003	9.4200e-003		9.4200e-003	9.4200e-003	0.0000	134.8658	134.8658	2.5800e-003	2.4700e-003	135.6673

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					
Arena	2.52729e+006	0.0136	0.1239	0.1041	7.4000e-004		9.4200e-003	9.4200e-003		9.4200e-003	9.4200e-003	0.0000	134.8658	134.8658	2.5800e-003	2.4700e-003	135.6673
Other Non-Asphalt Surfaces	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		**0.0136**	**0.1239**	**0.1041**	**7.4000e-004**		**9.4200e-003**	**9.4200e-003**		**9.4200e-003**	**9.4200e-003**	**0.0000**	**134.8658**	**134.8658**	**2.5800e-003**	**2.4700e-003**	**135.6673**

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					
Arena	2.52729e+006	0.0136	0.1239	0.1041	7.4000e-004		9.4200e-003	9.4200e-003		9.4200e-003	9.4200e-003	0.0000	134.8658	134.8658	2.5800e-003	2.4700e-003	135.6673
Other Non-Asphalt Surfaces	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		**0.0136**	**0.1239**	**0.1041**	**7.4000e-004**		**9.4200e-003**	**9.4200e-003**		**9.4200e-003**	**9.4200e-003**	**0.0000**	**134.8658**	**134.8658**	**2.5800e-003**	**2.4700e-003**	**135.6673**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Arena	1.06807e +006	180.6492	6.3000e-003	1.4500e-003	181.2398
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**180.6492**	**6.3000e-003**	**1.4500e-003**	**181.2398**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Arena	1.06807e +006	180.6492	6.3000e-003	1.4500e-003	181.2398
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**180.6492**	**6.3000e-003**	**1.4500e-003**	**181.2398**

6.0 Area Detail

6.1 Mitigation Measures Area

	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	0.5582	0.0000	3.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	5.0000e-005	5.0000e-005	0.0000	0.0000	6.0000e-005
Unmitigated	0.5582	0.0000	3.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	5.0000e-005	5.0000e-005	0.0000	0.0000	6.0000e-005

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	0.0845					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.4737					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	3.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	5.0000e-005	5.0000e-005	0.0000	0.0000	6.0000e-005
Total	**0.5582**	**0.0000**	**3.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**5.0000e-005**	**5.0000e-005**	**0.0000**	**0.0000**	**6.0000e-005**

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	0.0845					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.4737					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	3.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	5.0000e-005	5.0000e-005	0.0000	0.0000	6.0000e-005
Total	**0.5582**	**0.0000**	**3.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**5.0000e-005**	**5.0000e-005**	**0.0000**	**0.0000**	**6.0000e-005**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.1414	0.0000	0.0000	0.1419
Unmitigated	0.1414	0.0000	0.0000	0.1419

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Arena	0 / 0.238871	0.1414	0.0000	0.0000	0.1419
Other Non-Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.1414**	**0.0000**	**0.0000**	**0.1419**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Arena	0 / 0.238871	0.1414	0.0000	0.0000	0.1419
Other Non-Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.1414**	**0.0000**	**0.0000**	**0.1419**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0487	2.8800e-003	0.0000	0.1207
Unmitigated	0.0487	2.8800e-003	0.0000	0.1207

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Arena	0.24	0.0487	2.8800e-003	0.0000	0.1207
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0487**	**2.8800e-003**	**0.0000**	**0.1207**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Arena	0.24	0.0487	2.8800e-003	0.0000	0.1207
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0487**	**2.8800e-003**	**0.0000**	**0.1207**

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

Equipment Type	Number

11.0 Vegetation

Merced High School Stadium Project

Merced County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	0.28	Acre	0.28	12,196.80	0
Arena	2.78	Acre	2.78	121,096.80	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	49
Climate Zone	3			**Operational Year**	2030
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	372.88	**CH4 Intensity (lb/MWhr)**	0.013	**N2O Intensity (lb/MWhr)**	0.003

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Renewable portfolio standards adjustment to operation year 2030.

Land Use -

Construction Phase - Demolition and architectural coating would not occur.

Trips and VMT -

Architectural Coating -

Vehicle Trips - Maximum of 2,294 daily trips and 1.19 miles trip length.

Energy Use -

Water And Wastewater - No indoor water use would occur at the stadium.

Construction Off-road Equipment Mitigation - Soil stabilizer for unpaved roads; 50% PM reduction. Water exposed area; 61% PM reduction. Unpaved road mitigation; vehicle speed limit 15mph.

Area Mitigation -

Energy Mitigation -

Water Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	11.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00

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
tblConstEquipMitigation	Tier	No Change	Tier 3
tblProjectCharacteristics	CH4IntensityFactor	0.029	0.013
tblProjectCharacteristics	CO2IntensityFactor	641.35	372.88
tblProjectCharacteristics	N2OIntensityFactor	0.006	0.003
tblVehicleTrips	CC_TL	7.30	1.19
tblVehicleTrips	CC_TL	7.30	0.00
tblVehicleTrips	CNW_TL	7.30	1.19
tblVehicleTrips	CNW_TL	7.30	0.00
tblVehicleTrips	CW_TL	9.50	1.19
tblVehicleTrips	CW_TL	9.50	0.00
tblVehicleTrips	WD_TR	33.33	45.27
tblWater	IndoorWaterUseRate	3,742,315.40	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

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	lb/day										lb/day					
2020	4.1701	42.4711	22.2049	0.0396	18.2141	2.1985	20.4127	9.9699	2.0227	11.9926	0.0000	3,842.5603	3,842.5603	1.1971	0.0000	3,872.4876
2021	2.2451	19.9899	19.0109	0.0380	0.6092	0.9694	1.5786	0.1650	0.9115	1.0765	0.0000	3,691.8719	3,691.8719	0.6906	0.0000	3,709.1365
Maximum	**4.1701**	**42.4711**	**22.2049**	**0.0396**	**18.2141**	**2.1985**	**20.4127**	**9.9699**	**2.0227**	**11.9926**	**0.0000**	**3,842.5603**	**3,842.5603**	**1.1971**	**0.0000**	**3,872.4876**

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	lb/day										lb/day					
2020	1.0571	19.1194	23.6513	0.0396	7.1937	0.9473	8.1410	3.9122	0.9472	4.8594	0.0000	3,842.5603	3,842.5603	1.1971	0.0000	3,872.4876
2021	1.0181	16.7838	20.3094	0.0380	0.6092	0.9143	1.5235	0.1650	0.9137	1.0787	0.0000	3,691.8719	3,691.8719	0.6906	0.0000	3,709.1365
Maximum	**1.0571**	**19.1194**	**23.6513**	**0.0396**	**7.1937**	**0.9473**	**8.1410**	**3.9122**	**0.9472**	**4.8594**	**0.0000**	**3,842.5603**	**3,842.5603**	**1.1971**	**0.0000**	**3,872.4876**

	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	**67.65**	**42.52**	**-6.66**	**0.00**	**58.55**	**41.24**	**56.05**	**59.77**	**36.58**	**54.56**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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	lb/day										lb/day					
Area	3.0586	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.7000e-004	6.7000e-004	0.0000		7.1000e-004
Energy	0.0747	0.6788	0.5702	4.0700e-003		0.0516	0.0516		0.0516	0.0516		814.5980	814.5980	0.0156	0.0149	819.4387
Mobile	0.1293	1.7019	0.4519	3.5600e-003	0.0865	1.1200e-003	0.0876	0.0232	1.0500e-003	0.0243		370.0262	370.0262	0.0854		372.1610
Total	**3.2625**	**2.3807**	**1.0225**	**7.6300e-003**	**0.0865**	**0.0527**	**0.1392**	**0.0232**	**0.0526**	**0.0759**		**1,184.6248**	**1,184.6248**	**0.1010**	**0.0149**	**1,191.6004**

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	lb/day										lb/day					
Area	3.0586	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.7000e-004	6.7000e-004	0.0000		7.1000e-004
Energy	0.0747	0.6788	0.5702	4.0700e-003		0.0516	0.0516		0.0516	0.0516		814.5980	814.5980	0.0156	0.0149	819.4387
Mobile	0.1293	1.7019	0.4519	3.5600e-003	0.0865	1.1200e-003	0.0876	0.0232	1.0500e-003	0.0243		370.0262	370.0262	0.0854		372.1610
Total	**3.2625**	**2.3807**	**1.0225**	**7.6300e-003**	**0.0865**	**0.0527**	**0.1392**	**0.0232**	**0.0526**	**0.0759**		**1,184.6248**	**1,184.6248**	**0.1010**	**0.0149**	**1,191.6004**

	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	Site Preparation	Site Preparation	1/30/2020	2/5/2020	5	5	
2	Grading	Grading	2/6/2020	2/17/2020	5	8	
3	Building Construction	Building Construction	2/18/2020	1/4/2021	5	230	
4	Paving	Paving	1/5/2021	1/28/2021	5	18	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 4

Acres of Paving: 0.28

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
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	1	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Cement and Mortar Mixers	2	6.00	9	0.56
Paving	Pavers	1	8.00	130	0.42
Paving	Paving Equipment	2	6.00	132	0.36
Paving	Rollers	2	6.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37

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
Site Preparation	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	56.00	22.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Site Preparation - 2020

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	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	4.0765	42.4173	21.5136	0.0380		2.1974	2.1974		2.0216	2.0216		3,685.1016	3,685.1016	1.1918		3,714.8975
Total	**4.0765**	**42.4173**	**21.5136**	**0.0380**	**18.0663**	**2.1974**	**20.2637**	**9.9307**	**2.0216**	**11.9523**		**3,685.1016**	**3,685.1016**	**1.1918**		**3,714.8975**

3.2 Site Preparation - 2020

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	lb/day										lb/day					
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
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
Worker	0.0937	0.0538	0.6913	1.5800e-003	0.1479	1.1200e-003	0.1490	0.0392	1.0300e-003	0.0403		157.4588	157.4588	5.2600e-003		157.5902
Total	**0.0937**	**0.0538**	**0.6913**	**1.5800e-003**	**0.1479**	**1.1200e-003**	**0.1490**	**0.0392**	**1.0300e-003**	**0.0403**		**157.4588**	**157.4588**	**5.2600e-003**		**157.5902**

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	lb/day										lb/day					
Fugitive Dust					7.0458	0.0000	7.0458	3.8730	0.0000	3.8730			0.0000			0.0000
Off-Road	0.9312	19.0656	22.9600	0.0380		0.9462	0.9462		0.9462	0.9462	0.0000	3,685.1016	3,685.1016	1.1918		3,714.8975
Total	**0.9312**	**19.0656**	**22.9600**	**0.0380**	**7.0458**	**0.9462**	**7.9920**	**3.8730**	**0.9462**	**4.8191**	**0.0000**	**3,685.1016**	**3,685.1016**	**1.1918**		**3,714.8975**

3.2 Site Preparation - 2020

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	lb/day										lb/day					
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
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
Worker	0.0937	0.0538	0.6913	1.5800e-003	0.1479	1.1200e-003	0.1490	0.0392	1.0300e-003	0.0403		157.4588	157.4588	5.2600e-003		157.5902
Total	**0.0937**	**0.0538**	**0.6913**	**1.5800e-003**	**0.1479**	**1.1200e-003**	**0.1490**	**0.0392**	**1.0300e-003**	**0.0403**		**157.4588**	**157.4588**	**5.2600e-003**		**157.5902**

3.3 Grading - 2020

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	lb/day										lb/day					
Fugitive Dust					6.5523	0.0000	6.5523	3.3675	0.0000	3.3675			0.0000			0.0000
Off-Road	2.4288	26.3859	16.0530	0.0297		1.2734	1.2734		1.1716	1.1716		2,872.485 1	2,872.485 1	0.9290		2,895.710 6
Total	**2.4288**	**26.3859**	**16.0530**	**0.0297**	**6.5523**	**1.2734**	**7.8258**	**3.3675**	**1.1716**	**4.5390**		**2,872.485 1**	**2,872.485 1**	**0.9290**		**2,895.710 6**

3.3 Grading - 2020

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	lb/day										lb/day					
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
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
Worker	0.0780	0.0448	0.5761	1.3200e-003	0.1232	9.4000e-004	0.1242	0.0327	8.6000e-004	0.0336		131.2156	131.2156	4.3800e-003		131.3251
Total	**0.0780**	**0.0448**	**0.5761**	**1.3200e-003**	**0.1232**	**9.4000e-004**	**0.1242**	**0.0327**	**8.6000e-004**	**0.0336**		**131.2156**	**131.2156**	**4.3800e-003**		**131.3251**

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	lb/day										lb/day					
Fugitive Dust					2.5554	0.0000	2.5554	1.3133	0.0000	1.3133			0.0000			0.0000
Off-Road	0.7263	14.8397	18.9906	0.0297		0.7555	0.7555		0.7555	0.7555	0.0000	2,872.4851	2,872.4851	0.9290		2,895.7106
Total	**0.7263**	**14.8397**	**18.9906**	**0.0297**	**2.5554**	**0.7555**	**3.3110**	**1.3133**	**0.7555**	**2.0689**	**0.0000**	**2,872.4851**	**2,872.4851**	**0.9290**		**2,895.7106**

3.3 Grading - 2020

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	lb/day										lb/day					
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
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
Worker	0.0780	0.0448	0.5761	1.3200e-003	0.1232	9.4000e-004	0.1242	0.0327	8.6000e-004	0.0336		131.2156	131.2156	4.3800e-003		131.3251
Total	**0.0780**	**0.0448**	**0.5761**	**1.3200e-003**	**0.1232**	**9.4000e-004**	**0.1242**	**0.0327**	**8.6000e-004**	**0.0336**		**131.2156**	**131.2156**	**4.3800e-003**		**131.3251**

3.4 Building Construction - 2020

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	lb/day										lb/day					
Off-Road	2.1198	19.1860	16.8485	0.0269		1.1171	1.1171		1.0503	1.0503		2,553.0631	2,553.0631	0.6229		2,568.6345
Total	**2.1198**	**19.1860**	**16.8485**	**0.0269**		**1.1171**	**1.1171**		**1.0503**	**1.0503**		**2,553.0631**	**2,553.0631**	**0.6229**		**2,568.6345**

3.4 Building Construction - 2020

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	lb/day										lb/day					
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
Vendor	0.0919	2.6381	0.5470	6.4000e-003	0.1492	0.0144	0.1636	0.0430	0.0138	0.0568		669.1512	669.1512	0.0621		670.7029
Worker	0.2914	0.1672	2.1506	4.9200e-003	0.4600	3.4900e-003	0.4635	0.1220	3.2200e-003	0.1252		489.8717	489.8717	0.0164		490.2805
Total	**0.3832**	**2.8053**	**2.6976**	**0.0113**	**0.6092**	**0.0179**	**0.6271**	**0.1650**	**0.0170**	**0.1820**		**1,159.0228**	**1,159.0228**	**0.0784**		**1,160.9834**

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	lb/day										lb/day					
Off-Road	0.6739	14.2261	17.8738	0.0269		0.9036	0.9036		0.9036	0.9036	0.0000	2,553.0631	2,553.0631	0.6229		2,568.6345
Total	**0.6739**	**14.2261**	**17.8738**	**0.0269**		**0.9036**	**0.9036**		**0.9036**	**0.9036**	**0.0000**	**2,553.0631**	**2,553.0631**	**0.6229**		**2,568.6345**

3.4 Building Construction - 2020

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	lb/day										lb/day					
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
Vendor	0.0919	2.6381	0.5470	6.4000e-003	0.1492	0.0144	0.1636	0.0430	0.0138	0.0568		669.1512	669.1512	0.0621		670.7029
Worker	0.2914	0.1672	2.1506	4.9200e-003	0.4600	3.4900e-003	0.4635	0.1220	3.2200e-003	0.1252		489.8717	489.8717	0.0164		490.2805
Total	**0.3832**	**2.8053**	**2.6976**	**0.0113**	**0.6092**	**0.0179**	**0.6271**	**0.1650**	**0.0170**	**0.1820**		**1,159.0228**	**1,159.0228**	**0.0784**		**1,160.9834**

3.4 Building Construction - 2021

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	lb/day										lb/day					
Off-Road	1.9009	17.4321	16.5752	0.0269		0.9586	0.9586		0.9013	0.9013		2,553.3639	2,553.3639	0.6160		2,568.7643
Total	**1.9009**	**17.4321**	**16.5752**	**0.0269**		**0.9586**	**0.9586**		**0.9013**	**0.9013**		**2,553.3639**	**2,553.3639**	**0.6160**		**2,568.7643**

3.4 Building Construction - 2021

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	lb/day										lb/day					
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
Vendor	0.0760	2.4089	0.4735	6.3400e-003	0.1492	7.3900e-003	0.1566	0.0430	7.0600e-003	0.0500		662.8700	662.8700	0.0598		664.3659
Worker	0.2682	0.1489	1.9621	4.7800e-003	0.4600	3.4000e-003	0.4634	0.1220	3.1300e-003	0.1252		475.6380	475.6380	0.0147		476.0063
Total	**0.3442**	**2.5578**	**2.4357**	**0.0111**	**0.6092**	**0.0108**	**0.6200**	**0.1650**	**0.0102**	**0.1752**		**1,138.5080**	**1,138.5080**	**0.0746**		**1,140.3723**

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	lb/day										lb/day					
Off-Road	0.6739	14.2261	17.8738	0.0269		0.9036	0.9036		0.9036	0.9036	0.0000	2,553.3639	2,553.3639	0.6160		2,568.7643
Total	**0.6739**	**14.2261**	**17.8738**	**0.0269**		**0.9036**	**0.9036**		**0.9036**	**0.9036**	**0.0000**	**2,553.3639**	**2,553.3639**	**0.6160**		**2,568.7643**

3.4 Building Construction - 2021

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	lb/day										lb/day					
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
Vendor	0.0760	2.4089	0.4735	6.3400e-003	0.1492	7.3900e-003	0.1566	0.0430	7.0600e-003	0.0500		662.8700	662.8700	0.0598		664.3659
Worker	0.2682	0.1489	1.9621	4.7800e-003	0.4600	3.4000e-003	0.4634	0.1220	3.1300e-003	0.1252		475.6380	475.6380	0.0147		476.0063
Total	**0.3442**	**2.5578**	**2.4357**	**0.0111**	**0.6092**	**0.0108**	**0.6200**	**0.1650**	**0.0102**	**0.1752**		**1,138.5080**	**1,138.5080**	**0.0746**		**1,140.3723**

3.5 Paving - 2021

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	lb/day										lb/day					
Off-Road	1.0940	10.8399	12.2603	0.0189		0.5788	0.5788		0.5342	0.5342		1,804.5523	1,804.5523	0.5670		1,818.7270
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0940**	**10.8399**	**12.2603**	**0.0189**		**0.5788**	**0.5788**		**0.5342**	**0.5342**		**1,804.5523**	**1,804.5523**	**0.5670**		**1,818.7270**

3.5 Paving - 2021

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	lb/day										lb/day					
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
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
Worker	0.0958	0.0532	0.7008	1.7100e-003	0.1643	1.2100e-003	0.1655	0.0436	1.1200e-003	0.0447		169.8707	169.8707	5.2600e-003		170.0023
Total	**0.0958**	**0.0532**	**0.7008**	**1.7100e-003**	**0.1643**	**1.2100e-003**	**0.1655**	**0.0436**	**1.1200e-003**	**0.0447**		**169.8707**	**169.8707**	**5.2600e-003**		**170.0023**

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	lb/day										lb/day					
Off-Road	0.4389	9.0888	13.5323	0.0189		0.5246	0.5246		0.5246	0.5246	0.0000	1,804.552 3	1,804.552 3	0.5670		1,818.727 0
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.4389**	**9.0888**	**13.5323**	**0.0189**		**0.5246**	**0.5246**		**0.5246**	**0.5246**	**0.0000**	**1,804.552 3**	**1,804.552 3**	**0.5670**		**1,818.727 0**

3.5 Paving - 2021

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	lb/day										lb/day					
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
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
Worker	0.0958	0.0532	0.7008	1.7100e-003	0.1643	1.2100e-003	0.1655	0.0436	1.1200e-003	0.0447		169.8707	169.8707	5.2600e-003		170.0023
Total	**0.0958**	**0.0532**	**0.7008**	**1.7100e-003**	**0.1643**	**1.2100e-003**	**0.1655**	**0.0436**	**1.1200e-003**	**0.0447**		**169.8707**	**169.8707**	**5.2600e-003**		**170.0023**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Category	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
	lb/day										lb/day					
Mitigated	0.1293	1.7019	0.4519	3.5600e-003	0.0865	1.1200e-003	0.0876	0.0232	1.0500e-003	0.0243		370.0262	370.0262	0.0854		372.1610
Unmitigated	0.1293	1.7019	0.4519	3.5600e-003	0.0865	1.1200e-003	0.0876	0.0232	1.0500e-003	0.0243		370.0262	370.0262	0.0854		372.1610

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Arena	125.85	0.00	0.00	28,621	28,621
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Total	125.85	0.00	0.00	28,621	28,621

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
Arena	1.19	1.19	1.19	0.00	81.00	19.00	66	28	6
Other Non-Asphalt Surfaces	0.00	0.00	0.00	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
Arena	0.534827	0.027180	0.159779	0.085696	0.010184	0.003355	0.014433	0.153313	0.002347	0.001594	0.005527	0.001331	0.000436
Other Non-Asphalt Surfaces	0.534827	0.027180	0.159779	0.085696	0.010184	0.003355	0.014433	0.153313	0.002347	0.001594	0.005527	0.001331	0.000436

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	lb/day										lb/day					
NaturalGas Mitigated	0.0747	0.6788	0.5702	4.0700e-003		0.0516	0.0516		0.0516	0.0516		814.5980	814.5980	0.0156	0.0149	819.4387
NaturalGas Unmitigated	0.0747	0.6788	0.5702	4.0700e-003		0.0516	0.0516		0.0516	0.0516		814.5980	814.5980	0.0156	0.0149	819.4387

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	lb/day										lb/day					
Arena	6924.08	0.0747	0.6788	0.5702	4.0700e-003		0.0516	0.0516		0.0516	0.0516		814.5980	814.5980	0.0156	0.0149	819.4387
Other Non-Asphalt Surfaces	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
Total		**0.0747**	**0.6788**	**0.5702**	**4.0700e-003**		**0.0516**	**0.0516**		**0.0516**	**0.0516**		**814.5980**	**814.5980**	**0.0156**	**0.0149**	**819.4387**

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	lb/day										lb/day					
Arena	6.92408	0.0747	0.6788	0.5702	4.0700e-003		0.0516	0.0516		0.0516	0.0516		814.5980	814.5980	0.0156	0.0149	819.4387
Other Non-Asphalt Surfaces	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
Total		**0.0747**	**0.6788**	**0.5702**	**4.0700e-003**		**0.0516**	**0.0516**		**0.0516**	**0.0516**		**814.5980**	**814.5980**	**0.0156**	**0.0149**	**819.4387**

6.0 Area Detail

6.1 Mitigation Measures Area

	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	lb/day										lb/day					
Mitigated	3.0586	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.7000e-004	6.7000e-004	0.0000		7.1000e-004
Unmitigated	3.0586	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.7000e-004	6.7000e-004	0.0000		7.1000e-004

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	lb/day										lb/day					
Architectural Coating	0.4627					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	2.5958					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	3.0000e-005	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.7000e-004	6.7000e-004	0.0000		7.1000e-004
Total	**3.0586**	**0.0000**	**3.1000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**6.7000e-004**	**6.7000e-004**	**0.0000**		**7.1000e-004**

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	lb/day										lb/day					
Architectural Coating	0.4627					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	2.5958					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	3.0000e-005	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.7000e-004	6.7000e-004	0.0000		7.1000e-004
Total	**3.0586**	**0.0000**	**3.1000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**6.7000e-004**	**6.7000e-004**	**0.0000**		**7.1000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

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

Equipment Type	Number

11.0 Vegetation

Merced High School Stadium Project

Merced County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	0.28	Acre	0.28	12,196.80	0
Arena	2.78	Acre	2.78	121,096.80	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	49
Climate Zone	3			**Operational Year**	2030
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	372.88	**CH4 Intensity (lb/MWhr)**	0.013	**N2O Intensity (lb/MWhr)**	0.003

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Renewable portfolio standards adjustment to operation year 2030.

Land Use -

Construction Phase - Demolition and architectural coating would not occur.

Trips and VMT -

Architectural Coating -

Vehicle Trips - Maximum of 2,294 daily trips and 1.19 miles trip length.

Energy Use -

Water And Wastewater - No indoor water use would occur at the stadium.

Construction Off-road Equipment Mitigation - Soil stabilizer for unpaved roads; 50% PM reduction. Water exposed area; 61% PM reduction. Unpaved road mitigation; vehicle speed limit 15mph.

Area Mitigation -

Energy Mitigation -

Water Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	11.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00

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
tblConstEquipMitigation	Tier	No Change	Tier 3
tblProjectCharacteristics	CH4IntensityFactor	0.029	0.013
tblProjectCharacteristics	CO2IntensityFactor	641.35	372.88
tblProjectCharacteristics	N2OIntensityFactor	0.006	0.003
tblVehicleTrips	CC_TL	7.30	1.19
tblVehicleTrips	CC_TL	7.30	0.00
tblVehicleTrips	CNW_TL	7.30	1.19
tblVehicleTrips	CNW_TL	7.30	0.00
tblVehicleTrips	CW_TL	9.50	1.19
tblVehicleTrips	CW_TL	9.50	0.00
tblVehicleTrips	WD_TR	33.33	45.27
tblWater	IndoorWaterUseRate	3,742,315.40	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

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	lb/day										lb/day					
2020	4.1632	42.4813	22.1087	0.0394	18.2141	2.1985	20.4127	9.9699	2.0227	11.9926	0.0000	3,824.2373	3,824.2373	1.1965	0.0000	3,854.1494
2021	2.2289	20.0398	18.8120	0.0373	0.6092	0.9697	1.5789	0.1650	0.9117	1.0767	0.0000	3,615.0284	3,615.0284	0.6967	0.0000	3,632.4464
Maximum	**4.1632**	**42.4813**	**22.1087**	**0.0394**	**18.2141**	**2.1985**	**20.4127**	**9.9699**	**2.0227**	**11.9926**	**0.0000**	**3,824.2373**	**3,824.2373**	**1.1965**	**0.0000**	**3,854.1494**

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	lb/day										lb/day					
2020	1.0398	19.1295	23.5551	0.0394	7.1937	0.9473	8.1410	3.9122	0.9472	4.8594	0.0000	3,824.2373	3,824.2373	1.1965	0.0000	3,854.1494
2021	1.0019	16.8338	20.1106	0.0373	0.6092	0.9146	1.5238	0.1650	0.9140	1.0790	0.0000	3,615.0284	3,615.0284	0.6967	0.0000	3,632.4464
Maximum	**1.0398**	**19.1295**	**23.5551**	**0.0394**	**7.1937**	**0.9473**	**8.1410**	**3.9122**	**0.9472**	**4.8594**	**0.0000**	**3,824.2373**	**3,824.2373**	**1.1965**	**0.0000**	**3,854.1494**

	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	**68.06**	**42.48**	**-6.71**	**0.00**	**58.55**	**41.23**	**56.05**	**59.77**	**36.57**	**54.56**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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	lb/day										lb/day					
Area	3.0586	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.7000e-004	6.7000e-004	0.0000		7.1000e-004
Energy	0.0747	0.6788	0.5702	4.0700e-003		0.0516	0.0516		0.0516	0.0516		814.5980	814.5980	0.0156	0.0149	819.4387
Mobile	0.0932	1.6614	0.5669	3.1900e-003	0.0865	1.1600e-003	0.0877	0.0232	1.0800e-003	0.0243		331.3664	331.3664	0.0976		333.8060
Total	**3.2264**	**2.3403**	**1.1374**	**7.2600e-003**	**0.0865**	**0.0528**	**0.1393**	**0.0232**	**0.0527**	**0.0759**		**1,145.9650**	**1,145.9650**	**0.1132**	**0.0149**	**1,153.2454**

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	lb/day										lb/day					
Area	3.0586	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.7000e-004	6.7000e-004	0.0000		7.1000e-004
Energy	0.0747	0.6788	0.5702	4.0700e-003		0.0516	0.0516		0.0516	0.0516		814.5980	814.5980	0.0156	0.0149	819.4387
Mobile	0.0932	1.6614	0.5669	3.1900e-003	0.0865	1.1600e-003	0.0877	0.0232	1.0800e-003	0.0243		331.3664	331.3664	0.0976		333.8060
Total	**3.2264**	**2.3403**	**1.1374**	**7.2600e-003**	**0.0865**	**0.0528**	**0.1393**	**0.0232**	**0.0527**	**0.0759**		**1,145.9650**	**1,145.9650**	**0.1132**	**0.0149**	**1,153.2454**

	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	Site Preparation	Site Preparation	1/30/2020	2/5/2020	5	5	
2	Grading	Grading	2/6/2020	2/17/2020	5	8	
3	Building Construction	Building Construction	2/18/2020	1/4/2021	5	230	
4	Paving	Paving	1/5/2021	1/28/2021	5	18	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 4

Acres of Paving: 0.28

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
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	1	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Cement and Mortar Mixers	2	6.00	9	0.56
Paving	Pavers	1	8.00	130	0.42
Paving	Paving Equipment	2	6.00	132	0.36
Paving	Rollers	2	6.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37

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
Site Preparation	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	56.00	22.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Site Preparation - 2020

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	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	4.0765	42.4173	21.5136	0.0380		2.1974	2.1974		2.0216	2.0216		3,685.101 6	3,685.101 6	1.1918		3,714.897 5
Total	**4.0765**	**42.4173**	**21.5136**	**0.0380**	**18.0663**	**2.1974**	**20.2637**	**9.9307**	**2.0216**	**11.9523**		**3,685.101 6**	**3,685.101 6**	**1.1918**		**3,714.897 5**

3.2 Site Preparation - 2020

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	lb/day										lb/day					
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
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
Worker	0.0867	0.0639	0.5951	1.4000e-003	0.1479	1.1200e-003	0.1490	0.0392	1.0300e-003	0.0403		139.1358	139.1358	4.6500e-003		139.2519
Total	**0.0867**	**0.0639**	**0.5951**	**1.4000e-003**	**0.1479**	**1.1200e-003**	**0.1490**	**0.0392**	**1.0300e-003**	**0.0403**		**139.1358**	**139.1358**	**4.6500e-003**		**139.2519**

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	lb/day										lb/day					
Fugitive Dust					7.0458	0.0000	7.0458	3.8730	0.0000	3.8730			0.0000			0.0000
Off-Road	0.9312	19.0656	22.9600	0.0380		0.9462	0.9462		0.9462	0.9462	0.0000	3,685.1016	3,685.1016	1.1918		3,714.8975
Total	**0.9312**	**19.0656**	**22.9600**	**0.0380**	**7.0458**	**0.9462**	**7.9920**	**3.8730**	**0.9462**	**4.8191**	**0.0000**	**3,685.1016**	**3,685.1016**	**1.1918**		**3,714.8975**

3.2 Site Preparation - 2020

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	lb/day										lb/day					
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
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
Worker	0.0867	0.0639	0.5951	1.4000e-003	0.1479	1.1200e-003	0.1490	0.0392	1.0300e-003	0.0403		139.1358	139.1358	4.6500e-003		139.2519
Total	**0.0867**	**0.0639**	**0.5951**	**1.4000e-003**	**0.1479**	**1.1200e-003**	**0.1490**	**0.0392**	**1.0300e-003**	**0.0403**		**139.1358**	**139.1358**	**4.6500e-003**		**139.2519**

3.3 Grading - 2020

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	lb/day										lb/day					
Fugitive Dust					6.5523	0.0000	6.5523	3.3675	0.0000	3.3675			0.0000			0.0000
Off-Road	2.4288	26.3859	16.0530	0.0297		1.2734	1.2734		1.1716	1.1716		2,872.4851	2,872.4851	0.9290		2,895.7106
Total	**2.4288**	**26.3859**	**16.0530**	**0.0297**	**6.5523**	**1.2734**	**7.8258**	**3.3675**	**1.1716**	**4.5390**		**2,872.4851**	**2,872.4851**	**0.9290**		**2,895.7106**

3.3 Grading - 2020

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	lb/day										lb/day					
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
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
Worker	0.0723	0.0533	0.4959	1.1700e-003	0.1232	9.4000e-004	0.1242	0.0327	8.6000e-004	0.0336		115.9465	115.9465	3.8700e-003		116.0433
Total	**0.0723**	**0.0533**	**0.4959**	**1.1700e-003**	**0.1232**	**9.4000e-004**	**0.1242**	**0.0327**	**8.6000e-004**	**0.0336**		**115.9465**	**115.9465**	**3.8700e-003**		**116.0433**

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	lb/day										lb/day					
Fugitive Dust					2.5554	0.0000	2.5554	1.3133	0.0000	1.3133			0.0000			0.0000
Off-Road	0.7263	14.8397	18.9906	0.0297		0.7555	0.7555		0.7555	0.7555	0.0000	2,872.4851	2,872.4851	0.9290		2,895.7106
Total	**0.7263**	**14.8397**	**18.9906**	**0.0297**	**2.5554**	**0.7555**	**3.3110**	**1.3133**	**0.7555**	**2.0689**	**0.0000**	**2,872.4851**	**2,872.4851**	**0.9290**		**2,895.7106**

3.3 Grading - 2020

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	lb/day										lb/day					
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
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
Worker	0.0723	0.0533	0.4959	1.1700e-003	0.1232	9.4000e-004	0.1242	0.0327	8.6000e-004	0.0336		115.9465	115.9465	3.8700e-003		116.0433
Total	**0.0723**	**0.0533**	**0.4959**	**1.1700e-003**	**0.1232**	**9.4000e-004**	**0.1242**	**0.0327**	**8.6000e-004**	**0.0336**		**115.9465**	**115.9465**	**3.8700e-003**		**116.0433**

3.4 Building Construction - 2020

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	lb/day										lb/day					
Off-Road	2.1198	19.1860	16.8485	0.0269		1.1171	1.1171		1.0503	1.0503		2,553.0631	2,553.0631	0.6229		2,568.6345
Total	**2.1198**	**19.1860**	**16.8485**	**0.0269**		**1.1171**	**1.1171**		**1.0503**	**1.0503**		**2,553.0631**	**2,553.0631**	**0.6229**		**2,568.6345**

3.4 Building Construction - 2020

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	lb/day										lb/day					
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
Vendor	0.0961	2.6701	0.6353	6.1900e-003	0.1492	0.0147	0.1639	0.0430	0.0141	0.0571		647.5109	647.5109	0.0701		649.2621
Worker	0.2698	0.1989	1.8514	4.3500e-003	0.4600	3.4900e-003	0.4635	0.1220	3.2200e-003	0.1252		432.8668	432.8668	0.0145		433.2283
Total	**0.3659**	**2.8690**	**2.4866**	**0.0105**	**0.6092**	**0.0182**	**0.6274**	**0.1650**	**0.0173**	**0.1823**		**1,080.3777**	**1,080.3777**	**0.0845**		**1,082.4904**

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	lb/day										lb/day					
Off-Road	0.6739	14.2261	17.8738	0.0269		0.9036	0.9036		0.9036	0.9036	0.0000	2,553.0631	2,553.0631	0.6229		2,568.6345
Total	**0.6739**	**14.2261**	**17.8738**	**0.0269**		**0.9036**	**0.9036**		**0.9036**	**0.9036**	**0.0000**	**2,553.0631**	**2,553.0631**	**0.6229**		**2,568.6345**

3.4 Building Construction - 2020

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	lb/day										lb/day					
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
Vendor	0.0961	2.6701	0.6353	6.1900e-003	0.1492	0.0147	0.1639	0.0430	0.0141	0.0571		647.5109	647.5109	0.0701		649.2621
Worker	0.2698	0.1989	1.8514	4.3500e-003	0.4600	3.4900e-003	0.4635	0.1220	3.2200e-003	0.1252		432.8668	432.8668	0.0145		433.2283
Total	**0.3659**	**2.8690**	**2.4866**	**0.0105**	**0.6092**	**0.0182**	**0.6274**	**0.1650**	**0.0173**	**0.1823**		**1,080.3777**	**1,080.3777**	**0.0845**		**1,082.4904**

3.4 Building Construction - 2021

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	lb/day										lb/day					
Off-Road	1.9009	17.4321	16.5752	0.0269		0.9586	0.9586		0.9013	0.9013		2,553.3639	2,553.3639	0.6160		2,568.7643
Total	**1.9009**	**17.4321**	**16.5752**	**0.0269**		**0.9586**	**0.9586**		**0.9013**	**0.9013**		**2,553.3639**	**2,553.3639**	**0.6160**		**2,568.7643**

3.4 Building Construction - 2021

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	lb/day										lb/day					
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
Vendor	0.0800	2.4308	0.5552	6.1300e-003	0.1492	7.6600e-003	0.1569	0.0430	7.3300e-003	0.0503		641.3961	641.3961	0.0677		643.0889
Worker	0.2480	0.1769	1.6816	4.2200e-003	0.4600	3.4000e-003	0.4634	0.1220	3.1300e-003	0.1252		420.2684	420.2684	0.0130		420.5932
Total	**0.3280**	**2.6077**	**2.2368**	**0.0104**	**0.6092**	**0.0111**	**0.6203**	**0.1650**	**0.0105**	**0.1754**		**1,061.6645**	**1,061.6645**	**0.0807**		**1,063.6822**

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	lb/day										lb/day					
Off-Road	0.6739	14.2261	17.8738	0.0269		0.9036	0.9036		0.9036	0.9036	0.0000	2,553.3639	2,553.3639	0.6160		2,568.7643
Total	**0.6739**	**14.2261**	**17.8738**	**0.0269**		**0.9036**	**0.9036**		**0.9036**	**0.9036**	**0.0000**	**2,553.3639**	**2,553.3639**	**0.6160**		**2,568.7643**

3.4 Building Construction - 2021

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	lb/day										lb/day					
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
Vendor	0.0800	2.4308	0.5552	6.1300e-003	0.1492	7.6600e-003	0.1569	0.0430	7.3300e-003	0.0503		641.3961	641.3961	0.0677		643.0889
Worker	0.2480	0.1769	1.6816	4.2200e-003	0.4600	3.4000e-003	0.4634	0.1220	3.1300e-003	0.1252		420.2684	420.2684	0.0130		420.5932
Total	**0.3280**	**2.6077**	**2.2368**	**0.0104**	**0.6092**	**0.0111**	**0.6203**	**0.1650**	**0.0105**	**0.1754**		**1,061.6645**	**1,061.6645**	**0.0807**		**1,063.6822**

3.5 Paving - 2021

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	lb/day										lb/day					
Off-Road	1.0940	10.8399	12.2603	0.0189		0.5788	0.5788		0.5342	0.5342		1,804.5523	1,804.5523	0.5670		1,818.7270
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0940**	**10.8399**	**12.2603**	**0.0189**		**0.5788**	**0.5788**		**0.5342**	**0.5342**		**1,804.5523**	**1,804.5523**	**0.5670**		**1,818.7270**

3.5 Paving - 2021

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	lb/day										lb/day					
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
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
Worker	0.0886	0.0632	0.6006	1.5100e-003	0.1643	1.2100e-003	0.1655	0.0436	1.1200e-003	0.0447		150.0958	150.0958	4.6400e-003		150.2119
Total	**0.0886**	**0.0632**	**0.6006**	**1.5100e-003**	**0.1643**	**1.2100e-003**	**0.1655**	**0.0436**	**1.1200e-003**	**0.0447**		**150.0958**	**150.0958**	**4.6400e-003**		**150.2119**

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	lb/day										lb/day					
Off-Road	0.4389	9.0888	13.5323	0.0189		0.5246	0.5246		0.5246	0.5246	0.0000	1,804.5523	1,804.5523	0.5670		1,818.7270
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.4389**	**9.0888**	**13.5323**	**0.0189**		**0.5246**	**0.5246**		**0.5246**	**0.5246**	**0.0000**	**1,804.5523**	**1,804.5523**	**0.5670**		**1,818.7270**

3.5 Paving - 2021

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	lb/day										lb/day					
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
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
Worker	0.0886	0.0632	0.6006	1.5100e-003	0.1643	1.2100e-003	0.1655	0.0436	1.1200e-003	0.0447		150.0958	150.0958	4.6400e-003		150.2119
Total	**0.0886**	**0.0632**	**0.6006**	**1.5100e-003**	**0.1643**	**1.2100e-003**	**0.1655**	**0.0436**	**1.1200e-003**	**0.0447**		**150.0958**	**150.0958**	**4.6400e-003**		**150.2119**

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	lb/day										lb/day					
Mitigated	0.0932	1.6614	0.5669	3.1900e-003	0.0865	1.1600e-003	0.0877	0.0232	1.0800e-003	0.0243		331.3664	331.3664	0.0976		333.8060
Unmitigated	0.0932	1.6614	0.5669	3.1900e-003	0.0865	1.1600e-003	0.0877	0.0232	1.0800e-003	0.0243		331.3664	331.3664	0.0976		333.8060

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Arena	125.85	0.00	0.00	28,621	28,621
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Total	125.85	0.00	0.00	28,621	28,621

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
Arena	1.19	1.19	1.19	0.00	81.00	19.00	66	28	6
Other Non-Asphalt Surfaces	0.00	0.00	0.00	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
Arena	0.534827	0.027180	0.159779	0.085696	0.010184	0.003355	0.014433	0.153313	0.002347	0.001594	0.005527	0.001331	0.000436
Other Non-Asphalt Surfaces	0.534827	0.027180	0.159779	0.085696	0.010184	0.003355	0.014433	0.153313	0.002347	0.001594	0.005527	0.001331	0.000436

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	lb/day										lb/day					
NaturalGas Mitigated	0.0747	0.6788	0.5702	4.0700e-003		0.0516	0.0516		0.0516	0.0516		814.5980	814.5980	0.0156	0.0149	819.4387
NaturalGas Unmitigated	0.0747	0.6788	0.5702	4.0700e-003		0.0516	0.0516		0.0516	0.0516		814.5980	814.5980	0.0156	0.0149	819.4387

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	lb/day										lb/day					
Arena	6924.08	0.0747	0.6788	0.5702	4.0700e-003		0.0516	0.0516		0.0516	0.0516		814.5980	814.5980	0.0156	0.0149	819.4387
Other Non-Asphalt Surfaces	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
Total		**0.0747**	**0.6788**	**0.5702**	**4.0700e-003**		**0.0516**	**0.0516**		**0.0516**	**0.0516**		**814.5980**	**814.5980**	**0.0156**	**0.0149**	**819.4387**

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	lb/day										lb/day					
Arena	6.92408	0.0747	0.6788	0.5702	4.0700e-003		0.0516	0.0516		0.0516	0.0516		814.5980	814.5980	0.0156	0.0149	819.4387
Other Non-Asphalt Surfaces	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
Total		**0.0747**	**0.6788**	**0.5702**	**4.0700e-003**		**0.0516**	**0.0516**		**0.0516**	**0.0516**		**814.5980**	**814.5980**	**0.0156**	**0.0149**	**819.4387**

6.0 Area Detail

6.1 Mitigation Measures Area

	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	lb/day										lb/day					
Mitigated	3.0586	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.7000e-004	6.7000e-004	0.0000		7.1000e-004
Unmitigated	3.0586	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.7000e-004	6.7000e-004	0.0000		7.1000e-004

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	lb/day										lb/day					
Architectural Coating	0.4627					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	2.5958					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	3.0000e-005	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.7000e-004	6.7000e-004	0.0000		7.1000e-004
Total	**3.0586**	**0.0000**	**3.1000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**6.7000e-004**	**6.7000e-004**	**0.0000**		**7.1000e-004**

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	lb/day										lb/day					
Architectural Coating	0.4627					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	2.5958					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	3.0000e-005	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.7000e-004	6.7000e-004	0.0000		7.1000e-004
Total	**3.0586**	**0.0000**	**3.1000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**6.7000e-004**	**6.7000e-004**	**0.0000**		**7.1000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

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

Equipment Type	Number

11.0 Vegetation

APPENDIX B

LOCALIZED CARBON MONOXIDE MODELING

Localized Carbon Monoxide (CO)

Signalized Intersections	Exposure Duration	Carbon Monoxide Concentrations (PPM)					
		Predicted Traffic	Maximum Ambient Background	Persistent Factor	Caculated	California Ambient Air Quality Standard	Exceed Ambient Air Quality Standard?
"G" Street / Olive Avenue	1 Hour	0.7	2.7	--	3.4	20	No
	8 Hour	0.5	2.1	0.8	2.5	9	No

Localized mobile-source CO concentrations were calculated using the Caline4 computer program based on PM peak-hour traffic volumes derived from the traffic analysis prepared for this project. Predicted 1-hour CO concentrations were converted to 8-hour concentrations assuming a persistence factor of 0.8. Modeled 1-hour and 8-hour receiver locations were placed at 3 and 7 meters from the roadway edge, respectively. Ambient background 8-hour CO concentrations (2.1) were based on the highest measured CO concentrations obtained from the nearest monitoring stations for the last three years of available data (2016-2018).

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: “G” Street / Olive Avenue
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT:

I. SITE VARIABLES

U= 1.0 M/S	Z0= 100. CM	ALT= 54. (M)
BRG= WORST CASE	VD= 0.0 CM/S	
CLAS= 7 (G)	VS= 0.0 CM/S	
MIXH= 1000. M	AMB= 0.0 PPM	
SIGTH= 5. DEGREES	TEMP= 9.1 DEGREE (C)	

II. LINK VARIABLES

LINK DESCRIPTION	X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. EB OL APP EX	-750	-5	-150	-5	AG	1132	1.0	0.0	10.0
B. EB OL APP IN	-150	-5	0	-5	AG	1132	1.8	0.0	10.0
C. EB OL DEP IN	0	-5	150	-5	AG	785	1.8	0.0	10.0
D. EB OL DEP EX	150	-5	750	-5	AG	785	1.0	0.0	10.0
E. WB OL APP EX	750	5	150	5	AG	727	1.0	0.0	10.0
F. WB OL APP IN	150	5	0	5	AG	7272	1.8	0.0	10.0
G. WB OL DEP IN	0	5	-150	5	AG	1019	1.8	0.0	10.0
H. WB OL DEP EX	-150	5	-750	5	AG	1019	1.0	0.0	10.0
I. NB GS APP EX	5	-750	5	-150	AG	1022	1.0	0.0	10.0
J. NB GS APP IN	5	-150	5	0	AG	1022	1.8	0.0	10.0
K. NB GS DEP IN	5	0	5	150	AG	953	1.8	0.0	10.0
L. NB GS DEP EX	5	150	5	750	AG	953	1.0	0.0	10.0
M. SB GS APP EX	-5	750	-5	150	AG	857	1.0	0.0	10.0
N. SB GS APP IN	-5	150	-5	0	AG	857	1.8	0.0	10.0
O. SB GS DEP IN	-5	0	-5	-150	AG	981	1.8	0.0	10.0
P. SB GS DEP EX	-5	-150	-5	-750	AG	981	1.0	0.0	10.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: “G” Street / Olive Avenue
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT:

III. RECEPTOR LOCATIONS

RECEPTOR	X	Y	Z
	COORDINATES (M)		
1. 1 HR SW	-18	-18	0.0
2. 8 HR SW	-22	-22	0.0
3. 1 HR SE	18	-18	0.0
4. 8 HR SE	22	-22	0.0
5. 1 HR NW	-18	18	0.0
6. 8 HR NW	-22	22	0.0
7. 1 HR NE	18	18	0.0
8. 8 HR NE	22	22	0.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. 1 HR SW	76.	0.5	0.0	0.0	0.1	0.0	0.0	0.3	0.0	0.0
2. 8 HR SW	75.	0.4	0.0	0.0	0.1	0.0	0.0	0.3	0.0	0.0
3. 1 HR SE	349.	0.4	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0
4. 8 HR SE	348.	0.4	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0
5. 1 HR NW	102.	0.7	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0
6. 8 HR NW	102.	0.5	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0
7. 1 HR NE	223.	0.6	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0
8. 8 HR NE	222.	0.5	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0

JOB: “G” Street / Olive Avenue
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT:

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P
1. 1 HR SW	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
2. 8 HR SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3. 1 HR SE	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
4. 8 HR SE	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
5. 1 HR NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6. 8 HR NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7. 1 HR NE	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0

8. 8 HR NE * 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0

Monitor Values Report

Geographic Area: Stanislaus County, CA
Pollutant: CO
Year: 2016
Exceptional Events: Included (if any)

Obs	First Max 8hr	Second Max 8hr	Days 8hr Max >STD	First Max 1hr	Second Max 1hr	Days 1hr Max >STD	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
8326	1.5	1.4	0	1.9	1.8	0	None	3	060990005	814 14th St., Modesto	Modesto	Stanislaus	CA	09

Get detailed information about this report, including column descriptions, at https://www.epa.gov/outdoor-air-quality-data/about-air-data-reports#mon

AirData reports are produced from a direct query of the AQS Data Mart. The data represent the best and most recent information available to EPA from state agencies. However, some values may be absent due to incomplete reporting, and some values may change due to quality assurance activities. The AQS database is updated by state, local, and tribal organizations who own and submit the data.

Readers are cautioned not to rank order geographic areas based on AirData reports. Air pollution levels measured at a particular monitoring site are not necessarily representative of the air quality for an entire county or urban area.

This report is based on monitor-level summary statistics. Air quality standards for some pollutants (PM2.5 and Pb) allow for combining data from multiple monitors into a site-level summary statistic that can be compared to the standard. In those cases, the site-level statistics may differ from the monitor-level statistics upon which this report is based.

Source: U.S. EPA AirData <https://www.epa.gov/air-data>
Generated: November 1, 2019

Monitor Values Report

Geographic Area: Stanislaus County, CA
Pollutant: CO
Year: 2017
Exceptional Events: Included (if any)

Obs	First Max 8hr	Second Max 8hr	Days 8hr Max >STD	First Max 1hr	Second Max 1hr	Days 1hr Max >STD	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
8330	1.6	1.6	0	2	2	0	None	3	060990005	814 14th St., Modesto	Modesto	Stanislaus	CA	09

Get detailed information about this report, including column descriptions, at https://www.epa.gov/outdoor-air-quality-data/about-air-data-reports#mon

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This report is based on monitor-level summary statistics. Air quality standards for some pollutants (PM2.5 and Pb) allow for combining data from multiple monitors into a site-level summary statistic that can be compared to the standard. In those cases, the site-level statistics may differ from the monitor-level statistics upon which this report is based.

Source: U.S. EPA AirData <https://www.epa.gov/air-data>
Generated: November 1, 2019

Monitor Values Report

Geographic Area: Stanislaus County, CA
Pollutant: CO
Year: 2018
Exceptional Events: Included (if any)

Obs	First Max 8hr	Second Max 8hr	Days 8hr Max >STD	First Max 1hr	Second Max 1hr	Days 1hr Max >STD	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
8162	2.1	1.9	0	2.7	2.5	0	None	3	060990005	814 14th St., Modesto	Modesto	Stanislaus	CA	09

Get detailed information about this report, including column descriptions, at https://www.epa.gov/outdoor-air-quality-data/about-air-data-reports#mon

AirData reports are produced from a direct query of the AQS Data Mart. The data represent the best and most recent information available to EPA from state agencies. However, some values may be absent due to incomplete reporting, and some values may change due to quality assurance activities. The AQS database is updated by state, local, and tribal organizations who own and submit the data.

Readers are cautioned not to rank order geographic areas based on AirData reports. Air pollution levels measured at a particular monitoring site are not necessarily representative of the air quality for an entire county or urban area.

This report is based on monitor-level summary statistics. Air quality standards for some pollutants (PM2.5 and Pb) allow for combining data from multiple monitors into a site-level summary statistic that can be compared to the standard. In those cases, the site-level statistics may differ from the monitor-level statistics upon which this report is based.

Source: U.S. EPA AirData <https://www.epa.gov/air-data>
Generated: November 1, 2019

Appendix B

Biological Resource Reports:

Special Status Animal Species Known from the
Vicinity of the Merced High School Stadium Project

Special Status Plant Species Known from the
Vicinity of the Merced High School Stadium Project

Appendix B. Special status animal species known from the vicinity of the Merced High School Stadium Project.

Name	Status* State	Status* Federal	Description of Habitat Required [c, e, f]	Historic 9 Quad Presence[a]	Potential to Occur in Study Area [a,b,d]
MAMMALS					
Pallid bat (*Antrozous pallidus*)	SSC	FSC	Deserts, grasslands, scrublands, woodlands and open forests. Most common in open, dry habitats with rocky areas for roosting. Bridges, buildings, and exfoliating tree bark or hollows are frequently used for roost sites (H.T. Harvey 2004).	Yosemite Lake, Winton	Possible. School buildings, large trees, and adjacent residences may provide roosting habitat. Adjacent creek may provide water and foraging habitat.
Western mastiff bat (*Eumops perotis californicus*)	SSC	None	Many open, semi-arid to arid habitats, including annual and perennial grasslands, among others. Usually present only where there are significant rock features offering suitable roosting habitat. Frequently roosts in crevices in cliff faces and rocks; high buildings are used rarely, and they are not known to use bridges or trees for roosts (H.T. Harvey 2004).	Yosemite Lake, Winton, Merced	Unlikely. There are no cliff faces or rock areas in the project vicinity; therefore, suitable roosting habitat is not present. Species could forage over project area and adjacent creek. However, no suitable roosting habitat is within the project area.
Western red bat (*Lasiurus blossevillii*)	SSC	None	Occupies cismontane woodland, riparian forests, riparian woodland, and lower montane conifer forests where is prefers habitat edges and mosaics with trees that are protected from above and open below with open areas for foraging. Roosts primarily in trees, 2-40 ft above ground, from sea level up through mixed conifer forests.	Yosemite Lake, Winton	Possible. Large Eucalyptus trees and adjacent large trees along creek or associated with residences may provide suitable roosting habitat. Species could forage over project area and adjacent creek.
American badger (*Taxidea taxus*)	SSC	None	Herbaceous, shrub, and open stages of most habitats with dry, friable soils.	El Nido	Not Present. Project is frequently disturbed by school equipment (which destroy potential burrow sites and prey base), people and domestic animals. Also, access is restricted due to frequently travelled streets, bike paths, and residential development. Project is well within the city, as well, and surrounded by chain link fence.
San Joaquin kit fox (*Vulpes macrotis mutica*)	ST	FE	Large tracts of open, level, sandy ground preferred. Often associated with annual	Atwater, Plainsburg, Planada,	Unlikely. Potential very marginal habitat (adjacent creek) present is frequently disturbed by school equipment (which destroy potential burrow sites and

Name	Status* State	Federal	Description of Habitat Required [c, e, f]	Historic 9 Quad Presence[a]	Potential to Occur in Study Area [a,b,d]
			grasslands and small mammal burrow complexes.	Merced, Sandy Mush	prey base), people and domestic animals. Also, access is restricted due to frequently travelled streets, bike paths, and residential development. Project is well within the city, as well, and surrounded by chain link fence.
BIRDS					
Tricolored blackbird (*Agelaius tricolor*)	SSC ST	FSC	Open grasslands and pasturelands associated with nesting cover (e.g., blackberry shrubs, wetland emergent vegetation, etc.). Breeds Mar 15 to Aug 10.	All but Haystack Mtn.	Possible. Possible foraging habitat in open fields. Suitable aquatic nesting habitat (although marginal due to human disturbance) is adjacent to the project area in the cattails and tules of Black Rascal Creek.
Clark's grebe (*Aechmophorus clarkii*)	None	FSC	Breed on freshwater lakes and marshes with extensive open water bordered by emergent vegetation. During winter they move to saltwater or brackish bays, estuaries, or sheltered sea coasts and are less frequently found on freshwater lakes or rivers.	None	None, no habitat present.
Burrowing owl (*Athene cunicularia*)	SSC	FSC	Ground dweller of open country, golf courses, airports, etc. Often associated with California ground squirrel burrow complexes.	All but El Nido	Unlikely. Suitable breeding and foraging habitat marginal adjacent to project area. Nesting possible along creek edges, but very unlikely within the project area (school site) itself.
Swainson's hawk (*Buteo swainsoni*)	ST	FSC	Open agricultural fields, grasslands, and low hills, with sparse trees. Nesting often associated with riparian areas.	All	Possible. Foraging habitat in open fields and nesting habitat in large trees on project area and adjacent.
Mountain Plover (*Charadrius montanus*)	SSC	FSC	Short grasslands, freshly plowed fields, sprouting grain fields, and sod farms. Seen in areas of short vegetation or bare ground in flat topography, often where grazing and mammal burrows are present. This species does not breed in California.	Merced	Unlikely. Winter foraging habitat in the open fields.
Northern harrier (*Circus hudsonius*)	SSC	None	Grasslands, open agricultural fields, and edges of wetlands. Typically nests on the ground among dense cover.	Plainsburg	Possible. Nesting habitat possible but is marginal due to frequent human disturbance along Black Rascal Creek. No nesting habitat on the project area itself. Could forage over project area and vacant lots/fields in project vicinity.

Name	Status* State	Federal	Description of Habitat Required [c, e, f]	Historic 9 Quad Presence[a]	Potential to Occur in Study Area [a,b,d]
Bald eagle (*Haliaeetus leucocephalus*)	SE; FP	BGEPA; delisted	Inhabits lower montane coniferous forests and areas with oldgrowth trees. Prefers ocean shore, lake margins, & rivers for both nesting & wintering. Most nests are found within 1 mi of water. Nests in large, old-growth, or dominant live tree w/open branches, especially ponderosa pine. Roosts communally in winter. Breeds Jan 1 to Aug 31.	Merced, Yosemite Lake	Unlikely. Could forage in the open fields or open areas of creek, however, habitat type, frequent human disturbance and urban surrounding make nesting highly unlikely. Known to roost in winter at Yosemite Lake.
Yellow-bill magpie (*Pica nuttalli*)	None	FSC	California endemic species that occurs in the Central Valley and coastal mountain ranges from south of San Francisco to Santa Barbara County. Requires open oak & riparian woodland, farm & ranchland or urban areas with tall trees near grassland, pasture or cropland. Breeds Apr 1 to Jul 31.	Not followed in CNDDB	Possible. Could nest in trees within the project or study area and forage in open fields, agricultural land, or landscaped areas.
Nuttall's woodpecker (*Picoides nuttallii*)	None	FSC	Oak forest and woodlands, including riparian zones. Requires standing snag or hollow tree for nest cavity. Breeds Apr 1 to Jul 20.	Not followed in CNDDB	Possible. Project area and adjacent trees are suitable habitat for this species year-round.
Rufous hummingbird (*Selasphorus rufus*)	None	FSC	Forest edges, streamsides, mountain meadows. Breeding habitat includes forest edges and clearings, and brushy second growth within the region of northern coast and mountains. Winters mostly in pine-oak woods in Mexico. Migrants occur at all elevations but more commonly in lowlands during spring, in mountain meadows during late summer and fall. Breeds elsewhere.	Not followed in CNDDB	Unlikely. May use residential landscaped areas adjacent and forage during spring or fall migration. Otherwise, outside of known breeding range.
REPTILES					
Blunt-nosed leopard lizard (*Gambelia (=Crotaphytus) sila)*	SE, FP	FE	Occurs in semi-arid grasslands, washes and alkali flats, with sandy/gravelly/loamy soils. Occurs with plants such as annual and bunch grasses and *Atriplex* sp. Small mammal burrows provide cover for this species.	Sandy Mush	None. No habitat present.

Name	Status* State	Federal	Description of Habitat Required [c, e, f]	Historic 9 Quad Presence[a]	Potential to Occur in Study Area [a,b,d]
Western pond turtle (*Emys marmorata* aka *Actinemys marmorata*)	SSC	None	Aquatic turtle of ponds, lakes, marshes, rivers, streams, and irrigation ditches that typically have rocky or muddy bottom, with aquatic vegetation. Nests in uplands associated with wetland habitat.	El Nido, Yosemite Lake, Atwater	Unlikely. No habitat in the project area; however, Black Rascal Creek may provide habitat for turtles. Although the creek is close, the project area is contained by the school's chain link fence, which creates a barrier to turtle movement. In addition, the school site is not suitable habitat for turtles due to its human presence, continual disturbance and turf. Therefore, it is very unlikely that turtles would be present on the school site.
Giant garter snake (*Thamnophis gigas*)	ST	FT	Marshes, sloughs, mud-bottom canals of rice farming areas, but occasionally slow streams. Bulrush and cattails typically present. Extremely aquatic. Found in areas with aquatic connectivity to San Joaquin River and Delta.	Merced	Unlikely. No habitat in project area. Black Rascal Creek may have been historic habitat, but unlikely to support the species now due to urban development and agricultural operation. Nearest location was last detected in 1908.
AMPHIBIANS					
California tiger salamander (*Ambystoma californiense*)	ST, SSC	FT	Quiet water of ponds, reservoirs, lakes, vernal pools, streams, and stock ponds within annual grasslands, oak savannah, oak woodland and open chaparral.	Yosemite Lake, Planada, Sandy Mush, El Nido, Merced, Haystack Mtn., Winton	None. No habitat present in the project area due to frequent human disturbance and agricultural operation.
California red-legged frog (*Rana draytonii*)	SSC	FT	Chiefly lakes, ponds, and streams in coastal forest, inland woodlands, and valley grasslands where cattails, bulrush, or other plants provide dense cover. Aquatic sites need not be permanent.	None	None. No habitat present in the project area due to frequent human disturbance, past agricultural operation, and urban development. Also, outside of species historic range. This species occurred in the foothills, and they likely did not occur in the central valley due to annual floods. There are currently less than 20 known populations in the Sierra, all north of Mariposa County[g]. Therefore, this species is not expected to occur in the area along the valley floor.

Name	Status* State	Federal	Description of Habitat Required [c, e, f]	Historic 9 Quad Presence[a]	Potential to Occur in Study Area [a,b,d]
Western spadefoot (*Spea hammondii*)	SSC	None	Primarily a species of the lowlands, frequenting washes, river floodplains, alluvial fans, playas, alkali flats, but also foothills and mountains. Open vegetation and short grasses preferred, with sandy or gravelly soil. Valley and foothill grasslands, open chaparral, pine-oak woodlands. Often associated with vernal pools.	El Nido, Planada, Sandy Mush, Hatstack Mtn.	None. No habitat present.
FISH					
Delta smelt (*Hypomesus tranpacificus*)	SE	FT	Found only from the Suisun Bay upstream through the Delta in Contra Costa, Sacramento, San Joaquin, Solano and Yolo counties. Typically found in estuarine waters-along the freshwater edge of the mixing zone (saltwater-freshwater interface), and upstream into river channels and tidally-influenced backwater sloughs. Most spawning happens in tidally-influenced backwater sloughs and channel edgewaters.	None	None. No habitat present in the project area.
Hardhead (*Mylopharodon conocephalus*)	SSC	None	Clear, deep pools with sand-gravel-boulder bottoms & slow water velocity. Not found where exotic centrarchids predominate.	Yosemite Lake, Winton	None. No habitat present in the project area.
Steelhead – Central Valley DPS (*Oncorhynchus mykiss irideus* pop. 11)	None	FT	Aquatic habitats of the Sacramento/San Joaquin River flowing waters and their tributaries.	Yosemite Lake, Winton	None. No habitat present in the project area.
INVERTEBRATES					
Conservancy fairy shrimp (*Branchinecta conservatio*)	None	FE	Rather large, cool-water vernal pools with moderately turbid water; the pools generally last until June.	Planada, Haystack Mtn., El Nido, Sandy Mush, Merced	None. No habitat present in the project area.

Name	Status* State	Federal	Description of Habitat Required [c, e, f]	Historic 9 Quad Presence[a]	Potential to Occur in Study Area [a,b,d]
Vernal pool fairy shrimp (*Branchinecta lynchi*)	None	FT	Vernal pool habitats from small, clear, sandstone rock pools to large, turbid, alkaline, grassland valley floor pools. Tends to occur in smaller pools, most frequently pools measuring less than 0.05 acre often associated with mud bottomed swales, or basalt flow depression pools in unplowed grasslands.	All	None. No habitat present in the project area.
Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*)	None	FT	Nearly always found on or close to its host plant, elderberry (*Sambucus* sp.). Inhabited shrubs typically have stems that are 1.0 inch or greater in diameter at ground level. Distribution is patchy throughout the remaining riparian forests of the Central Valley from Redding to Madera County.	None	None. No habitat present within the project area or elderberry shrubs present.
Vernal pool tadpole shrimp (*Lepidurus packardi*)	None	FE	Inhabits vernal pools containing clear to highly turbid water, ranging in size from 50 square feet in the former Mather Air Force Base area of Sacramento County, to the 89-acre Olcott Lake at Jepson Prairie.	Plainsburg, El Nido, Merced, Planada, Haystack Mtn., Sandy Mush	None. No habitat present in the project area.

* None = no special status granted or recognized by named party
BGEPA = Bald and Golden Eagle Protection Act; USFWS prohibits the taking, possession and commerce of such birds.
FC = Federal Candidate; USFWS/NOAA FISHERIES has enough information on biological vulnerability and threats to support a proposal to list as endangered or threatened.
FE = Federally Endangered; listed by USFWS as in danger of extinction throughout all or a significant portion of its range.
FT = Federally Threatened; listed by USFWS as likely to become endangered within the foreseeable future throughout all or a significant portion of its range.
FSC = Federal Species of Concern, including Birds of Conservation Concern; provides no protection, but allows for awareness and research efforts that may keep species from being listed.
SCE = California Candidate for Endangered Status under the CESA.
SCT = California Candidate for Threatened Status under the CESA.
SE = California Endangered under the CESA.
ST = California Threatened under the CESA.
FP = Fully Protected under California Fish and Game Code (Sections 3511, 4700, 5050, and 5515)
SSC = California Species of Special Concern.
a = Based upon quad lists from query of California Natural Diversity Database (CNDDB) search, accessed November 2019.
b = Based upon planning survey conducted by Odell P&R on project site during October 2019.
c = USFWS Sacramento Fish and Wildlife Office's Endangered Species Program; http://www.fws.gov/sacramento/es/
d= Moyle, P.B. 2002. Inland fishes of California. University of California Press. Berkeley, CA
e= Zeiner, D.C., W.F.Laudenslayer, Jr., K.E. Mayer, and M. White, eds. 1988-1990. California's Wildlife. Vol. I-III. California Department of Fish and Game, Sacramento, California.

f = Shuford, W. D., and Gardali, T., editors. 2008. California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento.
g= Sean J. Barry and Gary M. Fellers. History and Status of the California Red-legged Frog (*Rana draytonii*) in the Sierra Nevada, California, USA Herpetological Conservation and Biology 8(2):456-502. Published: 15 September 2013.

Appendix B. Special status plant species known from the vicinity of the Merced High School Stadium Project.

Name	Status[a]		Description of Habitat Required[b]	Blooming Period	Historic 9 Quad Presence[c]	Potential to Occur in Study Area[d]
	State	Federal				
Henderson's bent grass (*Agrostis hendersonii*)	3.2	None	Occurs in vernal pools and mesic valley and foothill grassland habitats.	Apr-June	Yosemite Lake, Haystack Mtn.	Not present. Study area extremely disturbed – manicured turf of school yard.
Heartscale (*Atriplex cordulata* var. *cordulata*)	1B.2	None	Occurs in chenopod scrub, meadows and seeps, and valley and foothill grassland in saline or alkaline soils at 0 to 560 meters elevation.	Apr-Oct	Sandy Mush, El Nido, Plainsburg	Not present. Study area extremely disturbed – manicured turf of school yard.
Lesser saltscale (*Atriplex minuscula*)	1B.1	None	Occurs in chenopod scrub, playas, and valley and foothill grassland on alkaline and sandy substrates between 15-200 meters of elevation.	May - Oct	Sandy Mush, El Nido, Plainsburg	Not present. Study area extremely disturbed – manicured turf of school yard.
vernal pool smallscale (*Atriplex persistens*)	1B.2	None	Occurs in alkaline vernal pools from 10-115 meters elevation.	June-Oct	El Nido, Sandy Mush, Atwater	Not present. Study area extremely disturbed – manicured turf of school yard.
Subtle orache (*Atriplex subtilis*)	1B.2	None	Occurs in valley and foothill grassland in saline or alkaline soils at 40 to 100 meters elevation.	June-Oct	El Nido, Sandy Mush	Not present. Study area extremely disturbed – manicured turf of school yard.
watershield (*Brasenia schreberi*)	2B.3	None	Occurs in freshwater swamps and marshes.	June-Sept	Merced	Not present. No habitat present.
Hoover's calycadenia (*Calycadenia hooveri*)	1B.3	None	Occurs on exposed, rocky, barren soil in Cismontane woodland, valley and foothill grassland, between 60-260 meters elevation.	July-Sep	Haystack Mtn.	Not Present. No habitat present. Site highly disturbed.
Succulent owl's-clover (*Castilleja campestris* ssp. *succulenta*)	SE, 1B.2	FT	Occurs in vernal pools and valley and foothill grassland, often in acidic soils, between 50-750 meters of elevation.	Apr-May	Merced, Yosemite Lake, Winton, Planada, Haystack Mtn.	Not Expected. Site disturbed, and no vernal pool habitat on site.
Beaked clarkia (*Clarkia rostrata*)	1B.3	None	Occurs in cismontane woodland, valley and foothill grassland. Usually found on north-facing slopes; sometimes on sandstone. 60-915 m.	Apr-May	Haystack Mtn., Yosemite Lake	Not Expected. No habitat present. Site highly disturbed.
Recurved larkspur (*Delphinium recurvatum*)	1B.2	None	Occurs on alkaline substrates in chenopod scrub, cismontane woodland, and valley and foothill grassland between 3-750 meters elevation.	Mar - Jun	Sandy Mush	Not Expected. No habitat present. Site highly disturbed.

Name	Status[a]		Description of Habitat Required[b]	Blooming Period	Historic 9 Quad Presence[c]	Potential to Occur in Study Area[d]
	State	Federal				
Dwarf downingia (*Downingia pusilla*)	2B.2	None	Valley and foothill grassland (mesic sites), vernal pools. Vernal lake and pool margins with a variety of associates. In several types of vernal pools. 1-445 m.	Mar-May	Merced, Yosemite Lake	Not Expected. No vernal pool or grassland habitat present.
Delta button-celery (*Eryngium racemosum*)	SE, 1B.1	None	Occurs in riparian scrub (vernally mesic clay depressions).	June - Oct	Sandy Mush	Not Expected. No habitat present. Site highly disturbed.
Spiny-sepaled button-celery (*Eryngium spinosepalum*)	1B.2	None	Vernal pools, valley and foothill grassland. Some sites on clay soil of granitic origin; vernal pools, within grassland. 100-420 meters.	Apr-May	Planada, Merced	Not Expected. No vernal pool habitat present.
Boggs Lake hedge-hyssop (*Gratiola heterosepala*)	SE, 1B.2	None	Occurs in freshwater marshes and swamps, vernal pools. Usually in clay soils, sometimes on lake margins, between 4-2410 meters in elevation.	Apr-Aug	Planada	Not Present. No habitat present. Site highly disturbed.
Forked hare-leaf (*Lagophylla dichotoma*)	1B.1	None	Occurs in cismontane woodland, and valley and foothill grassland, sometimes in clay soils, between 45-335 meters in elevation.	Apr-May	Merced	Not Expected. No grassland or woodland habitat present. Site highly disturbed. Only know location in vicinity is historic (from 1915).
Pincushion navarretia (*Navarretia myersii* ssp. *myersii*)	1B.1	None	Occurs in vernal pools, often in acidic soils.	Apr-May	Haystack Mtn.	Not Present. No vernal pool habitat present.
Shining navarretia (*Navarretia nigelliformis* ssp. *radians*)	1B.2	None	Cismontane woodland, valley and foothill grassland, vernal pools.	Mar-Jul	Haystack Mtn., Yosemite Lake, Merced, Planada,	Not Expected. No grassland or woodland habitat present. Site highly disturbed.
Colusa grass (*Neostapfia colusana*)	SE, 1B.1	FT	Occurs in vernal pools, usually in the bottoms of large, or deep vernal pools; adobe soils. 5-125 m.	May -Aug	Planada, Haystack Mtn., Merced, El Nido, Sandy Mush, Atwater, Yosemite Lake	Not Present. No vernal pool habitat present.
San Joaquin Valley Orcutt grass (*Orcuttia inaequalis*)	SE, 1B.1	FT	Occurs in vernal pools, between 10-755 meters in elevation.	Apr-Sep	Planada, Haystack Mtn., Merced, Yosemite Lake	Not Present. No vernal pool habitat present.

Name	Status[a]		Description of Habitat Required[b]	Blooming Period	Historic 9 Quad Presence[c]	Potential to Occur in Study Area[d]
	State	Federal				
Hairy Orcutt grass (*Orcuttia pilosa*)	SE, 1B.1	FE	Occurs in vernal pools, between 45-200 meters in elevation.	May-Sep	Yosemite Lake, Merced	Not Present. No vernal pool habitat present.
Merced phacelia (*Phacelia ciliata* var. *opaca*)	3.2	None	Occurs in valley & foothill grasslands in adobe or clay soils of valley floors, open hills, or alkaline flats. 60-85 m.	Feb - May	Planada, Merced, Plainsburg	Not Expected. No habitat present. Site highly disturbed.
Hartweg's golden sunburst (*Pseudobahia bahiifolia*)	SE, 1B.1	FE	Valley and foothill grassland, cismontane woodland. Clay soils, often acidic. Predominantly on the northern slopes of knolls, but also along shady creeks or near vernal pools. 15-150 m.	Mar - Apr	Haystack Mtn.	Not Expected. No habitat present. Site highly disturbed.
California alkali grass (*Puccinellia simplex*)	1B.2	None	Occurs in chenopod scrub, valley and foothill grassland, vernal pools and meadows and seeps. Usually found on alkaline soils that are vernally mesic; such as sinks, flats, and lake margins.	Mar-May	Plainsburg	Not Expected. No habitat present. Site highly disturbed. Could possibly occur in nearby creek.
Sanford's arrowhead (*Sagittaria sanfordii*)	1B.2	None	Occurs in standing or slow-moving freshwater ponds, marshes, swamps, ditches between 0-650 meters in elevation.	May-Oct	Yosemite Lake, Merced, Atwater	Not Expected. No habitat present. Site highly disturbed. Could possibly occur in nearby creek.
Keck's checkerbloom (*Sidalcea keckii*)	1B.1	FE	Occurs in cismontane woodland and valley & foothill grasslands often on grassy slopes in blue oak woodland. On serpentine-derived, clay soils, at least sometimes. 85-505 m.	Apr-Jun	Yosemite Lake, Merced	Not Present. Suitable habitat not present.
Greene's tuctoria (*Tuctoria greenei*)	Rare, 1B.1	FE	Occurs in dry bottoms of vernal pools in valley and foothill grasslands between 30-1070 meters in elevation.	May-Jul	Planada, Haystack Mtn.	Not Expected. No vernal pool habitat present.

a Status codes are as follows:
FC = Federal Candidate; USFWS/NOAA FISHERIES has enough information on biological vulnerability and threats to support a proposal to list as endangered or threatened.
FE = Federally Endangered; listed by USFWS as in danger of extinction throughout all or a significant portion of its range.
FT = Federally Threatened; listed by USFWS as likely to become endangered within the foreseeable future throughout all or a significant portion of its range.
FSC = Federal Species of Concern; provides no protection, but allows for awareness and research efforts that may keep species from being listed.
SCE = California Candidate for Endangered Status under the CESA.
SCT = California Candidate for Threatened Status under the CESA.
ST = California Threatened under the CESA.
FP = Fully Protected under California Fish and Game Code (Sections 3511, 4700, 5050, and 5515)
SSC = California Species of Special Concern.
Rare = State listed as Rare

California Rare Plant Rank:
1A Presumed extinct in California
1B Rare or Endangered in California and elsewhere
2 Rare or Endangered in California, more common elsewhere
3 Plants for which we need more information - Review list
4 Plants of limited distribution - Watch list

California Native Plant Society Threat Codes:

.1 Seriously Endangered in California (over 80% of occurrences Threatened / high degree and immediacy of threat)

.2 Fairly Endangered in California (20-80% occurrences Threatened)

.3 Not very Endangered in California (<20% of occurrences Threatened or no current threats known)

b Habitat information sources and blooming times - CNPS Inventory of Rare & Endangered Plants website (http://cnps.web.aplus.net/cgi-bin/inv/inventory.cgi) used for all plant species.

c Quad lists for plant species from November 2019 query of California Natural Diversity Database (CNDDB), supplemented for plants by the CNPS Inventory of Rare & Endangered Plants website, which notes quads species have been extirpated from (noted with an * in this table).

d Site survey from work conducted by Odell P& R on project site during October 2019.

Appendix C

Cultural Resources Reports:

California Historical Resources
Information System Records Search

Native American Heritage
Commission Sacred Lands File Search

CENTRAL CALIFORNIA INFORMATION CENTER
California Historical Resources Information System
Department of Anthropology – California State University, Stanislaus
One University Circle, Turlock, California 95382
(209) 667-3307

Alpine, Calaveras, Mariposa, Merced, San Joaquin, Stanislaus & Tuolumne Counties

Date: June 12, 2019

CCaIC File #: 11107I
Re: Project: Merced High School Stadium project: construction of new athletic stadium and associated walking paths on existing campus at northwest corner of W. Olive and G St., Merced

Nicole Hoke, Associate Planner
ODELL Planning & Research, Inc.
49346 Road 426, Suite 2
Oakhurst, CA 93644

Email: nicole@odellplanning.com

Dear Ms. Hoke,

We have conducted a records search as per your request for the above-referenced project area located on the Merced USGS 7.5-minute quadrangle map in Merced County.

Search of our files includes review of our maps for the specific project area and the immediate vicinity of the project area, and review of the National Register of Historic Places (NRHP), the California Register of Historical Resources (CRHR), *California Inventory of Historic Resources* (DPR 1976), the *California Historical Landmarks* (1990), and the California Points of Historical Interest listing (May 1992 and updates), the Directory of Properties in the Historic Property Data File (HPDF) and the Archaeological Determinations of Eligibility (ADOE) (Office of Historic Preservation current computer lists dated 3-20-2014 and 4-05-2012, respectively), the *Survey of Surveys* (1989), GLO Plats and other historic maps on file for the area, and other pertinent historic data available at the CCIC for each specific county.

The following details the results of the records search:

Prehistoric or historic resources within the project area:

No prehistoric or historic-era archaeological resources or historic properties have been reported to the CCaIC. However, this does not preclude their existence in this vicinity.

Other information (historic maps):

- GLO Plat map for T7S/R14E (sheet #44-477, dated 1853-1854): an unnamed creek and a possible overflowed area are shown in the S ½ of Section 18 in the vicinity of the project area.

- On the 1914 and 1917 Merced USGS 1:31680-scale series maps, and the 1946 and 1948 Merced USGS 7.5' maps, the following are shown: On the high school property to the south of the project area: an unnamed canal, a smaller branch of Black Rascal Creek, and an old alignment of Olive Avenue; in or adjacent to the project location: Black Rascal Creek (north boundary of the current high school and adjacent to the project), and a pipeline (formerly in the project location, but no longer shown on the 1961 USGS).

Prehistoric or historic resources within the immediate vicinity of the project area:

No prehistoric or historic-era archaeological resources or historic properties have been reported to the CCaIC.

Resources that are known to have value to local cultural groups:

None have been formally reported to the Information Center.

Previous investigations within the project area:

One archaeological field survey report is on file at the IC that included survey along Black Rascal Creek, in a portion of the project area:

CCaIC Report #ME-00672 **Author/Date** Peak & Associates, Inc.(1982)
Merced County Streams Project, California Intensive Cultural Resources Survey (Downstream Channel Improvements).

This report also makes reference to a 1978 report by K. Wilson, not on file at the IC, which also included field survey along Black Rascal Creek.

Previous investigations within the immediate vicinity of the project area:

No others have been reported to the CCaIC.

Recommendations/Comments:

Based on existing data in our files the project area has a low *surface* sensitivity for the possible discovery of historical resources, prehistoric or historic-era. *However*, there may be some sensitivity for the presence of prehistoric cultural features and/or artifacts *under the surface*—potentially being found during excavation and trenching—because of the presence of Black Rascal Creek and the former presence of another, smaller creek south of it. We offer no recommendations for further study (such as additional field survey) at this time, but we recommend vigilance during ground-disturbance for this project, and we ask that you heed the advisories below:

Please be advised that a historical resource is defined as a building, structure, object, prehistoric or historic archaeological site, or district possessing physical evidence of human activities over 45 years old. There may be unidentified features involved in your project that are 45 years or older and considered as historical resources requiring further study and evaluation by a qualified professional of the appropriate discipline. If you should need it, The Statewide Referral List for Historical Resources Consultants is posted for your use on the internet at http://chrisinfo.org

We advise you that in accordance with State law, if any historical resources are discovered during project-related activities, all work is to stop and the lead agency and a qualified professional are to be consulted to determine the importance and appropriate treatment of the find. If Native American remains are found the County Coroner and the Native American Heritage Commission, Sacramento (916-373-3710) are to be notified immediately for recommended procedures.

The provision of CHRIS Data via this records search response does not in any way constitute public disclosure of records otherwise exempt from disclosure under the California Public Records Act or any other law, including, but not limited to, records related to archeological site information maintained by or on behalf of, or in the possession of, the State of California, Department of Parks and Recreation, State Historic Preservation Officer, Office of Historic Preservation, or the State Historical Resources Commission.

Due to processing delays and other factors, not all of the historical resource reports and resource records that have been submitted to the Office of Historic Preservation are available via this records search. Additional information may be available through the federal, state, and local agencies that produced or paid for historical resource management work in the search area. Additionally, Native American tribes have historical resource information not in the CHRIS Inventory, and you should contact the California Native American Heritage Commission for information on local/regional tribal contacts.

The California Office of Historic Preservation (OHP) contracts with the California Historical Resources Information System's (CHRIS) regional Information Centers (ICs) to maintain information in the CHRIS inventory and make it available to local, state, and federal agencies, cultural resource professionals, Native American tribes, researchers, and the public. Recommendations made by IC coordinators or their staff regarding the interpretation and application of this information are advisory only. Such recommendations do not necessarily represent the evaluation or opinion of the State Historic Preservation Officer in carrying out the OHP's regulatory authority under federal and state law.

We thank you for using the California Historical Resources Information System (CHRIS). Please let us know when we can be of further service. Thank you for sending in advance the Access Agreement Short Form.

Note: Billing ($150.00) will be transmitted separately via email from our Financial Services Office (lamarroquin@csustan.edu or MSR270@csustan.edu), payable within 60 days of receipt of the invoice.

Sincerely,

Robin Hards

R. L. Hards, Assistant Research Technician
Central California Information Center
California Historical Resources Information System

*Invoice to: Laurie Marroquin lamarroquin@csustan.edu, Financial Services

NATIVE AMERICAN HERITAGE COMMISSION
Cultural and Environmental Department
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691
Phone: (916) 373-3710
Email: nahc@nahc.ca.gov
Website: http://www.nahc.ca.gov
Twitter: @CA_NAHC

June 6, 2019

Nicole Hoke
Odell Planning & Research, Inc.

VIA Email to: nicole@odellplanning.com

RE: Merced High School Stadium Project, Merced County.

Dear Ms. Hoke:

A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results were negative. However, the absence of specific site information in the SLF does not indicate the absence of cultural resources in any project area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites.

Attached is a list of Native American tribes who may also have knowledge of cultural resources in the project area. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. I suggest you contact all of those indicated; if they cannot supply information, they might recommend others with specific knowledge. By contacting all those listed, your organization will be better able to respond to claims of failure to consult with the appropriate tribe. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call or email to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from tribes, please notify the NAHC. With your assistance, we can assure that our lists contain current information. If you have any questions or need additional information, please contact me at my email address: Katy.sanchez@nahc.ca.gov.

Sincerely,

Katy Sanchez

KATY SANCHEZ
Associate Environmental Planner

Attachment

Appendix D

Noise & Groundborne Vibration Impact Analysis

NOISE & GROUNDBORNE VIBRATION IMPACT ANALYSIS

FOR

MERCED HIGH SCHOOL STADIUM PROJECT

MERCED UNION HIGH SCHOOL DISTRICT
MERCED, CA

NOVEMBER 2019

PREPARED FOR:

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LIST OF COMMON TERMS AND ACRONYMS

ANSI	Acoustical National Standards Institute, Inc.
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
dB	Decibels
dBA	A-Weighted Decibels
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
Hz	Hertz
HVAC	Heating Ventilation & Air Conditioning
in/sec	Inches per Second
L_{dn}	Day-Night Level
L_{eq}	Equivalent Sound Level
L_{max}	Maximum Sound Level
ppv	Peak Particle Velocity
U.S. EPA	United States Environmental Protection Agency

INTRODUCTION

This report discusses the existing setting, identifies potential noise impacts associated with implementation of the proposed project. Noise mitigation measures are recommended where the predicted noise levels would exceed applicable noise standards.

PROPOSED PROJECT SUMMARY

Construction of a high school football stadium with a seating capacity for 3,100. The first 2,000 seats will be constructed in the first phase with an additional 1,100 seats completed in a future phase. Grandstands will be located on the south and north sides of the stadium, connected by concrete walkways around the perimeter of the football field to an entry gate structure located at the southeast corner of the stadium. The project includes the construction of walking paths connecting the stadium to existing parking on the southern portion of the high school campus. Construction of the stadium is anticipated to begin in early 2020.

The project site has been used as a campus football field since 1986. The stadium project will utilize the existing lights at the football field, which have been in place since 2009.

EXISTING SETTING

CONCEPTS AND TERMINOLOGY

ACOUSTIC FUNDAMENTALS

Noise is generally defined as sound that is loud, disagreeable, or unexpected. Sound is mechanical energy transmitted in the form of a wave because of a disturbance or vibration. Sound levels are described in terms of both amplitude and frequency.

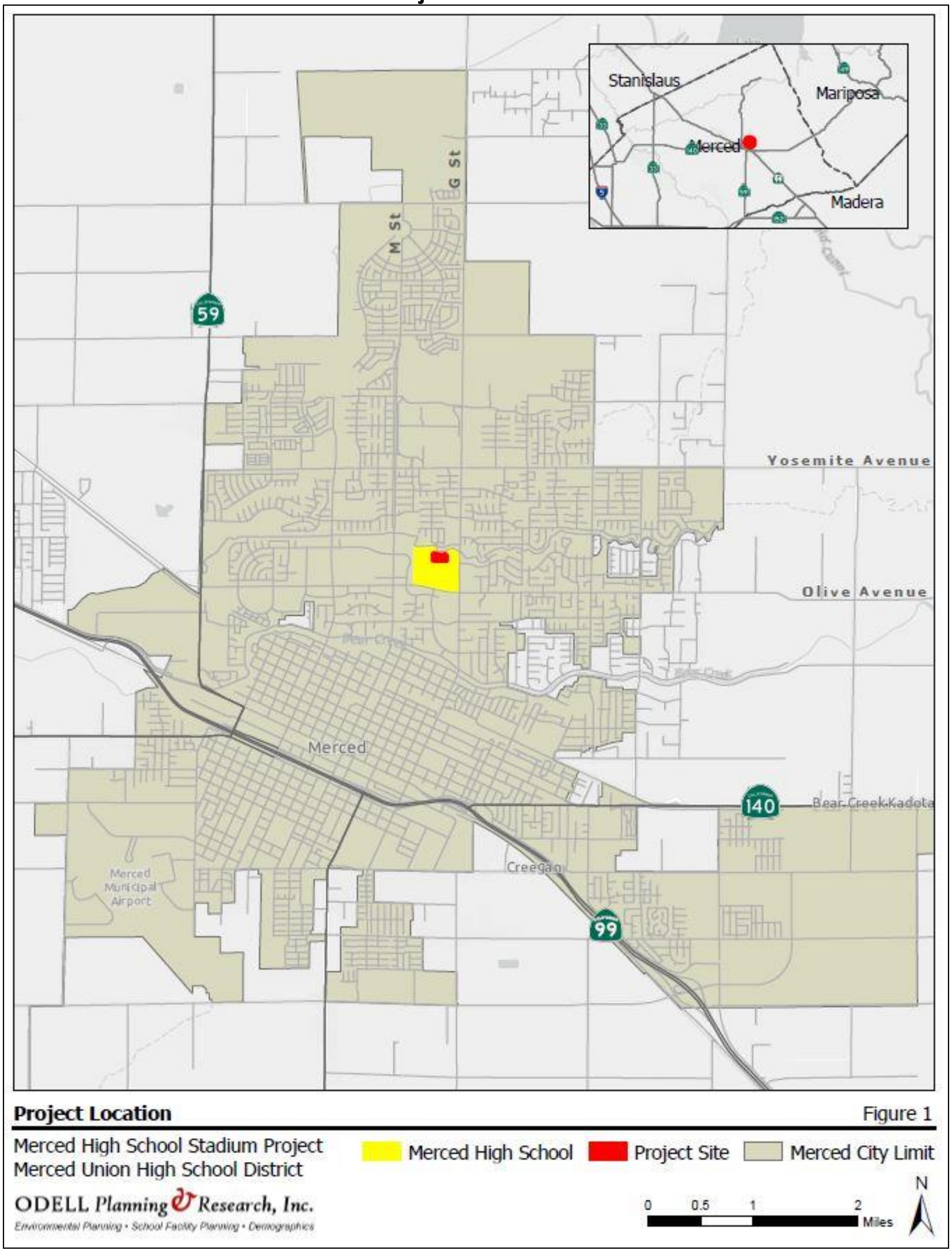
Amplitude

Amplitude is defined as the difference between ambient air pressure and the peak pressure of the sound wave. Amplitude is measured in decibels (dB) on a logarithmic scale. For example, a 65-dB source of sound, such as a truck, when joined by another 65 dB source results in a sound amplitude of 68 dB, not 130 dB (i.e., doubling the source strength increases the sound pressure by 3 dB). Amplitude is interpreted by the ear as corresponding to different degrees of loudness. Laboratory measurements correlate a 10 dB increase in amplitude with a perceived doubling of loudness and establish a 3-dB change in amplitude as the minimum audible difference perceptible to the average person.

Frequency

The frequency of a sound is defined as the number of fluctuations of the pressure wave per second. The unit of frequency is the Hertz (Hz). One Hz equals one cycle per second. The human ear is not equally sensitive to sound of different frequencies. For instance, the human ear is more sensitive to sound in the higher portion of this range than in the lower and sound waves below 16 Hz or above 20,000 Hz cannot be heard at all. To approximate the sensitivity of the human ear to changes in frequency, environmental sound is usually measured in what is referred to as "A-weighted decibels" (dBA). On this scale, the normal range of human hearing extends from about 10 dBA to about 140 dBA (U.S. EPA 1971). Common community noise sources and associated noise levels, in dBA, are depicted in Figure 3.

Figure 1
Project Location



Source: OPR 2019

Figure 2
Proposed Project Site Location

Source: OPR 2019

Addition of Decibels

Because decibels are logarithmic units, sound levels 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, the resulting sound level at a given distance would be 3 dB higher than one source under the same conditions. For example, if one automobile produces a sound level of 70 dB when it passes an observer, two cars passing simultaneously would not produce 140 dB; rather, they would combine to produce 73 dB. Under the decibel scale, three sources of equal loudness together would produce an increase of 5 dB.

Sound Propagation & Attenuation

Geometric Spreading

Sound from a localized source (i.e., a point source) propagates uniformly outward in a spherical pattern. The sound level decreases (attenuates) at a rate of approximately 6 decibels for each doubling of distance from a point source. 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. Noise from a line source propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of approximately 3 decibels for each doubling of distance from a line source, depending on ground surface characteristics. 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), an excess ground-attenuation value of 1.5 decibels per doubling of distance is normally assumed. When added to the cylindrical spreading, the excess ground attenuation for soft surfaces results in an overall attenuation rate of 4.5 decibels per doubling of distance from the source.

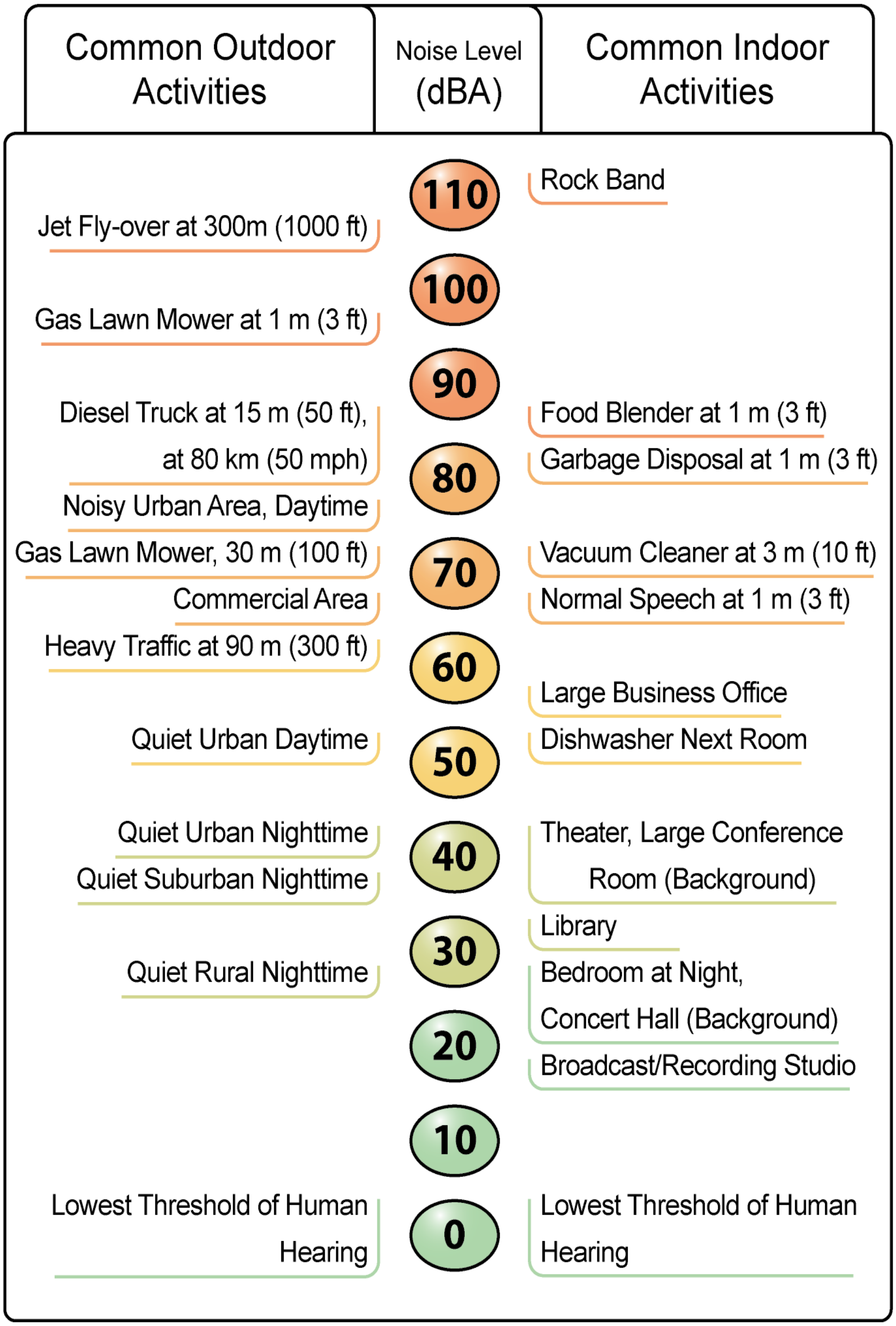
Atmospheric Effects

Receptors located downwind from a source can be exposed to increased noise levels relative to calm conditions, whereas locations upwind can have lowered noise levels. Sound levels can be increased at large distances (e.g., more than 500 feet) from the highway due to atmospheric temperature inversion (i.e., increasing temperature with elevation). Other factors such as air temperature, humidity, and turbulence can also have significant effects.

Shielding by Natural or Human-Made Features

A large object or barrier in the path between a noise source and a receiver can substantially attenuate noise levels at the receiver. The amount of attenuation provided by shielding depends on the size of the object and the frequency content 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. Walls are often constructed between a source and a receiver specifically to reduce noise. A barrier that breaks the line of sight between a source and a receiver will typically result in a minimum of 5 dB of noise reduction. Taller barriers provide increased noise reduction.

Figure 3
Common Community Noise Sources & Noise Levels



Source: Caltrans 2018

Noise reductions afforded by building construction can vary depending on construction materials and techniques. Standard construction practices typically provide approximately 15 dBA exterior-to-interior noise reductions for building facades, with windows open, and approximately 20-30 dBA with windows closed. With compliance with current Title 24 energy efficiency standards, which require increased building insulation and inclusion of an interior air ventilation system to allow windows on noise-impacted façades to remain closed, exterior-to-interior noise reductions typically average approximately 25 dBA. The absorptive characteristics of interior rooms, such as carpeted floors, draperies and furniture, can result in further reductions in interior noise.

NOISE DESCRIPTORS

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 sound-pressure level in that range. In general, people are most sensitive to the frequency range of 1,000–8,000 Hz, and perceive sounds within that range better than sounds of the same amplitude in higher or lower frequencies. To approximate the response of the human ear, sound levels of individual frequency bands are weighted, depending on the human sensitivity to those frequencies, which is referred to as the "A-weighted" sound level (expressed in units of dBA). 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 judgments correlate well with the A-scale sound levels of those sounds. Other weighting networks have been devised to address high noise levels or other special problems (e.g., B-, C-, and D-scales), but these scales are rarely used in conjunction with environmental noise.

The intensity of environmental noise fluctuates over time, and several descriptors of time-averaged noise levels are typically used. For the evaluation of environmental noise, the most commonly used descriptors are L_{eq}, L_{dn}, CNEL and SEL. The energy-equivalent noise level, L_{eq}, is a measure of the average energy content (intensity) of noise over any given period. Many communities use 24-hour descriptors of noise levels to regulate noise. The day-night average noise level, L_{dn}, is the 24-hour average of the noise intensity, with a 10-dBA "penalty" added for nighttime noise (10 p.m. to 7 a.m.) to account for the greater sensitivity to noise during this period. CNEL, the community equivalent noise level, is similar to L_{dn} but adds an additional 5-dBA penalty for evening noise (7 p.m. to 10 p.m.) Another descriptor that is commonly discussed is the single-event noise exposure level, also referred to as the sound-exposure level, expressed as SEL. The SEL describes a receiver's cumulative noise exposure from a single noise event, which is defined as an acoustical event of short duration (0.5 seconds), such as a backup beeper, the sound of an airplane traveling overhead, or a train whistle. Common noise level descriptors are summarized in Table 1.

HUMAN RESPONSE TO NOISE

The human response to environmental noise is subjective and varies considerably from individual to individual. Noise in the community has often been cited as a health problem, not in terms of actual physiological damage, such as hearing impairment, but in terms of inhibiting general well-being and contributing to undue stress and annoyance. The health effects of noise in the community arise from interference with human activities, including sleep, speech, recreation, and tasks that demand concentration or coordination. Hearing loss can occur at the highest noise intensity levels. When community noise interferes with human activities or contributes to stress, public annoyance with the noise source increases. The acceptability of noise and the threat to public well-being are the basis for land use planning policies preventing exposure to excessive community noise levels.

Table 1
Common Acoustical Descriptors

Descriptor	Definition
Energy Equivalent Noise Level (L_{eq})	The energy mean (average) noise level. The instantaneous noise levels during a specific period of time in dBA are converted to relative energy values. From the sum of the relative energy values, an average energy value (in dBA) is calculated.
Minimum Noise Level (L_{min})	The minimum instantaneous noise level during a specific period of time.
Maximum Noise Level (L_{max})	The maximum instantaneous noise level during a specific period of time.
Day-Night Average Noise Level (DNL or L_{dn})	The DNL was first recommended by the U.S. EPA in 1974 as a "simple, uniform and appropriate way" of measuring long term environmental noise. DNL takes into account both the frequency of occurrence and duration of all noise events during a 24-hour period with a 10 dBA "penalty" for noise events that occur between the more noise-sensitive hours of 10:00 p.m. and 7:00 a.m. In other words, 10 dBA is "added" to noise events that occur in the nighttime hours to account for increases sensitivity to noise during these hours.
Community Noise Equivalent Level (CNEL)	The CNEL is similar to the L_{dn} described above, but with an additional 5 dBA "penalty" added to noise events that occur between the hours of 7:00 p.m. to 10:00 p.m. The calculated CNEL is typically approximately 0.5 dBA higher than the calculated L_{dn}.
Sound Exposure Level (SEL)	The level of sound accumulated over a given time interval or event. Technically, the sound exposure level is the level of the time-integrated mean square A-weighted sound for a stated time interval or event, with a reference time of one second.

Unfortunately, there is no completely satisfactory way to measure the subjective effects of noise or of the corresponding reactions of annoyance and dissatisfaction. This is primarily because of the wide variation in individual thresholds of annoyance and habituation to noise over differing individual experiences with noise. Thus, an important way of determining a person's subjective reaction to a new noise is the comparison of it to the existing environment to which one has adapted: the so-called "ambient" environment. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged. Regarding increases in A-weighted noise levels, knowledge of the following relationships will be helpful in understanding this analysis:

- Except in carefully controlled laboratory experiments, a change of 1 dB cannot be perceived by humans;
- Outside of the laboratory, a 3-dB change is considered a just-perceivable difference;
- A change in level of at least 5 dB is required before any noticeable change in community response would be expected. An increase of 5 dB is typically considered substantial;
- A 10-dB change is subjectively heard as an approximate doubling in loudness and would almost certainly cause an adverse change in community response.

Effects of Noise on Human Activities

The extent to which environmental noise is deemed to result in increased levels of annoyance, activity interference, and sleep disruption varies greatly from individual to individual depending on various factors, including the loudness or suddenness of the noise, the information value of the noise (e.g., aircraft overflights, child crying, fire alarm), and an individual's sleep state and sleep habits. Over time, adaptation to noise events and increased levels of noise may also occur. In terms of land use compatibility, environmental noise is often evaluated in terms of the potential for noise events to result in increased levels of annoyance, sleep disruption, or interference with speech communication, activities, and learning. Noise-related effects on human activities are discussed in more detail, as follows:

Speech Communication

For most noise-sensitive land uses, an interior noise level of 45 dB L_{eq} is typically identified for the protection of speech communication in order to provide for 100-percent intelligibility of speech sounds. Assuming a minimum 20-dB reduction in sound level between outdoors and indoors, with windows closed, this interior noise level of 45 dB L_{eq} would equate to an exterior noise level of 65 dBA L_{eq}. For outdoor voice communication, an exterior noise level of 60 dBA L_{eq} allows normal conversation at distances up to 2 meters with 95 percent sentence intelligibility (U.S. EPA 1974.) Based on this information, speech interference begins to become a problem when steady noise levels reach approximately 60 to 65 dBA. Within interior noise environments, an average-hourly background noise level of 45 dBA L_{eq} is typically recommended for noise-sensitive land uses, such as educational facilities (Caltrans 2002).

Learning

Closely related to speech interference are the effects of noise on learning and, more broadly, on cognitive tasks. Recent studies have shown a strong relationship between noise and children's reading ability. Children's attention spans also appear to be adversely affected by noise. Adults are affected as well. Some studies indicate that, in a noisy environment, adults have increased difficulty accomplishing complex tasks. One of the issues associated with the assessment of these effects is which noise metric correlates most closely with the impacts. For example, the average-daily noise level (i.e., CNEL/L_{dn}), which incorporates a nighttime weighting, may not be the best measure of noise impacts on schools given that operational activities are often limited to the daytime hours (Caltrans 2002).

Various standards and recommended criteria have been developed to specifically address classroom noise. For instance, with regard to transportation sources, the California Department of Transportation has adopted abatement criteria that limit the maximum interior average-hourly noise level within classrooms and other noise-sensitive interior uses, to 52 dBA L_{eq}. In June 2002, the American National Standards Institute, Inc. (ANSI) released a new classroom acoustics standard entitled Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools" (ANSI S12.60-2002). For schools exposed to intermittent background noise sources, such as airport and other transportation noise, the ANSI standards recommend that interior noise levels not exceed 40 dBA L_{eq} during the noisiest hour of the day. At present complying with the ANSI-recommended standard is voluntary in most locations.

Annoyance & Sleep Disruption

With regard to potential increases in annoyance, activity interference, and sleep disruption, land use compatibility determinations are typically based on the use of the cumulative noise exposure metrics (i.e., CNEL or L_{dn}). Perhaps the most comprehensive and widely accepted evaluation of the relationship between noise exposure and the extent of annoyance was one originally developed by Theodore J. Schultz in 1978. In 1978 the research findings of Theodore J. Schultz provided support for L_{dn} as the descriptor for environmental noise. Research conducted by Schultz identified a correlation between the cumulative noise exposure metric and individuals who were highly annoyed by transportation noise. The Schultz curve, expressing this correlation, became a basis for noise standards. When expressed graphically, this relationship is typically referred to as the Schultz curve. The Schultz curve indicates that approximately 13 percent of the population is highly annoyed at a noise level of 65 dBA L_{dn}. It also indicates that the percentage of people describing themselves as being highly annoyed accelerates smoothly between 55 and 70 dBA L_{dn}. A noise level of 65 dBA L_{dn} is a commonly referenced dividing point between lower and higher rates of people describing themselves as being highly annoyed (Caltrans 2002).

The Schultz curve and associated research became the basis for many of the noise criteria subsequently established for federal, state, and local entities. Most federal and state of California regulations and policies related to transportation noise sources establish a noise level of 65 dBA CNEL/L_{dn} as the basic limit of acceptable noise exposure for residential and other noise-sensitive land uses. For instance, with respect to aircraft noise, both the Federal Aviation Administration (FAA) and the State of California have identified a noise level of 65 dBA L_{dn} as the dividing point between normally compatible and normally incompatible residential land use generally applied for determination of land use compatibility. For noise-sensitive land uses exposed to aircraft noise, noise levels in excess of 65 dBA CNEL/L_{dn} are typically considered to result in a potentially significant increase in levels of annoyance (Caltrans 2002).

Allowing for an average exterior-to-interior noise reduction of 20 dB, an exterior noise level of 65 dBA CNEL/L_{dn} would equate to an interior noise level of 45 dBA CNEL/L_{dn}. An interior noise level of 45 dB CNEL/L_{dn} is generally considered sufficient to protect against activity interference at most noise-sensitive land uses, including residential dwellings, and would also be sufficient to protect against sleep interference (U.S. EPA 1974.) Within California, the California Building Code establishes a noise level of 45 dBA CNEL as the maximum acceptable interior noise level for residential uses (other than detached single-family dwellings). Use of the 45 dBA CNEL threshold is further supported by recommendations provided in the State of California Office of Planning and Research's *General Plan Guidelines*, which recommend an interior noise level of 45 dB CNEL/L_{dn} as the maximum allowable interior noise level sufficient to permit "normal residential activity."

The cumulative noise exposure metric is currently the only noise metric for which there is a substantial body of research data and regulatory guidance defining the relationship between noise exposure, people's reactions, and land use compatibility. However, when evaluating environmental noise impacts involving intermittent noise events, such as aircraft overflights and train pass-bys, the use of cumulative noise metrics may not provide a thorough understanding of the resultant impact. The general public often finds it difficult to understand the relationship between intermittent noise events and cumulative noise exposure metrics. In such instances, supplemental use of other noise metrics, such as the L_{eq} or L_{max} descriptor, may be helpful as a means of increasing public understanding regarding the relationship between these metrics and the extent of the resultant noise impact (Caltrans 2002).

AFFECTED ENVIRONMENT

NOISE-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. Additional land uses such as parks, historic sites, cemeteries, and recreation areas are also considered sensitive to increases in exterior noise levels. Schools, churches, hotels, libraries, and other places where low interior noise levels are essential are also considered noise-sensitive land uses.

Sensitive land uses located in the vicinity of the proposed project site consist predominantly of residential land uses. The nearest residential land uses are located north of the project site, on the south side of Campus Drive

AMBIENT NOISE ENVIRONMENT

To document existing ambient noise levels in the project area, short-term ambient noise measurements were conducted on the evening of September 18, 2019 and the morning of September 19, 2019 using a Larson Davis Laboratories, Type I, Model 820 integrating sound-level meter. The meter was calibrated before use and is certified to be in compliance with ANSI specifications. Measured ambient noise levels are summarized in Table 2.

As indicated in Table 2, measured ambient noise levels in the project area ranged from approximately 51 to 74 dBA during morning hours and 50 to 73 dBA L_{eq} during evening hours. Ambient noise levels within the project area are predominantly influenced by vehicle traffic on area roadways. Ambient noise levels during the evening and nighttime hours are generally 5 to 10 dB lower than daytime noise levels.

Table 2
Summary of Measured Ambient Noise Levels

Location	Monitoring Period	Noise Levels (dBA)	
		L_{eq}	L_{max}
ST1: Approximately 100 feet south the Rascal Bike Path entrance on Campus Dr	8:31-8:41	50.6	62.9
	18:18-18:28	49.5	61.8
ST2: Approximately 200 feet North of Brookdale Dr and G St on east side of G St	8:49-8:59	73.9	85.8
	18:41-18:51	73.0	83.0
ST3: Immediately South of Buhach Preschool East of Collins Dr	9:07-9:17	51.3	65.0
	19:02-19:12	53.4	76.1
ST4: Approximately 700 feet West of Olive Ave and G St intersection on the south side of Olive St	9:24-9:34	66.1	75.5
	19:18-19:18	67.7	79.7
Ambient noise measurements were conducted on September 18, 2019 and September 19, 2019 using a Larson Davis Laboratories, Type I, Model 820 integrating sound-level meter.			

REGULATORY FRAMEWORK

NOISE

State of California

The State of California regulates vehicular and freeway noise affecting classrooms sets standards for sound transmission and occupational noise control and identifies noise insulation standards and airport noise/land-use compatibility criteria.

California General Plan Guidelines

The *State of California General Plan Guidelines*, published by the Governor's Office of Planning and Research (OPR 2003), also provides guidance for the acceptability of projects within specific CNEL/L_{dn} contours. The guidelines also present adjustment factors that may be used in order to arrive at noise acceptability standards that reflect the noise control goals of the community, the particular community's sensitivity to noise, and the community's assessment of the relative importance of noise pollution. For school land uses, the *State of California General Plan Guidelines* identifies a "normally acceptable" exterior noise level of up to 70 dBA CNEL/L_{dn}. Schools are considered "conditionally acceptable" within noise environments of 60 to 70 dBA CNEL/L_{dn} and "normally unacceptable" within exterior noise environments of 70 to 80 CNEL/L_{dn} and "clearly unacceptable" within exterior noise environments in excess of 80 dBA CNEL/L_{dn}. Assuming a minimum exterior-to-interior noise reduction of 20 dB, an exterior noise environment of 65 dBA CNEL/L_{dn} would allow for a normally acceptable interior noise level of 45 dBA CNEL/L_{dn}.

City of Merced

The *Merced General Plan Noise Element* includes noise standards for both stationary and transportation noise sources for the determination of land use compatibility. In accordance with General Plan policies, new noise-sensitive land uses impacted by existing or projected future transportation or stationary noise sources shall include mitigation measures so that resulting noise levels do not exceed these standards (City of Merced 2012). The land use compatibility noise standards for non-transportation (stationary) and transportation noise sources are summarized in Tables 3 and 4, respectively.

Table 3
City of Merced General Plan Noise Standards - Stationary Noise Sources

Noise Descriptor	Noise Level Standards (dBA)[1]	
	Daytime (7 am - 10 pm)	Nighttime (10 pm – 7 am)
Hourly Equivalent Sound Level (L_{eq})	55	45

Notes:
1. The Inspection Services Division currently addresses noise levels for construction equipment on a case-by-case basis.
Source: City of Merced 2012

Table 4
City of Merced General Plan Noise Standards - Transportation Noise Sources

Land Use	Outdoor Activity Areas[1] (CNEL/L_{dn} dBA)			Interior Spaces (dBA)[3]	
	Roadways	Railroads	Aircraft	Average Daily (CNEL/L_{dn})	Average Hourly (L_{eq}) [2]
Residential	60/65[3]	65[5]	60[3]	45	--
Transient Lodging	65[4,5]	65[4,5]	65[4,5]	45	--
Hospitals, Nursing Homes	60[3]	65[5]	60[3]	45	--
Theaters, Auditoriums, Music Halls	--	--	--	--	35
Churches, Meeting Halls	60[3]	65[5]	60[3]	--	40
Office Buildings	--	--	--	--	45
Schools, Libraries, Museums	--	--	--	--	45
Playgrounds, Neighborhood Parks	70	70	75	--	--

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.
3. Where it is not possible to reduce noise in outdoor activity areas to 60 dB Ldn/CNEL or less using a practical application of the best-available noise reduction measures, an exterior noise level of up to 65 dB Ldn/CNEL may be allowed provided that available exterior noise level reduction measures have been implemented and interior noise levels are in compliance with this table. For residential uses located adjacent to major roadways such as S.R. 99, S.R. 59, and S.R. 140, the normally acceptable exterior noise level is 65 dB Ldn/CNEL.
4. In the case of hotel/motel facilities or other transient lodgings, outdoor activity areas such as pool areas may not be included in the project design. In these cases, only the interior noise level criterion will apply.
5. Where it is not possible to reduce noise in outdoor activity areas to 65 dB Ldn/CNEL or less using a practical application of the best-available noise reduction measures, an exterior noise level of up to 70 dB Ldn/CNEL may be allowed provided that available exterior noise level reduction measures have been implemented and interior noise levels are in compliance with this table.
Source: City of Merced 2012

GROUNDBORNE VIBRATION

Vibration is like noise in that it involves a source, a transmission path, and a receiver. While vibration is related to noise, it differs in that noise is generally considered to be pressure waves transmitted through air, whereas vibration usually consists of the excitation of a structure or surface. As with noise, vibration consists of amplitude and frequency. A person's perception of the vibration will depend on their individual sensitivity to vibration, as well as the amplitude and frequency of the source and the response of the system which is vibrating. Vibration can be measured in terms of acceleration, velocity, or displacement.

The effects of groundborne vibration levels, with regard to human annoyance and structural damage, is influenced by various factors, including ground type, the distance between source and receptor, and duration. Overall effects are also influenced by the type of the vibration event, defined as either continuous or transient. Continuous vibration events would include most construction equipment, including pile drivers, and compactors; whereas, transient sources of vibration create single isolated vibration events, such as demolition ball drops and blasting. The threshold criteria for continuous and transient events are summarized in Table 5.

Table 5
Summary of Groundborne Vibration Levels and Potential Effects

Vibration Level (in/sec ppv)	Human Reaction	Effect on Buildings
0.006 - 0.019	Threshold of perception; possibility of intrusion.	Vibrations unlikely to cause damage of any type.
0.08	Vibrations readily perceptible.	Recommended upper level of the vibration to which ruins and ancient monuments should be subjected.
0.10	Level at which continuous vibrations begin to annoy people.	Virtually no risk of "architectural" damage to normal buildings.
0.20	Vibrations annoying to people in buildings (this agrees with the levels established for people standing on bridges and subjected to relatively short periods of vibrations).	Threshold at which there is a risk of "architectural" damage to fragile buildings.
0.3 - 0.6	Vibrations become distinctly perceptible at 0.04 in/sec ppv and considered unpleasant by people subjected to continuous vibrations and unacceptable to some people walking on bridges.	Potential risk of "architectural" damage may occur at levels above 0.3 in/sec ppv for older residential structures and above 0.5 in/sec ppv for newer structures.

The vibration levels are based on peak particle velocity in the vertical direction for continuous vibration sources, which includes most construction activities.
Source: Caltrans 2013

As indicated in Table 5, the threshold at which there is a risk to normal structures from continuous events is 0.5 in/sec ppv for newer building construction. A threshold of 0.5 in/sec ppv also represents the structural damage threshold applied to older structures for transient vibration sources. With regard to human perception (refer to Table 5), vibration levels would begin to become distinctly perceptible at levels of 0.04 in/sec ppv for continuous events and 0.25 in/sec ppv for transient events. Continuous vibration levels are considered annoying for people in buildings at levels of 0.2 in/sec ppv.

IMPACTS AND MITIGATION MEASURES

METHODOLOGY

Short-Term Construction Noise

Short-term noise impacts associated with construction activities were analyzed based on typical construction equipment noise levels and distances to the nearest noise-sensitive land uses. Noise levels were predicted based on an average noise-attenuation rate of 6 dB per doubling of distance from the source.

Long-term Operational Noise

Roadway Traffic Noise

Traffic noise levels were calculated using the Federal Highway Administration (FHWA) roadway noise prediction model (FHWA-RD-77-108) based on California vehicle reference noise levels and traffic data obtained from the traffic analysis prepared for this project. Additional input data included day/night percentages of autos, medium and heavy trucks, vehicle speeds, ground attenuation factors, and roadway widths. The project's contribution to traffic noise levels along area roadways was determined by comparing the predicted noise levels with and without project-generated traffic. The compatibility of the proposed land uses were evaluated based on predicted future on-site noise conditions and in comparison to the City of Merced's interior noise standard of 45 dBA CNEL/L_{dn} for school uses (refer to Table 4).

The *CEQA Guidelines* do not define the levels at which temporary and permanent increases in ambient noise are considered "substantial." As discussed previously in this section, a noise level increase of 3 dBA is barely perceptible to most people, a 5 dBA increase is readily noticeable, and a difference of 10 dBA would be perceived as a doubling of loudness. For purposes of this analysis, a significant increase in ambient noise levels would be defined as an increase of 3 dBA, or greater. Significant increases in ambient noise levels that would exceed applicable noise standards would be considered to have a potentially significant impact.

Non-Transportation Noise

Noise levels generated by on-site noise sources include an on-site amplified sound/public address (PA) system and stadium uses were assessed based on representative noise data obtained from similar land uses.

Groundborne Vibration

The *CEQA Guidelines* also do not define the levels at which groundborne vibration levels would be considered excessive. For this reason, Caltrans' recommended groundborne vibration thresholds were used for the evaluation of impacts based on increased potential for structural damage and human annoyance, as identified in Table 5. Based on these levels, groundborne vibration levels would be considered to have a potentially significant impact with regard to potential structural damage if levels would exceed a 0.5 in/sec ppv.

PROJECT IMPACTS

Impact Noise-A:	***Would the project result in the generation of 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?***

Noise generated by the proposed project would occur during short-term construction and long-term operation. Noise-related impacts associated with short-term construction and long-term operations of the proposed project are discussed separately, as follows:

<u>Short-term Construction Noise Levels</u>

Construction noise typically occurs intermittently and varies depending upon the nature or phase (e.g., demolition/land clearing, grading, excavation and erection) of construction. Noise generated by construction equipment, including earth movers, material handlers, and portable generators, can reach high levels. Although noise ranges were found to be similar for all construction phases, the initial site preparation phases, including demolition and grading/excavation activities, tend to involve the most equipment and result in the highest average-hourly noise levels.

Noise levels commonly associated with construction equipment are summarized in Table 6. As noted in Table 7, instantaneous noise levels (in dBA L_{max}) generated by individual pieces of construction equipment typically range from approximately 80 dBA to 85 dBA L_{max} at 50 feet (FTA 2006). Typical operating cycles may involve 2 minutes of full power, followed by 3 or 4 minutes at lower settings. Average-hourly noise levels for individual equipment generally range from approximately 73 to 82 dBA L_{eq}. Based on typical off-road equipment usage rates and assuming multiple pieces of equipment operating simultaneously within a localized area, such as soil excavation activities, average-hourly noise levels could reach levels of approximately 80 dBA L_{eq} at roughly 100 feet.

Table 6
Typical Construction Equipment Noise Levels

Equipment	Typical Noise Level (dBA) at 50 feet from Source	
	L_{max}	L_{eq}
Compactor, Concrete Vibratory Mixer	80	73
Backhoe/Front-End Loader, Air Compressor	80	76
Generator	82	79
Crane, Mobile	85	77
Jack Hammer, Roller	85	78
Dozer, Excavator, Grader, Concrete Mixer Truck	85	81
Paver, Pneumatic Tools	85	82
Sources: FTA 2006		

The City has not adopted noise standards that apply to short-term construction activities. However, based on screening noise criteria commonly recommended by federal agencies, construction activities would generally be considered to have a potentially significant impact if average-hourly daytime noise levels would exceed 80 dBA L_{eq} at noise-sensitive land uses, such as residential land uses (FTA 2006). Depending on the location and types of activities conducted (e.g., building demolition, soil excavation, grading), predicted noise levels at the nearest residences, which are located adjacent to and north of the project site, could potentially exceed 80 dBA L_{eq}. Furthermore, with regard to residential land uses, activities occurring during the more noise-sensitive evening and nighttime hours could result in increased levels of annoyance and potential sleep disruption. For these reasons, noise-generating construction activities would be considered to have a ***potentially significant*** short-term noise impact.

Mitigation Measure Noise-1: The following measures shall be implemented to reduce construction-generated noise levels:

a. Construction activities (excluding activities that would result in a safety concern to the public or construction workers) shall be limited to between the hours of 7:00 a.m. and 10:00 p.m. Construction activities shall be prohibited on Sundays and legal holidays.

b. Construction truck trips shall be scheduled, to the extent feasible, to occur during non-peak hours and truck haul routes shall be selected to minimize impacts to nearby residential dwellings.

c. 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.

d. Stationary construction equipment (e.g., portable power generators) should be located at the furthest distance possible from nearby residences. If deemed necessary, portable noise barriers shall be erected to sufficiently shield nearby residences from direct line-of-sight of stationary construction equipment.

e. When not in use, all equipment shall be turned off and shall not be allowed to idle. Provide clear signage that posts this requirement for workers at the entrances to the site.

Significance After Mitigation: The use of mufflers would reduce individual equipment noise levels by approximately 10 dBA. Implementation of the above mitigation measures would limit construction activities to the less noise-sensitive periods of the day. With the implementation of the above mitigation measures, this impact would be considered ***less than significant***.

Long-term Operational Noise Levels

The proposed project includes the construction of a high school football stadium with an amplified sound/ PA system. It is anticipated that the stadium would primarily be used during the hours of 7:00 p.m. and 10:00 p.m. Noise generated by events held at the proposed stadium would have the greatest potential for adverse noise impacts, given the potential to attract larger participant/spectator crowds.

Based on noise measurements conducted for similar projects, average-hourly noise levels associated with outdoor play areas and recreational facilities that draw smaller spectator crowds (i.e.., soccer fields, baseball fields, basketball courts, swimming pools) typically average less than 65 dBA L_{eq} at approximately 50 feet. Intermittent noise events typically associated with such uses include elevated voices, whistles, and the hitting of balls. Maximum instantaneous noise levels associated with activities conducted at smaller ballfields and playgrounds, excluding the use of amplified sound/PA systems, can reach levels up to approximately 70 dBA at 100 feet, for brief periods of time.

For larger high school stadiums, representative exterior noise levels measured at various events generally range from approximately 55 to 71 dBA L_{eq} at approximately 250 feet from the source. It is important to note that noise levels at large recreational facilities, such as stadiums, are dependent on various factors including facility design and orientation, the activities conducted, spectator crowd size, the type of amplified sound/PA system installed, as well as speaker placement. In general, noise from amplified sound/PA systems at stadiums tends to dominate the noise environment and occurs on a more frequent basis then noise generated by spectators. For audibility purposes, noise levels of amplified sound/PA systems tend to be approximately 3 to 10 dBA greater than spectator noise. In addition, due to decreased volume levels required to address spectators, the use of multiple speakers placed throughout the stadium tend to generate lower overall noise levels than centrally located amplified sound/PA systems. Other uses commonly associated with high school stadiums, such as band performances, can also result in substantial increases in ambient noise levels. Band performances at similar facilities have measured up to 69 dBA L_{eq} at 400 feet. Maximum instantaneous noise levels associated with activities conducted at stadiums, including the use of amplified sound/PA systems, can reach levels up to approximately 95 dBA at 50 feet, for brief periods of time.

Predicted average-hourly noise levels associated with proposed onsite land uses are depicted in Figure 4 and summarized in Table 7. These levels were calculated using SoundPlan Essential software. It is important to note that these predicted noise levels are based on preliminary site designs and do not account for noise reductions associated with variations in site terrain or noise-reduction design features, such as (e.g., closed bleachers, berms, barriers). Substantial reductions in noise levels can be achieved through the incorporation of various design features (i.e., spectator shielding, elevation changes, amplified sound/PA speaker placement, stadium orientation, and berms), as well as incorporation of operational limitations.

As noted in Table 8 (receivers 3-10), predicted average-hourly noise levels at nearby residential dwellings would range from approximately 52 to 67 dBA L_{eq}. Predicted maximum instantaneous noise levels at these nearest residences would range from approximately 64 to 82 dBA L_{max}. For smaller recreational events not involving large spectator crowds or the use of amplified sound/PA systems, predicted recreational use noise levels at these nearest residential dwellings would be largely masked by traffic noise emanating from area roadways. However, noise generated by recreational events involving large spectator crowds and/or the use of amplified sound/PA systems would result in a substantial increase in ambient noise levels at nearby land uses.

Table 7
Predicted Noise Levels at Nearby Land Uses

Receiver Number	Distance from Project Boundary (feet)	Predicted Noise Levels (dBA)	
		Average Hourly (L_{eq}/L_{50})	Maximum Instantaneous L_{max}/L_0)
1	700	51.0	62.8
2	215	61.8	75.2
3	605	51.9	63.9
4	525	55.7	67.1
5	235	60.9	76.0
6	200	62.2	78.0
7	145	65.9	81.7
8	135	69.3	84.7
9	135	67.2	82.2
10	170	66.0	80.4

Non-residential land uses include the Valley Baptist Church located to the east across G street, and Buhach Preschool located adjacently to the west of the project site. Exterior noise levels at Valley Baptist Church and Buhach Preschool would be approximately 52 dBA L_{eq}, or less. Based on this noise level and assuming an average exterior-to-interior noise reduction of 25 dBA, predicted interior noise levels at these land uses would be approximately 27 dBA L_{eq}, or less. Predicted interior noise levels at these land uses would not be predicted to exceed the commonly applied interior noise threshold of 45 dBA L_{eq}.

Policy HS-7.13 of the City of Merced General Plan provides exemptions from noise source standards. It states that activities at schools are exempt from noise standards provided said activities occur during daytime hours. However, onsite recreational-use activities, particularly activities involving the use of amplified sound/PA systems, would be projected to result in significant increases in ambient noise levels at nearby residential land uses. Activities occurring during the more noise-sensitive nighttime hours may result in increased levels of annoyance and potential sleep disruption to occupants of nearby dwellings. As a result, increases in noise associated with onsite recreational uses would be considered a **potentially significant** noise impact.

Mitigation Measure Noise-2: The following measures shall be implemented to reduce long-term operational noise impacts:

a. Bleachers shall be constructed with solid risers between the spectator seats and floor, or plywood backing shall be installed along the rear vertical face of the bleachers.

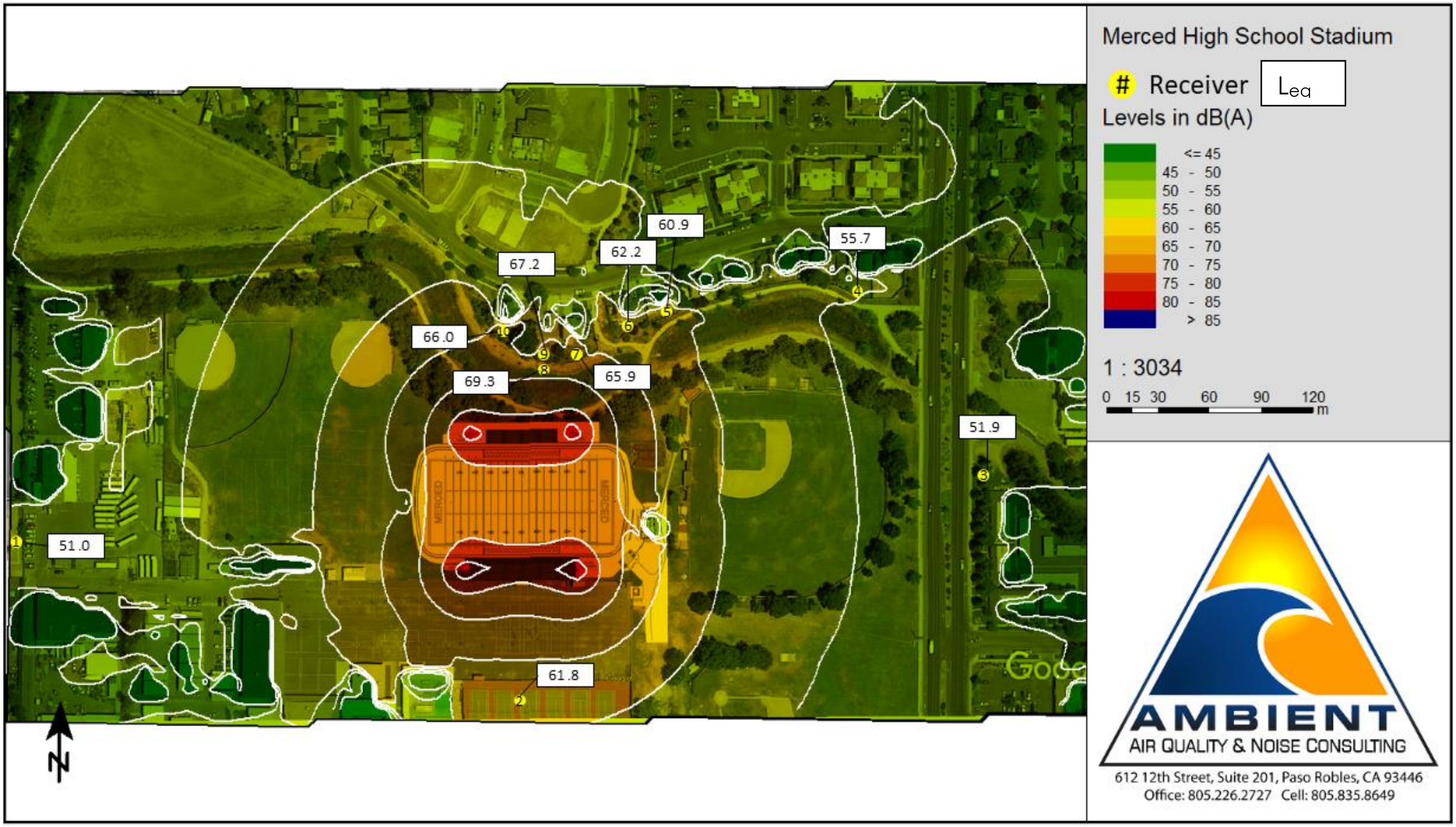
b. Any exterior mounted amplified sound/PA system speakers shall be directed at a downward angle and away from the nearest offsite residential land uses.

c. To the extent practical, exterior mounted amplified sound/PA system speakers shall be mounted in locations that would provide shielding from line-of-sight of nearby residential land uses.

Significance After Mitigation

Implementation of Mitigation Measure Noise-2a would reduce event noise levels, particularly spectator noise, at nearby residential land uses by approximately 3 dBA. Additional mitigation measures have also been included to further reduce operational noise levels associated with the proposed amplified sound/PA system. However, the effects of these measures cannot be quantified at this time. Nonetheless, predicted noise levels at the nearest residential land uses would still be projected to exceed the City of Merced's noise standards. This impact would be considered ***significant and unavoidable***.

Figure 4
Predicted Average-Hourly Noise Levels



Roadway Traffic

Predicted existing traffic noise levels, with and without the implementation of the proposed project, are summarized in Table 8. Predicted increases in future cumulative traffic noise levels along nearby roadways for the proposed project are summarized in Table 9. In comparison to existing traffic noise levels, the proposed project would result in a predicted increase in traffic noise levels of approximately 0.2 to 0.8 dBA along area roadways. In future years, the project's contribution to traffic noise levels are projected to decrease slightly. As depicted in Table 9, the proposed project would result in increases in traffic noise levels of approximately 0.7 dBA, or less, under future cumulative conditions. As noted earlier in this report, changes in ambient noise levels of approximately 3 dBA, or less, are typically not discernible to the human ear and would not be considered to result in a significant impact. As a result, this impact would be considered ***less than significant.***

Table 8
Predicted Increases in Existing Traffic Noise Levels

Roadway Segment	Predicted Noise Level at 50 feet from Centerline of Near Travel Lane (dBA CNEL/L_{dn})[1]			
	Existing Without Project	Existing With Project	Difference[2]	Significant Impact?[3]
Olive Avenue west of Merced High School Driveway	67.4	68.2	0.8	No
Olive Avenue between Merced High School Driveway and Park Avenue	67.5	68.2	0.7	No
Olive Avenue between Park Avenue and G Street	67.3	67.9	0.6	No
Olive Avenue east of G Street	65.5	65.8	0.3	No
G Street north of Olive Avenue	67.1	67.3	0.2	No
G Street south of Olive Avenue	66.2	66.4	0.2	No
Park Avenue south of Olive Avenue	59.5	59.8	0.3	No

1. Traffic noise levels were calculated using the FHWA roadway noise prediction model (FHWA-RD-77-108), based on data obtained from the traffic analysis prepared for this project.
2. Difference in noise levels reflects the incremental increase attributable to the proposed project.
3. Defined as a substantial increase in ambient noise levels in excess of the City's exterior noise standard of 65 dBA CNEL.

Table 9
Predicted Increases in Future Cumulative Traffic Noise Levels

Roadway Segment	Predicted Noise Level at 50 feet from Centerline of Near Travel Lane (dBA CNEL/L_{dn})[1]			
	Future Without Project	Future With Project	Difference[2]	Significant Impact?[3]
Olive Avenue west of Merced High School Driveway	68.0	68.7	0.7	No
Olive Avenue between Merced High School Driveway and Park Avenue	68.1	68.8	0.7	No
Olive Avenue between Park Avenue and G Street	68.0	68.5	0.5	No
Olive Avenue east of G Street	66.5	66.8	0.3	No
G Street north of Olive Avenue	68.7	68.8	0.1	No
G Street south of Olive Avenue	67.8	67.9	0.1	No
Park Avenue south of Olive Avenue	60.3	60.5	0.3	No

1. Traffic noise levels were calculated using the FHWA roadway noise prediction model (FHWA-RD-77-108), based on data obtained from the traffic analysis prepared for this project.
2. Difference in noise levels reflects the incremental increase attributable to the proposed project.
3. Defined as a substantial increase in ambient noise levels in excess of the City's exterior noise standard of 65 dBA CNEL.

Land Use Compatibility

The Merced City General Plan Noise Element includes noise standards for determination of land use compatibility for new land uses. As previously discussed, the City's "normally acceptable" exterior noise standard for schools is 65 dBA CNEL/L_{dn}.

As noted earlier in this report, ambient noise levels in the project area are largely influenced by traffic noise on area roadways. Under future cumulative conditions, with project-generated vehicle traffic included, the predicted 65 dBA CNEL/L_{dn} noise contour for G Street north of Olive Avenue would extend to 145 feet from the roadway centerline. Based on preliminary site plans, the proposed stadium would be located approximately 550 feet from the centerline of G Street. Based on this setback distance, predicted traffic noise levels at the stadium would be 56 dBA CNEL/L_{dn}. As a result, the stadium would not be projected to exceed applicable City noise standards for land use compatibility. As a result, this impact would be considered ***less than significant***.

Impact Noise-B. ***Would the project result in the generation of excessive groundborne vibration or groundborne noise levels?***

Long-term operational activities associated with the proposed project would not involve the use of any equipment or processes that would result in potentially significant levels of ground vibration. Increases in groundborne vibration levels attributable to the proposed project would be primarily associated with short-term construction-related activities. Construction activities associated with the proposed improvements would likely require the use of various off-road equipment, such as tractors, concrete mixers, and haul trucks. The use of major groundborne vibration-generating construction equipment, such as pile drivers, would not be required for this project.

Groundborne vibration levels associated with representative construction equipment are summarized in Table 10. As depicted, ground vibration generated by construction equipment would be approximately 0.089 in/sec ppv, or less, at 25 feet. Predicted vibration levels at the nearest existing structures would not be anticipated to exceed commonly applied criteria for structural damage or human annoyance (i.e., 0.5 and 0.2 in/sec ppv, respectively). In addition, no fragile or historic structures have been identified in the project area. As a result, this impact would be considered ***less than significant.***

Table 10
Representative Vibration Source Levels for Construction Equipment

Equipment	Peak Particle Velocity at 25 Feet (In/Sec)
Large Bulldozer	0.089
Loaded Truck	0.076
Jackhammer	0.035
Small Bulldozer	0.003
Source: FTA 2006, Caltrans 2004	

Impact Noise-C. ***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 two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?***

The nearest airports in the project vicinity include the Merced Regional Airport and the Merced County Castle Airport, which are located approximately 3.3 and 5.6 miles to the southwest and northwest, respectively. No private airstrips were identified within two miles of the project site. Implementation of the proposed project would not result in the exposure of sensitive receptors to aircraft noise levels nor would the proposed project affect airport operations. This impact is considered ***less than significant***.

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APPENDIX A

Noise Prediction Modeling & Supportive Documentation

Noise Monitoring

NOISE MEASUREMENT SURVEY FORM

DATE:	9-18-19 to 9-19-19
PROJECT:	Merced High School Stadium

NOISE MONITORING LOCATION	Merced

MET CONDITIONS: night/day | TEMP: 77/59 F. | HUMIDITY: 47/83 % | WIND SPEED: 10 N/9 NNW MPH | SKY: cloudy/sunny | GROUND: dry/dry

NOISE MONITORING EQUIPMENT: LARSON DAVIS MODEL 820, TYPE I SLM

CALIBRATED PRIOR TO AND UPON COMPLETION OF MEASUREMENTS: YES

LOCATION	MONITORING PERIOD	NOISE SOURCES NOTED	NOISE LEVEL			NOTES
			LEQ	LMIN	LMAX	
ST1	18:18-18:28	Birds, Dogs, High School Team Practce	49.5	44.2	61.8	
ST2	18:41-18:51	Traffic, Electric Box Humming	73.0	52.9	83.0	
ST3	19:02-19:12	Bus Idle	53.4	42.5	76.1	
ST4	19:18-19:28	Traffic, Shopping Carts, Stereo	67.7	53.8	79.7	
ST1	8:31-8:41	Birds, Dogs	50.6	43.9	62.9	
ST2	8:49-8:59	Traffic, Electric Box Humming	73.9	57.0	85.8	
ST3	9:07-9:17	Children at Daycare	51.3	45.5	65.0	
ST4	9:24-9:34	Traffic	66.1	51.9	75.5	

Existing Predicted Traffic Noise Levels

Road Segment	Road Segment ADT	AHW (feet)	Speed (mph)	CNEL (dBA) at 50 feet from Near Lane Centerline	Distance (feet) from Roadway Centerline to			
					70 CNEL (dBA)	65 CNEL (dBA)	60 CNEL (dBA)	55 CNEL (dBA)
Existing								
Olive Avenue west of Merced High School Driveway	19310	37.5	45	67.44	65.2	120.9	250.3	534.4
Olive Avenue between Merced High School Driveway and Park Avenue	19500	37.5	45	67.48	65.5	121.6	251.9	537.9
Olive Avenue Park Avenue and G Street	18810	38	45	67.3	64.7	119.1	246.1	525.2
Olive Avenue east of G Street	13820	25	40	65.45	0	79.7	165	352.3
G Street north of Olive Avenue	17460	35.75	45	67.09	0	113.3	234.2	499.9
G Street south of Olive Avenue	19240	35.75	40	66.24	0	100.9	206.3	439.1
Park Avenue south of Olive Avenue	4210	16.5	35	59.48	0	0	61.7	129.1
Existing plus Project								
Olive Avenue west of Merced High School Driveway	23080	37.5	45	68.21	70.8	134.7	281.2	601.5
Olive Avenue between Merced High School Driveway and Park Avenue	23070	37.5	45	68.21	70.8	134.7	281.1	601.3
Olive Avenue Park Avenue and G Street	21550	38	45	67.89	68.8	129.3	268.9	5748
Olive Avenue east of G Street	14910	25	40	65.78	0	83.5	173.4	370.4
G Street north of Olive Avenue	18260	35.75	45	67.29	62.6	116.3	241.1	514.9
G Street south of Olive Avenue	20040	35.75	40	66.42	0	103.3	211.8	451.1
Park Avenue south of Olive Avenue	4550	16.5	35	59.82	0	0	64.7	135.9

Traffic noise levels were calculated using the FHWA roadway noise prediction model (FHWA-RD-77-108), based on data obtained from the traffic analysis prepared for this project.

Future Predicted Traffic Noise Levels

Road Segment	Road Segment ADT	AHW (feet)	Speed (mph)	CNEL (dBA) at 50 feet from Near Lane Centerline	Distance (feet) from Roadway Centerline to			
					70 CNEL (dBA)	65 CNEL (dBA)	60 CNEL (dBA)	55 CNEL (dBA)
Future No Build								
Olive Avenue west of Merced High School Driveway	22190	37.5	45	68.04	69.5	131.5	274.1	586
Olive Avenue between Merced High School Driveway and Park Avenue	22420	37.5	45	68.09	69.8	132.3	275.9	590
Olive Avenue Park Avenue and G Street	21990	38	45	67.98	69.5	130.9	272.5	582.5
Olive Avenue east of G Street	17710	25	40	66.53	0	92.8	194.1	415.3
G Street north of Olive Avenue	25320	35.75	45	68.71	73.2	142.2	298.7	639.7
G Street south of Olive Avenue	27640	35.75	40	67.82	66.2	125.3	261.1	558.3
Park Avenue south of Olive Avenue	5040	16.5	35	60.26	0	0	69	145.3
Future Build								
Olive Avenue west of Merced High School Driveway	25960	37.5	45	68.72	75	144.9	303.8	650.4
Olive Avenue between Merced High School Driveway and Park Avenue	26560	37.5	45	68.82	75.9	147	308.4	660.3
Olive Avenue Park Avenue and G Street	24680	38	45	68.48	73.4	140.5	293.9	628.9
Olive Avenue east of G Street	18800	25	40	66.78	0	96.3	210.8	432.1
G Street north of Olive Avenue	26120	35.75	45	68.84	74.4	145	304.8	653
G Street south of Olive Avenue	28440	35.75	40	67.94	67.1	127.5	266	568.9
Park Avenue south of Olive Avenue	5380	16.5	35	60.54	0	0	71.9	151.7

Traffic noise levels were calculated using the FHWA roadway noise prediction model (FHWA-RD-77-108), based on data obtained from the traffic analysis prepared for this project.

Appendix E

Traffic Impact Analysis

Traffic Impact Analysis

Merced Union High School District
Merced High School Stadium

Located on the Northwest Corner of "G" Street and Olive Avenue

In the City of Merced, California

Prepared for:

Merced Union High School District
3430 "A" Street
Atwater, CA 95301

November 7, 2019

JLB Project No. 035-005

JLB TRAFFIC ENGINEERING, INC.

Traffic Engineering, Transportation Planning, & Parking Solutions
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JLB TRAFFIC ENGINEERING, INC.

Traffic Engineering, Transportation Planning, & Parking Solutions

Traffic Impact Analysis

For the Merced Union High School District Merced High School Stadium located on the Northwest Corner of "G" Street and Olive Avenue

In the City of Merced, CA

November 7, 2019

This Traffic Impact Analysis has been prepared under the direction of a licensed Traffic Engineer. The licensed Traffic Engineer attests to the technical information contained therein, and has judged the qualifications of any technical specialists providing engineering data from which recommendations, conclusions, and decisions are based.

Prepared by:

Jose Luis Benavides, PE, TE

President

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Exp:06/30/21
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Introduction and Summary

Introduction

This report describes a Traffic Impact Analysis (TIA) prepared by JLB Traffic Engineering, Inc. (JLB) for the Merced Union High School District's (District) proposed Merced High School Stadium (Project) located on the northwest corner of "G" Street and Olive Avenue in the City of Merced. The Project proposes to construct a 3,100-seat football stadium on the north side of campus where an existing football field is currently located. Merced High school currently uses the stadium located at Golden Valley High School. The proposed Merced High School Stadium would serve as the "home" game location for Merced High School varsity and junior varsity football teams and as a venue for special events such sporting events and graduation ceremonies. The proposed stadium is not expected to generate a significant number of trips on a daily basis throughout the year. The proposed stadium would likely host up to six (6) varsity football games on Friday evenings during a 12-week period. Per information provided to JLB, the Project is consistent with the City of Merced General Plan. Figure 1 shows the location of the proposed Project site relative to the surrounding roadway network.

The purpose of this TIA is to evaluate the potential on-site and off-site traffic impacts, identify short-term roadway and circulation needs, determine potential mitigation measures, and identify any critical traffic issues that should be addressed in the on-going planning process. The TIA primarily focused on evaluating traffic conditions at study intersections that may potentially be impacted by the proposed Project. The Scope of Work was prepared via consultation with City of Merced, County of Merced and Caltrans staff.

Summary

The potential traffic impacts of the proposed Project were evaluated in accordance with the standards set forth by the Level of Service (LOS) policy of the City of Merced, County of Merced and Caltrans.

Existing Traffic Conditions

- At present, all study intersections operate at an acceptable LOS during the PM peak period.

Existing plus Project Traffic Conditions

- JLB analyzed the location of the proposed driveways relative to the existing local roads and driveways in the Project's vicinity. Based on this review, it is recommended that the Project modify Merced High School Driveway access to Olive Avenue to left-in, right-in and right-out only by installing a raised median island across the intersection along the center of Olive Avenue. Based on the Queuing Analysis, the existing driveway throat depth of 100 feet is adequate for onsite and offsite traffic operations and circulation. Installation of a raised median island across the intersection along the center of Olive Avenue would improve onsite and offsite traffic operations and circulation.
- The surrounding Project site is well-developed with sidewalks providing adequate and safe pedestrian facilities at all times.
- At buildout, the Project is estimated to generate a maximum of 2,294 daily trips and 680 PM peak hour trips before a Friday evening event.

- As the Project is within a defined service area that is currently being served by another stadium, JLB determined the anticipated average trip length reductions that would be observed as a result of the proposed stadium. It estimated that the average trip length for Merced High School Friday evening events taking place at the Merced Golden Valley High School Stadium is 2.66 miles. With the Project, the estimated average trip length is 1.19 miles resulting in a reduction of 1.46 miles per project trip on average. Additionally, the proposed stadium is located near transit services and adequate pedestrian and bicycle facilities.
- Under this scenario, all study intersections are projected to operate at an acceptable LOS during the PM peak period.

Near Term plus Project Traffic Conditions

- The total trip generation for the Near Term Projects by year 2025 is 88,641 daily trips and 8,301 PM peak hour trips.
- Under this scenario, the intersections of State Route 59 and Olive Avenue and Merced High School Driveway and Olive Avenue are projected to exceed their LOS threshold during the PM peak period. To improve the LOS at these intersections, it is recommended that the following improvements be implemented.
    - State Route 59 / Olive Avenue
        - Due to the limited frequency of stadium events, mitigation measures that involve modifications to the lane geometrics of this intersection would not be appropriate. However, it is recommended that the traffic signals be modified to implement overlap phasing of the northbound right-turn with the westbound left-turn phase.
    - Merced High School Driveway / Olive Avenue
        - Modify Merced High School Driveway access to Olive Avenue to left-in, right-in and right-out only. To accomplish this, it is recommended that a raised median island be extended across the intersection along the center of Olive Avenue. With the extension of the raised median island, southbound left-turns would need to be redirected. Southbound left-turning traffic from Merced High School Driveway would need to make a right-turn onto Olive Avenue, proceed to make a legal eastbound to westbound U-turn on Olive Avenue, and then continue eastbound on Olive Avenue past Merced High School Driveway.

Cumulative Year 2039 No Project Traffic Conditions

- Under this scenario, all study intersections are projected to operate at an acceptable LOS during the PM peak period.

Cumulative Year 2039 plus Project Traffic Conditions

- Under this scenario, the intersections of State Route 59 and Olive Avenue, Merced High School Driveway and Olive Avenue, and “G” Street and Olive Avenue are projected to exceed their LOS threshold during the PM peak period. To improve the LOS at these intersections, it is recommended that the following improvements be implemented.
  - State Route 59 / Olive Avenue
    - Due to the limited frequency of stadium events, mitigation measures that involve modifications to the lane geometrics of this intersection would not be appropriate. However, it is recommended that the traffic signals be modified to implement overlap phasing of the northbound right-turn with the westbound left-turn phase.
  - Merced High School Driveway / Olive Avenue
    - Modify Merced High School Driveway access to Olive Avenue to left-in, right-in and right-out only. To accomplish this, it is recommended that a raised median island be extended across the intersection along the center of Olive Avenue. With the extension of the raised median island, southbound left-turns would need to be redirected. Southbound left-turning traffic from Merced High School Driveway would need to make a right-turn onto Olive Avenue, proceed to make a legal eastbound to westbound U-turn on Olive Avenue, and then continue eastbound on Olive Avenue past Merced High School Driveway.
  - “G” Street / Olive Avenue
    - It is recommended that the intersection be modified to convert the southbound through-right lane to a through lane and stripe a southbound right-turn lane.

Queuing Analysis

- It is recommended that the City consider left-turn and right-turn lane storage lengths as indicated in the Queuing Analysis.

Scope of Work

The study focused on evaluating traffic conditions at the existing study intersections that may potentially be impacted by the Project. On September 18, 2019, a Draft Scope of Work for the preparation of a TIA for this Project was provided to the City of Merced, County of Merced and Caltrans for their review and comment. Any comments to the Draft Scope of Work were to be provided by October 2, 2019.

On September 25, 2019, the City of Merced responded and approved the Draft Scope of Work as presented. On October 3, 2019, Caltrans responded to the Draft Scope of Work. Caltrans requested that the TIA include an operational analysis before and after a Friday evening event consistent with the Merced Golden Valley High School Stadium Seating Expansion TIA (April 13, 2010). Caltrans also requested that the TIA include the intersection of State Route 59 and Olive Avenue and that Highway Capacity Manual 2010 methodologies within Synchro be utilized to perform the analysis. JLB forwarded the Draft Scope of Work to another staff member at the County of Merced on September 30, 2019. JLB failed to receive comments from the County of Merced on the Draft Scope of Work.

JLB obtained a turning movement count for the intersection of State Route 59 and Olive Avenue collected on Friday, October 11, 2019 between the hours of 4:30 PM and 10:30 PM – to capture traffic volumes before and after a Friday evening event. Based on a review of this count, traffic volumes during the hour immediately prior to a Friday evening event were on average approximately 300 trips lower when compared to the actual PM peak traffic volumes. JLB communicated this to the City Engineer at the City of Merced who agreed to the analysis of the 5:45 PM to 6:45 PM hour – the hour before a Friday evening event.

With regard to the analysis of the hour after a Friday evening event, JLB began with a comparison of the total volumes for the 9:00 PM to 10:00 PM hour with those of the 5:45 PM to 6:45 PM hour for the intersection of State Route 59 and Olive Avenue. Then, JLB determined the estimated maximum trip generation for the Project consistent with the Merced Golden Valley High School Stadium Seating Expansion TIA (April 13, 2010). After preparing the Project's anticipated trip distribution, JLB compared the sum of the existing volumes and the anticipated project only trips at the intersection of State Route 59 and Olive Avenue for the hours selected. Based on this comparison, JLB found that the volumes that would be analyzed for the 9:00 PM to 10:00 PM hour were nearly 55% lower than those analyzed for the 5:45 PM to 6:45 PM hour. Since the worst-case scenario occurs during the hour before a Friday evening event, JLB considered it of no value to include the analysis of the hour after a Friday evening event.

Based on the comments received, this TIA includes: analysis of the intersection of State Route 59 and Olive Avenue; analysis of the 5:45 PM to 6:45 PM hour (the hour with the heaviest traffic right before a Friday evening event); trip generation based on rates obtained from the Golden Valley High School Stadium Seating Expansion TIA (April 13, 2010) for the hour before a Friday evening event; and 2010 Highway Capacity Manual methodologies within Synchro. The TIA does not include analysis of the hour after a Friday evening event since analysis of the hour before a Friday evening event would yield the worst-case scenario. The Draft Scope of Work and the comments received from the lead agency and responsible agencies are included in Appendix A.

Study Facilities

The existing peak hour turning movement counts were conducted at the study intersections in September and October 2019. The intersection turning movement counts included pedestrian volumes. The traffic counts for the existing study intersections are contained in Appendix B. The existing intersection turning movement volumes, intersection geometrics and traffic controls are illustrated in Figure 2.

Study Intersections

1. State Route 59 / Olive Avenue
2. Merced High School Driveway / Olive Avenue
3. Park Avenue / Olive Avenue
4. "G" Street / Olive Avenue

Study Scenarios

Existing Traffic Conditions

This scenario evaluates the Existing Traffic Conditions based on existing traffic volumes and roadway conditions from traffic counts and field surveys conducted in September and October 2019.

Existing plus Project Traffic Conditions

This scenario evaluates total traffic volumes and roadway conditions based on the Existing plus Project Traffic Conditions. The Existing plus Project traffic volumes were obtained by adding the Project Only Trips to the Existing Traffic Conditions scenario. The Project Only Trips to the study intersections were developed based on existing travel patterns, the existing roadway network, engineering judgment, data provided by the District, knowledge of the study area, existing residential and commercial densities, and the Merced Vision 2030 General Plan Transportation and Circulation Element in the vicinity of the Project.

Near Term plus Project Traffic Conditions

This scenario evaluates total traffic volumes and roadway conditions based on the Near Term plus Project Traffic Conditions. The Near Term plus Project traffic volumes were obtained by adding the Near Term (Year 2025) related trips to the Existing plus Project Traffic Conditions scenario.

Cumulative Year 2039 No Project Traffic Conditions

This scenario evaluates total traffic volumes and roadway conditions based on the Cumulative Year 2039 No Project Traffic Conditions. The Cumulative Year 2039 No Project traffic volumes were obtained by subtracting the Project Only Trips from the Cumulative Year 2039 plus Project Traffic Conditions scenario.

Cumulative Year 2039 plus Project Traffic Conditions

This scenario evaluates total traffic volumes and roadway conditions based on the Cumulative Year 2039 plus Project Traffic Conditions. The Cumulative Year 2039 plus Project traffic volumes were obtained by expanding Existing traffic volumes by an average annual growth rate of 0.7 percent, assuming full buildout of all Near Term Projects, and utilizing the greater of the two volumes. The average annual growth rate of 0.7 percent was approved by City of Merced staff in their approval of the Draft Scope of Work. The average annual growth rate of 0.7 percent was based on a review of the Base Year 2015 and Cumulative Year 2042 Merced CAG models.

Level of Service Analysis Methodology

Level of Service (LOS) is a qualitative index of the performance of an element of the transportation system. LOS is a rating scale running from “A” to “F”, with “A” indicating no congestion of any kind and “F” indicating unacceptable congestion and delays. LOS in this study describes the operating conditions for signalized and unsignalized intersections.

The *2010 Highway Capacity Manual* (HCM) is the standard reference published by the Transportation Research Board and contains the specific criteria and methods to be used in assessing LOS. U-turn movements were analyzed using HCM 2000 methodologies and would yield more accurate results for the reason that HCM 2010 methodologies do not allow the analysis of U-turns or some shared turn lane movements. Synchro software was used to define LOS in this study. Details regarding these calculations are included in Appendix C.

Criteria of Significance

The Merced Vision 2030 General Plan has established LOS D as the acceptable level of traffic congestion on new and upgraded intersections and road segments. However, the City of Merced Vision 2030 General Plan recognizes that this may not always be feasible, appropriate or necessary. For those cases in which a LOS criterion for a roadway segment differs from that of the established LOS, such criteria are identified in the roadway description. Most study intersections within the City of Merced SOI utilize LOS D to evaluate the potential significance of LOS impacts pursuant to the Merced Vision 2030 General Plan.

The 2030 Merced County General Plan has established LOS C or better for roadways located within rural areas, LOS D or better for roadways located outside Urban Communities that serve as connectors between Urban Communities, and LOS D or better for roadways located within Urban Communities. Since all study intersections fall within the City of Merced SOI, the City of Merced LOS is utilized.

Caltrans endeavors to maintain a target LOS at the transition between LOS C and D on State highway facilities consistent with the *Caltrans Guide for the Preparation of Traffic Impact Studies* dated December 2002. However, Caltrans acknowledges that this may not always be feasible and recommends that the lead agency consult with Caltrans to determine the appropriate target LOS. The State Route 59 Transportation Concept Report has established LOS D as the concept LOS for State Route 59 within the City of Merced. In this TIA, study facilities within Caltrans’ jurisdiction utilize LOS D threshold as the criteria of significance.

Operational Analysis Assumptions and Defaults

The following operational analysis values, assumptions and defaults were used in this study to ensure a consistent analysis of LOS among the various scenarios.

- Yellow time consistent with the California Manual of Uniform Traffic Control Devices (CA MUTCD) based on approach speeds
- All-red clearance intervals of 1.0 second for all phases
- Walk intervals of 7.0 seconds
- Flashing Don't Walk based on 3.5 feet/second walking speed with yellow plus all-red clearance subtracted and 2.0 seconds added
- All new or modified signals utilize protective left-turn phasing
- Heavy vehicle factor:
  - An average 7 percent on State Route 59
  - An average 3 percent on all other roadways
- An average of 10 pedestrian calls per hour at all signalized intersections
- The number of observed pedestrians at existing intersections was utilized under all study scenarios
- The observed approach Peak Hour Factor (PHF) at existing intersections was utilized in the Existing, Existing plus Project and Near Term plus Project scenarios
- A PHF of 0.92, or the existing PHF, if higher, is utilized for all intersections in the Cumulative Year 2039 scenarios

Existing Traffic Conditions

Roadway Network

The Project site and surrounding study area are illustrated in Figure 1. Important roadways serving the Project are discussed below.

State Route 59 is an existing north-south two-lane undivided major arterial in the vicinity of the proposed Project. In this area, State Route 59 extends north of State Route 99 via "V" Street and 16th Street. State Route 59 is predominantly a two-lane undivided arterial north of 16th Street through the City of Merced SOI and is also known as Snelling Highway. The Merced Vision 2030 General Plan designates State Route 59 as a six-lane arterial between 16th Street and Yosemite Avenue, a four-lane arterial between Yosemite Avenue and Bellevue Road, and a six-lane arterial between Bellevue Road and Oakdale Road. The Transportation Concept Report for State Route 59 designates the segment of State Route 59 between 16th Street and Buena Vista Road as a four-lane expressway with a Class III Bicycle Facility.

Olive Avenue is an existing east-west six-lane divided arterial adjacent to the proposed Project. In this area, Olive Avenue is a six-lane divided major arterial between State Route 59 and "R" Street, a six-lane divided arterial between "R" Street and "G" Street, a two-lane arterial divided by a two-way left-turn lane between "G" Street and McKee Road, and a two-lane undivided arterial east of McKee Road through the City of Merced SOI. Olive Avenue is a four-lane divided major arterial west of State Route 59 through the City of Merced SOI and is known as Santa Fe Drive. The Merced Vision 2030 General Plan designates Olive Avenue as a six-lane divided major arterial west of "G" Street, a four-lane divided arterial between "G" Street and Parsons Avenue, and a two-lane divided arterial east of Parsons Avenue. Furthermore, the Merced Vision 2030 General Plan acknowledged that Olive Avenue would exceed LOS D as a four-lane divided arterial between "G" Street and Parsons Avenue. However, City Council made appropriate findings to designate LOS E as the criteria of significance for Olive Avenue as four-lane facility between "G" Street and Parsons Avenue.

Merced High School Driveway is an existing north-south two-lane undivided access to the proposed Project. Merced High School Driveway serves as the fire lane road for the Merced High School campus and requires a special permit to enter the gated parking lot immediately to the northeast of the driveway and Olive Avenue. The gated parking lot has another gate onsite that connects to the open parking lot accessible via the northern extension of Park Avenue. During a Friday evening event, gates to this parking lot are opened to attendees.

Park Avenue is an existing north-south two-lane undivided collector in the vicinity of the proposed Project. In this area, Park Avenue is a two-lane undivided collector between Olive Avenue and "G" Street. North of Olive Avenue, Park Avenue becomes the main access driveway to the Merced High School campus. The Merced Vision 2030 General Plan designated Park Avenue as a collector between Olive Avenue and "G" Street.

"G" Street is an existing north-south four-lane divided minor arterial adjacent to the proposed Project. In this area, "G" Street is a two-lane undivided arterial north of Farmland Road, a three-lane arterial divided by a two-way left-turn lane between Farmland Road and Bellevue Road, a four-lane divided arterial between Bellevue Road and Cardella Road, a two-lane undivided major arterial between Cardella Road and Mercy Avenue, a five-lane divided arterial between Mercy Avenue and Yosemite Avenue, a four-lane arterial divided by a two-way left-turn lane between Yosemite Avenue and El Portal Drive, a four-lane divided arterial between El Portal Drive and Bear Creek Drive, a four-lane arterial divided by a two-way left-turn lane between Bear Creek Drive and 13th Street, and a two-lane undivided collector south of 13th Street. The Merced Vision 2030 General Plan designates "G" Street as a four-lane divided arterial north of Old Lake Road, a six-lane major arterial between Old Lake Road and Bellevue Road, a four-lane major arterial between Bellevue Road and Yosemite Avenue, a four-lane minor arterial between Yosemite Avenue and Olive Avenue, a four-lane divided arterial between Olive Avenue and 13th Street, and a two-lane undivided collector south of 13th Street. Furthermore, the Merced Vision 2030 General Plan acknowledged that "G" Street would exceed LOS D as a four-lane divided arterial between Olive Avenue and Bear Creek Drive. However, City Council made appropriate findings to designate LOS E as the criteria of significance for "G" Street as four-lane facility between Olive Avenue and Bear Creek Drive.

Traffic Signal Warrants

Peak hour traffic signal warrants, as appropriate, were prepared for the Existing Traffic Conditions scenario. The warrants found in Appendix I were prepared pursuant to the CA MUTCD guidelines for the preparation of traffic signal warrants. Under this scenario, the intersection of Merced High School Driveway and Olive Avenue does not satisfy the peak hour signal warrant during the PM peak period. Based on the signal warrant and engineering judgment, signalization of this intersection is not recommended.

Results of Existing Level of Service Analysis

Figure 2 illustrates the Existing turning movement volumes, intersection geometrics and traffic controls. LOS worksheets for the Existing Traffic Conditions scenario are provided in Appendix D. Table I presents a summary of the Existing peak hour LOS at the study intersections.

At present, all study intersections operate at an acceptable LOS during the PM peak period.

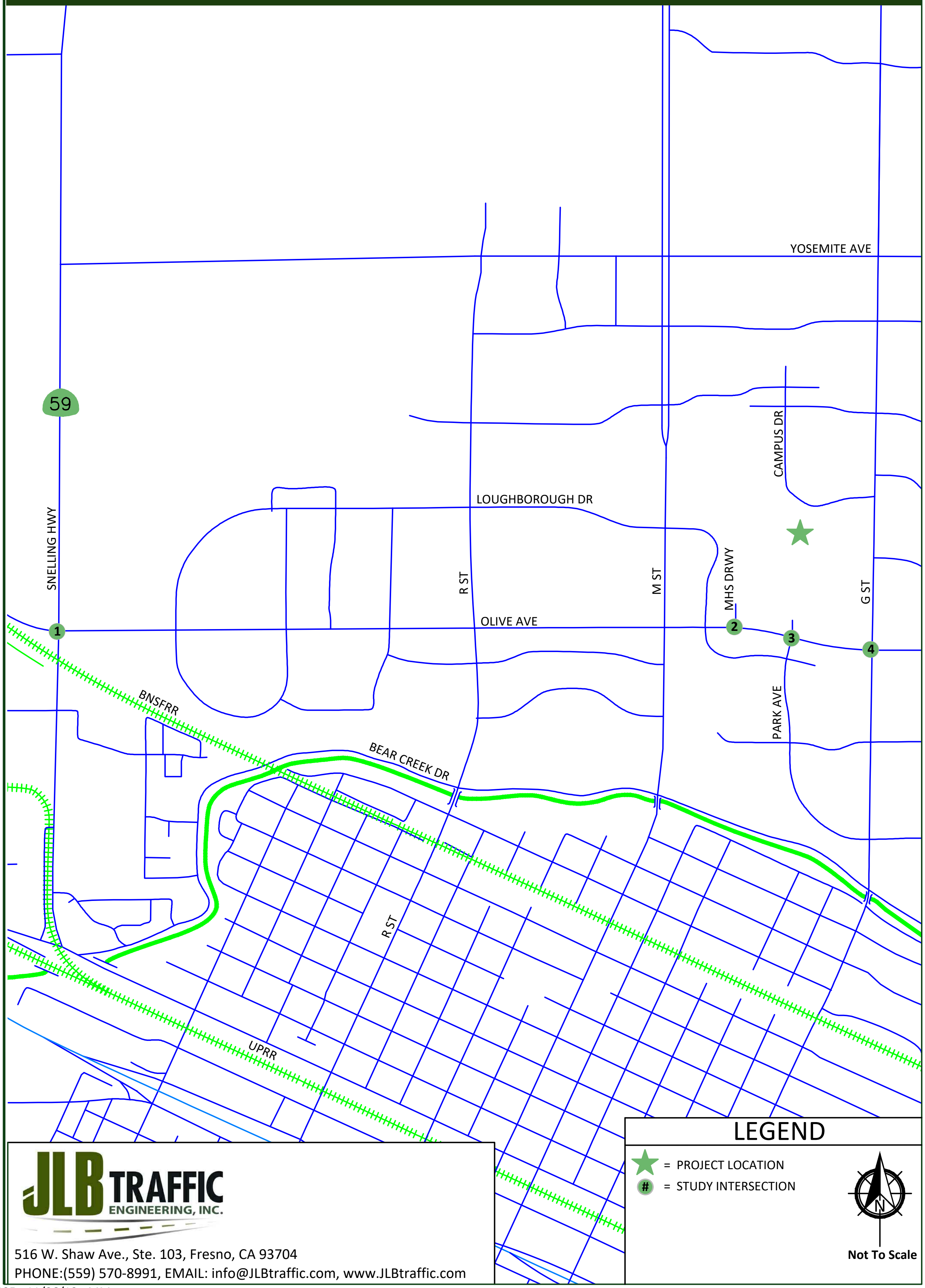
Table I: Existing Intersection LOS Results

ID	*Intersection*	*Intersection Control*	*PM (5:45-6:45) Peak Hour*	
			Average Delay (sec/veh)	*LOS*
1	State Route 59 / Olive Avenue	Signalized	37.2	D
2	Merced High School Driveway / Olive Avenue	One-Way Stop	18.1	C
3	Park Avenue / Olive Avenue	Signalized	19.1	B
4	"G" Street / Olive Avenue	Signalized	45.3	D

Note: LOS = Level of Service based on average delay on signalized intersections and All-Way STOP Controls.
LOS for two-way STOP controlled intersections are based on the worst approach/movement of the minor street.

Merced High School Stadium - City of Merced
Vicinity Map

Figure 1



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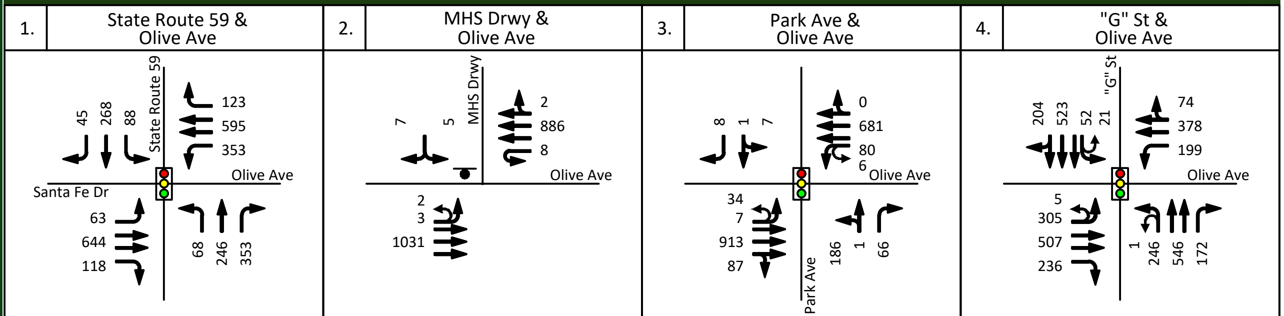
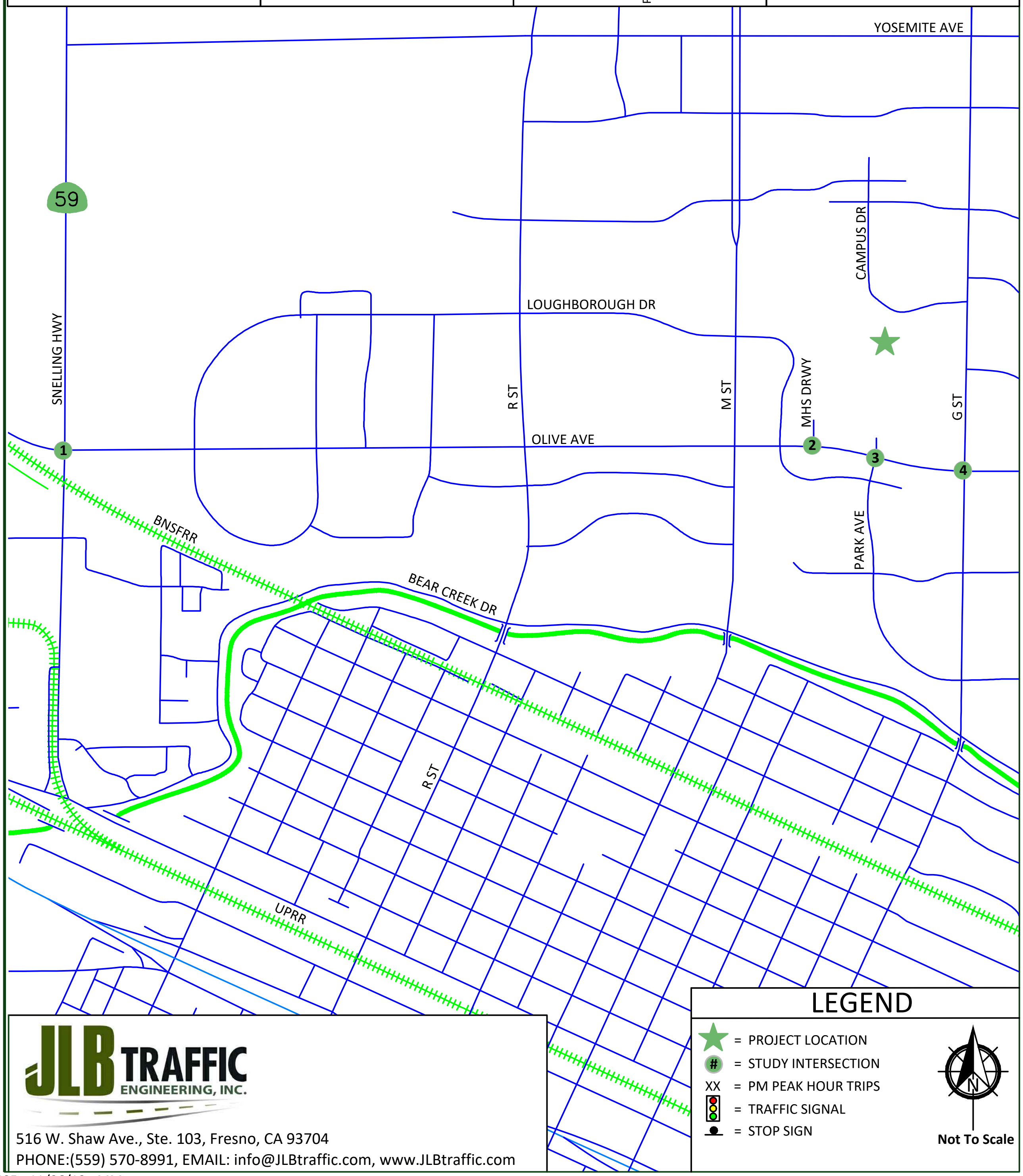
Merced High School Stadium - City of Merced
Existing - Traffic Volumes, Geometrics and Controls

Figure 2





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Existing plus Project Traffic Conditions

Project Description

The Project proposes to construct a 3,100-seat football stadium on the north side of campus where an existing football field is currently located. Merced High school currently uses the stadium located at Golden Valley High School. The proposed Merced High School Stadium would serve as the "home" game location for Merced High School varsity and junior varsity football teams and as a venue for special events such sporting events and graduation ceremonies. The proposed stadium is not expected to generate a significant number of trips on a daily basis throughout the year. The proposed stadium would likely host up to six (6) varsity football games on Friday evenings during a 12-week period. Per information provided to JLB, the Project is consistent with the City of Merced General Plan. Figure 3 illustrates the latest Project Site Plan.

Project Access

Access to and from the Project will be from three (3) existing access driveways to the Merced High School campus. The main access is aligned with Park Avenue and provides full access. The second access driveway (Merced High School Driveway) is located along the north side of Olive Avenue approximately 700 feet west of Park Avenue and serves as the fire lane road for the Merced High School campus. This driveway access requires a special permit to enter the gated parking lot immediately to the northeast of the driveway and Olive Avenue. While this driveway is intended to limit movements to left-in, right-in and right-out only, it is often utilized as a full access based on counts and observations. The third driveway is located along the north side of Olive Avenue approximately midway between Park Avenue and "G" Street and is limited to right-in and right-out access only.

JLB analyzed the location of the existing driveways relative to the existing local roads and driveways in the Project's vicinity. Based on this review, it is recommended that the Project modify Merced High School Driveway access to Olive Avenue to left-in, right-in and right-out only by installing a raised median island across the intersection along the center of Olive Avenue. Based on the Queuing Analysis, the existing driveway throat depth of 100 feet is adequate for onsite and offsite traffic operations and circulation. Installation of a raised median island across the intersection along the center of Olive Avenue would improve onsite and offsite traffic operations and circulation.

Walkways

Currently, walkways exist adjacent to the proposed Project site along Olive Avenue, Park Avenue and "G" Street. The Merced Vision 2030 General Plan recommends that walkways be implemented during all phases of a Project to guarantee adequate and safe pedestrian facilities at all times. Since the surrounding Project site is well-developed with sidewalks, pedestrians will have adequate and safe pedestrian facilities at all times.

Bikeways

Currently, bikeways exist in the vicinity of the proposed Project site along State Route 59, Olive Avenue and “G” Street. State Route 59 contains a Class I bike path along the east side south of Olive Avenue. Olive Avenue contains a Class III bike route between “R” Street and “G” Street. “G” Street contains a Class II bike lane between Mercy Avenue and 13th Street and a Class III bike route between 13th Street and Childs Avenue. The Merced Vision 2030 General Plan recommends that a Class II bike lane be implemented on Olive Avenue east of “G” Street through the City of Merced SOI. Furthermore, the Merced Vision 2030 General Plan recommends that a Class II bike lane be implemented on “G” Street between Farmland Avenue and Mercy Avenue and between Childs Avenue and Mission Avenue.

Transit

The Bus, Merced’s Regional Transit System, is the single public transportation service provider for all of Merced County. At present, there are two routes - M4 and M6 - that have stops adjacent to or in the vicinity of the proposed Project. Retention of the existing and expansion of future transit routes is dependent on transit ridership demand and available funding.

Route M4 runs on “G” Street adjacent to the proposed Project. Its nearest stop to the Project is located along the west side of “G” Street approximately 150 feet north of Olive Avenue. Route M4 operates at 30-minute intervals on weekdays and 90-minute intervals on weekends. This route provides a direct connection to East Campus, SaveMart, Raley’s, Merced College, Mercy Medical, Health Department, Family Care Clinic, Fairgrounds, and Mental Health.

Route M6 runs on Olive Avenue east of “G” Street. Its nearest stop to the Project is located along the west side of “G” Street approximately 475 feet south of Olive Avenue. Route M6 operates at 45-minute intervals on weekdays and weekends. This route provides a direct connection to Burbank Park, SaveMart, Hansen Park, Santa Fe Apartments, El Tareb Market, and the Transportation Center.

Trip Generation

Trip generation rates for the proposed Project were obtained from the Merced Golden Valley High School Stadium Seating Expansion TIA (April 13, 2010). Table II presents the trip generation for the proposed Project site with trip generation rates for a High School Stadium before a Friday evening event. At buildout, the Project is estimated to generate a maximum of 2,294 daily trips and 680 PM peak hour trips before a Friday evening event.

Table II: Project Trip Generation

Land Use (ITE Code)	Size	Unit	Daily		PM (5:45-6:45) Peak Hour					
			Rate	Total	Trip Rate	In %	Out %	In	Out	Total
High School Stadium[1]	3,100	seats	0.74	2,294	0.22	70	30	476	204	680
Total Project Trip Generation				**2,294**				**476**	**204**	**680**

Note: 1 = Trip generation rates for daily and PM peak hour were obtained from Merced Golden Valley High School Stadium Seating Expansion Traffic Impact Analysis Report (April 13, 2010).

Trip Distribution

The Project Only Trips to the study intersections were developed based on existing travel patterns, the existing roadway network, engineering judgment, data provided by the District, knowledge of the study area, existing residential and commercial densities, and the Merced Vision 2030 General Plan Transportation and Circulation Element in the vicinity of the Project. Figure 4 presents the Project Only Trips to the study intersections.

Vehicle Miles Traveled

Senate Bill (SB) 743 (Steinberg 2013) was approved by then Governor Brown on September 27, 2013. SB 743 created a path to revise the definition of transportation impacts according to CEQA. The revised CEQA Guidelines requiring VMT analysis became effective December 28, 2018; however, agencies have until July 1, 2020 to finalize their local guidelines on VMT analysis. Therefore, as agencies finalize their VMT analysis protocol, CEQA transportation impacts are to be determined using LOS of intersections and roadways, which is a measure of congestion. The intent of SB 743 is to align CEQA transportation study methodology with and promote the statewide goals and policies of reducing vehicle miles traveled (VMT) and greenhouse gases (GHG). Three objectives of SB 743 related to development are to reduce GHG, diversify land uses, and focus on creating a multimodal environment. It is hoped that this will spur infill development.

The Technical Advisory on Evaluating Transportation Impacts in CEQA published by the Governor's Office of Planning and Research (OPR) dated December 2018 acknowledges that lead agencies should set criteria and thresholds for VMT and transportation impacts. However, the Technical Advisory provides guidance to residential, office and retail uses, citing these as the most common land uses. Beyond these three land uses, there is no guidance provided for any other land use type. The Technical Advisory also notes that land uses may have a less than significant impact if located within low VMT areas of a region. Screening maps are suggested for this determination.

VMT is simply the product of a number of trips and the length of those trips. The first step in a VMT analysis is to establish the baseline average VMT, which requires the definition of a region. The Technical Advisory states that existing VMT may be measured at the regional or city level. On the contrary, the Technical Advisory also notes that VMT analyses should not be truncated due to "jurisdictional or other boundaries."

As the Project is within a defined service area that is currently being served by another stadium, JLB determined the anticipated average trip length reductions that would be observed as a result of the proposed stadium. It estimated that the average trip length for Merced High School Friday evening events taking place at the Merced Golden Valley High School Stadium is 2.66 miles. With the Project, the estimated average trip length is 1.19 miles resulting in a reduction of 1.46 miles per project trip on average. Therefore, upon completion of this Project, VMT will be significantly reduced. Additionally, the proposed stadium is located near transit services and adequate pedestrian and bicycle facilities. In the near future, the City may wish to coordinate with the regional agency (MCAG) and develop criteria and thresholds that balance the direction from OPR and the goals of SB743 with the vision for Merced and economic development, affordable housing, access to goods and services, and overall quality of life.

Traffic Signal Warrants

Peak hour traffic signal warrants, as appropriate, were prepared for the Existing plus Project Traffic Conditions scenario. The warrants found in Appendix I were prepared pursuant to the CA MUTCD guidelines for the preparation of traffic signal warrants. Under this scenario, the intersection of Merced High School Driveway and Olive Avenue is not projected to satisfy the peak hour signal warrant during the PM peak period. Based on the signal warrant and engineering judgment, signalization of this intersection is not recommended.

Results of Existing plus Project Level of Service Analysis

The Existing plus Project Traffic Conditions scenario assumes the same roadway geometrics and traffic controls as those assumed in the Existing Traffic Conditions scenario with one exception. The exception includes the intersection of State Route 59 and Olive Avenue which is, at the time of the preparation of this TIA, being improved. The improvements include increased storage capacity for certain turning movements. Figure 5 illustrates the Existing plus Project turning movement volumes, intersection geometrics and traffic controls. LOS worksheets for the Existing plus Project Traffic Conditions scenario are provided in Appendix E. Table III presents a summary of the Existing plus Project peak hour LOS at the study intersections.

Under this scenario, all study intersections are projected to operate at an acceptable LOS during the PM peak period.

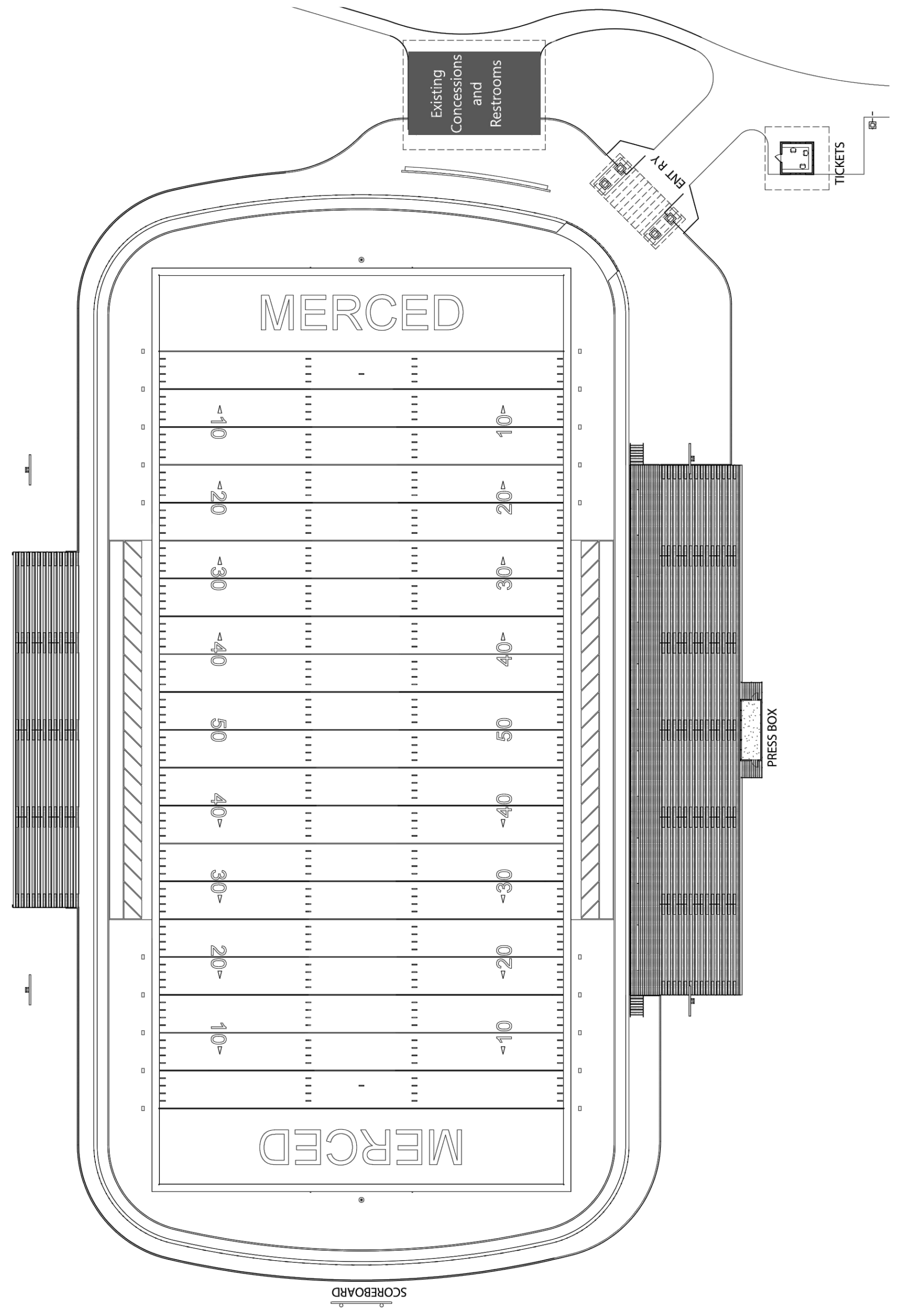
Table III: Existing plus Project Intersection LOS Results

ID	*Intersection*	*Intersection Control*	*PM (5:45-6:45) Peak Hour*	
			Average Delay (sec/veh)	*LOS*
1	State Route 59 / Olive Avenue	Signalized	49.2	D
2	Merced High School Driveway / Olive Avenue	One-Way Stop	32.1	D
3	Park Avenue / Olive Avenue	Signalized	30.8	C
4	“G” Street / Olive Avenue	Signalized	56.2	E

Note: LOS = Level of Service based on average delay on signalized intersections and All-Way STOP Controls.
LOS for two-way STOP controlled intersections are based on the worst approach/movement of the minor street.

Merced High School Stadium - City of Merced
Project Site Plan

Figure 3



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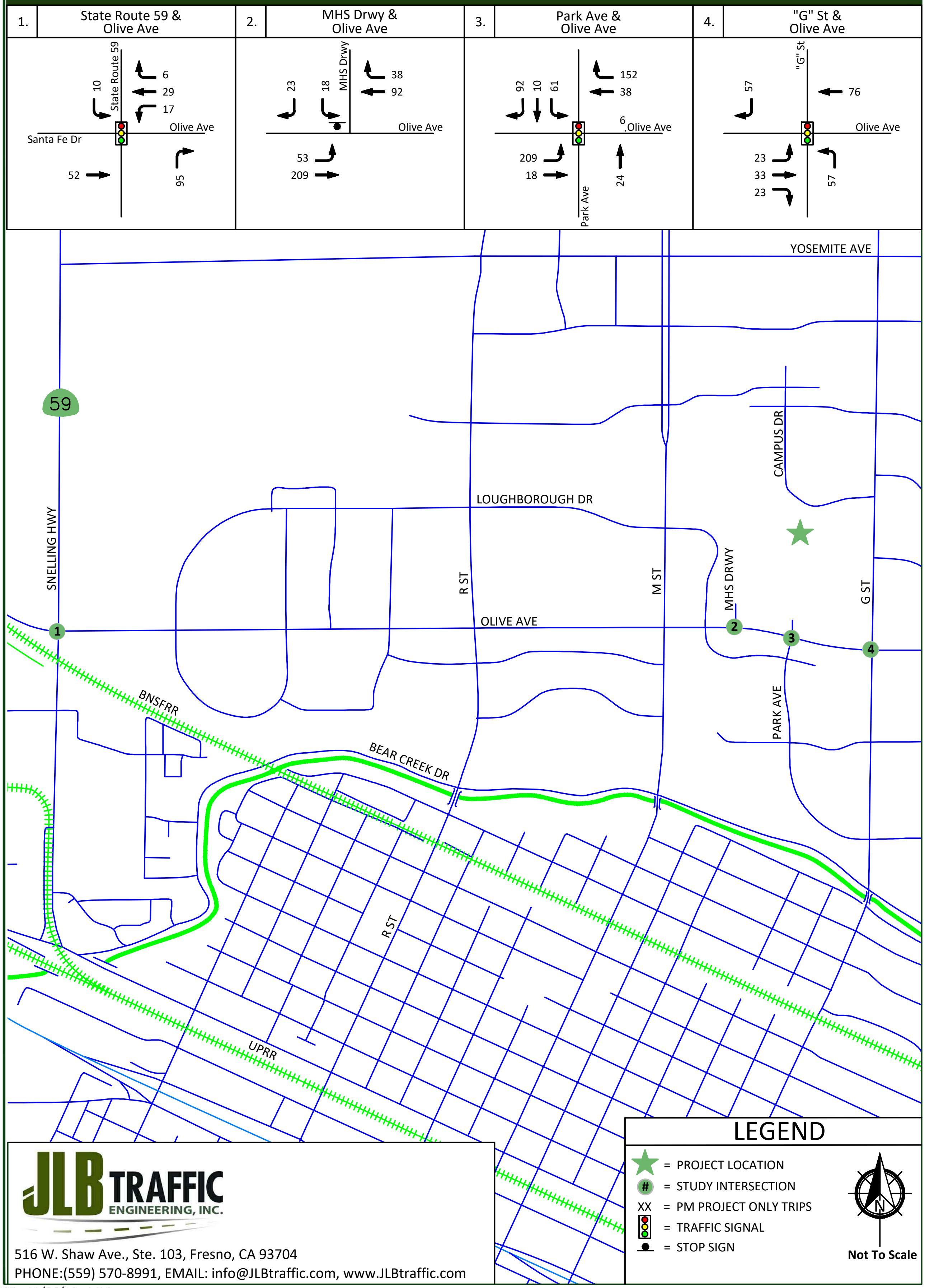
Merced High School Stadium - City of Merced
Project Only Trips

Figure 4



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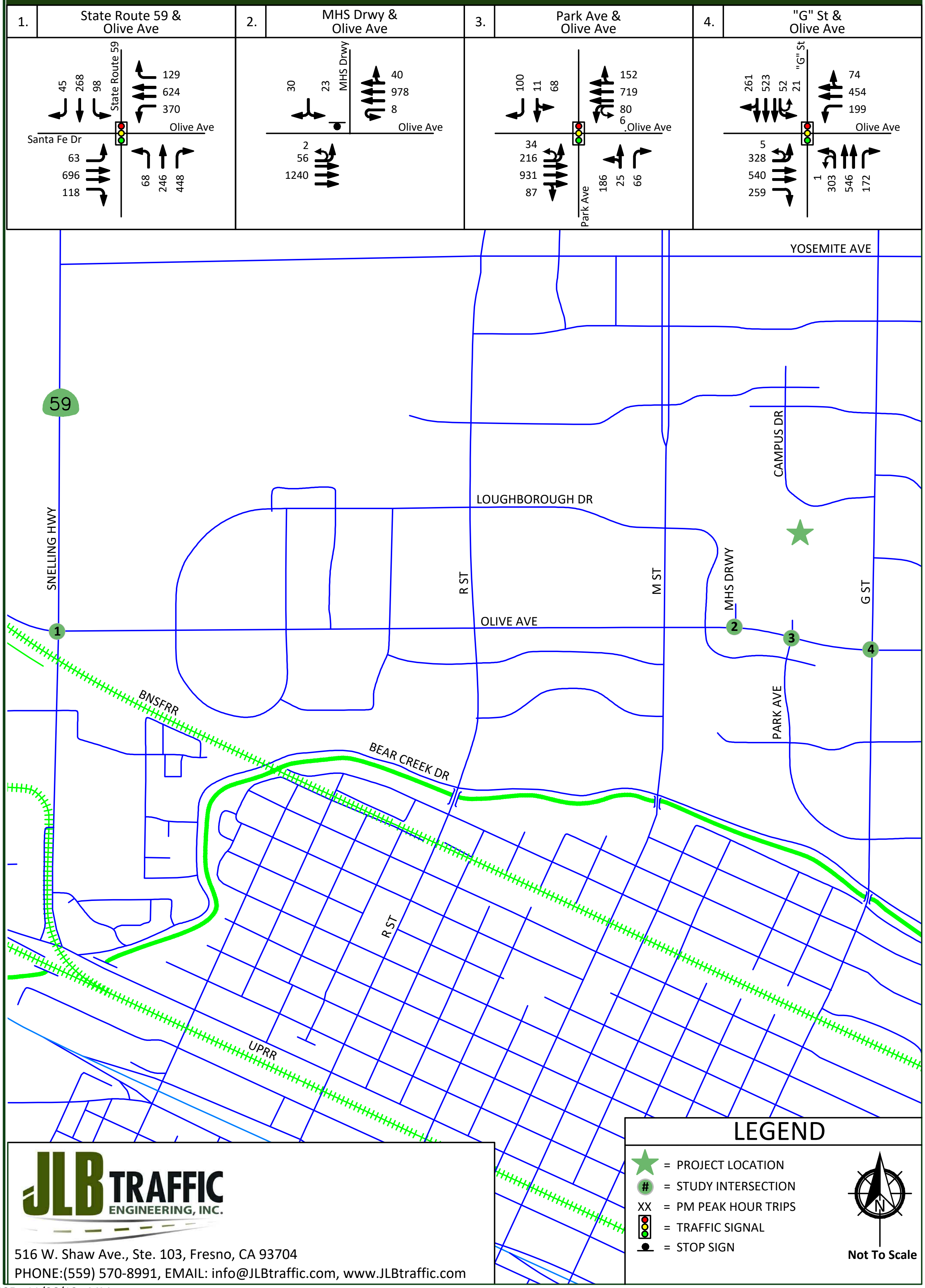
Merced High School Stadium - City of Merced
Existing plus Project - Traffic Volumes, Geometrics and Controls

Figure 5



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Near Term plus Project Traffic Conditions

Description of Approved and Pipeline Projects

Approved and Pipeline Projects consist of developments that are either under construction, built but not fully occupied, are not built but have final site development review (SDR) approval, or for which the lead agency or responsible agencies have knowledge of. The City of Merced, County of Merced and Caltrans staff were consulted throughout the preparation of this TIA regarding approved and/or known projects that could potentially impact the study intersections. JLB staff conducted a reconnaissance of the surrounding area to confirm the Near Term Projects. Subsequently, it was agreed that the projects listed in Table IV were approved, near approval, or in the pipeline within the proximity of the Project site.

The trip generation listed in Table IV is that which is anticipated to be added to the streets and highways by these projects between the time of the preparation of this report and five years after build-out of the Project estimated to be year 2025. As shown in Table IV, the total trip generation for the Near Term Projects by year 2025 is 88,641 daily trips and 8,301 PM peak hour trips. Figure 6 illustrates the location of the approved, near approval, or pipeline projects and their combined trip assignment to the study intersections under the Near Term plus Project Traffic Conditions scenario.

Table IV: Near Term Projects' Trip Generation

Approved Project Location	*Approved or Pipeline Project Name*	*Daily Trips*	*PM Peak Hour*
A	Bellevue Ranch 2, Phases 3 & 4[1]	274	29
B	Bellevue Ranch North, Village 23[1]	548	57
C	Bellevue Ranch West, Villages 17 & 18[1]	2,351	247
D	Bellevue Ranch East, Village 15 (Phase I) (portion of)[1]	66	7
E	Bellevue Ranch East, Village 14 (Phase 2) (portion of)[1]	94	10
F	Bellevue Ranch West, Village 12[1]	2,284	240
G	Bellevue Ranch West, Village 10 (portion of)[1]	972	102
H	Bellevue Ranch East, Village 8 (Phase I) (portion of)[1]	104	11
I	Bellevue Ranch East, Village 8 (Phase 2)[1]	85	9
J	Bright Development[1]	1,586	166
K	Regency Court Apartments[1]	1,318	101
L	Bellevue Ranch East, Lot Q (portion of)[1]	198	21
M	Bellevue Ranch East, Village 7 (portion of)[1]	104	11
N	Bellevue Ranch West, Village 5 (portion of)[1]	689	72
O	Bellevue Ranch West, Village 4 (portion of)[1]	727	76
P	Bellevue Ranch West, Village 3 (portion of)[1]	2,058	216
Q	Bellevue Ranch West, Village 2 (portion of)[1]	1,576	165
R	Latana Estates South, Phase I (portion of)[1]	566	59
S	Terrazzo[1]	661	69
T	Shadow Creek at Campus Pointe (portion of)[1]	142	15
U	Cottages at El Redondo (portion of)[1]	755	79
V	Northview Medical Offices[1]	2,312	230

Note: 1 = Trip Generation prepared by JLB Traffic Engineering, Inc. based on readily available information
2 = Trip Generation based on LSA Associates, Inc. Traffic Impact Analysis Report

Table IV: Near Term Projects' Trip Generation (cont.)

Approved Project Location	*Approved or Pipeline Project Name*	*Daily Trips*	*PM Peak Hour*
W	Mansionette Estates, Phase 5[1]	189	20
X	University Village Merced Annexation[1]	3,926	337
Y	Yosemite & McKee Commercial Center[1]	2,341	236
Z	Moraga (Phase I) (portion of)[1]	1,992	209
AA	University Village Merced – Lake[1]	1,896	151
AB	Campus Vista Unit 2 (portion of)[1]	217	23
AC	Camelot 2[1]	179	19
AD	Summer Creek[1]	1,331	140
AE	Bianchi/Norcal Cajun Annexation[1]	1,586	160
AF	Merced Mall Expansion & Redevelopment (Alt. 1)[2]	4,892	367
AG	Pro-Lube/Car Wash/Sandwich Shop[1]	593	60
AH	Prime Shine[1]	944	79
AI	El Capitan Hotel[1]	836	60
AJ	Sierra Vista (Phases 2 &3) (portion of)[1]	623	65
AK	Tuscany East[1]	444	47
AL	PG&E Regional Utility Center[1]	636	109
AM	Gas Station/Convenience Market/Car Wash[1]	242	24
AN	Towne Place Suites[1]	727	52
AO	Salazar[1]	387	41
AP	Summer Field[1]	2,379	249
AQ	The Crossing at River Oaks[1]	2,615	274
AR	Cypress Terrace (Phases 6 & 7)[1]	2,454	257
AS	Sandcastle (Phase 3) [1]	859	90
AT	Cypress Terrace East (portion of)[1]	746	78
AU	Merced Gateway Center[1]	20,964	2,081
AV	Mission Ranch (portion of)[1]	1,246	131
AW	Stoneridge South[1]	2,242	214
AX	Merced Mixed-Use Development[3]	11,685	736
Total Approved and Pipeline Project Trips		**88,641**	**8,301**

Note: 1 = Trip Generation prepared by JLB Traffic Engineering, Inc. based on readily available information
2 = Trip Generation based on LSA Associates, Inc. Traffic Impact Analysis Report
3 = Trip Generation based on JLB Traffic Engineering, Inc. Traffic Impact Analysis Report

Traffic Signal Warrants

Peak hour traffic signal warrants, as appropriate, were prepared for the Near Term plus Project Traffic Conditions scenario. The warrants found in Appendix I were prepared pursuant to the CA MUTCD guidelines for the preparation of traffic signal warrants. Under this scenario, the intersection of Merced High School Driveway and Olive Avenue is not projected to satisfy the peak hour signal warrant during the PM peak period. Based on the signal warrant and engineering judgment, signalization of this intersection is not recommended.

Results of Near Term plus Project Level of Service Analysis

The Near Term plus Project Traffic Conditions scenario assumes the same roadway geometrics and traffic controls as those assumed in the Existing plus Project Traffic Conditions scenario. Figure 7 illustrates the Near Term plus Project turning movement volumes, intersection geometrics and traffic controls. LOS worksheets for the Near Term plus Project Traffic Conditions scenario are provided in Appendix F. Table V presents a summary of the Near Term plus Project peak hour LOS at the study intersections.

Under this scenario, the intersections of State Route 59 and Olive Avenue and Merced High School Driveway and Olive Avenue are projected to exceed their LOS threshold during the PM peak period. To improve the LOS at these intersections, it is recommended that the following improvements be implemented.

- State Route 59 / Olive Avenue
  - Due to the limited frequency of stadium events, mitigation measures that involve modifications to the lane geometrics of this intersection would not be appropriate. However, it is recommended that the traffic signals be modified to implement overlap phasing of the northbound right-turn with the westbound left-turn phase.
- Merced High School Driveway / Olive Avenue
  - Modify Merced High School Driveway access to Olive Avenue to left-in, right-in and right-out only. To accomplish this, it is recommended that a raised median island be extended across the intersection along the center of Olive Avenue. With the extension of the raised median island, southbound left-turns would need to be redirected. Southbound left-turning traffic from Merced High School Driveway would need to make a right-turn onto Olive Avenue, proceed to make a legal eastbound to westbound U-turn on Olive Avenue, and then continue eastbound on Olive Avenue past Merced High School Driveway.

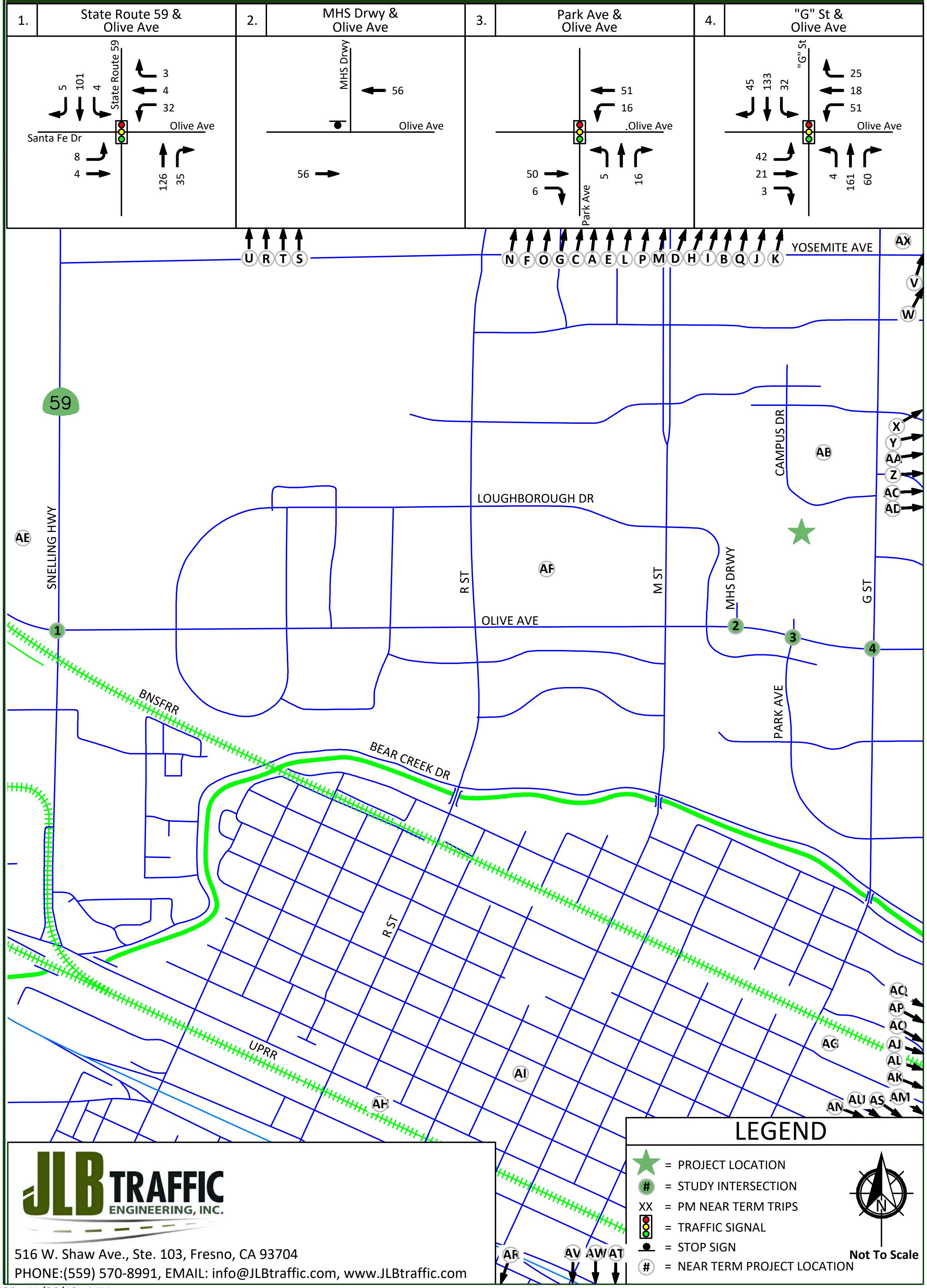
Table V: Near Term plus Project Intersection LOS Results

ID	***Intersection***	***Intersection Control***	***PM (5:45-6:45) Peak Hour***	
			Average Delay (sec/veh)	***LOS***
1	State Route 59 / Olive Avenue	Signalized	**55.5**	**E**
		Signalized (Mitigated)	40.9	D
2	Merced High School Driveway / Olive Avenue	One-Way Stop	**36.3**	**E**
		One-Way Stop (Mitigated)	15.6	C
3	Park Avenue / Olive Avenue	Signalized	31.7	C
4	"G" Street / Olive Avenue	Signalized	73.1	E

Note: LOS = Level of Service based on average delay on signalized intersections and All-Way STOP Controls.
LOS for two-way STOP controlled intersections are based on the worst approach/movement of the minor street.

Merced High School Stadium - City of Merced
Near Term Projects' Trip Assignment

Figure 6



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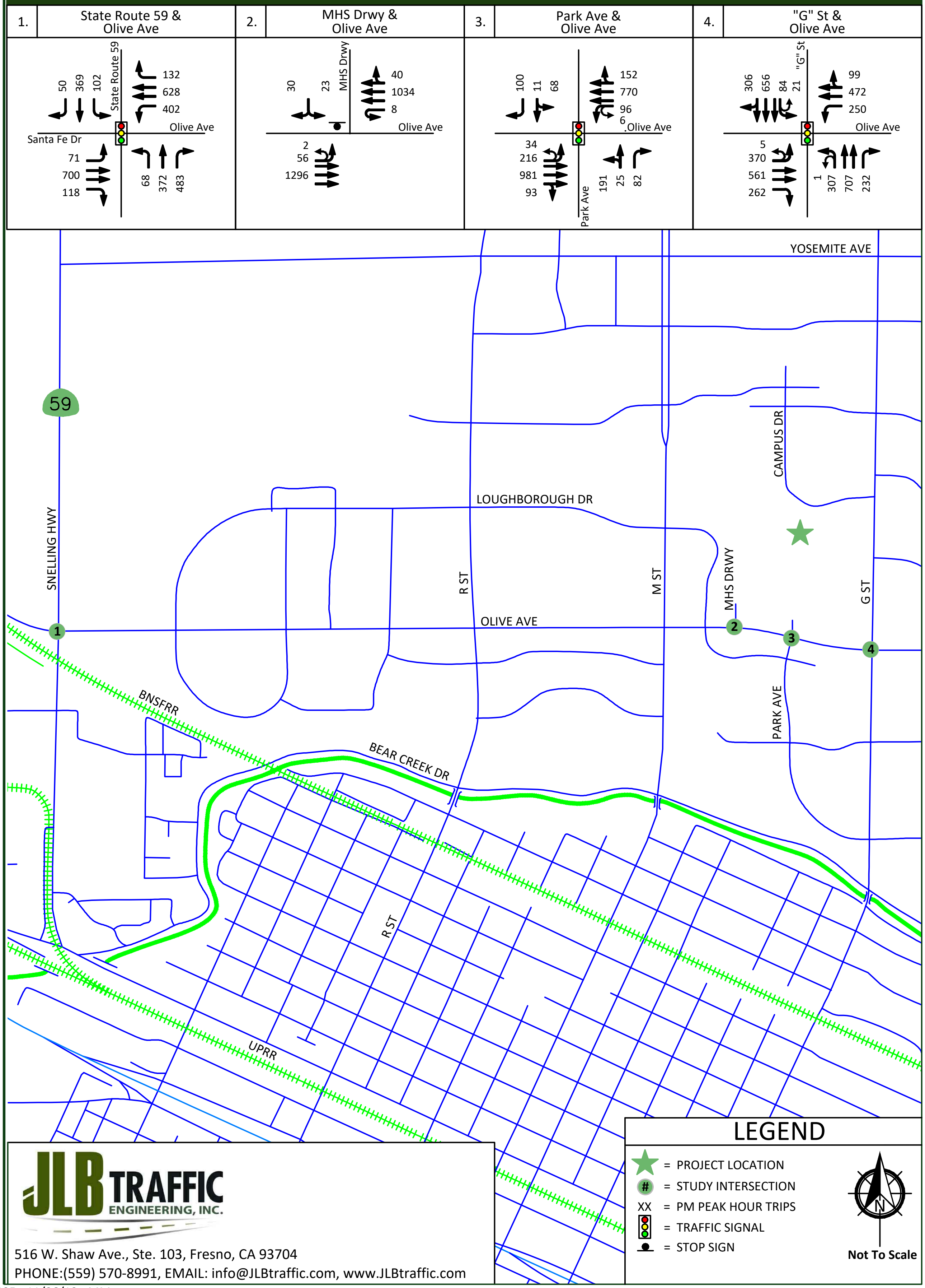
Merced High School Stadium - City of Merced
Near Term plus Project - Traffic Volumes, Geometrics and Controls
Figure 7



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Cumulative Year 2039 No Project Traffic Conditions

Traffic Signal Warrants

Peak hour traffic signal warrants, as appropriate, were prepared for the Cumulative Year 2039 No Project Traffic Conditions scenario. The warrants found in Appendix I were prepared pursuant to the CA MUTCD guidelines for the preparation of traffic signal warrants. Under this scenario, the intersection of Merced High School Driveway and Olive Avenue is not projected to satisfy the peak hour signal warrant during the PM peak period. Based on the signal warrant and engineering judgment, signalization of this intersection is not recommended.

Results of Cumulative Year 2039 No Project Level of Service Analysis

The Cumulative Year 2039 No Project Traffic Conditions scenario assumes the same roadway geometrics and traffic controls as those assumed in the Existing plus Project Traffic Conditions scenario. Figure 8 illustrates the Cumulative Year 2039 No Project turning movement volumes, intersection geometrics and traffic controls. LOS worksheets for the Cumulative Year 2039 No Project Traffic Conditions scenario are provided in Appendix G. Table VI presents a summary of the Cumulative Year 2039 No Project peak hour LOS at the study intersections.

Under this scenario, all study intersections are projected to operate at an acceptable LOS during the PM peak period.

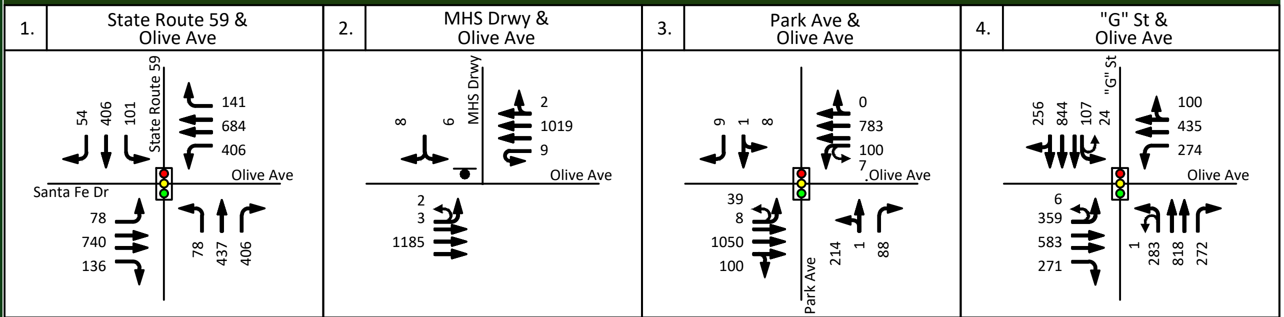
Table VI: Cumulative Year 2039 No Project Intersection LOS Results

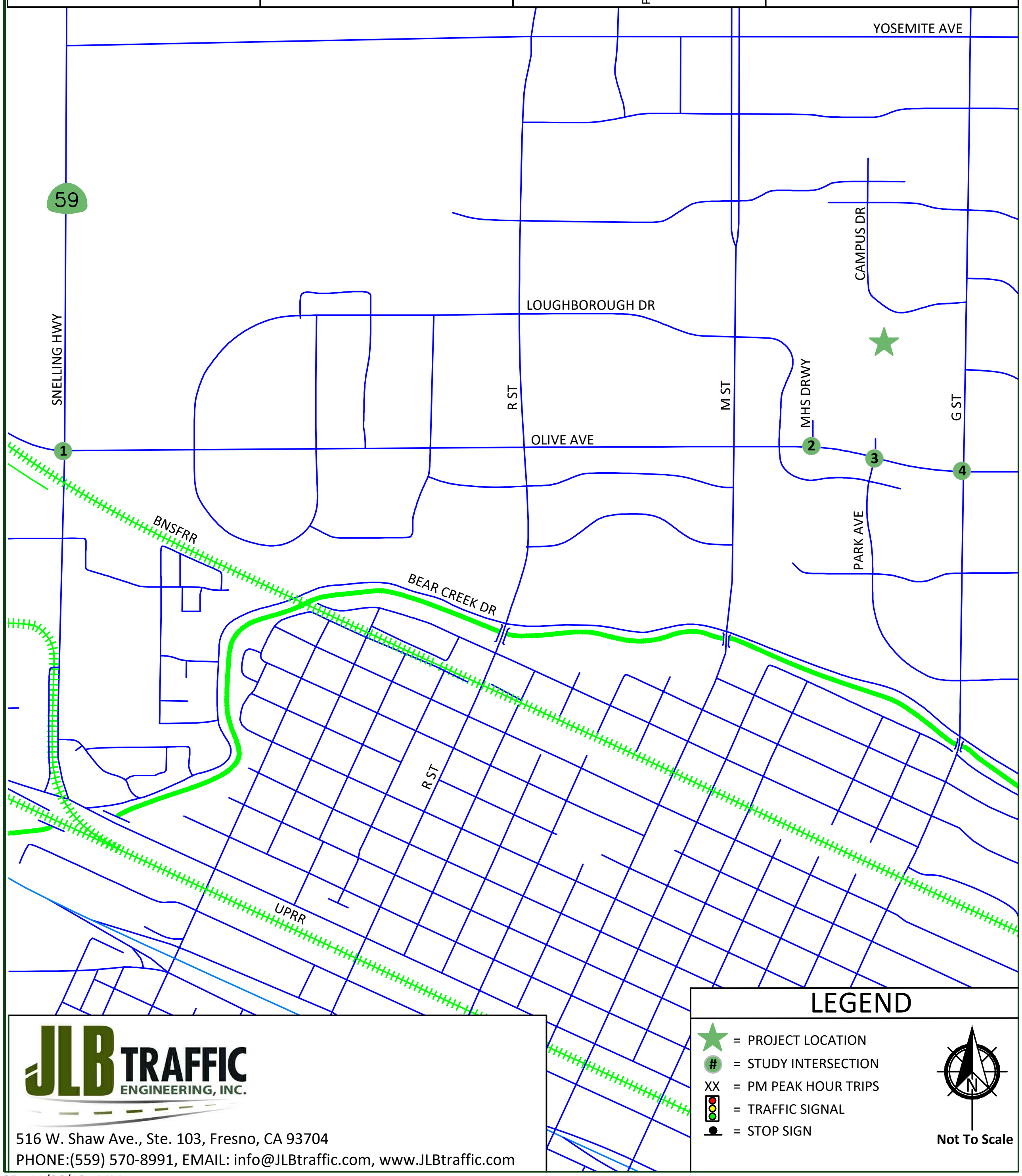
ID	*Intersection*	*Intersection Control*	*PM (5:45-6:45) Peak Hour*	
			Average Delay (sec/veh)	*LOS*
1	State Route 59 / Olive Avenue	Signalized	50.4	D
2	Merced High School Driveway / Olive Avenue	One-Way Stop	21.6	C
3	Park Avenue / Olive Avenue	Signalized	21.7	C
4	"G" Street / Olive Avenue	Signalized	76.2	E

Note: LOS = Level of Service based on average delay on signalized intersections and All-Way STOP Controls.
LOS for two-way STOP controlled intersections are based on the worst approach/movement of the minor street.

Merced High School Stadium - City of Merced
Cumulative Year 2039 No Project - Traffic Volumes, Geometrics and Controls

Figure 8





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Cumulative Year 2039 plus Project Traffic Conditions

Traffic Signal Warrants

Peak hour traffic signal warrants, as appropriate, were prepared for the Cumulative Year 2039 plus Project Traffic Conditions scenario. The warrants found in Appendix I were prepared pursuant to the CA MUTCD guidelines for the preparation of traffic signal warrants. Under this scenario, the intersection of Merced High School Driveway and Olive Avenue is not projected to satisfy the peak hour signal warrant during the PM peak period. Based on the signal warrant and engineering judgment, signalization of this intersection is not recommended.

Results of Cumulative Year 2039 plus Project Level of Service Analysis

The Cumulative Year 2039 plus Project Traffic Conditions scenario assumes the same roadway geometrics and traffic controls as those assumed in the Existing plus Project Traffic Conditions scenario. Figure 9 illustrates the Cumulative Year 2039 plus Project turning movement volumes, intersection geometrics and traffic controls. LOS worksheets for the Cumulative Year 2039 plus Project Traffic Conditions scenario are provided in Appendix H. Table VII presents a summary of the Cumulative Year 2039 plus Project peak hour LOS at the study intersections.

Under this scenario, the intersections of State Route 59 and Olive Avenue, Merced High School Driveway and Olive Avenue, and “G” Street and Olive Avenue are projected to exceed their LOS threshold during the PM peak period. To improve the LOS at these intersections, it is recommended that the following improvements be implemented.

- State Route 59 / Olive Avenue
  - Due to the limited frequency of stadium events, mitigation measures that involve modifications to the lane geometrics of this intersection would not be appropriate. However, it is recommended that the traffic signals be modified to implement overlap phasing of the northbound right-turn with the westbound left-turn phase.
- Merced High School Driveway / Olive Avenue
  - Modify Merced High School Driveway access to Olive Avenue to left-in, right-in and right-out only. To accomplish this, it is recommended that a raised median island be extended across the intersection along the center of Olive Avenue. With the extension of the raised median island, southbound left-turns would need to be redirected. Southbound left-turning traffic from Merced High School Driveway would need to make a right-turn onto Olive Avenue, proceed to make a legal eastbound to westbound U-turn on Olive Avenue, and then continue eastbound on Olive Avenue past Merced High School Driveway.
- “G” Street / Olive Avenue
  - It is recommended that the intersection be modified to convert the southbound through-right lane to a through lane and stripe a southbound right-turn lane.

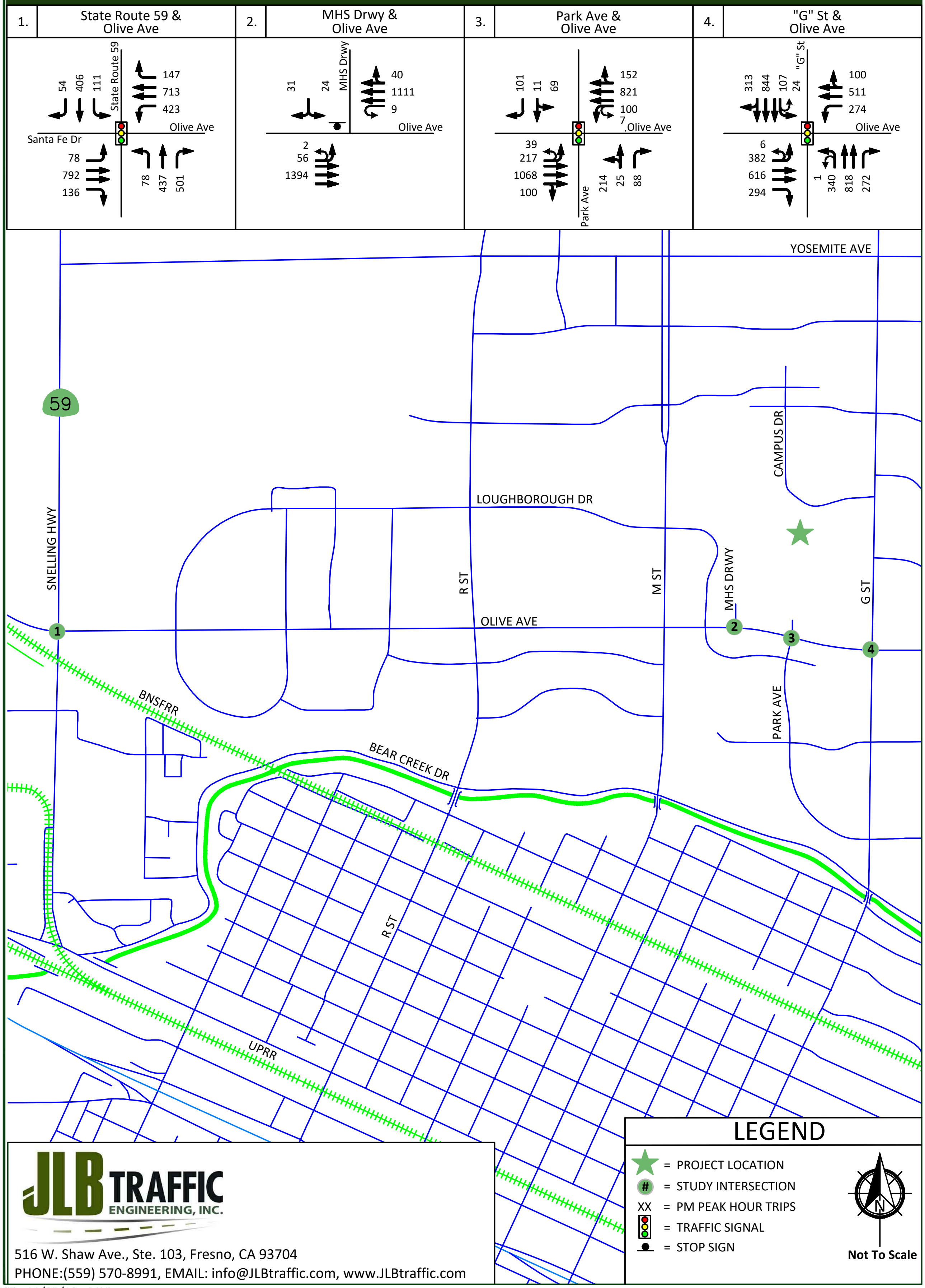
Table VII: Cumulative Year 2039 plus Project Intersection LOS Results

ID	Intersection	Intersection Control	PM (5:45-6:45) Peak Hour	
			Average Delay (sec/veh)	LOS
1	State Route 59 / Olive Avenue	Signalized	**65.2**	**E**
		Signalized (Mitigated)	49.9	D
2	Merced High School Driveway / Olive Avenue	One-Way Stop	**45.2**	**E**
		One-Way Stop (Mitigated)	16.4	C
3	Park Avenue / Olive Avenue	Signalized	34.2	C
4	"G" Street / Olive Avenue	Signalized	**94.5**	**F**
		Signalized (Mitigated)	72.1	E

Note: LOS = Level of Service based on average delay on signalized intersections and All-Way STOP Controls.
LOS for two-way STOP controlled intersections are based on the worst approach/movement of the minor street.

Merced High School Stadium - City of Merced
Cumulative Year 2039 plus Project - Traffic Volumes, Geometrics and Controls

Figure 9



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Queuing Analysis

Table VIII provides a queue length summary for left-turn and right-turn lanes at the study intersections under all study scenarios. The queuing analyses for the study intersections are contained in the LOS worksheets for the respective scenarios. Appendix C contains the methodologies used to evaluate these intersections.

Queuing analyses were completed using Sim Traffic output information. Synchro provides both 50th and 95th percentile maximum queue lengths (in feet). According to the Synchro manual, "the 50th percentile maximum queue is the maximum back of queue on a typical cycle and the 95th percentile queue is the maximum back of queue with 95th percentile volumes." The queues shown on Table VIII are the 95th percentile queue lengths for the respective lane movements.

The Highway Design Manual (HDM) provides guidance for determining deceleration lengths for the left-turn and right-turn lanes based on design speeds. Per the HDM criteria, "tapers for right-turn lanes are usually un-necessary since the main line traffic need not be shifted laterally to provide space for the right-turn lane. If, in some rare instances, a lateral shift were needed, the approach taper would use the same formula as for a left-turn lane." Therefore, a bay taper length pursuant to the Caltrans HDM would need to be added, as necessary, to the recommended storage lengths presented below.

Based on the SimTraffic output files and engineering judgement, it is recommended that the storage capacity for the following be considered for the Cumulative Year 2039 plus Project Traffic Conditions. At the remaining approaches to the study intersections, the existing storage capacity will be sufficient to accommodate the maximum queue.

- Park Avenue / Olive Avenue
  - Consider increasing the storage capacity of the northbound right-turn lane to 150 feet.
- "G" Street / Olive Avenue
  - The storage capacity of the eastbound left-turn lane is projected to exceed that available during the PM peaks in the Cumulative Year 2039 scenarios. However, increasing the storage capacity of this movement is not possible without impacting the westbound left-turn pocket immediately to the west. Therefore, this cumulative impact is considered adverse but not significant.
  - The storage capacity of the westbound left-turn lane is projected to exceed that available during the PM peak in the Cumulative Year 2039 scenarios. However, increasing the storage capacity of this movement is not possible without impacting the eastbound left turn pocket immediately to the east. Therefore, it is recommended that this movement be monitored.
  - The storage capacity of the northbound left-turn lane is projected to exceed that available during the PM peak in the Cumulative Year 2039 scenarios. However, increasing the storage capacity of this movement is not possible without impacting the northbound left-turn pocket immediately to the south. Therefore, it is recommended that this movement be monitored.
  - Consider increasing the storage capacity of the northbound right-turn lane to 350 feet.
  - Consider increasing the storage capacity of the southbound left-turn lane to 275 feet.
  - Consider setting the storage capacity of the southbound right-turn lane to 475 feet.

Table VIII: Queuing Analysis

ID	Intersection	Existing Queue Storage Length (ft.)		Existing	Existing plus Project	Near Term plus Project	Cumulative Year 2039 No Project	Cumulative Year 2039 plus Project
				PM	PM	PM	PM	PM
1	State Route 59 / Olive Avenue	EB L	400	107	103	88	143	157
		EB T	>500	199	321	349	384	409
		EB T	>500	216	335	355	382	444
		EB R	225	129	174	242	201	323
		WB L	500	317	416	692	553	666
		WB T	>500	780	199	1260	296	654
		WB T	>500	392	218	415	284	324
		WB R	>500	54	64	77	83	96
		NB L	200	98	82	174	251	243
		NB T	>500	179	261	429	535	464
		NB R	175	132	206	254	308	300
		SB L	100	192	160	212	210	209
		SB T	>500	320	249	339	403	365
		SB R	275	31	34	48	137	44
2	Merced High School Driveway / Olive Avenue	EB L	150	9	61	61	14	72
		EB T	>500	0	0	0	296	0
		EB T	>500	0	0	10	218	0
		EB T	>500	0	0	18	108	0
		WB U	60	19	36	32	29	25
		WB T	>500	0	0	0	0	0
		WB T	>500	0	0	10	10	0
		WB TR	>500	0	7	0	20	10
		SB LR	>100	26	69	*	37	*
		SB R	*	*	*	45	*	56
3	Park Avenue / Olive Avenue	EB L	500	65	328	434	512	325
		EB T	>500	314	410	463	798	390
		EB T	>500	246	336	297	735	271
		EB TR	>500	165	219	187	426	216
		WB L	350	104	127	135	139	151
		WB T	>500	100	184	206	131	245
		WB T	>500	139	220	242	160	288
		WB TR	>500	131	276	276	178	326
		NB LT	>500	172	269	225	216	314
		NB R	75	87	130	171	125	144
		SB LT	100	27	78	102	25	108
		SB R	100	32	63	66	29	80

Note: * = Does not exist or is not projected to exist

Table VIII: Queuing Analysis (cont.)

ID	Intersection	Existing Queue Storage Length (ft.)		Existing	Existing plus Project	Near Term plus Project	Cumulative Year 2039 No Project	Cumulative Year 2039 plus Project
				PM	PM	PM	PM	PM
4	"G" Street / Olive Avenue	EB L	300	414	456	435	447	416
		EB T	>500	369	712	1114	1200	1005
		EB T	>500	268	538	1058	1155	966
		EB R	>500	127	186	360	244	218
		WB L	170	226	251	269	256	265
		WB T	>500	258	340	452	421	435
		WB TR	>500	214	307	363	332	406
		NB L	250	347	341	360	380	383
		NB T	>500	331	313	1178	1807	815
		NB T	>500	231	244	1145	1785	792
		NB R	170	81	132	181	308	364
		SB L	120	205	241	283	272	272
		SB T	>500	323	827	974	2021	1301
		SB T	*	*	*	*	*	1334
		SB TR	>500	351	848	1015	2030	*
		SB R	*	*	*	*	*	482

Note: * = Does not exist or is not projected to exist

Conclusions and Recommendations

Conclusions and recommendations regarding the proposed Project are presented below.

Existing Traffic Conditions

- At present, all study intersections operate at an acceptable LOS during the PM peak period.

Existing plus Project Traffic Conditions

- JLB analyzed the location of the proposed driveways relative to the existing local roads and driveways in the Project's vicinity. Based on this review, it is recommended that the Project modify Merced High School Driveway access to Olive Avenue to left-in, right-in and right-out only by installing a raised median island across the intersection along the center of Olive Avenue. Based on the Queuing Analysis, the existing driveway throat depth of 100 feet is adequate for onsite and offsite traffic operations and circulation. Installation of a raised median island across the intersection along the center of Olive Avenue would improve onsite and offsite traffic operations and circulation.
- The surrounding Project site is well-developed with sidewalks providing adequate and safe pedestrian facilities at all times.
- At buildout, the Project is estimated to generate a maximum of 2,294 daily trips and 680 PM peak hour trips before a Friday evening event.
- As the Project is within a defined service area that is currently being served by another stadium, JLB determined the anticipated average trip length reductions that would be observed as a result of the proposed stadium. It estimated that the average trip length for Merced High School Friday evening events taking place at the Merced Golden Valley High School Stadium is 2.66 miles. With the Project, the estimated average trip length is 1.19 miles resulting in a reduction of 1.46 miles per project trip on average. Additionally, the proposed stadium is located near transit services and adequate pedestrian and bicycle facilities.
- Under this scenario, all study intersections are projected to operate at an acceptable LOS during the PM peak period.

Near Term plus Project Traffic Conditions

- The total trip generation for the Near Term Projects by year 2025 is 88,641 daily trips and 8,301 PM peak hour trips.
- Under this scenario, the intersections of State Route 59 and Olive Avenue and Merced High School Driveway and Olive Avenue are projected to exceed their LOS threshold during the PM peak period. To improve the LOS at these intersections, it is recommended that the following improvements be implemented.
    - State Route 59 / Olive Avenue
        - Due to the limited frequency of stadium events, mitigation measures that involve modifications to the lane geometrics of this intersection would not be appropriate. However, it is recommended that the traffic signals be modified to implement overlap phasing of the northbound right-turn with the westbound left-turn phase.

- Merced High School Driveway / Olive Avenue
  - Modify Merced High School Driveway access to Olive Avenue to left-in, right-in and right-out only. To accomplish this, it is recommended that a raised median island be extended across the intersection along the center of Olive Avenue. With the extension of the raised median island, southbound left-turns would need to be redirected. Southbound left-turning traffic from Merced High School Driveway would need to make a right-turn onto Olive Avenue, proceed to make a legal eastbound to westbound U-turn on Olive Avenue, and then continue eastbound on Olive Avenue past Merced High School Driveway.

Cumulative Year 2039 No Project Traffic Conditions

- Under this scenario, all study intersections are projected to operate at an acceptable LOS during the PM peak period.

Cumulative Year 2039 plus Project Traffic Conditions

- Under this scenario, the intersections of State Route 59 and Olive Avenue, Merced High School Driveway and Olive Avenue, and “G” Street and Olive Avenue are projected to exceed their LOS threshold during the PM peak period. To improve the LOS at these intersections, it is recommended that the following improvements be implemented.
  - State Route 59 / Olive Avenue
    - Due to the limited frequency of stadium events, mitigation measures that involve modifications to the lane geometrics of this intersection would not be appropriate. However, it is recommended that the traffic signals be modified to implement overlap phasing of the northbound right-turn with the westbound left-turn phase.
  - Merced High School Driveway / Olive Avenue
    - Modify Merced High School Driveway access to Olive Avenue to left-in, right-in and right-out only. To accomplish this, it is recommended that a raised median island be extended across the intersection along the center of Olive Avenue. With the extension of the raised median island, southbound left-turns would need to be redirected. Southbound left-turning traffic from Merced High School Driveway would need to make a right-turn onto Olive Avenue, proceed to make a legal eastbound to westbound U-turn on Olive Avenue, and then continue eastbound on Olive Avenue past Merced High School Driveway.
  - “G” Street / Olive Avenue
    - It is recommended that the intersection be modified to convert the southbound through-right lane to a through lane and stripe a southbound right-turn lane.

Queuing Analysis

- It is recommended that the City consider left-turn and right-turn lane storage lengths as indicated in the Queuing Analysis.

Study Participants

JLB Traffic Engineering, Inc. Personnel:

Jose Luis Benavides, PE, TE	Project Manager
Susana Maciel, EIT	Project Engineer
Matthew Arndt, EIT	Engineer I/II
Javier Rios	Engineer I/II
Jove Alcazar, EIT	Engineer I/II
Dennis Wynn	Sr. Engineering Technician
Michael McConnel	Engineering Aide
Adrian Benavides	Engineering Aide
Jesus Garcia	Engineering Aide

Persons Consulted:

Scott Odell	Odell Planning and Research, Inc.
Ted Walstrom	Merced Union High School District
Kim Espinosa	City of Merced
Mike Beltran	City of Merced
Hilda Sousa	Caltrans
Joe Giulian	County of Merced
Brian Guerrero	County of Merced

References

1. City of Merced, *Merced Vision 2030 General Plan*, adopted January 2, 2012.
2. County of Merced, *2030 General Plan,* adopted December 10, 2013.
3. *Guide for the Preparation of Traffic Impact Studies*, Caltrans, dated December 2002.
4. *Trip Generation,* 10th Edition, Washington D.C., Institute of Transportation Engineers, 2017.
5. *2014 California Manual on Uniform Traffic Control Devices*, Caltrans, November 7, 2014.

Appendix A: Scope of Work

September 18, 2019

Ms. Kim Espinosa
Merced City of Merced
Planning and Zoning Department
678 West 18th Street
Merced, California, 95340

Via Email Only: espinosak@cityofmerced.org

Subject: ***Scope of Work for the Preparation of a Traffic Impact Analysis for the Merced High School Football Stadium Project located in the City of Merced (JLB Project 035-005)***

Dear Ms. Espinosa,

JLB Traffic Engineering, Inc. (JLB) hereby submits this Draft Scope of Work for the preparation of a Traffic Impact Analysis (TIA) for the Merced High School Football Stadium (Project) located on the Merced High School campus in the City of Merced. The Project includes a 3,800-seat football stadium and concession stand. An aerial of the Project vicinity and Project Site Plan are shown in Exhibit A and Exhibit B, respectively.

The purpose of the TIA is to evaluate the potential on-site and off-site traffic impacts, identify short-term roadway and circulation needs, determine potential mitigation measures and identify any critical traffic issues that should be addressed in the on-going planning process. To evaluate the on-site and off-site traffic impacts of the proposed Project, JLB proposes the following Scope of Work.

Scope of Work

- To arrive at the future forecast volumes, JLB proposes to utilize an average annual growth rate of 0.7 percent to expand existing traffic volumes by 20 years to arrive at the Cumulative Year 2039 traffic volumes. The average annual growth rate of 0.7 percent is based on a review of the Base Year 2015 and Cumulative Year 2042 Merced CAG models.
- JLB will obtain recent or schedule and conduct new traffic counts at the study facility(ies) as necessary. These counts will include pedestrians and vehicles.
- JLB will perform a site visit to observe existing traffic conditions, especially during the PM peak hours. Existing roadway conditions including intersection geometrics and traffic controls will be verified.
- JLB will evaluate on-site circulation and provide recommendations as necessary to improve circulation to and within the Project.
- JLB will prepare CA MUTCD Warrant 3 “Peak Hour” for unsignalized study intersections under all study scenarios.
- JLB will forecast trip distribution based on turn count information and knowledge of the existing and planned circulation network in the vicinity of the Project.

- JLB will evaluate existing and forecasted levels of service (LOS) at the study intersection(s). JLB will use HCM 6th or HCM 2000 methodologies (as appropriate) within Synchro to perform this analysis for the PM peak hour. JLB will identify the causes of poor LOS.

Study Scenarios

1. Existing Traffic Conditions with needed improvements (if any);
2. Existing plus Project Traffic Conditions with proposed mitigation measures (if any);
3. Near Term plus Project Traffic Conditions with proposed mitigation measures (if any);
4. Cumulative Year 2039 No Project Traffic Conditions with needed improvements (if any); and
5. Cumulative Year 2039 plus Project Traffic Conditions with proposed mitigation measures (if any).

Friday peak hours to be analyzed only

1. 5 - 7 PM peak hour

JLB recommends that the analysis of the PM peak hour coincide with the Stadium's peak traffic activities, e.g. sports games, ceremonies, etc.

Study Intersections

1. Merced High School Driveway / Olive Avenue
2. Park Avenue / Olive Avenue
3. "G" Street / Olive Avenue

Queuing analysis is included in the proposed Scope of Work for the study intersection(s) listed above under all study scenarios. This analysis will be utilized to recommend minimum storage lengths for left-turn and right-turn lanes at all study intersections.

Study Segments

1. none

Project Trip Generation

Table I provides the trip generation for the proposed project during a Friday PM peak event. Based on a review of the Project, it is anticipated that the highest generator for traffic during a Friday event would be associated with that of a high school football game during homecoming week. Normally, when a high school football game is held during homecoming week, there would be no other school facilities or school events that would drive additional traffic. As ITE does not contain data for trip generation for a high school football game, JLB proposes to utilize data from the study prepared for the Irvine Unified School District. It should be noted that high school stadium activities that attract large numbers of spectators tend to be seasonal and include football games, graduation ceremonies and occasional community events. Varsity football games are typically scheduled on Friday evenings between late August and early December. At build-out, the 3,800-seat high school stadium is estimated to generate a maximum of 646 PM peak hour trips during a sold-out event.

Table I: Project Trip Generation

Land Use (ITE Code)	Size	Unit	Daily		PM Peak Hour					
			Rate	Total	Trip Rate	In %	Out %	In	Out	Total
High School Stadium[1]	3,800	seats	0.74	2,812	0.17	71	29	459	187	646
Total Project Trips				**2,812**				**459**	**187**	**646**

Note: 1 = Trip generation rates based on the Irvine Unified School District Traffic Study

Near Term Projects to be Included

Based on our local knowledge of the study area, consultation with City of Merced Development Services and Engineering staff, JLB proposes to include projects in the vicinity of the proposed Project under the Near Term plus Project Analysis. The near term projects proposed to be included in the Near Term Scenario are:

Project Name

1. Bellevue Ranch 2, Phases 3 & 4
2. Bellevue Ranch North, Village 23
3. Bellevue Ranch West, Villages 17 & 18
4. Bellevue Ranch East, Village 15 (Phase I) (portion of)
5. Bellevue Ranch East, Village 14 (Phase 2) (portion of)
6. Bellevue Ranch West, Village 12
7. Bellevue Ranch West, Village 10 (portion of)
8. Bellevue Ranch East, Village 8 Phase 1 (portion of)
9. Bellevue Ranch East, Village 8 Phase 2
10. Bright Development
11. Regency Court Apartments
12. Bellevue Ranch East, Lot Q (portion of)
13. Bellevue Ranch East, Village 7 (portion of)
14. Bellevue Ranch West, Village 5 (portion of)
15. Bellevue Ranch West, Village 4 (portion of)
16. Bellevue Ranch West, Village 3 (portion of)
17. Bellevue Ranch West, Village 2 (portion of)
18. Latana Estates South Phase I (portion of)
19. Terrazzo
20. Shadow Creek at Campus Pointe (portion of)
21. Cottages at El Redondo (portion of)
22. Northview Medical Offices
23. Mansionette Estates Phase 5
24. University Village Merced Annexation
25. Yosemite & McKee Commerical Center
26. Moraga (Phase I) (portion of)
27. University Village Merced – Lake
28. Campus Vista Unit 2 (portion of)
29. Camelot 2
30. Summer Creek
31. Bianchi/Norcal Cajun Annexation
32. Merced Mall Expansion & Redevelopment (Alt. 1)
33. Pro Lube/Car Wash/Sandwich Shop
34. Prime Shine
35. El Capitan Hotel
36. Sierra Vista Phases 2 & 3 (portion of)
37. Tuscany East
38. PG&E Regional Utility Center
39. Gas Station/Convenience Market/Car Wash
40. Towne Place Suites
41. Salazar
42. Summer Field
43. The Crossing at River Oaks
44. Cypress Terrace Phase 6 & 7
45. Sandcastle Phase 3
46. Cypress Terrace East (portion of)
47. Merced Gateway Center
48. Mission Ranch (portion of)
49. Stoneridge South

Other Near Term Projects the City, County or Caltrans has knowledge and for which it is anticipated that said project(s) is/are projected to be whole or partially built by the Near Term Project Year 2024. City, County and Caltrans, as appropriate, would provide JLB with project details such as a project description, location, proposed land uses with breakdowns and type of residential units and amount of square footages for non-residential uses.

The above Scope of Work is based on our understanding of this Project and our experience with similar TIAs. In the absence of comments by October 2, 2019 it will be assumed that the Scope of Work is acceptable to the agency(ies) that have not submitted any comments. If you have any questions or require additional information, please contact me by phone at (559) 317-6273 or by e-mail at smaciel@JLBtraffic.com.

Sincerely,

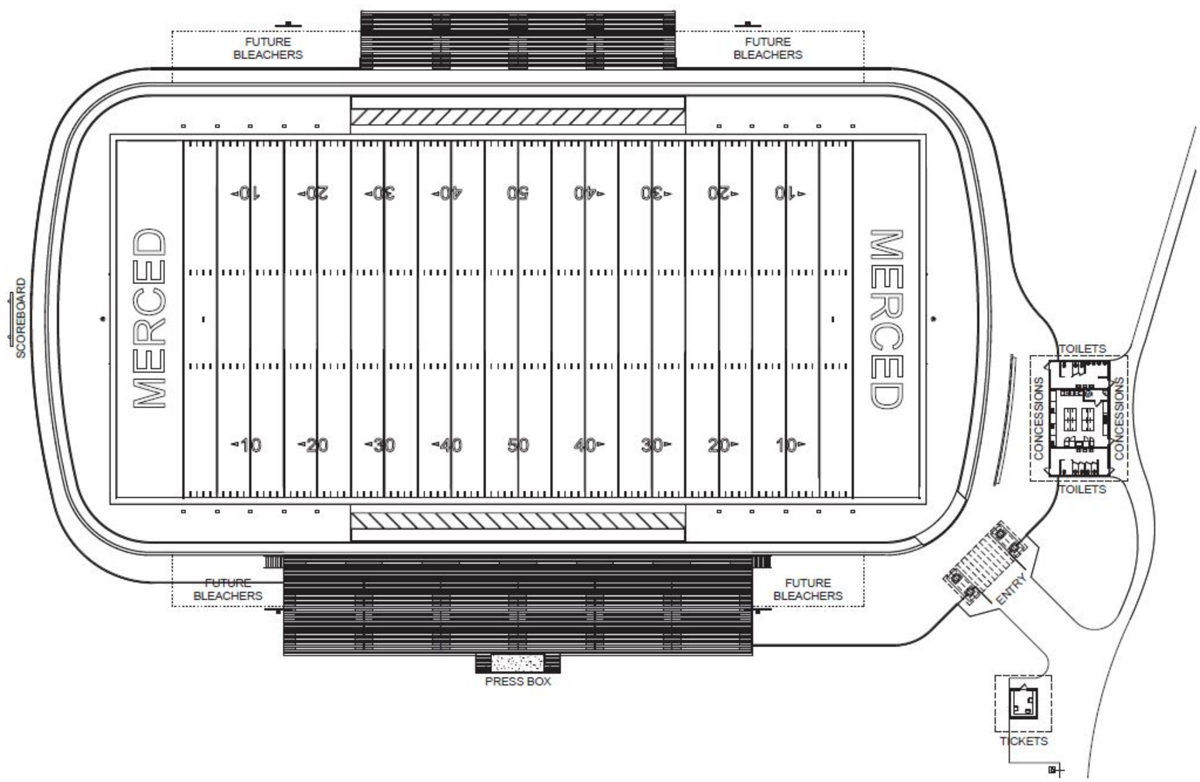
Susana Maciel

Susana Maciel
Project Engineer

cc: Steven Rough, County of Merced
Vu Nguyen, Caltrans District 10
Jose Benavides, JLB Traffic Engineering, Inc.

Exhibit A – Aerial

Exhibit B – Project Site Plan



Susana Maciel

From: Espinosa, Kim <ESPINOSAK@cityofmerced.org>
Sent: Wednesday, September 25, 2019 11:46 AM
To: Susana Maciel
Cc: vu.h.nguyen@dot.ca.gov; srough@co.merced.ca.us; Jose Benavides; Beltran, Michael
Subject: RE: Merced High School Stadium TIA: Draft Scope of Work
Attachments: L09182019 Draft Scope of Work.pdf

Susan,
This looks fine to us. I also forwarded it to our City Engineer Michael Beltran and he was OK with the scope as well. Looking forward to seeing the final document. Thanks!
--Kim

Kim Espinosa, Planning Manager
City of Merced Planning & Permitting
678 West 18th Street
Merced, CA 95340
(209) 385-6858 Phone
(209) 725-8775 Fax
espinosak@cityofmerced.org

From: Susana Maciel <smaciel@jlbtraffic.com>
Sent: Tuesday, September 24, 2019 9:47 AM
To: Espinosa, Kim <ESPINOSAK@cityofmerced.org>
Cc: vu.h.nguyen@dot.ca.gov; srough@co.merced.ca.us; Jose Benavides <jbenavides@jlbtraffic.com>
Subject: RE: Merced High School Stadium TIA: Draft Scope of Work

Good morning,

I hope you have all had a chance to review the proposed Scope of Work for the Merced High School Stadium Project. I look forward to receiving all of your comments before October 2nd! Please feel welcome to contact me with any questions, comments or concerns.

Have a great day!

Best,

Susana Maciel, EIT
Project Engineer
JLB TRAFFIC ENGINEERING, INC.
Traffic Engineering, Transportation Planning and Parking Solutions

Certified Disadvantaged Business Enterprise (DBE) and Small Business Enterprise (SBE)

516 W. Shaw Ave., Ste. 103
Fresno, CA 93704
Direct: (559) 317-6273
Office: (559) 570-8991
Cell: (559) 232-9474
www.JLBtraffic.com

From: Susana Maciel
Sent: Wednesday, September 18, 2019 4:03 PM
To: Espinosa, Kim <ESPINOSAK@cityofmerced.org>
Cc: vu.h.nguyen@dot.ca.gov; srough@co.merced.ca.us; Jose Benavides (jbenavides@jlbtraffic.com) <jbenavides@jlbtraffic.com>
Subject: Merced High School Stadium TIA: Draft Scope of Work

Good afternoon, Ms. Espinosa,

Attached is a Draft Scope of Work for the preparation of a Traffic Impact Analysis for a Project located in the City of Merced. I kindly ask that you take some time to review and comment on the proposed Scope of Work. In the absence of comments by October 2, 2019, it will be assumed that the Scope of Work is acceptable to the agency(ies) that have not submitted any comments.

If you have any questions or require any additional information, please feel welcome to contact me by phone at 559.317.6273 or by email at smaciel@jlbtraffic.com.

I sincerely appreciate your time and attention to this matter and look forward to hearing from you soon. Enjoy your day!

Best,

Susana Maciel, EIT
Project Engineer

JLB TRAFFIC ENGINEERING, INC.

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DEPARTMENT OF TRANSPORTATION
OFFICE OF THE DISTRICT 10 DIRECTOR
P.O. BOX 2048, STOCKTON, CA 95201
(1976 E. DR. MARTIN LUTHER KING JR. BOULEVARD 95205)
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FAX (209) 948-3895
TTY 711
www.dot.ca.gov

Making Conservation a California Way of Life.

October 3, 2019

10-MER-99-PM 14.082
Merced High School Stadium Project
Merced Union High School District

Mr. Ted Walstrom
Director of Facilities and Planning
Merced Union High School District
P.O. Box 2147
Merced, CA 95344

Dear Mr. Walstrom:

Thank you for the opportunity to review the Draft Scope of Work for the preparation of a Traffic Impact Analysis for the Merced High School Stadium Project. The Department has the following comments:

1. The Friday evening high school football game usually starts around 6:30 pm and ends 2 or 3 hours after. In order to determine the potential traffic impacts of the proposed Merced High School Stadium Project, the proposed TIS-Scope of Work needs to include the operational analysis before and after the Friday evening event. Therefore, the provided Table 1 Project Trip Generation, Merced High School Stadium TIA-Draft Scope of Work needs to be revised to describe the trip generation of the peak hours of generator before and after the game instead of providing one trip generation as shown in Table 1, which does not represent a realistic impact for the proposed project. Since the Institute of Transportation Engineers (ITE) Book does not include trip generation data for high school football stadiums, we suggest using the trip generation identified through the observed traffic conditions at a local high school football game instead of Irvine Unified School District. According to the Merced Golden Valley High School Stadium Seating Expansion TIS (April 13, 2010), its trip generation was based on the observed trip generation rates from a high school football game at Chavez High School in Stockton. In order to provide the reasonable trip generation rates of the proposed Merced High School Football Stadium, the

following trip rates from the Golden Valley High School Stadium Seating Expansion TIS are suggested:

Land Use	Attendance	Trip Generation					
		Before Football Game				After Football Game	
Observed Football Game	Per	In	Out	Total	In	Out	Total
	100 attendees	15.25	6.67	21.92	15.46	29.37	44.86
Merced H.S.	3800	580	253	833	587	1116	1705

2. The proposed schedule or hours to obtain the existing traffic counts at the studied facilities needs to be adjusted to reflect the above comment.

3. The proposed project may have potential impacts on the SR 59/Olive Ave/Santa Fe Dr intersection. The analysis needs to include this intersection.

4. The proposed Scope of Work shows Highway Capacity Manual HCM 6th or HCM 2000 methodologies within Synchro will be used to perform the analysis. This needs to be revised to use HCM 2010 instead of HCM 6th or HCM 2000. The analysis should use Synchro V.10.

5. The proposed Scope of Work indicates the Stadium Project will include 3800 seats. However, the Merced High School Stadium Project NOP of DEIR shows 3100 seats. Please verify what is the correct number of seats for the project.

Given the importance of mobility options, this project should provide an assessment of how various transportation options will be incorporated into the site. Specifically, pedestrian and bicycle access to and through the subject site should be provided.

Any work within the State's right-of-way will require an encroachment permit from Caltrans and must be done to our engineering and environmental standards, and at no cost to the State. The conditions of approval and the requirements for the encroachment permit are issued at the sole discretion of the Permits Office. For more information regarding the encroachment permit process, please visit our Encroachment Permit Website at:

https://dot.ca.gov/programs/traffic-operations/ep or you can contact their office at (209)948-7891.

If you have any questions, please contact Hilda Sousa at (209) 942-6184 (email: hilda.sousa@dot.ca.gov) or me at (209) 941-1921. We look forward to continuing to work with you in a cooperative manner.

Sincerely,

for

TOM DUMAS, Chief
Office of Metropolitan Planning

Appendix B: Traffic Counts

Prepared by National Data & Surveying Services

SR 59/Snelling Hwy & W Olive Ave

Peak Hour Turning Movement Count

ID: 19-07373-001
City: Merced

Day: Friday
Date: 10/11/2019

	PEAK HOURS	COUNT PERIODS
AM	NONE	NONE
NOON	NONE	NONE
PM	05:45 PM - 06:45 PM	04:30 PM - 10:30 PM

SR 59/Snelling Hwy — SOUTHBOUND

	Right	Thru	Left	U-Turn	Out
AM	0	0	0	0	0
NOON	0	0	0	0	0
PM	45	268	88	0	432
(red)	0	0	0	0	

W Olive Ave — EASTBOUND

	AM	NOON	PM	(red)
Out	0	0	708	
U-Turn	0	0	0	0
Left	0	0	63	0
Thru	0	0	644	0
Right	0	0	118	0

W Olive Ave — WESTBOUND

	(red)	PM	NOON	AM
Right	0	123	0	0
Thru	0	595	0	0
Left	0	353	0	0
U-Turn	0	3	0	0
Out		###	0	0

SR 59/Snelling Hwy — NORTHBOUND

	Out	U-Turn	Left	Thru	Right
(red)		0	0	0	0
PM	739	0	68	246	353
NOON	0	0	0	0	0
AM	0	0	0	0	0

CONTROL

Signalized

	AM	NOON	PM
TEV	0	0	###
PHF			0.97

Total Vehicles (AM)

SB: N/A N/A N/A; EB: N/A N/A N/A; WB: N/A N/A N/A; NB: N/A N/A N/A

Total Vehicles (Noon)

SB: N/A N/A N/A; EB: N/A N/A N/A; WB: N/A N/A N/A; NB: N/A N/A N/A

Total Vehicles (PM)

SB: 45 258 88; EB: 63 644 118; WB: 123 595 353; NB: 68 246 353

Bikes (AM)

SB: N/A N/A N/A; EB: N/A N/A N/A; WB: N/A N/A N/A; NB: N/A N/A N/A

Bikes (NOON)

SB: N/A N/A N/A; EB: N/A N/A N/A; WB: N/A N/A N/A; NB: N/A N/A N/A

Bikes (PM)

SB: 1 1 0; EB: 0 0 1; WB: 0 0 0; NB: 0 0 0

Pedestrians (Crosswalks)

Crosswalk	AM	NOON	PM
North leg (west side)	0	0	0
North leg (east side)	0	0	0
East leg (north side)	0	0	0
East leg (south side)	0	0	0
South leg (east side)	0	0	0
South leg (west side)	0	0	0
West leg (south side)	0	0	0
West leg (north side)	0	0	0
NW diagonal	0	0	0
NE diagonal	0	0	0
SW diagonal	0	0	0
SE diagonal	0	0	0

National Data & Surveying Services

Intersection Turning Movement Count

Location: SR 59/Snelling Hwy & W Olive Ave
City: Merced
Control: Signalized

Project ID: 19-07373-001
Date: 10/11/2019

Total

NS/EW Streets:	SR 59/Snelling Hwy				SR 59/Snelling Hwy				W Olive Ave				W Olive Ave				
PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:30 PM	17	46	82	0	18	66	13	0	14	159	30	0	60	144	31	4	684
4:45 PM	26	54	77	0	23	69	9	0	8	177	27	0	67	162	23	0	722
5:00 PM	15	64	95	0	17	67	18	0	21	155	22	0	73	153	29	7	736
5:15 PM	27	66	101	0	26	63	28	0	15	148	20	0	103	180	26	3	806
5:30 PM	19	61	86	0	18	58	9	0	15	146	32	0	81	167	30	3	725
5:45 PM	15	56	91	0	23	54	13	0	19	170	18	0	82	176	27	0	744
6:00 PM	13	64	101	0	28	79	7	0	17	148	24	0	105	148	33	1	768
6:15 PM	22	72	81	0	21	65	12	0	12	177	38	0	92	135	29	2	758
6:30 PM	18	54	80	0	16	70	13	0	15	149	38	0	74	136	34	0	697
6:45 PM	19	46	93	0	15	54	9	0	10	126	26	0	68	125	17	3	611
7:00 PM	20	66	89	0	11	50	12	0	8	101	23	0	92	139	27	3	641
7:15 PM	26	47	96	0	16	59	10	0	8	145	15	0	55	120	24	1	622
7:30 PM	10	42	74	0	20	43	13	0	8	104	19	0	70	104	23	4	534
7:45 PM	10	50	63	0	18	48	4	0	6	73	14	0	83	91	24	0	484
8:00 PM	16	56	73	0	10	33	4	0	7	73	8	0	60	93	20	1	454
8:15 PM	17	59	77	0	10	34	5	0	8	68	17	0	53	90	16	6	460
8:30 PM	12	40	60	0	7	41	12	0	9	59	12	0	55	66	29	2	404
8:45 PM	9	54	43	0	8	18	11	0	8	46	15	0	49	73	16	4	354
9:00 PM	6	38	64	0	9	33	18	0	6	58	15	0	44	79	14	0	384
9:15 PM	9	42	44	0	7	34	10	0	8	36	13	0	40	56	11	1	311
9:30 PM	8	42	40	0	5	27	7	0	8	42	11	0	47	78	7	3	325
9:45 PM	9	32	29	0	6	25	6	0	5	53	11	0	44	52	15	0	287
10:00 PM	8	33	34	0	7	29	7	0	12	73	9	0	38	46	11	2	309
10:15 PM	5	43	35	0	3	19	6	0	10	71	19	0	39	44	10	0	304
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	356	1227	1708	0	342	1138	256	0	257	2557	476	0	1574	2657	526	50	13124
APPROACH %'s :	10.82%	37.28%	51.90%	0.00%	19.70%	65.55%	14.75%	0.00%	7.81%	77.72%	14.47%	0.00%	32.74%	55.27%	10.94%	1.04%	
PEAK HR :	05:45 PM - 06:45 PM																TOTAL
PEAK HR VOL :	68	246	353	0	88	268	45	0	63	644	118	0	353	595	123	3	2967
PEAK HR FACTOR :	0.773	0.854	0.874	0.000	0.786	0.848	0.865	0.000	0.829	0.910	0.776	0.000	0.840	0.845	0.904	0.375	0.966
	0.937				0.879				0.909				0.936				

National Data & Surveying Services

Intersection Turning Movement Count

Location: SR 59/Snelling Hwy & W Olive Ave
City: Merced
Control: Signalized

Project ID: 19-07373-001
Date: 10/11/2019

Bikes

NS/EW Streets:	SR 59/Snelling Hwy				SR 59/Snelling Hwy				W Olive Ave				W Olive Ave				
PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
5:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	1	0	0	1	1	1	0	0	0	0	0	4
5:45 PM	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	2
6:00 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
7:00 PM	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2
7:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 PM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
10:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	2	0	0	2	4	1	0	2	1	2	0	1	0	1	0	16
APPROACH %'s :	0.00%	100.00%	0.00%	0.00%	28.57%	57.14%	14.29%	0.00%	40.00%	20.00%	40.00%	0.00%	50.00%	0.00%	50.00%	0.00%	
PEAK HR :	05:45 PM - 06:45 PM																TOTAL
PEAK HR VOL :	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	3
PEAK HR FACTOR :	0.00	0.000	0.000	0.000	0.000	0.250	0.250	0.000	0.000	0.000	0.250	0.000	0.000	0.000	0.000	0.000	0.375
					0.500				0.250								

National Data & Surveying Services

Intersection Turning Movement Count

Location: SR 59/Snelling Hwy & W Olive Ave **Project ID:** 19-07373-001
City: Merced **Date:** 10/11/2019

Pedestrians (Crosswalks)

NS/EW Streets:	SR 59/Snelling Hwy		SR 59/Snelling Hwy		W Olive Ave		W Olive Ave		
	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
PM	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
4:30 PM	0	0	0	0	1	0	0	0	1
4:45 PM	0	0	0	0	1	0	0	0	1
5:00 PM	0	0	0	0	0	1	0	0	1
5:15 PM	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0
6:00 PM	0	0	0	0	0	0	0	0	0
6:15 PM	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	1	0	0	1
7:00 PM	0	0	0	0	0	0	0	0	0
7:15 PM	0	0	0	0	0	0	0	0	0
7:30 PM	0	0	0	0	0	0	0	0	0
7:45 PM	0	0	0	0	0	0	0	0	0
8:00 PM	0	0	0	0	0	0	0	0	0
8:15 PM	0	0	0	0	0	0	0	0	0
8:30 PM	0	0	0	0	0	0	0	0	0
8:45 PM	0	0	0	0	0	0	0	0	0
9:00 PM	0	0	0	0	0	0	0	0	0
9:15 PM	0	0	0	0	0	0	0	0	0
9:30 PM	0	0	0	0	0	0	0	0	0
9:45 PM	0	0	0	0	0	0	0	0	0
10:00 PM	0	0	0	0	0	0	0	0	0
10:15 PM	0	0	0	0	0	0	0	0	0
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	0	0	0	0	2	2	0	0	4
APPROACH %'s :					50.00%	50.00%			
PEAK HR :	05:45 PM - 06:45 PM								TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :									

Metro Traffic Data Inc.
310 N. Irwin Street - Suite 20
Hanford, CA 93230

800-975-6938 Phone/Fax
www.metrotrafficdata.com

Turning Movement Report

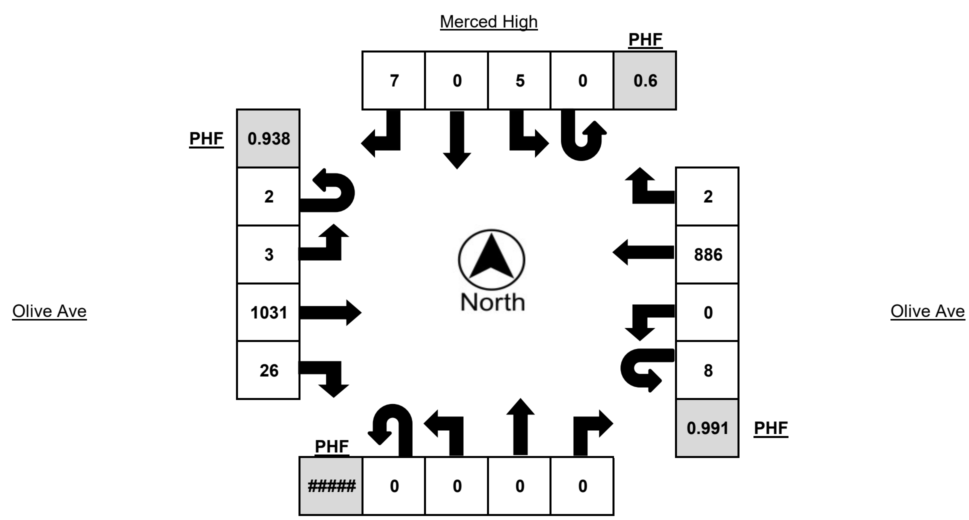
Prepared For:
JLB Traffic Engineering, Inc.
1300 E. Shaw Ave, Suite 103
Fresno, CA

LOCATION	Olive Ave @ Merced High West Driveway	**LATITUDE**	37.3193
COUNTY	Merced	**LONGITUDE**	-120.4752
COLLECTION DATE	Friday, September 20, 2019	**WEATHER**	Clear

	Northbound					Southbound					Eastbound					Westbound				
Time	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**
4:30 PM - 4:45 PM	0	0	0	0	0	0	0	0	7	1	0	0	340	0	0	0	0	207	1	1
4:45 PM - 5:00 PM	0	0	0	0	0	0	1	0	6	2	2	2	252	1	3	3	0	272	1	1
5:00 PM - 5:15 PM	0	0	0	0	0	0	1	0	5	0	1	1	309	2	2	2	0	233	0	1
5:15 PM - 5:30 PM	0	0	0	0	0	0	1	0	4	0	1	2	313	3	2	1	0	250	3	3
5:30 PM - 5:45 PM	0	0	0	0	0	0	2	0	0	0	0	2	282	4	1	1	0	253	1	1
5:45 PM - 6:00 PM	0	0	0	0	0	0	1	0	2	0	1	0	272	5	0	2	0	224	0	1
6:00 PM - 6:15 PM	0	0	0	0	0	0	1	0	4	0	1	1	275	6	3	2	0	223	0	3
6:15 PM - 6:30 PM	0	0	0	0	0	0	3	0	1	0	0	2	253	7	1	2	0	216	1	2
6:30 PM - 6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	231	8	0	2	0	223	1	0
6:45 PM - 7:00 PM	0	0	0	0	0	0	2	0	3	0	1	0	228	9	2	1	0	208	2	1
7:00 PM - 7:15 PM	0	0	0	0	0	0	1	0	1	0	0	0	261	10	0	2	0	191	2	0
7:15 PM - 7:30 PM	0	0	0	0	0	0	0	0	2	0	0	1	213	11	0	3	0	189	0	0
TOTAL	**0**	**0**	**0**	**0**	**0**	**0**	**13**	**0**	**35**	**3**	**7**	**11**	**3229**	**66**	**14**	**21**	**0**	**2689**	**12**	**14**

	Northbound					Southbound					Eastbound					Westbound				
STUDY PERIOD	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**
5:45 PM - 6:45 PM	0	0	0	0	0	0	5	0	7	0	2	3	1031	26	4	8	0	886	2	6

	PHF	Trucks
5:45 PM - 6:45 PM	0.960	0.5%



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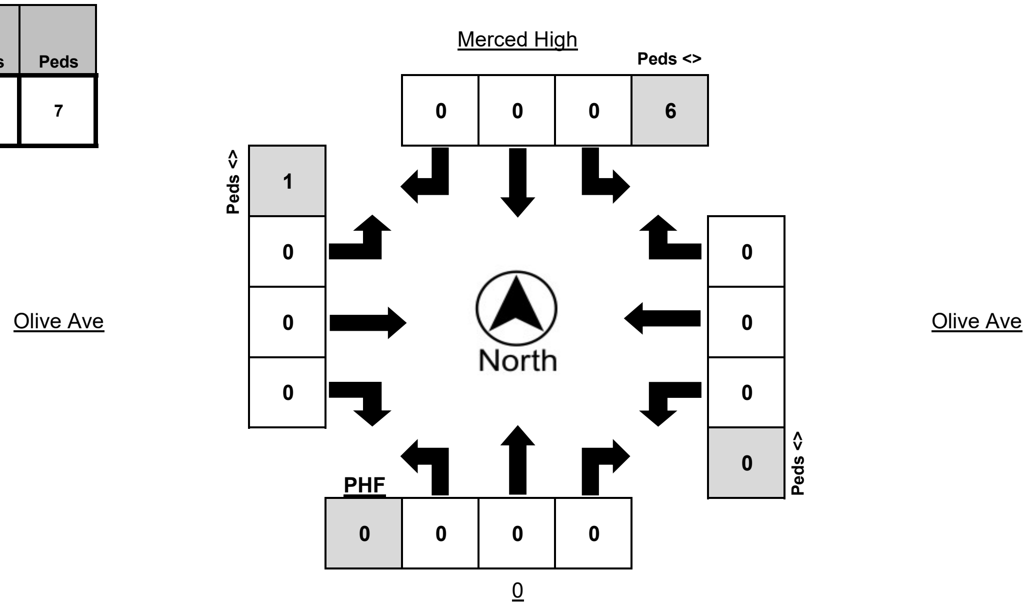
LATITUDE 37.3193
COUNTY Merced
LONGITUDE -120.4752
COLLECTION DATE Friday, September 20, 2019
WEATHER Clear

	Northbound Bikes			N.Leg	Southbound Bikes			S.Leg	Eastbound Bikes			E.Leg	Westbound Bikes			W.Leg
Time	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**
4:30 PM - 4:45 PM	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM - 5:00 PM	0	0	0	6	0	0	0	0	0	0	0	0	0	2	0	1
5:00 PM - 5:15 PM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2
5:15 PM - 5:30 PM	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM - 5:45 PM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM - 6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 PM - 6:15 PM	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0
6:15 PM - 6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 PM - 6:45 PM	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	1
6:45 PM - 7:00 PM	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0
7:00 PM - 7:15 PM	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0
7:15 PM - 7:30 PM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	**0**	**0**	**0**	**37**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**4**

	Northbound Bikes			N.Leg	Southbound Bikes			S.Leg	Eastbound Bikes			E.Leg	Westbound Bikes			W.Leg
STUDY PERIOD	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**
5:45 PM - 6:45 PM	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	1

	Bikes	**Peds**
5:45 PM - 6:45 PM	0	7



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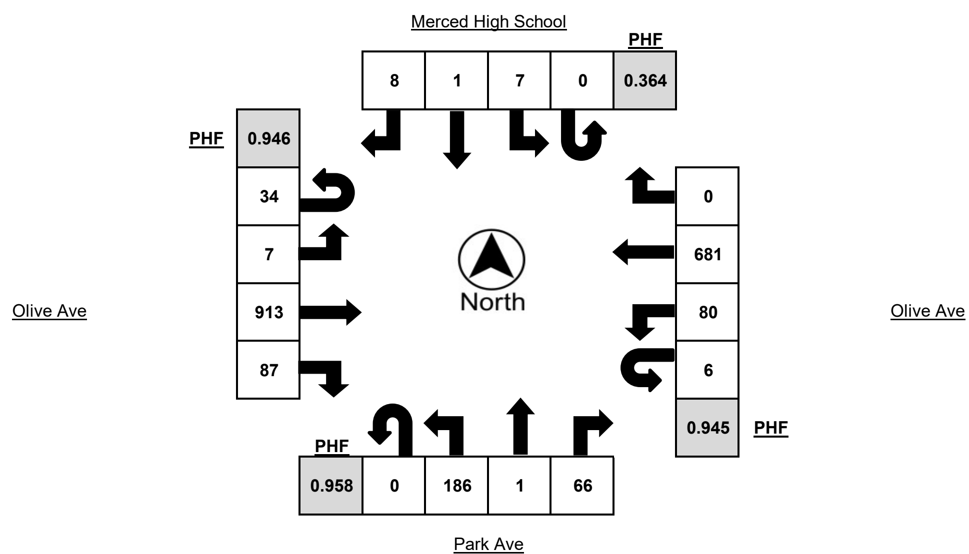
LOCATION	Olive Ave @ Park Ave	**LATITUDE**	37.3188
COUNTY	Merced	**LONGITUDE**	-120.4728
COLLECTION DATE	Friday, September 20, 2019	**WEATHER**	Clear

	Northbound					Southbound					Eastbound					Westbound				
Time	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**
4:30 PM - 4:45 PM	0	49	0	15	3	0	6	0	7	0	4	9	287	29	2	0	19	160	1	0
4:45 PM - 5:00 PM	0	63	0	16	1	0	2	1	2	0	10	2	241	21	2	1	14	201	1	0
5:00 PM - 5:15 PM	0	69	1	19	1	0	2	0	4	0	14	4	291	21	2	2	21	192	0	1
5:15 PM - 5:30 PM	0	50	1	18	0	0	2	0	3	0	11	2	266	26	3	2	26	178	0	4
5:30 PM - 5:45 PM	0	56	0	17	1	0	1	0	1	0	12	1	267	32	0	2	25	184	0	1
5:45 PM - 6:00 PM	0	50	1	14	0	0	1	0	1	0	8	3	243	21	0	3	20	180	0	1
6:00 PM - 6:15 PM	0	47	0	18	0	0	6	0	5	0	5	2	242	25	2	2	17	173	0	2
6:15 PM - 6:30 PM	0	45	0	12	1	0	0	1	2	0	8	0	241	18	1	0	20	167	0	1
6:30 PM - 6:45 PM	0	44	0	22	0	0	0	0	0	0	13	2	187	23	0	1	23	161	0	0
6:45 PM - 7:00 PM	0	55	0	12	1	0	2	1	0	0	7	1	227	20	2	1	15	164	0	0
7:00 PM - 7:15 PM	0	46	0	15	0	0	1	1	0	0	8	2	219	27	0	1	8	143	0	0
7:15 PM - 7:30 PM	0	36	0	8	0	0	0	0	0	0	10	0	189	23	0	3	20	165	0	0
TOTAL	**0**	**610**	**3**	**186**	**8**	**0**	**23**	**4**	**25**	**0**	**110**	**28**	**2900**	**286**	**14**	**18**	**228**	**2068**	**2**	**10**

	Northbound					Southbound					Eastbound					Westbound				
STUDY PERIOD	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**
5:45 PM - 6:45 PM	0	186	1	66	1	0	7	1	8	0	34	7	913	87	3	6	80	681	0	4

	PHF	**Trucks**
5:45 PM - 6:45 PM	0.953	0.4%



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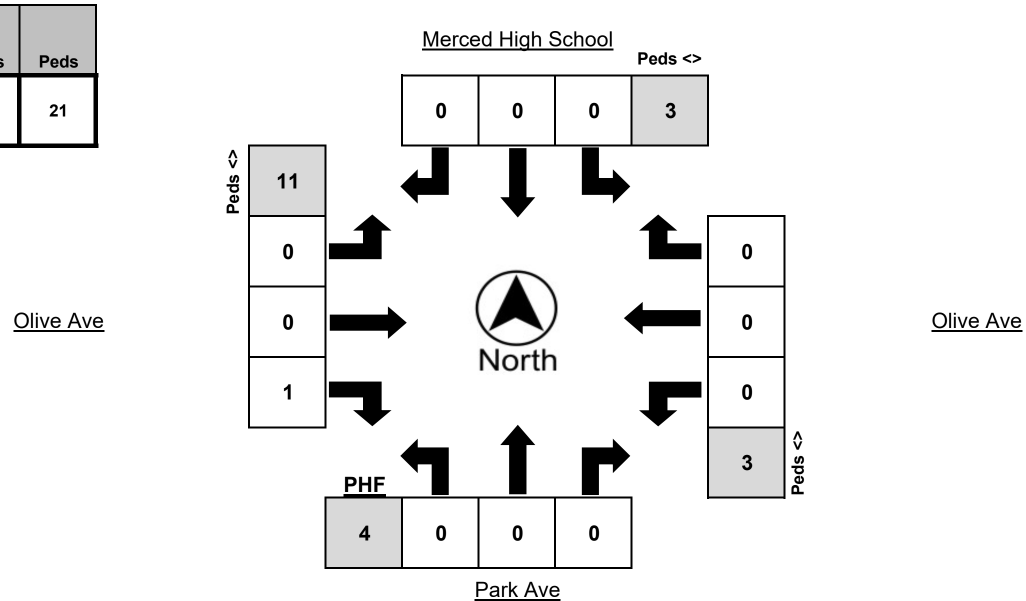
LOCATION Olive Ave @ Park Ave
COUNTY Merced
COLLECTION DATE Friday, September 20, 2019
LATITUDE 37.3188
LONGITUDE -120.4728
WEATHER Clear

	Northbound Bikes			N.Leg	Southbound Bikes			S.Leg	Eastbound Bikes			E.Leg	Westbound Bikes			W.Leg
Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
4:30 PM - 4:45 PM	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2
4:45 PM - 5:00 PM	0	0	0	6	0	0	0	2	0	0	0	5	0	0	0	1
5:00 PM - 5:15 PM	0	0	0	3	0	0	0	3	0	0	0	1	0	0	0	1
5:15 PM - 5:30 PM	0	0	0	2	0	0	0	3	0	0	0	0	0	0	0	5
5:30 PM - 5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM - 6:00 PM	0	0	0	0	0	0	0	1	0	0	0	2	0	0	0	4
6:00 PM - 6:15 PM	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	4
6:15 PM - 6:30 PM	0	0	0	2	0	0	0	1	0	0	0	1	0	0	0	0
6:30 PM - 6:45 PM	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	3
6:45 PM - 7:00 PM	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	2
7:00 PM - 7:15 PM	0	0	0	3	0	0	0	1	0	0	0	3	0	0	0	0
7:15 PM - 7:30 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2
TOTAL	**0**	**0**	**0**	**24**	**0**	**0**	**0**	**14**	**0**	**0**	**1**	**12**	**0**	**0**	**0**	**24**

	Northbound Bikes			N.Leg	Southbound Bikes			S.Leg	Eastbound Bikes			E.Leg	Westbound Bikes			W.Leg
STUDY PERIOD	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
5:45 PM - 6:45 PM	0	0	0	3	0	0	0	4	0	0	1	3	0	0	0	11

	Bikes	Peds
5:45 PM - 6:45 PM	1	21



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Turning Movement Report

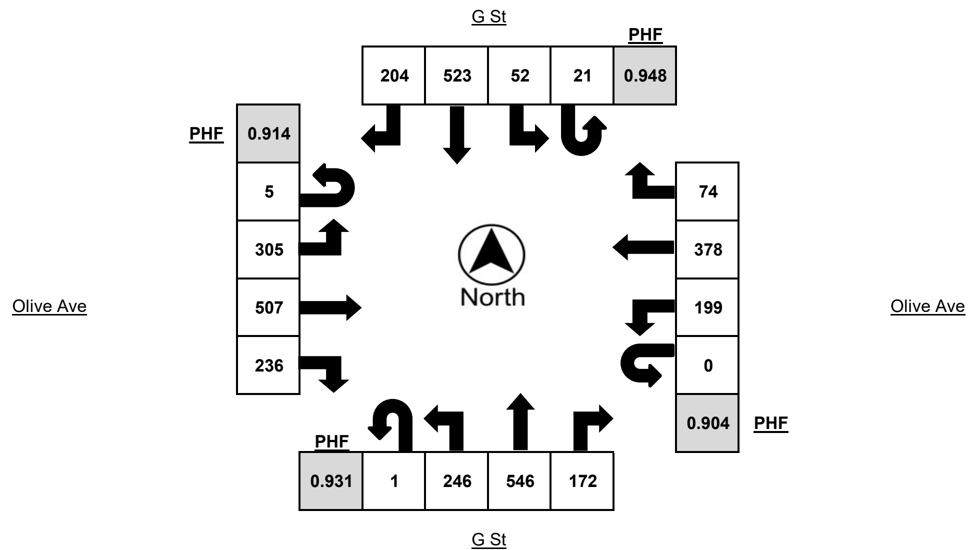
Prepared For:
JLB Traffic Engineering, Inc.
1300 E. Shaw Ave, Suite 103
Fresno, CA

LOCATION Olive Ave @ G St
LATITUDE 37.3185
COUNTY Merced
LONGITUDE -120.4693
COLLECTION DATE Friday, September 20, 2019
WEATHER Clear

	Northbound					Southbound					Eastbound					Westbound				
Time	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**
4:30 PM - 4:45 PM	2	55	126	45	1	6	13	145	57	2	4	77	157	73	1	0	59	92	13	2
4:45 PM - 5:00 PM	0	35	185	48	1	9	11	186	83	6	2	93	112	55	1	0	57	107	8	1
5:00 PM - 5:15 PM	0	73	161	40	3	11	15	144	65	2	3	63	156	94	2	1	40	125	15	0
5:15 PM - 5:30 PM	1	55	148	43	3	6	11	154	63	3	4	92	149	67	0	0	53	113	16	2
5:30 PM - 5:45 PM	0	55	185	39	4	3	11	131	58	3	1	86	127	61	0	0	40	92	12	0
5:45 PM - 6:00 PM	1	59	132	42	1	7	15	127	62	0	1	69	153	65	0	0	51	109	20	1
6:00 PM - 6:15 PM	0	58	126	46	2	3	11	130	59	3	0	83	151	50	0	0	55	88	21	2
6:15 PM - 6:30 PM	0	55	148	39	1	7	18	126	46	1	3	71	114	62	0	0	43	88	21	0
6:30 PM - 6:45 PM	0	74	140	45	1	4	8	140	37	1	1	82	89	59	0	0	50	93	12	0
6:45 PM - 7:00 PM	0	62	122	34	1	7	9	123	49	2	3	73	100	63	0	0	37	82	13	1
7:00 PM - 7:15 PM	0	52	112	22	2	4	12	102	41	0	1	65	135	67	0	0	47	89	17	1
7:15 PM - 7:30 PM	1	70	111	45	1	12	12	115	51	1	3	43	94	39	0	0	32	69	17	0
TOTAL	**5**	**703**	**1696**	**488**	**21**	**79**	**146**	**1623**	**671**	**24**	**26**	**897**	**1537**	**755**	**4**	**1**	**564**	**1147**	**185**	**10**

	Northbound					Southbound					Eastbound					Westbound				
STUDY PERIOD	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**
5:45 PM - 6:45 PM	1	246	546	172	5	21	52	523	204	5	5	305	507	236	0	0	199	378	74	3

	PHF	**Trucks**
5:45 PM - 6:45 PM	0.950	0.4%



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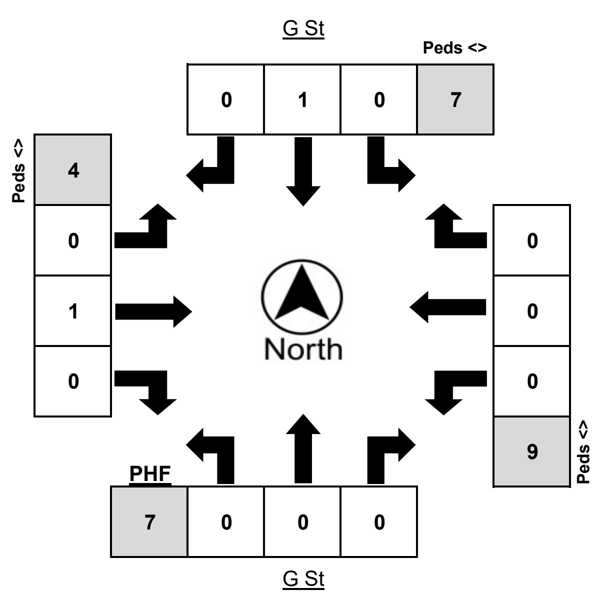
COUNTY	Merced	**LONGITUDE**	-120.4693
COLLECTION DATE	Friday, September 20, 2019	**WEATHER**	Clear

	Northbound Bikes			N.Leg	Southbound Bikes			S.Leg	Eastbound Bikes			E.Leg	Westbound Bikes			W.Leg
Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
4:30 PM - 4:45 PM	0	1	0	3	0	0	0	3	0	0	0	4	0	0	0	2
4:45 PM - 5:00 PM	0	0	0	4	0	0	0	0	0	1	0	1	0	0	0	1
5:00 PM - 5:15 PM	0	1	1	3	0	1	0	2	0	0	0	2	0	0	0	2
5:15 PM - 5:30 PM	0	0	1	3	0	0	0	1	0	1	0	2	0	0	0	0
5:30 PM - 5:45 PM	0	1	0	2	0	1	0	0	0	0	0	0	0	0	0	4
5:45 PM - 6:00 PM	0	0	0	4	0	0	0	0	0	0	0	1	0	0	0	1
6:00 PM - 6:15 PM	0	0	0	0	0	1	0	4	0	0	0	8	0	0	0	0
6:15 PM - 6:30 PM	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	2
6:30 PM - 6:45 PM	0	0	0	2	0	0	0	2	0	1	0	0	0	0	0	1
6:45 PM - 7:00 PM	0	1	0	5	0	0	0	2	0	0	0	0	0	0	0	1
7:00 PM - 7:15 PM	0	0	0	4	0	0	0	0	0	1	0	2	0	0	0	0
7:15 PM - 7:30 PM	0	1	0	3	0	0	0	0	0	0	0	2	0	0	0	2
TOTAL	**0**	**5**	**2**	**34**	**0**	**3**	**0**	**15**	**0**	**4**	**0**	**22**	**0**	**0**	**0**	**16**

	Northbound Bikes			N.Leg	Southbound Bikes			S.Leg	Eastbound Bikes			E.Leg	Westbound Bikes			W.Leg
STUDY PERIOD	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
5:45 PM - 6:45 PM	0	0	0	7	0	1	0	7	0	1	0	9	0	0	0	4

	Bikes	Peds
5:45 PM - 6:45 PM	2	27



Appendix C: Methodology

Levels of Service Methodology

The description and procedures for calculating capacity and level of service (LOS) are found in the Transportation Research Board, Highway Capacity Manual (HCM). The HCM 2010 represents the research on capacity and quality of service for transportation facilities.

Quality of service requires quantitative measures to characterize operational conditions within a traffic stream. Level of service is a quality measure describing operational conditions within a traffic stream, generally in terms of such service measures as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience.

Six levels of service are defined for each type of facility that has analysis procedures available. Letters designate each level of service (LOS), from A to F, with LOS A representing the best operating conditions and LOS F the worst. Each LOS represents a range of operating conditions and the driver's perception of these conditions. Safety is not included in the measures that establish a LOS.

Urban Streets (Automobile Mode)

The term "urban streets" refers to urban arterials and collectors, including those in downtown areas. Arterial streets are roads that primarily serve longer through trips. However, providing access to abutting commercial and residential land uses is also an important function of arterials. Collector streets provide both land access and traffic circulation within residential, commercial and industrial areas. Their access function is more important than that of arterials, and unlike arterials their operation is not always dominated by traffic signals. Downtown streets are signalized facilities that often resemble arterials. They not only move through traffic but also provide access to local businesses for passenger cars, transit buses, and trucks. Pedestrian conflicts and lane obstructions created by stopping or standing taxicabs, buses, trucks and parking vehicles that cause turbulence in the traffic flow are typical of downtown streets.

Flow Characteristics

The speed of vehicles on urban streets is influenced by three main factors, street environment, interaction among vehicles and traffic control.

The street environment includes the geometric characteristics of the facility, the character of roadside activity, and adjacent land uses. Thus, the environment reflects the number and width of lanes, type of median, driveway/access point density, spacing between signalized intersections, existence of parking, level of pedestrian and bicyclist activity and speed limit.

The interaction among vehicles is determined by traffic density, the proportion of trucks and buses, and turning movements. This interaction affects the operation of vehicles at intersections and, to a lesser extent, between signals.

Traffic controls (including signals and signs) forces a portion of all vehicles to slow or stop. The delays and speed changes caused by traffic control devices reduce vehicle speeds; however, such controls are needed to establish right-of-way.

Levels of Service (automobile Mode)

The average travel speed for through vehicles along an urban street is the determinant of the operating level of service (LOS). The travel speed along a segment, section or entire length of an urban street is dependent on the running speed between signalized intersections and the amount of control delay incurred at signalized intersections.

LOS A describes primarily free-flow operation. Vehicles are completely unimpeded in their ability to maneuver within the traffic stream. Control delay at signalized intersections is minimal. Travel speeds exceed 85 of the base free flow speed (FFS).

LOS B describes reasonably unimpeded operation. The ability to maneuver within the traffic stream is only slightly restricted and control delay at the boundary intersections is not significant. The travel speed is between 67 and 85 percent of the base FFS.

LOS C describes stable operations. The ability to maneuver and change lanes in midblock location may be more restricted than at LOS B. Longer queues at the boundary intersections may contribute to lower travel speeds. The travel speed is between 50 and 67 percent of the base FFS.

LOS D indicates a less stable condition in which small increases in flow may cause substantial increases in delay and decreases in travel speed. This operation may be due to adverse signal progression, high volumes, inappropriate signal timing, at the boundary intersections. The travel speed is between 40 and 50 percent of the base FFS.

LOS E is characterized unstable operation and significant delay. Such operations may be due to some combination of adverse progression, high volume, and inappropriate signal timing at the boundary intersections. The travel speed is between 30 and 40 percent of the base FFS.

LOS F is characterized by street flow at extremely low speed. Congestion is likely occurring at the boundary intersections, as indicated by high delay and extensive queuing. The travel speed is 30 percent or less of the base FFS.

Table A-1: Urban Street Levels of Service (Automobile Mode)

Travel Speed as a Percentage of Base Free-Flow Speed (%)	LOS by Critical Volume-to-Capacity Ratio[a]	
	≤1.0	>1.0
>85	A	F
>67 to 85	B	F
>50 to 67	C	F
>40 to 50	D	F
>30 to 40	E	F
≤30	F	F

a = The Critical volume-to-capacity ratio is based on consideration of the through movement-to-capacity ratio at each boundary intersection in the subject direction of travel. The critical volume-to-capacity ratio is the largest ratio of those considered.
Source: Highway Capacity Manual 2010, Exhibit 16-4. Urban Street LOS Criteria (Automobile Mode)

Intersection Levels of Service

One of the more important elements limiting, and often interrupting the flow of traffic on a highway is the intersection. Flow on an interrupted facility is usually dominated by points of fixed operation such as traffic signals, stop and yield signs.

Signalized Intersections – Performance Measures

For signalized intersections the performance measures include automobile volume-to-capacity ratio, automobile delay, queue storage length, ratio of pedestrian delay, pedestrian circulation area, pedestrian perception score, bicycle delay, and bicycle perception score. LOS is also considered a performance measure. For the automobile mode average control delay per vehicle per approach is determined for the peak hour. A weighted average of control delay per vehicle is then determined for the intersection. A LOS designation is given to the weighted average control delay to better describe the level of operation. A description of LOS for signalized intersections is found in Table A-2.

Table A-2: Signalized Intersection Level of Service Description (Automobile Mode)

Level of Service	Description	Average Control Delay (seconds per vehicle)
A	Operations with a control delay of 10 seconds/vehicle or less and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when volume-to-capacity ratio is and either progression is exceptionally favorable or the cycle length is very short. If it's due to favorable progression, most vehicles arrive during the green indication and travel through the intersection without stopping.	≤10
B	Operations with control delay between 10.1 to 20.0 seconds/vehicle and a volume-to-capacity ratio no greater than 1.0. 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.	>10.0 to 20.0
C	Operations with average control delays between 20.1 to 35.0 seconds/vehicle and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio no greater than 1.0. 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.	>20 to 35
D	Operations with control delay between 35.1 to 55.0 seconds/vehicle and a volume-to-capacity ratio no greater than 1.0. 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 i ndividual cycle failures are noticeable.	>35 to 55
E	Operations with control delay between 55.1 to 80.0 seconds/vehicle and a volume-to-capacity ratio no greater than 1.0. 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.	>55 to 80
F	Operations with unacceptable control delay exceeding 80.0 seconds/vehicle and a volume-to-capacity ratio greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is very high, progression is very poor, and the cycle length is long. Most cycles fail to clear the queue.	>80

Source: Highway Capacity Manual 2010

Unsignalized Intersections

The HCM 2010 procedures use control delay as a measure of effectiveness to determine level of service. Delay is a measure of driver discomfort, frustration, fuel consumption, and increased travel time. The delay experienced by a motorist is made up of a number of factors that relate to control, traffic and incidents. Total delay is the difference between the travel time actually experienced and the reference travel time that would result during base conditions, i. e., in the absence of traffic control, geometric delay, any incidents, and any other vehicles. Control delay is the increased time of travel for a vehicle approaching and passing through an unsignalized intersection, compared with a free-flow vehicle if it were not required to slow or stop at the intersection.

All-Way Stop Controlled Intersections

All-way stop controlled intersections is a form of traffic controls in which all approaches to an intersection are required to stop. Similar to signalized intersections, at all-way stop controlled intersections the average control delay per vehicle per approach is determined for the peak hour. A weighted average of control delay per vehicle is then determined for the intersection as a whole. In other words the delay measured for all-way stop controlled intersections is a measure of the average delay for all vehicles passing through the intersection during the peak hour. A LOS designation is given to the weighted average control delay to better describe the level of operation.

Two-Way Stop Controlled Intersections

Two-way stop controlled (TWSC) intersections in which stop signs are used to assign the right-of-way, are the most prevalent type of intersection in the United States. At TWSC intersections the stop-controlled approaches are referred as the minor street approaches and can be either public streets or private driveways. The approaches that are not controlled by stop signs are referred to as the major street approaches.

The capacity of movements subject to delay are determined using the "critical gap" method of capacity analysis. Expected average control delay based on movement volume and movement capacity is calculated. A LOS for TWSC intersection is determined by the computed or measured control delay for each minor movement. LOS is not defined for the intersection as a whole for three main reasons: (a) major-street through vehicles are assumed to experience zero delay; (b) the disproportionate number of major-street through vehicles at the typical TWSC intersection skews the weighted average of all movements, resulting in a very low overall average delay from all vehicles; and (c) the resulting low delay can mask important LOS deficiencies for minor movements. Table A-3 provides a description of LOS at unsignalized intersections.

Table A-3: Unsignalized Intersection Level of Service Description (Automobile Mode)

Control Delay (seconds per vehicle)	**LOS by Volume-to-Capacity Ratio**	
	v/c ≤ 1.0	**v/c > 1.0**
≤10	A	F
>10 to 15	B	F
>15 to 25	C	F
>25 to 35	D	F
>35 to 50	E	F
>50	F	F

Source: HCM 2010 Exhibit 19-1.

Appendix D: Existing Traffic Conditions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	63	644	118	353	595	123	68	246	353	88	268	45
Future Volume (veh/h)	63	644	118	353	595	123	68	246	353	88	268	45
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1810	1845	1845	1810	1845
Adj Flow Rate, veh/h	65	664	122	364	613	127	70	254	364	91	276	46
Adj No. of Lanes	1	2	1	1	2	1	1	1	1	1	1	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	3	3	3	3	3	3	3	5	3	3	5	3
Cap, veh/h	83	811	363	370	1382	618	89	490	425	104	505	438
Arrive On Green	0.05	0.23	0.23	0.21	0.39	0.39	0.05	0.27	0.27	0.06	0.28	0.28
Sat Flow, veh/h	1757	3505	1568	1757	3505	1568	1757	1810	1568	1757	1810	1568
Grp Volume(v), veh/h	65	664	122	364	613	127	70	254	364	91	276	46
Grp Sat Flow(s),veh/h/ln	1757	1752	1568	1757	1752	1568	1757	1810	1568	1757	1810	1568
Q Serve(g_s), s	3.1	15.2	5.5	17.5	10.9	4.5	3.3	10.1	18.6	4.3	11.0	1.8
Cycle Q Clear(g_c), s	3.1	15.2	5.5	17.5	10.9	4.5	3.3	10.1	18.6	4.3	11.0	1.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	83	811	363	370	1382	618	89	490	425	104	505	438
V/C Ratio(X)	0.78	0.82	0.34	0.98	0.44	0.21	0.78	0.52	0.86	0.88	0.55	0.11
Avail Cap(c_a), veh/h	193	990	443	370	1382	618	104	727	630	104	727	630
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.8	30.8	27.1	33.3	18.8	16.9	39.7	26.2	29.3	39.5	25.9	22.6
Incr Delay (d2), s/veh	14.4	4.6	0.5	42.5	0.2	0.2	27.7	0.8	7.7	51.4	0.9	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	7.9	2.4	12.8	5.2	2.0	2.3	5.1	9.0	3.6	5.6	0.8
LnGrp Delay(d),s/veh	54.2	35.4	27.6	75.8	19.0	17.0	67.4	27.0	36.9	90.9	26.9	22.7
LnGrp LOS	D	D	C	E	B	B	E	C	D	F	C	C
Approach Vol, veh/h		851			1104			688			413	
Approach Delay, s/veh		35.7			37.5			36.4			40.5	
Approach LOS		D			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.2	27.8	22.0	25.6	8.5	28.5	8.2	39.4
Change Period (Y+Rc), s	* 4.2	4.9	* 4.2	6.0	* 4.2	4.9	* 4.2	* 6
Max Green Setting (Gmax), s	* 5	34.0	* 18	23.9	* 5	34.0	* 9.3	* 33
Max Q Clear Time (g_c+I1), s	6.3	20.6	19.5	17.2	5.3	13.0	5.1	12.9
Green Ext Time (p_c), s	0.0	2.3	0.0	2.4	0.0	1.6	0.0	4.1

Intersection Summary	
HCM 2010 Ctrl Delay	37.2
HCM 2010 LOS	D

Notes

Intersection	
Int Delay, s/veh	0.2

Movement	EBU	EBL	EBT	WBU	WBT	WBR	SBL	SBR
Lane Configurations								
Traffic Vol, veh/h	2	3	1031	8	886	2	5	7
Future Vol, veh/h	2	3	1031	8	886	2	5	7
Conflicting Peds, #/hr	0	6	0	0	0	6	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	None
Storage Length	-	150	-	60	-	-	0	-
Veh in Median Storage, #	-	-	0	-	0	-	0	-
Grade, %	-	-	0	-	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96
Heavy Vehicles, %	3	3	3	3	3	3	3	3
Mvmt Flow	2	3	1074	8	923	2	5	7

Major/Minor	Major1			Major2			Minor2	
Conflicting Flow All	675	931	0	784	-	0	1386	470
Stage 1	-	-	-	-	-	-	946	-
Stage 2	-	-	-	-	-	-	440	-
Critical Hdwy	5.66	5.36	-	5.66	-	-	5.76	7.16
Critical Hdwy Stg 1	-	-	-	-	-	-	6.66	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.06	-
Follow-up Hdwy	2.33	3.13	-	2.33	-	-	3.83	3.93
Pot Cap-1 Maneuver	660	420	-	574	-	-	196	460
Stage 1	-	-	-	-	-	-	259	-
Stage 2	-	-	-	-	-	-	561	-
Platoon blocked, %			-		-	-		
Mov Cap-1 Maneuver	488	488	-	574	-	-	189	457
Mov Cap-2 Maneuver	-	-	-	-	-	-	189	-
Stage 1	-	-	-	-	-	-	251	-
Stage 2	-	-	-	-	-	-	558	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0.1	18.1
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBU	WBT	WBR	SBLn1
Capacity (veh/h)	488	-	574	-	-	287
HCM Lane V/C Ratio	0.011	-	0.015	-	-	0.044
HCM Control Delay (s)	12.5	-	11.4	-	-	18.1
HCM Lane LOS	B	-	B	-	-	C
HCM 95th %tile Q(veh)	0	-	0	-	-	0.1

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	34	7	913	87	6	80	681	0	186	1	66	7
Future Volume (vph)	34	7	913	87	6	80	681	0	186	1	66	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.2	5.3			4.2	4.9			4.2	4.2	
Lane Util. Factor		1.00	0.91			1.00	0.91			1.00	1.00	
Frpb, ped/bikes		1.00	1.00			1.00	1.00			1.00	0.99	
Flpb, ped/bikes		1.00	1.00			1.00	1.00			1.00	1.00	
Frt		1.00	0.99			1.00	1.00			1.00	0.85	
Flt Protected		0.95	1.00			0.95	1.00			0.95	1.00	
Satd. Flow (prot)		1752	4958			1752	5036			1757	1546	
Flt Permitted		0.95	1.00			0.95	1.00			0.95	1.00	
Satd. Flow (perm)		1752	4958			1752	5036			1757	1546	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	36	7	961	92	6	84	717	0	196	1	69	7
RTOR Reduction (vph)	0	0	7	0	0	0	0	0	0	0	55	0
Lane Group Flow (vph)	0	43	1046	0	0	90	717	0	0	197	14	0
Confl. Peds. (#/hr)				4				3	11		3	3
Turn Type	Prot	Prot	NA		Prot	Prot	NA		Split	NA	Perm	Split
Protected Phases	7	7	4		3	3	8		2	2		6
Permitted Phases											2	
Actuated Green, G (s)		3.1	29.5			7.7	34.5			15.2	15.2	
Effective Green, g (s)		3.1	29.5			7.7	34.5			15.2	15.2	
Actuated g/C Ratio		0.04	0.39			0.10	0.46			0.20	0.20	
Clearance Time (s)		4.2	5.3			4.2	4.9			4.2	4.2	
Vehicle Extension (s)		3.0	3.0			3.0	3.0			3.0	3.0	
Lane Grp Cap (vph)		71	1932			178	2295			352	310	
v/s Ratio Prot		0.02	c0.21			c0.05	0.14			c0.11		
v/s Ratio Perm											0.01	
v/c Ratio		0.61	0.54			0.51	0.31			0.56	0.04	
Uniform Delay, d1		35.7	17.9			32.2	13.1			27.2	24.4	
Progression Factor		1.00	1.00			1.00	1.00			1.00	1.00	
Incremental Delay, d2		13.7	0.3			2.3	0.1			1.9	0.1	
Delay (s)		49.4	18.2			34.5	13.2			29.2	24.5	
Level of Service		D	B			C	B			C	C	
Approach Delay (s)			19.4				15.5			27.9		
Approach LOS			B				B			C		

Intersection Summary			
HCM 2000 Control Delay	19.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	75.7	Sum of lost time (s)	17.7
Intersection Capacity Utilization	58.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	1	8
Future Volume (vph)	1	8
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.0	4.0
Lane Util. Factor	1.00	1.00
Frpb, ped/bikes	1.00	0.98
Flpb, ped/bikes	1.00	1.00
Frt	1.00	0.85
Flt Protected	0.96	1.00
Satd. Flow (prot)	1767	1539
Flt Permitted	0.96	1.00
Satd. Flow (perm)	1767	1539
Peak-hour factor, PHF	0.95	0.95
Adj. Flow (vph)	1	8
RTOR Reduction (vph)	0	7
Lane Group Flow (vph)	8	1
Confl. Peds. (#/hr)		11
Turn Type	NA	Perm
Protected Phases	6	
Permitted Phases		6
Actuated Green, G (s)	5.6	5.6
Effective Green, g (s)	5.6	5.6
Actuated g/C Ratio	0.07	0.07
Clearance Time (s)	4.0	4.0
Vehicle Extension (s)	3.0	3.0
Lane Grp Cap (vph)	130	113
v/s Ratio Prot	c0.00	
v/s Ratio Perm		0.00
v/c Ratio	0.06	0.01
Uniform Delay, d1	32.6	32.5
Progression Factor	1.00	1.00
Incremental Delay, d2	0.2	0.0
Delay (s)	32.8	32.5
Level of Service	C	C
Approach Delay (s)	32.6	
Approach LOS	C	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU
Lane Configurations												
Traffic Volume (vph)	5	305	507	236	199	378	74	1	246	546	172	21
Future Volume (vph)	5	305	507	236	199	378	74	1	246	546	172	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.2	5.3	5.3	4.2	4.9			4.2	4.9	4.9	
Lane Util. Factor		1.00	0.95	1.00	1.00	0.95			1.00	0.95	1.00	
Frpb, ped/bikes		1.00	1.00	0.98	1.00	1.00			1.00	1.00	0.98	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	
Frt		1.00	1.00	0.85	1.00	0.98			1.00	1.00	0.85	
Flt Protected		0.95	1.00	1.00	0.95	1.00			0.95	1.00	1.00	
Satd. Flow (prot)		1752	3505	1539	1752	3408			1752	3505	1534	
Flt Permitted		0.95	1.00	1.00	0.95	1.00			0.95	1.00	1.00	
Satd. Flow (perm)		1752	3505	1539	1752	3408			1752	3505	1534	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	321	534	248	209	398	78	1	259	575	181	22
RTOR Reduction (vph)	0	0	0	187	0	14	0	0	0	0	114	0
Lane Group Flow (vph)	0	326	534	61	209	462	0	0	260	575	67	0
Confl. Peds. (#/hr)				7			7				9	
Turn Type	Prot	Prot	NA	Perm	Prot	NA		Prot	Prot	NA	Perm	Prot
Protected Phases	7	7	4		3	8		5	5	2		1
Permitted Phases				4							2	
Actuated Green, G (s)		24.2	28.4	28.4	17.6	22.2			20.0	42.6	42.6	
Effective Green, g (s)		24.2	28.4	28.4	17.6	22.2			20.0	42.6	42.6	
Actuated g/C Ratio		0.21	0.25	0.25	0.15	0.19			0.17	0.37	0.37	
Clearance Time (s)		4.2	5.3	5.3	4.2	4.9			4.2	4.9	4.9	
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0	
Lane Grp Cap (vph)		366	861	378	266	654			303	1291	565	
v/s Ratio Prot		c0.19	0.15		0.12	c0.14			c0.15	0.16		
v/s Ratio Perm				0.04							0.04	
v/c Ratio		0.89	0.62	0.16	0.79	0.71			0.86	0.45	0.12	
Uniform Delay, d1		44.4	38.8	34.2	47.2	43.7			46.4	27.6	24.1	
Progression Factor		1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	
Incremental Delay, d2		22.6	1.4	0.2	14.1	3.5			20.6	0.2	0.1	
Delay (s)		67.0	40.2	34.4	61.3	47.1			67.1	27.8	24.2	
Level of Service		E	D	C	E	D			E	C	C	
Approach Delay (s)			46.8			51.5				37.2		
Approach LOS			D			D				D		

Intersection Summary			
HCM 2000 Control Delay	45.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	115.6	Sum of lost time (s)	19.0
Intersection Capacity Utilization	84.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBL	SBT	SBR
Lane Configurations			
Traffic Volume (vph)	52	523	204
Future Volume (vph)	52	523	204
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	4.2	5.3	
Lane Util. Factor	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	
Frt	1.00	0.96	
Flt Protected	0.95	1.00	
Satd. Flow (prot)	1752	3342	
Flt Permitted	0.95	1.00	
Satd. Flow (perm)	1752	3342	
Peak-hour factor, PHF	0.95	0.95	0.95
Adj. Flow (vph)	55	551	215
RTOR Reduction (vph)	0	31	0
Lane Group Flow (vph)	77	735	0
Confl. Peds. (#/hr)			4
Turn Type	Prot	NA	
Protected Phases	1	6	
Permitted Phases			
Actuated Green, G (s)	8.4	30.6	
Effective Green, g (s)	8.4	30.6	
Actuated g/C Ratio	0.07	0.26	
Clearance Time (s)	4.2	5.3	
Vehicle Extension (s)	3.0	3.0	
Lane Grp Cap (vph)	127	884	
v/s Ratio Prot	0.04	c0.22	
v/s Ratio Perm			
v/c Ratio	0.61	0.83	
Uniform Delay, d1	52.0	40.1	
Progression Factor	1.00	1.00	
Incremental Delay, d2	7.9	6.7	
Delay (s)	59.9	46.8	
Level of Service	E	D	
Approach Delay (s)		48.0	
Approach LOS		D	

Intersection Summary

Intersection: 1: State Route 59 & Santa Fe Drive/Olive Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	R	L	T	T	R	L	T	R	L
Maximum Queue (ft)	118	200	263	200	280	806	696	54	106	184	207	200
Average Queue (ft)	48	133	149	51	261	373	168	32	52	116	74	103
95th Queue (ft)	107	199	216	129	317	780	392	54	98	179	132	192
Link Distance (ft)		969	969			5168	5168	5168		367		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	150			100	180				80		120	100
Storage Blk Time (%)		6	25	1	63	0			4	14	1	24
Queuing Penalty (veh)		4	30	2	188	0			25	61	2	76

Intersection: 1: State Route 59 & Santa Fe Drive/Olive Avenue

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	597	38
Average Queue (ft)	152	15
95th Queue (ft)	320	31
Link Distance (ft)	4512	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		100
Storage Blk Time (%)	13	
Queuing Penalty (veh)	18	

Intersection: 2: Olive Avenue & MHS Driveway

Movement	EB	WB	SB
Directions Served	UL	U	LR
Maximum Queue (ft)	27	27	31
Average Queue (ft)	1	4	6
95th Queue (ft)	9	19	26
Link Distance (ft)			432
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	150	60	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Park Avenue & Olive Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	UL	T	T	TR	UL	T	T	TR	LT	R	LT	R
Maximum Queue (ft)	87	357	317	180	132	134	190	166	250	140	29	31
Average Queue (ft)	30	188	118	95	56	48	73	72	89	39	7	10
95th Queue (ft)	65	314	246	165	104	100	139	131	172	87	27	32
Link Distance (ft)		658	658	658		938	938	938	1266		286	286
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	500				350					75		
Storage Blk Time (%)									15			
Queuing Penalty (veh)									10			

Intersection: 4: "G" Street & Olive Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB
Directions Served	UL	T	T	R	L	T	TR	UL	T	T	R	UL
Maximum Queue (ft)	399	456	369	180	229	337	217	324	386	242	112	220
Average Queue (ft)	264	218	146	52	142	139	133	244	177	156	44	86
95th Queue (ft)	414	369	268	127	226	258	214	347	331	231	81	205
Link Distance (ft)		938	938	938		315	315		3054	3054		
Upstream Blk Time (%)						1						
Queuing Penalty (veh)						0						
Storage Bay Dist (ft)	300				170			250			170	120
Storage Blk Time (%)	9	2			8	4		22	1	6		1
Queuing Penalty (veh)	24	5			16	7		59	1	10		2

Intersection: 4: "G" Street & Olive Avenue

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	347	384
Average Queue (ft)	216	250
95th Queue (ft)	323	351
Link Distance (ft)	2914	2914
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)	34	
Queuing Penalty (veh)	25	

Zone Summary

Zone wide Queuing Penalty: 158

Appendix E: Existing plus Project Traffic Conditions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	63	696	118	370	624	129	68	246	448	98	268	45
Future Volume (veh/h)	63	696	118	370	624	129	68	246	448	98	268	45
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1810	1845	1845	1810	1845
Adj Flow Rate, veh/h	65	718	122	381	643	133	70	254	462	101	276	46
Adj No. of Lanes	1	2	1	1	2	1	1	1	1	1	1	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	3	3	3	3	3	3	3	5	3	3	5	3
Cap, veh/h	83	776	347	399	1406	629	89	558	484	117	587	508
Arrive On Green	0.05	0.22	0.22	0.23	0.40	0.40	0.05	0.31	0.31	0.07	0.32	0.32
Sat Flow, veh/h	1757	3505	1568	1757	3505	1568	1757	1810	1568	1757	1810	1568
Grp Volume(v), veh/h	65	718	122	381	643	133	70	254	462	101	276	46
Grp Sat Flow(s),veh/h/ln	1757	1752	1568	1757	1752	1568	1757	1810	1568	1757	1810	1568
Q Serve(g_s), s	4.0	22.0	7.2	23.4	14.7	6.1	4.3	12.4	31.6	6.2	13.3	2.2
Cycle Q Clear(g_c), s	4.0	22.0	7.2	23.4	14.7	6.1	4.3	12.4	31.6	6.2	13.3	2.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	83	776	347	399	1406	629	89	558	484	117	587	508
V/C Ratio(X)	0.78	0.93	0.35	0.95	0.46	0.21	0.78	0.46	0.96	0.86	0.47	0.09
Avail Cap(c_a), veh/h	156	784	351	399	1406	629	114	562	487	117	587	508
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.6	41.8	36.0	41.7	24.0	21.5	51.4	30.5	37.1	50.6	29.5	25.8
Incr Delay (d2), s/veh	14.3	16.7	0.6	33.2	0.2	0.2	23.3	0.6	29.6	44.1	0.6	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	12.5	3.2	15.0	7.2	2.6	2.7	6.3	17.7	4.5	6.8	1.0
LnGrp Delay(d),s/veh	65.9	58.5	36.6	75.0	24.3	21.6	74.7	31.0	66.7	94.8	30.1	25.8
LnGrp LOS	E	E	D	E	C	C	E	C	E	F	C	C
Approach Vol, veh/h		905			1157			786			423	
Approach Delay, s/veh		56.1			40.7			55.9			45.1	
Approach LOS		E			D			E			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.5	38.7	29.1	30.2	9.8	40.4	9.4	49.9
Change Period (Y+Rc), s	* 4.2	4.9	* 4.2	6.0	* 4.2	4.9	* 4.2	* 6
Max Green Setting (Gmax), s	* 7.3	34.0	* 25	24.5	* 7.1	34.2	* 9.7	* 40
Max Q Clear Time (g_c+I1), s	8.2	33.6	25.4	24.0	6.3	15.3	6.0	16.7
Green Ext Time (p_c), s	0.0	0.1	0.0	0.3	0.0	1.5	0.0	4.5

Intersection Summary	
HCM 2010 Ctrl Delay	49.2
HCM 2010 LOS	D

Notes

Intersection	
Int Delay, s/veh	1.2

Movement	EBU	EBL	EBT	WBU	WBT	WBR	SBL	SBR
Lane Configurations								
Traffic Vol, veh/h	2	56	1240	8	978	40	23	30
Future Vol, veh/h	2	56	1240	8	978	40	23	30
Conflicting Peds, #/hr	0	6	0	0	0	6	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	None
Storage Length	-	150	-	60	-	-	0	-
Veh in Median Storage, #	-	-	0	-	0	-	0	-
Grade, %	-	-	0	-	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96
Heavy Vehicles, %	3	3	3	3	3	3	3	3
Mvmt Flow	2	58	1292	8	1019	42	24	31

Major/Minor	Major1			Major2			Minor2	
Conflicting Flow All	774	1067	0	943	-	0	1699	538
Stage 1	-	-	-	-	-	-	1062	-
Stage 2	-	-	-	-	-	-	637	-
Critical Hdwy	5.66	5.36	-	5.66	-	-	5.76	7.16
Critical Hdwy Stg 1	-	-	-	-	-	-	6.66	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.06	-
Follow-up Hdwy	2.33	3.13	-	2.33	-	-	3.83	3.93
Pot Cap-1 Maneuver	582	360	-	469	-	-	134	415
Stage 1	-	-	-	-	-	-	220	-
Stage 2	-	-	-	-	-	-	443	-
Platoon blocked, %			-		-	-		
Mov Cap-1 Maneuver	362	362	-	469	-	-	109	412
Mov Cap-2 Maneuver	-	-	-	-	-	-	109	-
Stage 1	-	-	-	-	-	-	179	-
Stage 2	-	-	-	-	-	-	440	-

Approach	EB	WB	SB
HCM Control Delay, s	0.8	0.1	32.1
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBU	WBT	WBR	SBLn1
Capacity (veh/h)	362	-	469	-	-	187
HCM Lane V/C Ratio	0.167	-	0.018	-	-	0.295
HCM Control Delay (s)	16.9	-	12.8	-	-	32.1
HCM Lane LOS	C	-	B	-	-	D
HCM 95th %tile Q(veh)	0.6	-	0.1	-	-	1.2

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	34	216	931	87	6	80	719	152	186	25	66	68
Future Volume (vph)	34	216	931	87	6	80	719	152	186	25	66	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.2	5.3			4.2	4.9			4.2	4.2	
Lane Util. Factor		1.00	0.91			1.00	0.91			1.00	1.00	
Frpb, ped/bikes		1.00	1.00			1.00	1.00			1.00	0.99	
Flpb, ped/bikes		1.00	1.00			1.00	1.00			1.00	1.00	
Frt		1.00	0.99			1.00	0.97			1.00	0.85	
Flt Protected		0.95	1.00			0.95	1.00			0.96	1.00	
Satd. Flow (prot)		1752	4959			1752	4883			1767	1546	
Flt Permitted		0.95	1.00			0.95	1.00			0.96	1.00	
Satd. Flow (perm)		1752	4959			1752	4883			1767	1546	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	36	227	980	92	6	84	757	160	196	26	69	72
RTOR Reduction (vph)	0	0	7	0	0	0	22	0	0	0	55	0
Lane Group Flow (vph)	0	263	1065	0	0	90	895	0	0	222	14	0
Confl. Peds. (#/hr)				4				3	11		3	3
Turn Type	Prot	Prot	NA		Prot	Prot	NA		Split	NA	Perm	Split
Protected Phases	7	7	4		3	3	8		2	2		6
Permitted Phases											2	
Actuated Green, G (s)		16.7	31.5			8.7	23.9			18.2	18.2	
Effective Green, g (s)		16.7	31.5			8.7	23.9			18.2	18.2	
Actuated g/C Ratio		0.19	0.35			0.10	0.27			0.20	0.20	
Clearance Time (s)		4.2	5.3			4.2	4.9			4.2	4.2	
Vehicle Extension (s)		3.0	3.0			3.0	3.0			3.0	3.0	
Lane Grp Cap (vph)		328	1751			170	1308			360	315	
v/s Ratio Prot		c0.15	0.21			0.05	c0.18			c0.13		
v/s Ratio Perm											0.01	
v/c Ratio		0.80	0.61			0.53	0.68			0.62	0.04	
Uniform Delay, d1		34.7	23.8			38.3	29.3			32.3	28.5	
Progression Factor		1.00	1.00			1.00	1.00			1.00	1.00	
Incremental Delay, d2		13.2	0.6			3.0	1.5			3.1	0.1	
Delay (s)		47.8	24.4			41.3	30.8			35.5	28.6	
Level of Service		D	C			D	C			D	C	
Approach Delay (s)			29.0				31.7			33.8		
Approach LOS			C				C			C		

Intersection Summary			
HCM 2000 Control Delay	30.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	89.2	Sum of lost time (s)	17.7
Intersection Capacity Utilization	74.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	11	100
Future Volume (vph)	11	100
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.0	4.0
Lane Util. Factor	1.00	1.00
Frpb, ped/bikes	1.00	0.98
Flpb, ped/bikes	1.00	1.00
Frt	1.00	0.85
Flt Protected	0.96	1.00
Satd. Flow (prot)	1769	1537
Flt Permitted	0.96	1.00
Satd. Flow (perm)	1769	1537
Peak-hour factor, PHF	0.95	0.95
Adj. Flow (vph)	12	105
RTOR Reduction (vph)	0	90
Lane Group Flow (vph)	84	15
Confl. Peds. (#/hr)		11
Turn Type	NA	Perm
Protected Phases	6	
Permitted Phases		6
Actuated Green, G (s)	13.1	13.1
Effective Green, g (s)	13.1	13.1
Actuated g/C Ratio	0.15	0.15
Clearance Time (s)	4.0	4.0
Vehicle Extension (s)	3.0	3.0
Lane Grp Cap (vph)	259	225
v/s Ratio Prot	c0.05	
v/s Ratio Perm		0.01
v/c Ratio	0.32	0.07
Uniform Delay, d1	34.1	32.8
Progression Factor	1.00	1.00
Incremental Delay, d2	0.7	0.1
Delay (s)	34.8	32.9
Level of Service	C	C
Approach Delay (s)	33.8	
Approach LOS	C	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU
Lane Configurations												
Traffic Volume (vph)	5	328	540	259	199	454	74	1	303	546	172	21
Future Volume (vph)	5	328	540	259	199	454	74	1	303	546	172	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.2	5.3	5.3	4.2	4.9			4.2	4.9	4.9	
Lane Util. Factor		1.00	0.95	1.00	1.00	0.95			1.00	0.95	1.00	
Frpb, ped/bikes		1.00	1.00	0.98	1.00	1.00			1.00	1.00	0.98	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	
Frt		1.00	1.00	0.85	1.00	0.98			1.00	1.00	0.85	
Flt Protected		0.95	1.00	1.00	0.95	1.00			0.95	1.00	1.00	
Satd. Flow (prot)		1752	3505	1538	1752	3422			1752	3505	1531	
Flt Permitted		0.95	1.00	1.00	0.95	1.00			0.95	1.00	1.00	
Satd. Flow (perm)		1752	3505	1538	1752	3422			1752	3505	1531	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	345	568	273	209	478	78	1	319	575	181	22
RTOR Reduction (vph)	0	0	0	201	0	10	0	0	0	0	110	0
Lane Group Flow (vph)	0	350	568	72	209	546	0	0	320	575	71	0
Confl. Peds. (#/hr)				7			7				9	
Turn Type	Prot	Prot	NA	Perm	Prot	NA		Prot	Prot	NA	Perm	Prot
Protected Phases	7	7	4		3	8		5	5	2		1
Permitted Phases				4							2	
Actuated Green, G (s)		27.8	35.0	35.0	19.1	26.7			25.4	51.0	51.0	
Effective Green, g (s)		27.8	35.0	35.0	19.1	26.7			25.4	51.0	51.0	
Actuated g/C Ratio		0.21	0.26	0.26	0.14	0.20			0.19	0.38	0.38	
Clearance Time (s)		4.2	5.3	5.3	4.2	4.9			4.2	4.9	4.9	
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0	
Lane Grp Cap (vph)		367	924	405	252	688			335	1347	588	
v/s Ratio Prot		c0.20	0.16		0.12	c0.16			c0.18	0.16		
v/s Ratio Perm				0.05							0.05	
v/c Ratio		0.95	0.61	0.18	0.83	0.79			0.96	0.43	0.12	
Uniform Delay, d1		51.8	42.9	37.7	55.2	50.4			53.1	30.1	26.4	
Progression Factor		1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	
Incremental Delay, d2		34.8	1.2	0.2	19.7	6.3			37.1	0.2	0.1	
Delay (s)		86.6	44.1	37.9	74.9	56.7			90.2	30.3	26.5	
Level of Service		F	D	D	E	E			F	C	C	
Approach Delay (s)			55.2			61.7				47.5		
Approach LOS			E			E				D		

Intersection Summary			
HCM 2000 Control Delay	56.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	132.7	Sum of lost time (s)	19.0
Intersection Capacity Utilization	92.2%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBL	SBT	SBR
Lane Configurations			
Traffic Volume (vph)	52	523	261
Future Volume (vph)	52	523	261
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	4.2	5.3	
Lane Util. Factor	1.00	0.95	
Frpb, ped/bikes	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	
Frt	1.00	0.95	
Flt Protected	0.95	1.00	
Satd. Flow (prot)	1752	3311	
Flt Permitted	0.95	1.00	
Satd. Flow (perm)	1752	3311	
Peak-hour factor, PHF	0.95	0.95	0.95
Adj. Flow (vph)	55	551	275
RTOR Reduction (vph)	0	43	0
Lane Group Flow (vph)	77	783	0
Confl. Peds. (#/hr)			4
Turn Type	Prot	NA	
Protected Phases	1	6	
Permitted Phases			
Actuated Green, G (s)	9.0	34.2	
Effective Green, g (s)	9.0	34.2	
Actuated g/C Ratio	0.07	0.26	
Clearance Time (s)	4.2	5.3	
Vehicle Extension (s)	3.0	3.0	
Lane Grp Cap (vph)	118	853	
v/s Ratio Prot	0.04	c0.24	
v/s Ratio Perm			
v/c Ratio	0.65	0.92	
Uniform Delay, d1	60.3	47.9	
Progression Factor	1.00	1.00	
Incremental Delay, d2	12.2	14.5	
Delay (s)	72.5	62.4	
Level of Service	E	E	
Approach Delay (s)		63.3	
Approach LOS		E	

Intersection Summary

Intersection: 1: State Route 59 & Santa Fe Drive/Olive Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	R	L	T	T	R	L	T	R	L
Maximum Queue (ft)	134	337	370	325	465	260	235	70	89	369	250	200
Average Queue (ft)	53	213	225	55	288	116	133	34	42	148	111	87
95th Queue (ft)	103	321	335	174	416	199	218	64	82	261	206	160
Link Distance (ft)		969	969			5167	5167	5167		367		
Upstream Blk Time (%)										0		
Queuing Penalty (veh)										0		
Storage Bay Dist (ft)	400			225	500				200		175	100
Storage Blk Time (%)			12							5	1	7
Queuing Penalty (veh)			14							24	2	22

Intersection: 1: State Route 59 & Santa Fe Drive/Olive Avenue

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	279	45
Average Queue (ft)	144	16
95th Queue (ft)	249	34
Link Distance (ft)	4512	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		275
Storage Blk Time (%)	19	
Queuing Penalty (veh)	26	

Intersection: 2: Olive Avenue & MHS Driveway

Movement	EB	WB	WB	SB
Directions Served	UL	U	TR	LR
Maximum Queue (ft)	74	53	22	79
Average Queue (ft)	26	11	1	35
95th Queue (ft)	61	36	7	69
Link Distance (ft)			658	432
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	150	60		
Storage Blk Time (%)		0		
Queuing Penalty (veh)		0		

Intersection: 3: Park Avenue & Olive Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	UL	T	T	TR	UL	T	T	TR	LT	R	LT	R
Maximum Queue (ft)	348	444	413	251	174	240	258	294	311	150	94	75
Average Queue (ft)	219	244	149	121	66	105	140	174	157	50	41	39
95th Queue (ft)	328	410	336	219	127	184	220	276	269	130	78	63
Link Distance (ft)		658	658	658		938	938	938	1266		286	286
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	500				350					75		
Storage Blk Time (%)									32	0		
Queuing Penalty (veh)									21	1		

Intersection: 4: "G" Street & Olive Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	B6	B6	NB	NB	NB
Directions Served	UL	T	T	R	L	T	TR	T	T	UL	T	T
Maximum Queue (ft)	400	834	703	321	229	386	343	140	128	324	394	291
Average Queue (ft)	326	361	231	55	155	191	205	9	4	236	180	175
95th Queue (ft)	456	712	538	186	251	340	307	61	42	341	313	244
Link Distance (ft)		938	938	938		315	315	559	559		3054	3054
Upstream Blk Time (%)						6	0					
Queuing Penalty (veh)						0	0					
Storage Bay Dist (ft)	300				170					250		
Storage Blk Time (%)	30	3			21	6				12	0	8
Queuing Penalty (veh)	81	10			48	11				32	1	14

Intersection: 4: "G" Street & Olive Avenue

Movement	NB	SB	SB	SB
Directions Served	R	UL	T	TR
Maximum Queue (ft)	290	220	875	932
Average Queue (ft)	52	104	474	503
95th Queue (ft)	132	241	827	848
Link Distance (ft)			2914	2914
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	170	120		
Storage Blk Time (%)			63	
Queuing Penalty (veh)			46	

Zone Summary

Zone wide Queuing Penalty: 265

Appendix F: Near Term plus Project Traffic Conditions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	71	700	118	402	628	132	68	372	483	102	369	50
Future Volume (veh/h)	71	700	118	402	628	132	68	372	483	102	369	50
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1810	1845	1845	1810	1845
Adj Flow Rate, veh/h	73	722	122	414	647	136	70	384	498	105	380	52
Adj No. of Lanes	1	2	1	1	2	1	1	1	1	1	1	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	3	3	3	3	3	3	3	5	3	3	5	3
Cap, veh/h	93	752	336	412	1388	621	89	559	485	117	587	509
Arrive On Green	0.05	0.21	0.21	0.23	0.40	0.40	0.05	0.31	0.31	0.07	0.32	0.32
Sat Flow, veh/h	1757	3505	1568	1757	3505	1568	1757	1810	1568	1757	1810	1568
Grp Volume(v), veh/h	73	722	122	414	647	136	70	384	498	105	380	52
Grp Sat Flow(s),veh/h/ln	1757	1752	1568	1757	1752	1568	1757	1810	1568	1757	1810	1568
Q Serve(g_s), s	4.5	22.4	7.3	25.8	15.0	6.3	4.3	20.5	34.0	6.5	19.7	2.5
Cycle Q Clear(g_c), s	4.5	22.4	7.3	25.8	15.0	6.3	4.3	20.5	34.0	6.5	19.7	2.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	93	752	336	412	1388	621	89	559	485	117	587	509
V/C Ratio(X)	0.78	0.96	0.36	1.00	0.47	0.22	0.78	0.69	1.03	0.90	0.65	0.10
Avail Cap(c_a), veh/h	163	752	336	412	1388	621	113	559	485	117	587	509
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.4	42.7	36.8	42.1	24.6	22.0	51.6	33.3	38.0	51.0	31.8	25.9
Incr Delay (d2), s/veh	13.1	23.4	0.7	45.5	0.2	0.2	23.5	3.5	48.1	53.7	2.5	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	13.3	3.2	17.7	7.3	2.8	2.7	10.8	21.1	4.9	10.2	1.1
LnGrp Delay(d),s/veh	64.6	66.2	37.5	87.6	24.9	22.2	75.1	36.8	86.1	104.7	34.2	26.0
LnGrp LOS	E	E	D	F	C	C	E	D	F	F	C	C
Approach Vol, veh/h		917			1197			952			537	
Approach Delay, s/veh		62.2			46.3			65.4			47.2	
Approach LOS		E			D			E			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.5	38.9	30.0	29.6	9.8	40.6	10.0	49.6
Change Period (Y+Rc), s	* 4.2	4.9	* 4.2	6.0	* 4.2	4.9	* 4.2	* 6
Max Green Setting (Gmax), s	* 7.3	34.0	* 26	23.6	* 7.1	34.2	* 10	* 40
Max Q Clear Time (g_c+I1), s	8.5	36.0	27.8	24.4	6.3	21.7	6.5	17.0
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	1.8	0.0	4.5

Intersection Summary	
HCM 2010 Ctrl Delay	55.5
HCM 2010 LOS	E

Notes

Intersection	
Int Delay, s/veh	1.3

Movement	EBU	EBL	EBT	WBU	WBT	WBR	SBL	SBR
Lane Configurations								
Traffic Vol, veh/h	2	56	1296	8	1034	40	23	30
Future Vol, veh/h	2	56	1296	8	1034	40	23	30
Conflicting Peds, #/hr	0	6	0	0	0	6	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	None
Storage Length	-	150	-	60	-	-	0	-
Veh in Median Storage, #	-	-	0	-	0	-	0	-
Grade, %	-	-	0	-	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96
Heavy Vehicles, %	3	3	3	3	3	3	3	3
Mvmt Flow	2	58	1350	8	1077	42	24	31

Major/Minor	Major1			Major2			Minor2	
Conflicting Flow All	817	1125	0	986	-	0	1780	567
Stage 1	-	-	-	-	-	-	1120	-
Stage 2	-	-	-	-	-	-	660	-
Critical Hdwy	5.66	5.36	-	5.66	-	-	5.76	7.16
Critical Hdwy Stg 1	-	-	-	-	-	-	6.66	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.06	-
Follow-up Hdwy	2.33	3.13	-	2.33	-	-	3.83	3.93
Pot Cap-1 Maneuver	551	338	-	444	-	-	121	398
Stage 1	-	-	-	-	-	-	203	-
Stage 2	-	-	-	-	-	-	431	-
Platoon blocked, %			-		-	-		
Mov Cap-1 Maneuver	340	340	-	444	-	-	97	395
Mov Cap-2 Maneuver	-	-	-	-	-	-	97	-
Stage 1	-	-	-	-	-	-	163	-
Stage 2	-	-	-	-	-	-	428	-

Approach	EB	WB	SB
HCM Control Delay, s	0.8	0.1	36.3
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBU	WBT	WBR	SBLn1
Capacity (veh/h)	340	-	444	-	-	169
HCM Lane V/C Ratio	0.178	-	0.019	-	-	0.327
HCM Control Delay (s)	17.9	-	13.3	-	-	36.3
HCM Lane LOS	C	-	B	-	-	E
HCM 95th %tile Q(veh)	0.6	-	0.1	-	-	1.3

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	34	216	981	93	6	96	770	152	191	25	82	68
Future Volume (vph)	34	216	981	93	6	96	770	152	191	25	82	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.2	5.3			4.2	4.9			4.2	4.2	
Lane Util. Factor		1.00	0.91			1.00	0.91			1.00	1.00	
Frpb, ped/bikes		1.00	1.00			1.00	1.00			1.00	0.99	
Flpb, ped/bikes		1.00	1.00			1.00	1.00			1.00	1.00	
Frt		1.00	0.99			1.00	0.98			1.00	0.85	
Flt Protected		0.95	1.00			0.95	1.00			0.96	1.00	
Satd. Flow (prot)		1752	4958			1752	4891			1766	1546	
Flt Permitted		0.95	1.00			0.95	1.00			0.96	1.00	
Satd. Flow (perm)		1752	4958			1752	4891			1766	1546	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	36	227	1033	98	6	101	811	160	201	26	86	72
RTOR Reduction (vph)	0	0	7	0	0	0	19	0	0	0	69	0
Lane Group Flow (vph)	0	263	1124	0	0	107	952	0	0	227	17	0
Confl. Peds. (#/hr)				4				3	11		3	3
Turn Type	Prot	Prot	NA		Prot	Prot	NA		Split	NA	Perm	Split
Protected Phases	7	7	4		3	3	8		2	2		6
Permitted Phases											2	
Actuated Green, G (s)		16.6	32.6			9.9	26.3			18.4	18.4	
Effective Green, g (s)		16.6	32.6			9.9	26.3			18.4	18.4	
Actuated g/C Ratio		0.18	0.36			0.11	0.29			0.20	0.20	
Clearance Time (s)		4.2	5.3			4.2	4.9			4.2	4.2	
Vehicle Extension (s)		3.0	3.0			3.0	3.0			3.0	3.0	
Lane Grp Cap (vph)		317	1762			189	1402			354	310	
v/s Ratio Prot		c0.15	c0.23			0.06	0.19			c0.13		
v/s Ratio Perm											0.01	
v/c Ratio		0.83	0.64			0.57	0.68			0.64	0.06	
Uniform Delay, d1		36.2	24.6			38.9	29.0			33.6	29.6	
Progression Factor		1.00	1.00			1.00	1.00			1.00	1.00	
Incremental Delay, d2		16.2	0.8			3.9	1.3			3.9	0.1	
Delay (s)		52.4	25.4			42.7	30.3			37.6	29.7	
Level of Service		D	C			D	C			D	C	
Approach Delay (s)			30.5				31.5			35.4		
Approach LOS			C				C			D		

Intersection Summary			
HCM 2000 Control Delay	31.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	91.7	Sum of lost time (s)	17.7
Intersection Capacity Utilization	75.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	11	100
Future Volume (vph)	11	100
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.0	4.0
Lane Util. Factor	1.00	1.00
Frpb, ped/bikes	1.00	0.98
Flpb, ped/bikes	1.00	1.00
Frt	1.00	0.85
Flt Protected	0.96	1.00
Satd. Flow (prot)	1769	1537
Flt Permitted	0.96	1.00
Satd. Flow (perm)	1769	1537
Peak-hour factor, PHF	0.95	0.95
Adj. Flow (vph)	12	105
RTOR Reduction (vph)	0	90
Lane Group Flow (vph)	84	15
Confl. Peds. (#/hr)		11
Turn Type	NA	Perm
Protected Phases	6	
Permitted Phases		6
Actuated Green, G (s)	13.1	13.1
Effective Green, g (s)	13.1	13.1
Actuated g/C Ratio	0.14	0.14
Clearance Time (s)	4.0	4.0
Vehicle Extension (s)	3.0	3.0
Lane Grp Cap (vph)	252	219
v/s Ratio Prot	c0.05	
v/s Ratio Perm		0.01
v/c Ratio	0.33	0.07
Uniform Delay, d1	35.4	34.0
Progression Factor	1.00	1.00
Incremental Delay, d2	0.8	0.1
Delay (s)	36.2	34.2
Level of Service	D	C
Approach Delay (s)	35.0	
Approach LOS	D	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU
Lane Configurations												
Traffic Volume (vph)	5	370	561	262	250	472	99	1	307	707	232	21
Future Volume (vph)	5	370	561	262	250	472	99	1	307	707	232	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.2	5.3	5.3	4.2	4.9			4.2	4.9	4.9	
Lane Util. Factor		1.00	0.95	1.00	1.00	0.95			1.00	0.95	1.00	
Frpb, ped/bikes		1.00	1.00	0.98	1.00	1.00			1.00	1.00	0.98	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	
Frt		1.00	1.00	0.85	1.00	0.97			1.00	1.00	0.85	
Flt Protected		0.95	1.00	1.00	0.95	1.00			0.95	1.00	1.00	
Satd. Flow (prot)		1752	3505	1536	1752	3402			1752	3505	1530	
Flt Permitted		0.95	1.00	1.00	0.95	1.00			0.95	1.00	1.00	
Satd. Flow (perm)		1752	3505	1536	1752	3402			1752	3505	1530	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	389	591	276	263	497	104	1	323	744	244	22
RTOR Reduction (vph)	0	0	0	207	0	12	0	0	0	0	110	0
Lane Group Flow (vph)	0	394	591	69	263	589	0	0	324	744	134	0
Confl. Peds. (#/hr)				7			7				9	
Turn Type	Prot	Prot	NA	Perm	Prot	NA		Prot	Prot	NA	Perm	Prot
Protected Phases	7	7	4		3	8		5	5	2		1
Permitted Phases				4							2	
Actuated Green, G (s)		29.8	36.1	36.1	23.5	30.2			24.8	53.2	53.2	
Effective Green, g (s)		29.8	36.1	36.1	23.5	30.2			24.8	53.2	53.2	
Actuated g/C Ratio		0.21	0.25	0.25	0.16	0.21			0.17	0.37	0.37	
Clearance Time (s)		4.2	5.3	5.3	4.2	4.9			4.2	4.9	4.9	
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0	
Lane Grp Cap (vph)		359	870	381	283	707			299	1283	560	
v/s Ratio Prot		c0.22	0.17		0.15	c0.17			c0.18	0.21		
v/s Ratio Perm				0.04							0.09	
v/c Ratio		1.10	0.68	0.18	0.93	0.83			1.08	0.58	0.24	
Uniform Delay, d1		57.8	49.4	43.0	60.1	55.1			60.3	37.1	32.0	
Progression Factor		1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	
Incremental Delay, d2		76.3	2.1	0.2	34.8	8.3			76.2	0.6	0.2	
Delay (s)		134.1	51.5	43.2	94.9	63.5			136.4	37.7	32.2	
Level of Service		F	D	D	F	E			F	D	C	
Approach Delay (s)			75.5			73.0				61.1		
Approach LOS			E			E				E		

Intersection Summary			
HCM 2000 Control Delay	73.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	145.3	Sum of lost time (s)	19.0
Intersection Capacity Utilization	100.4%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBL	SBT	SBR
Lane Configurations			
Traffic Volume (vph)	84	656	306
Future Volume (vph)	84	656	306
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	4.2	5.3	
Lane Util. Factor	1.00	0.95	
Frpb, ped/bikes	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	
Frt	1.00	0.95	
Flt Protected	0.95	1.00	
Satd. Flow (prot)	1752	3319	
Flt Permitted	0.95	1.00	
Satd. Flow (perm)	1752	3319	
Peak-hour factor, PHF	0.95	0.95	0.95
Adj. Flow (vph)	88	691	322
RTOR Reduction (vph)	0	36	0
Lane Group Flow (vph)	110	977	0
Confl. Peds. (#/hr)			4
Turn Type	Prot	NA	
Protected Phases	1	6	
Permitted Phases			
Actuated Green, G (s)	13.9	41.9	
Effective Green, g (s)	13.9	41.9	
Actuated g/C Ratio	0.10	0.29	
Clearance Time (s)	4.2	5.3	
Vehicle Extension (s)	3.0	3.0	
Lane Grp Cap (vph)	167	957	
v/s Ratio Prot	0.06	c0.29	
v/s Ratio Perm			
v/c Ratio	0.66	1.02	
Uniform Delay, d1	63.4	51.7	
Progression Factor	1.00	1.00	
Incremental Delay, d2	9.0	34.4	
Delay (s)	72.4	86.1	
Level of Service	E	F	
Approach Delay (s)		84.8	
Approach LOS		F	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	71	700	118	402	628	132	68	372	483	102	369	50
Future Volume (veh/h)	71	700	118	402	628	132	68	372	483	102	369	50
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1810	1845	1845	1810	1845
Adj Flow Rate, veh/h	73	722	122	414	647	136	70	384	498	105	380	52
Adj No. of Lanes	1	2	1	1	2	1	1	1	1	1	1	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	3	3	3	3	3	3	3	5	3	3	5	3
Cap, veh/h	94	786	352	437	1471	658	90	489	814	124	524	454
Arrive On Green	0.05	0.22	0.22	0.25	0.42	0.42	0.05	0.27	0.27	0.07	0.29	0.29
Sat Flow, veh/h	1757	3505	1568	1757	3505	1568	1757	1810	1568	1757	1810	1568
Grp Volume(v), veh/h	73	722	122	414	647	136	70	384	498	105	380	52
Grp Sat Flow(s),veh/h/ln	1757	1752	1568	1757	1752	1568	1757	1810	1568	1757	1810	1568
Q Serve(g_s), s	4.3	20.9	6.8	24.0	13.6	5.7	4.1	20.4	23.2	6.1	19.6	2.5
Cycle Q Clear(g_c), s	4.3	20.9	6.8	24.0	13.6	5.7	4.1	20.4	23.2	6.1	19.6	2.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	94	786	352	437	1471	658	90	489	814	124	524	454
V/C Ratio(X)	0.78	0.92	0.35	0.95	0.44	0.21	0.78	0.79	0.61	0.85	0.72	0.11
Avail Cap(c_a), veh/h	173	798	357	437	1471	658	120	594	905	124	597	517
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.5	39.3	33.8	38.2	21.4	19.1	48.6	35.0	17.6	47.6	33.1	27.0
Incr Delay (d2), s/veh	13.0	15.5	0.6	29.8	0.2	0.2	20.5	5.7	1.0	39.4	3.8	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	11.8	3.0	15.2	6.6	2.5	2.5	10.9	10.2	4.3	10.4	1.1
LnGrp Delay(d),s/veh	61.5	54.8	34.4	68.1	21.6	19.3	69.1	40.7	18.6	87.0	36.9	27.2
LnGrp LOS	E	D	C	E	C	B	E	D	B	F	D	C
Approach Vol, veh/h		917			1197			952			537	
Approach Delay, s/veh		52.6			37.4			31.2			45.7	
Approach LOS		D			D			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.5	32.9	30.0	29.2	9.5	34.9	9.7	49.5
Change Period (Y+Rc), s	* 4.2	4.9	* 4.2	6.0	* 4.2	4.9	* 4.2	* 6
Max Green Setting (Gmax), s	* 7.3	34.0	* 26	23.6	* 7.1	34.2	* 10	* 40
Max Q Clear Time (g_c+I1), s	8.1	25.2	26.0	22.9	6.1	21.6	6.3	15.6
Green Ext Time (p_c), s	0.0	2.8	0.0	0.4	0.0	1.9	0.0	4.6

Intersection Summary	
HCM 2010 Ctrl Delay	40.9
HCM 2010 LOS	D

Notes

Intersection	
Int Delay, s/veh	0.8

Movement	EBU	EBL	EBT	WBU	WBT	WBR	SBL	SBR
Lane Configurations								
Traffic Vol, veh/h	2	56	1319	8	1034	40	0	53
Future Vol, veh/h	2	56	1319	8	1034	40	0	53
Conflicting Peds, #/hr	0	6	0	0	0	6	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	None
Storage Length	-	150	-	60	-	-	-	0
Veh in Median Storage, #	-	-	0	-	0	-	0	-
Grade, %	-	-	0	-	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96
Heavy Vehicles, %	3	3	3	3	3	3	3	3
Mvmt Flow	2	58	1374	8	1077	42	0	55

Major/Minor	Major1			Major2			Minor2	
Conflicting Flow All	817	1125	0	1003	-	0	-	567
Stage 1	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-
Critical Hdwy	5.66	5.36	-	5.66	-	-	-	7.16
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-
Follow-up Hdwy	2.33	3.13	-	2.33	-	-	-	3.93
Pot Cap-1 Maneuver	551	338	-	434	-	-	0	398
Stage 1	-	-	-	-	-	-	0	-
Stage 2	-	-	-	-	-	-	0	-
Platoon blocked, %			-		-	-		
Mov Cap-1 Maneuver	339	339	-	434	-	-	-	395
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0.8	0.1	15.6
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBU	WBT	WBR	SBLn1
Capacity (veh/h)	339	-	434	-	-	395
HCM Lane V/C Ratio	0.178	-	0.019	-	-	0.14
HCM Control Delay (s)	17.9	-	13.5	-	-	15.6
HCM Lane LOS	C	-	B	-	-	C
HCM 95th %tile Q(veh)	0.6	-	0.1	-	-	0.5

Intersection: 1: State Route 59 & Santa Fe Drive/Olive Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	B6
Directions Served	L	T	T	R	L	T	T	R	L	T	R	T
Maximum Queue (ft)	96	395	395	325	600	1106	744	91	249	440	250	187
Average Queue (ft)	50	241	247	84	579	778	178	38	66	235	117	19
95th Queue (ft)	88	349	355	242	692	1260	415	77	174	429	254	103
Link Distance (ft)		969	969			5167	5167	5167		367		130
Upstream Blk Time (%)										4		1
Queuing Penalty (veh)										0		0
Storage Bay Dist (ft)	400			225	500				200		175	
Storage Blk Time (%)		0	18		76					16	0	
Queuing Penalty (veh)		0	22		240					90	1	

Intersection: 1: State Route 59 & Santa Fe Drive/Olive Avenue

Movement	SB	SB	SB
Directions Served	L	T	R
Maximum Queue (ft)	200	518	65
Average Queue (ft)	112	205	20
95th Queue (ft)	212	339	48
Link Distance (ft)		4512	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	100		275
Storage Blk Time (%)	13	36	
Queuing Penalty (veh)	53	55	

Intersection: 2: Olive Avenue & MHS Driveway

Movement	EB	EB	EB	WB	WB	SB
Directions Served	UL	T	T	U	T	R
Maximum Queue (ft)	70	31	55	51	29	31
Average Queue (ft)	27	1	2	9	1	26
95th Queue (ft)	61	10	18	32	10	45
Link Distance (ft)		3224	3224		664	432
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	150			60		
Storage Blk Time (%)				0		
Queuing Penalty (veh)				0		

Intersection: 3: Park Avenue & Olive Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	UL	T	T	TR	UL	T	T	TR	LT	R	LT	R
Maximum Queue (ft)	560	590	334	214	180	223	261	340	259	150	116	96
Average Queue (ft)	225	296	174	125	73	119	158	184	131	80	54	41
95th Queue (ft)	434	463	297	187	135	206	242	276	225	171	102	66
Link Distance (ft)		664	664	664		938	938	938	1266		286	286
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	500				350					75		
Storage Blk Time (%)	2	0							37	1		
Queuing Penalty (veh)	7	0							30	1		

Intersection: 4: "G" Street & Olive Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	B6	B6	NB	NB	NB
Directions Served	UL	T	T	R	L	T	TR	T	T	UL	T	T
Maximum Queue (ft)	400	974	938	856	230	405	384	309	246	325	1085	1075
Average Queue (ft)	391	772	704	106	203	271	242	58	27	311	646	580
95th Queue (ft)	435	1114	1058	360	269	452	363	223	138	360	1178	1145
Link Distance (ft)		938	938	938		315	315	559	559		3054	3054
Upstream Blk Time (%)		1	0			23	4					
Queuing Penalty (veh)		5	0			0	0					
Storage Bay Dist (ft)	300				170					250		
Storage Blk Time (%)	76	1			43	10				65	1	17
Queuing Penalty (veh)	212	5			103	25				230	3	39

Intersection: 4: "G" Street & Olive Avenue

Movement	NB	SB	SB	SB
Directions Served	R	UL	T	TR
Maximum Queue (ft)	290	220	969	1008
Average Queue (ft)	79	155	675	733
95th Queue (ft)	181	283	974	1015
Link Distance (ft)			2914	2914
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	170	120		
Storage Blk Time (%)		8	70	
Queuing Penalty (veh)		27	73	

Zone Summary

Zone wide Queuing Penalty: 761

Appendix G: Cumulative Year 2039 No Project Traffic Conditions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	78	740	136	406	684	141	78	437	406	101	406	54
Future Volume (veh/h)	78	740	136	406	684	141	78	437	406	101	406	54
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1810	1845	1845	1810	1845
Adj Flow Rate, veh/h	80	763	140	419	705	145	80	451	419	104	419	56
Adj No. of Lanes	1	2	1	1	2	1	1	1	1	1	1	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	3	3	3	3	3	3	3	5	3	3	5	3
Cap, veh/h	102	803	359	442	1482	663	97	496	430	122	533	462
Arrive On Green	0.06	0.23	0.23	0.25	0.42	0.42	0.06	0.27	0.27	0.07	0.29	0.29
Sat Flow, veh/h	1757	3505	1568	1757	3505	1568	1757	1810	1568	1757	1810	1568
Grp Volume(v), veh/h	80	763	140	419	705	145	80	451	419	104	419	56
Grp Sat Flow(s),veh/h/ln	1757	1752	1568	1757	1752	1568	1757	1810	1568	1757	1810	1568
Q Serve(g_s), s	5.1	24.5	8.6	26.7	16.6	4.8	5.1	27.5	16.4	6.7	24.2	3.0
Cycle Q Clear(g_c), s	5.1	24.5	8.6	26.7	16.6	4.8	5.1	27.5	16.4	6.7	24.2	3.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	102	803	359	442	1482	663	97	496	430	122	533	462
V/C Ratio(X)	0.79	0.95	0.39	0.95	0.48	0.22	0.82	0.91	0.97	0.85	0.79	0.12
Avail Cap(c_a), veh/h	183	803	359	442	1482	663	97	540	468	122	565	490
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	53.0	43.3	37.2	41.9	23.8	10.7	53.3	40.0	12.1	52.5	36.9	29.4
Incr Delay (d2), s/veh	12.4	20.6	0.7	29.7	0.2	0.2	41.2	18.4	33.8	41.0	6.9	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	14.2	3.8	16.6	8.1	2.1	3.6	16.2	11.1	4.6	13.1	1.3
LnGrp Delay(d),s/veh	65.4	63.9	37.9	71.6	24.0	10.8	94.5	58.4	45.8	93.5	43.8	29.5
LnGrp LOS	E	E	D	E	C	B	F	E	D	F	D	C
Approach Vol, veh/h		983			1269			950			579	
Approach Delay, s/veh		60.3			38.2			55.9			51.3	
Approach LOS		E			D			E			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	12.8	36.2	32.9	32.1	10.5	38.5	10.8	54.2				
Change Period (Y+Rc), s	4.9	* 4.9	* 4.2	6.0	* 4.2	4.9	* 4.2	* 6				
Max Green Setting (Gmax), s	7.9	* 34	* 29	26.1	* 6.3	35.6	* 12	* 44				
Max Q Clear Time (g_c+I1), s	8.7	29.5	28.7	26.5	7.1	26.2	7.1	18.6				
Green Ext Time (p_c), s	0.0	1.8	0.0	0.0	0.0	1.8	0.1	5.1				
Intersection Summary												
HCM 2010 Ctrl Delay			50.4									
HCM 2010 LOS			D									
Notes												

Intersection	
Int Delay, s/veh	0.2

Movement	EBU	EBL	EBT	WBU	WBT	WBR	SBL	SBR
Lane Configurations								
Traffic Vol, veh/h	2	3	1185	9	1019	2	6	8
Future Vol, veh/h	2	3	1185	9	1019	2	6	8
Conflicting Peds, #/hr	0	6	0	0	0	6	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	None
Storage Length	-	150	-	60	-	-	0	-
Veh in Median Storage, #	-	-	0	-	0	-	0	-
Grade, %	-	-	0	-	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96
Heavy Vehicles, %	3	3	3	3	3	3	3	3
Mvmt Flow	2	3	1234	9	1061	2	6	8

Major/Minor	Major1			Major2			Minor2	
Conflicting Flow All	776	1069	0	901	-	0	1590	539
Stage 1	-	-	-	-	-	-	1086	-
Stage 2	-	-	-	-	-	-	504	-
Critical Hdwy	5.66	5.36	-	5.66	-	-	5.76	7.16
Critical Hdwy Stg 1	-	-	-	-	-	-	6.66	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.06	-
Follow-up Hdwy	2.33	3.13	-	2.33	-	-	3.83	3.93
Pot Cap-1 Maneuver	580	360	-	495	-	-	153	415
Stage 1	-	-	-	-	-	-	213	-
Stage 2	-	-	-	-	-	-	520	-
Platoon blocked, %			-		-	-		
Mov Cap-1 Maneuver	420	420	-	495	-	-	147	412
Mov Cap-2 Maneuver	-	-	-	-	-	-	147	-
Stage 1	-	-	-	-	-	-	205	-
Stage 2	-	-	-	-	-	-	517	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0.1	21.6
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBU	WBT	WBR	SBLn1
Capacity (veh/h)	420	-	495	-	-	232
HCM Lane V/C Ratio	0.012	-	0.019	-	-	0.063
HCM Control Delay (s)	13.7	-	12.4	-	-	21.6
HCM Lane LOS	B	-	B	-	-	C
HCM 95th %tile Q(veh)	0	-	0.1	-	-	0.2

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	39	8	1050	100	7	100	783	0	214	1	88	8
Future Volume (vph)	39	8	1050	100	7	100	783	0	214	1	88	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.2	5.3			4.2	4.9			4.2	4.2	
Lane Util. Factor		1.00	0.91			1.00	0.91			1.00	1.00	
Frpb, ped/bikes		1.00	1.00			1.00	1.00			1.00	0.99	
Flpb, ped/bikes		1.00	1.00			1.00	1.00			1.00	1.00	
Frt		1.00	0.99			1.00	1.00			1.00	0.85	
Flt Protected		0.95	1.00			0.95	1.00			0.95	1.00	
Satd. Flow (prot)		1752	4958			1752	5036			1757	1546	
Flt Permitted		0.95	1.00			0.95	1.00			0.95	1.00	
Satd. Flow (perm)		1752	4958			1752	5036			1757	1546	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	41	8	1105	105	7	105	824	0	225	1	93	8
RTOR Reduction (vph)	0	0	7	0	0	0	0	0	0	0	68	0
Lane Group Flow (vph)	0	49	1203	0	0	112	824	0	0	226	25	0
Confl. Peds. (#/hr)				4				3	11		3	3
Turn Type	Prot	Prot	NA		Prot	Prot	NA		Split	NA	Perm	Split
Protected Phases	7	7	4		3	3	8		2	2		6
Permitted Phases											2	
Actuated Green, G (s)		4.7	35.0			10.5	41.2			17.6	17.6	
Effective Green, g (s)		4.7	35.0			10.5	41.2			17.6	17.6	
Actuated g/C Ratio		0.05	0.40			0.12	0.48			0.20	0.20	
Clearance Time (s)		4.2	5.3			4.2	4.9			4.2	4.2	
Vehicle Extension (s)		3.0	3.0			3.0	3.0			3.0	3.0	
Lane Grp Cap (vph)		94	2001			212	2393			356	313	
v/s Ratio Prot		0.03	c0.24			c0.06	0.16			c0.13		
v/s Ratio Perm											0.02	
v/c Ratio		0.52	0.60			0.53	0.34			0.63	0.08	
Uniform Delay, d1		39.9	20.4			35.8	14.3			31.6	28.0	
Progression Factor		1.00	1.00			1.00	1.00			1.00	1.00	
Incremental Delay, d2		5.1	0.5			2.4	0.1			3.7	0.1	
Delay (s)		45.0	20.9			38.1	14.4			35.3	28.1	
Level of Service		D	C			D	B			D	C	
Approach Delay (s)			21.8				17.2			33.2		
Approach LOS			C				B			C		

Intersection Summary			
HCM 2000 Control Delay	21.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	86.7	Sum of lost time (s)	17.7
Intersection Capacity Utilization	64.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	1	9
Future Volume (vph)	1	9
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.0	4.0
Lane Util. Factor	1.00	1.00
Frpb, ped/bikes	1.00	0.98
Flpb, ped/bikes	1.00	1.00
Frt	1.00	0.85
Flt Protected	0.96	1.00
Satd. Flow (prot)	1766	1538
Flt Permitted	0.96	1.00
Satd. Flow (perm)	1766	1538
Peak-hour factor, PHF	0.95	0.95
Adj. Flow (vph)	1	9
RTOR Reduction (vph)	0	8
Lane Group Flow (vph)	9	1
Confl. Peds. (#/hr)		11
Turn Type	NA	Perm
Protected Phases	6	
Permitted Phases		6
Actuated Green, G (s)	5.9	5.9
Effective Green, g (s)	5.9	5.9
Actuated g/C Ratio	0.07	0.07
Clearance Time (s)	4.0	4.0
Vehicle Extension (s)	3.0	3.0
Lane Grp Cap (vph)	120	104
v/s Ratio Prot	c0.01	
v/s Ratio Perm		0.00
v/c Ratio	0.07	0.01
Uniform Delay, d1	37.8	37.7
Progression Factor	1.00	1.00
Incremental Delay, d2	0.3	0.0
Delay (s)	38.1	37.7
Level of Service	D	D
Approach Delay (s)	37.9	
Approach LOS	D	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU
Lane Configurations												
Traffic Volume (vph)	6	359	583	271	274	435	100	1	283	818	272	24
Future Volume (vph)	6	359	583	271	274	435	100	1	283	818	272	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.2	5.3	5.3	4.2	4.9			4.2	4.9	4.9	
Lane Util. Factor		1.00	0.95	1.00	1.00	0.95			1.00	0.95	1.00	
Frpb, ped/bikes		1.00	1.00	0.98	1.00	1.00			1.00	1.00	0.98	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	
Frt		1.00	1.00	0.85	1.00	0.97			1.00	1.00	0.85	
Flt Protected		0.95	1.00	1.00	0.95	1.00			0.95	1.00	1.00	
Satd. Flow (prot)		1752	3505	1537	1752	3394			1752	3505	1530	
Flt Permitted		0.95	1.00	1.00	0.95	1.00			0.95	1.00	1.00	
Satd. Flow (perm)		1752	3505	1537	1752	3394			1752	3505	1530	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	6	378	614	285	288	458	105	1	298	861	286	25
RTOR Reduction (vph)	0	0	0	197	0	14	0	0	0	0	114	0
Lane Group Flow (vph)	0	384	614	88	288	549	0	0	299	861	172	0
Confl. Peds. (#/hr)				7			7				9	
Turn Type	Prot	Prot	NA	Perm	Prot	NA		Prot	Prot	NA	Perm	Prot
Protected Phases	7	7	4		3	8		5	5	2		1
Permitted Phases				4							2	
Actuated Green, G (s)		27.8	32.2	32.2	24.2	29.0			21.8	54.6	54.6	
Effective Green, g (s)		27.8	32.2	32.2	24.2	29.0			21.8	54.6	54.6	
Actuated g/C Ratio		0.19	0.22	0.22	0.17	0.20			0.15	0.38	0.38	
Clearance Time (s)		4.2	5.3	5.3	4.2	4.9			4.2	4.9	4.9	
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0	
Lane Grp Cap (vph)		337	783	343	294	683			265	1328	579	
v/s Ratio Prot		c0.22	c0.18		0.16	0.16			c0.17	0.25		
v/s Ratio Perm				0.06							0.11	
v/c Ratio		1.14	0.78	0.26	0.98	0.80			1.13	0.65	0.30	
Uniform Delay, d1		58.1	52.7	46.1	59.7	54.8			61.1	36.8	31.3	
Progression Factor		1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	
Incremental Delay, d2		92.4	5.2	0.4	46.3	6.8			94.3	1.1	0.3	
Delay (s)		150.6	57.8	46.5	106.0	61.7			155.5	37.9	31.6	
Level of Service		F	E	D	F	E			F	D	C	
Approach Delay (s)			83.1			76.7				61.0		
Approach LOS			F			E				E		

Intersection Summary			
HCM 2000 Control Delay	76.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	144.1	Sum of lost time (s)	19.0
Intersection Capacity Utilization	101.3%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBL	SBT	SBR
Lane Configurations			
Traffic Volume (vph)	107	844	256
Future Volume (vph)	107	844	256
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	4.2	5.3	
Lane Util. Factor	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	
Frt	1.00	0.97	
Flt Protected	0.95	1.00	
Satd. Flow (prot)	1752	3369	
Flt Permitted	0.95	1.00	
Satd. Flow (perm)	1752	3369	
Peak-hour factor, PHF	0.95	0.95	0.95
Adj. Flow (vph)	113	888	269
RTOR Reduction (vph)	0	19	0
Lane Group Flow (vph)	138	1138	0
Confl. Peds. (#/hr)			4
Turn Type	Prot	NA	
Protected Phases	1	6	
Permitted Phases			
Actuated Green, G (s)	14.5	46.9	
Effective Green, g (s)	14.5	46.9	
Actuated g/C Ratio	0.10	0.33	
Clearance Time (s)	4.2	5.3	
Vehicle Extension (s)	3.0	3.0	
Lane Grp Cap (vph)	176	1096	
v/s Ratio Prot	0.08	c0.34	
v/s Ratio Perm			
v/c Ratio	0.78	1.04	
Uniform Delay, d1	63.3	48.6	
Progression Factor	1.00	1.00	
Incremental Delay, d2	20.1	37.7	
Delay (s)	83.3	86.3	
Level of Service	F	F	
Approach Delay (s)		86.0	
Approach LOS		F	

Intersection Summary

Intersection: 1: State Route 59 & Santa Fe Drive/Olive Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	B6
Directions Served	L	T	T	R	L	T	T	R	L	T	R	T
Maximum Queue (ft)	178	473	457	316	561	560	518	94	250	477	250	248
Average Queue (ft)	76	267	275	83	390	152	157	47	109	401	235	132
95th Queue (ft)	143	384	382	201	553	296	284	83	251	535	308	283
Link Distance (ft)		969	969			5167	5167	5167		367		130
Upstream Blk Time (%)										31		23
Queuing Penalty (veh)										0		0
Storage Bay Dist (ft)	400			225	500				200		175	
Storage Blk Time (%)		1	28		5					45	1	
Queuing Penalty (veh)		1	38		17					218	4	

Intersection: 1: State Route 59 & Santa Fe Drive/Olive Avenue

Movement	B7	B8	SB	SB	SB
Directions Served	T	T	L	T	R
Maximum Queue (ft)	373	91	200	462	385
Average Queue (ft)	128	12	116	254	25
95th Queue (ft)	374	58	210	403	137
Link Distance (ft)	278	459		4512	
Upstream Blk Time (%)	7				
Queuing Penalty (veh)	0				
Storage Bay Dist (ft)			100		275
Storage Blk Time (%)			22	38	
Queuing Penalty (veh)			100	59	

Intersection: 2: Olive Avenue & MHS Driveway

Movement	EB	EB	EB	EB	WB	WB	WB	SB
Directions Served	UL	T	T	T	U	T	TR	LR
Maximum Queue (ft)	27	386	351	266	50	31	56	31
Average Queue (ft)	2	80	45	15	7	1	2	13
95th Queue (ft)	14	296	218	108	29	10	20	37
Link Distance (ft)		3230	3230	3230		658	658	432
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	150				60			
Storage Blk Time (%)		15			0			
Queuing Penalty (veh)		1			0			

Intersection: 3: Park Avenue & Olive Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	UL	T	T	TR	UL	T	T	TR	LT	R	LT	R
Maximum Queue (ft)	590	691	658	603	160	145	172	213	303	150	29	30
Average Queue (ft)	138	481	384	199	72	56	86	98	122	57	6	8
95th Queue (ft)	512	798	735	426	139	131	160	178	216	125	25	29
Link Distance (ft)		658	658	658		938	938	938	1266		286	286
Upstream Blk Time (%)		17	0									
Queuing Penalty (veh)		68	1									
Storage Bay Dist (ft)	500				350					75		
Storage Blk Time (%)		41							26	3		
Queuing Penalty (veh)		19							23	7		

Intersection: 4: "G" Street & Olive Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	B6	NB	NB	NB	NB
Directions Served	UL	T	T	R	L	T	TR	T	UL	T	T	R
Maximum Queue (ft)	400	971	966	288	230	423	385	105	325	1731	1712	290
Average Queue (ft)	387	847	744	118	200	257	213	8	313	1031	1002	140
95th Queue (ft)	447	1200	1155	244	256	421	332	45	380	1807	1785	308
Link Distance (ft)		938	938	938		315	315	559		3054	3054	
Upstream Blk Time (%)		22	1			8	2					
Queuing Penalty (veh)		84	3			0	0					
Storage Bay Dist (ft)	300				170				250			170
Storage Blk Time (%)	75	5			35	10			81	4	27	1
Queuing Penalty (veh)	217	20			77	26			329	10	72	6

Intersection: 4: "G" Street & Olive Avenue

Movement	SB	SB	SB
Directions Served	UL	T	TR
Maximum Queue (ft)	220	2151	2160
Average Queue (ft)	185	1165	1183
95th Queue (ft)	272	2021	2030
Link Distance (ft)		2914	2914
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	120		
Storage Blk Time (%)	23	67	
Queuing Penalty (veh)	97	88	

Zone Summary

Zone wide Queuing Penalty: 1149

Appendix H: Cumulative Year 2039 plus Project Traffic Conditions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	78	792	136	423	713	147	78	437	501	111	406	54
Future Volume (veh/h)	78	792	136	423	713	147	78	437	501	111	406	54
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1810	1845	1845	1810	1845
Adj Flow Rate, veh/h	80	816	140	436	735	152	80	451	516	114	419	56
Adj No. of Lanes	1	2	1	1	2	1	1	1	1	1	1	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	3	3	3	3	3	3	3	5	3	3	5	3
Cap, veh/h	102	801	359	437	1470	658	97	498	432	126	540	468
Arrive On Green	0.06	0.23	0.23	0.25	0.42	0.42	0.06	0.28	0.28	0.07	0.30	0.30
Sat Flow, veh/h	1757	3505	1568	1757	3505	1568	1757	1810	1568	1757	1810	1568
Grp Volume(v), veh/h	80	816	140	436	735	152	80	451	516	114	419	56
Grp Sat Flow(s),veh/h/ln	1757	1752	1568	1757	1752	1568	1757	1810	1568	1757	1810	1568
Q Serve(g_s), s	5.1	26.1	8.6	28.3	17.6	5.1	5.1	27.5	17.2	7.4	24.1	3.0
Cycle Q Clear(g_c), s	5.1	26.1	8.6	28.3	17.6	5.1	5.1	27.5	17.2	7.4	24.1	3.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	102	801	359	437	1470	658	97	498	432	126	540	468
V/C Ratio(X)	0.79	1.02	0.39	1.00	0.50	0.23	0.83	0.90	1.19	0.90	0.78	0.12
Avail Cap(c_a), veh/h	183	801	359	437	1470	658	97	539	467	126	569	493
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	53.1	44.0	37.3	42.8	24.3	10.8	53.4	39.9	12.4	52.6	36.6	29.1
Incr Delay (d2), s/veh	12.4	36.4	0.7	42.3	0.3	0.2	41.6	18.0	108.3	51.7	6.4	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	16.6	3.8	18.8	8.5	2.8	3.6	16.1	22.7	5.4	12.9	1.3
LnGrp Delay(d),s/veh	65.5	80.5	38.0	85.2	24.6	11.0	94.9	57.9	120.6	104.2	43.0	29.3
LnGrp LOS	E	F	D	F	C	B	F	E	F	F	D	C
Approach Vol, veh/h		1036			1323			1047			589	
Approach Delay, s/veh		73.6			43.0			91.6			53.5	
Approach LOS		E			D			F			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.1	36.3	32.6	32.1	10.5	38.9	10.8	53.9
Change Period (Y+Rc), s	4.9	* 4.9	* 4.2	6.0	* 4.2	4.9	* 4.2	* 6
Max Green Setting (Gmax), s	8.2	* 34	* 28	26.1	* 6.3	35.9	* 12	* 43
Max Q Clear Time (g_c+I1), s	9.4	29.5	30.3	28.1	7.1	26.1	7.1	19.6
Green Ext Time (p_c), s	0.0	2.0	0.0	0.0	0.0	1.8	0.1	5.3

Intersection Summary	
HCM 2010 Ctrl Delay	65.2
HCM 2010 LOS	E

Notes

Intersection	
Int Delay, s/veh	1.4

Movement	EBU	EBL	EBT	WBU	WBT	WBR	SBL	SBR
Lane Configurations								
Traffic Vol, veh/h	2	56	1394	9	1111	40	24	31
Future Vol, veh/h	2	56	1394	9	1111	40	24	31
Conflicting Peds, #/hr	0	6	0	0	0	6	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	None
Storage Length	-	150	-	60	-	-	0	-
Veh in Median Storage, #	-	-	0	-	0	-	0	-
Grade, %	-	-	0	-	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96
Heavy Vehicles, %	3	3	3	3	3	3	3	3
Mvmt Flow	2	58	1452	9	1157	42	25	32

Major/Minor	Major1			Major2			Minor2	
Conflicting Flow All	875	1205	0	1060	-	0	1903	607
Stage 1	-	-	-	-	-	-	1202	-
Stage 2	-	-	-	-	-	-	701	-
Critical Hdwy	5.66	5.36	-	5.66	-	-	5.76	7.16
Critical Hdwy Stg 1	-	-	-	-	-	-	6.66	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.06	-
Follow-up Hdwy	2.33	3.13	-	2.33	-	-	3.83	3.93
Pot Cap-1 Maneuver	511	309	-	403	-	-	104	375
Stage 1	-	-	-	-	-	-	180	-
Stage 2	-	-	-	-	-	-	410	-
Platoon blocked, %			-		-	-		
Mov Cap-1 Maneuver	311	311	-	403	-	-	81	373
Mov Cap-2 Maneuver	-	-	-	-	-	-	81	-
Stage 1	-	-	-	-	-	-	141	-
Stage 2	-	-	-	-	-	-	408	-

Approach	EB	WB	SB
HCM Control Delay, s	0.8	0.1	45.2
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBU	WBT	WBR	SBLn1
Capacity (veh/h)	311	-	403	-	-	145
HCM Lane V/C Ratio	0.194	-	0.023	-	-	0.395
HCM Control Delay (s)	19.4	-	14.1	-	-	45.2
HCM Lane LOS	C	-	B	-	-	E
HCM 95th %tile Q(veh)	0.7	-	0.1	-	-	1.7

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	39	217	1068	100	7	100	821	152	214	25	88	69
Future Volume (vph)	39	217	1068	100	7	100	821	152	214	25	88	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.2	5.3			4.2	4.9			4.2	4.2	
Lane Util. Factor		1.00	0.91			1.00	0.91			1.00	1.00	
Frpb, ped/bikes		1.00	1.00			1.00	1.00			1.00	0.99	
Flpb, ped/bikes		1.00	1.00			1.00	1.00			1.00	1.00	
Frt		1.00	0.99			1.00	0.98			1.00	0.85	
Flt Protected		0.95	1.00			0.95	1.00			0.96	1.00	
Satd. Flow (prot)		1752	4959			1752	4898			1766	1545	
Flt Permitted		0.95	1.00			0.95	1.00			0.96	1.00	
Satd. Flow (perm)		1752	4959			1752	4898			1766	1545	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	41	228	1124	105	7	105	864	160	225	26	93	73
RTOR Reduction (vph)	0	0	7	0	0	0	16	0	0	0	74	0
Lane Group Flow (vph)	0	269	1222	0	0	112	1008	0	0	251	19	0
Confl. Peds. (#/hr)				4				3	11		3	3
Turn Type	Prot	Prot	NA		Prot	Prot	NA		Split	NA	Perm	Split
Protected Phases	7	7	4		3	3	8		2	2		6
Permitted Phases											2	
Actuated Green, G (s)		23.1	41.7			10.8	29.8			20.9	20.9	
Effective Green, g (s)		23.1	41.7			10.8	29.8			20.9	20.9	
Actuated g/C Ratio		0.22	0.40			0.10	0.28			0.20	0.20	
Clearance Time (s)		4.2	5.3			4.2	4.9			4.2	4.2	
Vehicle Extension (s)		3.0	3.0			3.0	3.0			3.0	3.0	
Lane Grp Cap (vph)		385	1971			180	1391			351	307	
v/s Ratio Prot		c0.15	0.25			0.06	c0.21			c0.14		
v/s Ratio Perm											0.01	
v/c Ratio		0.70	0.62			0.62	0.72			0.72	0.06	
Uniform Delay, d1		37.7	25.3			45.1	33.8			39.2	34.0	
Progression Factor		1.00	1.00			1.00	1.00			1.00	1.00	
Incremental Delay, d2		5.5	0.6			6.5	1.9			6.8	0.1	
Delay (s)		43.2	25.9			51.6	35.7			46.0	34.1	
Level of Service		D	C			D	D			D	C	
Approach Delay (s)			29.0				37.3			42.8		
Approach LOS			C				D			D		

Intersection Summary			
HCM 2000 Control Delay	34.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	104.9	Sum of lost time (s)	17.7
Intersection Capacity Utilization	77.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	11	101
Future Volume (vph)	11	101
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.0	4.0
Lane Util. Factor	1.00	1.00
Frpb, ped/bikes	1.00	0.98
Flpb, ped/bikes	1.00	1.00
Frt	1.00	0.85
Flt Protected	0.96	1.00
Satd. Flow (prot)	1769	1535
Flt Permitted	0.96	1.00
Satd. Flow (perm)	1769	1535
Peak-hour factor, PHF	0.95	0.95
Adj. Flow (vph)	12	106
RTOR Reduction (vph)	0	92
Lane Group Flow (vph)	85	14
Confl. Peds. (#/hr)		11
Turn Type	NA	Perm
Protected Phases	6	
Permitted Phases		6
Actuated Green, G (s)	13.8	13.8
Effective Green, g (s)	13.8	13.8
Actuated g/C Ratio	0.13	0.13
Clearance Time (s)	4.0	4.0
Vehicle Extension (s)	3.0	3.0
Lane Grp Cap (vph)	232	201
v/s Ratio Prot	c0.05	
v/s Ratio Perm		0.01
v/c Ratio	0.37	0.07
Uniform Delay, d1	41.6	39.9
Progression Factor	1.00	1.00
Incremental Delay, d2	1.0	0.1
Delay (s)	42.5	40.1
Level of Service	D	D
Approach Delay (s)	41.2	
Approach LOS	D	

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU
Lane Configurations												
Traffic Volume (vph)	6	382	616	294	274	511	100	1	340	818	272	24
Future Volume (vph)	6	382	616	294	274	511	100	1	340	818	272	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.2	5.3	5.3	4.2	4.9			4.2	4.9	4.9	
Lane Util. Factor		1.00	0.95	1.00	1.00	0.95			1.00	0.95	1.00	
Frpb, ped/bikes		1.00	1.00	0.98	1.00	1.00			1.00	1.00	0.98	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	
Frt		1.00	1.00	0.85	1.00	0.98			1.00	1.00	0.85	
Flt Protected		0.95	1.00	1.00	0.95	1.00			0.95	1.00	1.00	
Satd. Flow (prot)		1752	3505	1536	1752	3407			1752	3505	1530	
Flt Permitted		0.95	1.00	1.00	0.95	1.00			0.95	1.00	1.00	
Satd. Flow (perm)		1752	3505	1536	1752	3407			1752	3505	1530	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	6	402	648	309	288	538	105	1	358	861	286	25
RTOR Reduction (vph)	0	0	0	235	0	11	0	0	0	0	115	0
Lane Group Flow (vph)	0	408	648	74	288	632	0	0	359	861	171	0
Confl. Peds. (#/hr)				7			7				9	
Turn Type	Prot	Prot	NA	Perm	Prot	NA		Prot	Prot	NA	Perm	Prot
Protected Phases	7	7	4		3	8		5	5	2		1
Permitted Phases				4							2	
Actuated Green, G (s)		25.8	33.8	33.8	23.0	31.4			22.9	56.5	56.5	
Effective Green, g (s)		25.8	33.8	33.8	23.0	31.4			22.9	56.5	56.5	
Actuated g/C Ratio		0.18	0.23	0.23	0.16	0.21			0.16	0.39	0.39	
Clearance Time (s)		4.2	5.3	5.3	4.2	4.9			4.2	4.9	4.9	
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0	
Lane Grp Cap (vph)		308	808	354	275	730			273	1351	590	
v/s Ratio Prot		c0.23	0.18		0.16	c0.19			c0.20	0.25		
v/s Ratio Perm				0.05							0.11	
v/c Ratio		1.32	0.80	0.21	1.05	0.87			1.32	0.64	0.29	
Uniform Delay, d1		60.4	53.2	45.6	61.8	55.5			61.8	36.7	31.1	
Progression Factor		1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	
Incremental Delay, d2		167.0	5.8	0.3	67.2	10.5			165.4	1.0	0.3	
Delay (s)		227.3	59.0	45.9	128.9	66.0			227.2	37.7	31.4	
Level of Service		F	E	D	F	E			F	D	C	
Approach Delay (s)			106.3			85.5				81.6		
Approach LOS			F			F				F		

Intersection Summary			
HCM 2000 Control Delay	94.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	146.5	Sum of lost time (s)	19.0
Intersection Capacity Utilization	109.2%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBL	SBT	SBR
Lane Configurations			
Traffic Volume (vph)	107	844	313
Future Volume (vph)	107	844	313
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	4.2	5.3	
Lane Util. Factor	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	
Frt	1.00	0.96	
Flt Protected	0.95	1.00	
Satd. Flow (prot)	1752	3347	
Flt Permitted	0.95	1.00	
Satd. Flow (perm)	1752	3347	
Peak-hour factor, PHF	0.95	0.95	0.95
Adj. Flow (vph)	113	888	329
RTOR Reduction (vph)	0	25	0
Lane Group Flow (vph)	138	1192	0
Confl. Peds. (#/hr)			4
Turn Type	Prot	NA	
Protected Phases	1	6	
Permitted Phases			
Actuated Green, G (s)	14.6	47.8	
Effective Green, g (s)	14.6	47.8	
Actuated g/C Ratio	0.10	0.33	
Clearance Time (s)	4.2	5.3	
Vehicle Extension (s)	3.0	3.0	
Lane Grp Cap (vph)	174	1092	
v/s Ratio Prot	0.08	c0.36	
v/s Ratio Perm			
v/c Ratio	0.79	1.09	
Uniform Delay, d1	64.5	49.4	
Progression Factor	1.00	1.00	
Incremental Delay, d2	21.5	55.8	
Delay (s)	85.9	105.1	
Level of Service	F	F	
Approach Delay (s)		103.2	
Approach LOS		F	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	78	792	136	423	713	147	78	437	501	111	406	54
Future Volume (veh/h)	78	792	136	423	713	147	78	437	501	111	406	54
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1810	1845	1845	1810	1845
Adj Flow Rate, veh/h	80	816	140	436	735	152	80	451	516	114	419	56
Adj No. of Lanes	1	2	1	1	2	1	1	1	1	1	1	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	3	3	3	3	3	3	3	5	3	3	5	3
Cap, veh/h	102	840	376	440	1515	678	96	491	818	124	531	460
Arrive On Green	0.06	0.24	0.24	0.25	0.43	0.43	0.05	0.27	0.27	0.07	0.29	0.29
Sat Flow, veh/h	1757	3505	1568	1757	3505	1568	1757	1810	1568	1757	1810	1568
Grp Volume(v), veh/h	80	816	140	436	735	152	80	451	516	114	419	56
Grp Sat Flow(s),veh/h/ln	1757	1752	1568	1757	1752	1568	1757	1810	1568	1757	1810	1568
Q Serve(g_s), s	5.3	27.5	8.9	29.4	17.9	5.2	5.4	28.8	16.9	7.7	25.3	3.1
Cycle Q Clear(g_c), s	5.3	27.5	8.9	29.4	17.9	5.2	5.4	28.8	16.9	7.7	25.3	3.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	102	840	376	440	1515	678	96	491	818	124	531	460
V/C Ratio(X)	0.79	0.97	0.37	0.99	0.49	0.22	0.83	0.92	0.63	0.92	0.79	0.12
Avail Cap(c_a), veh/h	179	840	376	440	1515	678	96	517	841	124	546	473
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.3	44.8	37.8	44.5	24.3	10.8	55.7	42.1	8.6	55.0	38.7	30.8
Incr Delay (d2), s/veh	12.6	24.3	0.6	40.4	0.2	0.2	43.8	21.0	1.5	56.5	7.5	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.0	16.1	3.9	19.2	8.7	2.3	3.8	17.3	7.6	5.7	13.8	1.4
LnGrp Delay(d),s/veh	67.9	69.1	38.4	84.9	24.5	11.0	99.5	63.1	10.0	111.4	46.2	30.9
LnGrp LOS	E	E	D	F	C	B	F	E	B	F	D	C
Approach Vol, veh/h		1036			1323			1047			589	
Approach Delay, s/veh		64.9			42.8			39.7			57.4	
Approach LOS		E			D			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.3	37.2	34.0	34.5	10.7	39.8	11.1	57.4
Change Period (Y+Rc), s	4.9	* 4.9	* 4.2	6.0	* 4.2	4.9	* 4.2	* 6
Max Green Setting (Gmax), s	8.4	* 34	* 30	28.5	* 6.5	35.9	* 12	* 47
Max Q Clear Time (g_c+I1), s	9.7	30.8	31.4	29.5	7.4	27.3	7.3	19.9
Green Ext Time (p_c), s	0.0	1.5	0.0	0.0	0.0	1.7	0.1	5.5

Intersection Summary	
HCM 2010 Ctrl Delay	49.9
HCM 2010 LOS	D

Notes

Intersection	
Int Delay, s/veh	0.8

Movement	EBU	EBL	EBT	WBU	WBT	WBR	SBL	SBR
Lane Configurations								
Traffic Vol, veh/h	2	56	1418	9	1111	40	0	55
Future Vol, veh/h	2	56	1418	9	1111	40	0	55
Conflicting Peds, #/hr	0	6	0	0	0	6	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	None
Storage Length	-	150	-	60	-	-	-	0
Veh in Median Storage, #	-	-	0	-	0	-	0	-
Grade, %	-	-	0	-	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96
Heavy Vehicles, %	3	3	3	3	3	3	3	3
Mvmt Flow	2	58	1477	9	1157	42	0	57

Major/Minor	Major1			Major2			Minor2	
Conflicting Flow All	875	1205	0	1078	-	0	-	607
Stage 1	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-
Critical Hdwy	5.66	5.36	-	5.66	-	-	-	7.16
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-
Follow-up Hdwy	2.33	3.13	-	2.33	-	-	-	3.93
Pot Cap-1 Maneuver	511	309	-	394	-	-	0	375
Stage 1	-	-	-	-	-	-	0	-
Stage 2	-	-	-	-	-	-	0	-
Platoon blocked, %			-		-	-		
Mov Cap-1 Maneuver	310	310	-	394	-	-	-	373
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0.8	0.1	16.4
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBU	WBT	WBR	SBLn1
Capacity (veh/h)	310	-	394	-	-	373
HCM Lane V/C Ratio	0.195	-	0.024	-	-	0.154
HCM Control Delay (s)	19.4	-	14.4	-	-	16.4
HCM Lane LOS	C	-	B	-	-	C
HCM 95th %tile Q(veh)	0.7	-	0.1	-	-	0.5

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU
Lane Configurations												
Traffic Volume (vph)	6	382	616	294	274	511	100	1	340	818	272	24
Future Volume (vph)	6	382	616	294	274	511	100	1	340	818	272	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.2	5.3	5.3	4.2	4.9			4.2	4.9	4.9	
Lane Util. Factor		1.00	0.95	1.00	1.00	0.95			1.00	0.95	1.00	
Frpb, ped/bikes		1.00	1.00	0.98	1.00	1.00			1.00	1.00	0.98	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	
Frt		1.00	1.00	0.85	1.00	0.98			1.00	1.00	0.85	
Flt Protected		0.95	1.00	1.00	0.95	1.00			0.95	1.00	1.00	
Satd. Flow (prot)		1752	3505	1536	1752	3407			1752	3505	1530	
Flt Permitted		0.95	1.00	1.00	0.95	1.00			0.95	1.00	1.00	
Satd. Flow (perm)		1752	3505	1536	1752	3407			1752	3505	1530	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	6	402	648	309	288	538	105	1	358	861	286	25
RTOR Reduction (vph)	0	0	0	240	0	11	0	0	0	0	115	0
Lane Group Flow (vph)	0	408	648	69	288	632	0	0	359	861	171	0
Confl. Peds. (#/hr)				7			7				9	
Turn Type	Prot	Prot	NA	Perm	Prot	NA		Prot	Prot	NA	Perm	Prot
Protected Phases	7	7	4		3	8		5	5	2		1
Permitted Phases				4							2	
Actuated Green, G (s)		32.4	32.9	32.9	30.5	31.4			28.7	49.8	49.8	
Effective Green, g (s)		32.4	32.9	32.9	30.5	31.4			28.7	49.8	49.8	
Actuated g/C Ratio		0.22	0.22	0.22	0.21	0.21			0.20	0.34	0.34	
Clearance Time (s)		4.2	5.3	5.3	4.2	4.9			4.2	4.9	4.9	
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0	
Lane Grp Cap (vph)		387	787	345	365	730			343	1192	520	
v/s Ratio Prot		c0.23	0.18		0.16	c0.19			c0.20	0.25		
v/s Ratio Perm				0.05							0.11	
v/c Ratio		1.05	0.82	0.20	0.79	0.87			1.05	0.72	0.33	
Uniform Delay, d1		57.0	54.0	46.1	54.9	55.5			58.9	42.3	35.9	
Progression Factor		1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	
Incremental Delay, d2		60.7	7.0	0.3	10.8	10.5			61.3	2.2	0.4	
Delay (s)		117.7	61.0	46.4	65.7	66.0			120.2	44.4	36.2	
Level of Service		F	E	D	E	E			F	D	D	
Approach Delay (s)			74.6			65.9				60.9		
Approach LOS			E			E				E		

Intersection Summary			
HCM 2000 Control Delay	72.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	146.4	Sum of lost time (s)	19.0
Intersection Capacity Utilization	99.5%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBL	SBT	SBR
Lane Configurations			
Traffic Volume (vph)	107	844	313
Future Volume (vph)	107	844	313
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	4.2	5.3	5.3
Lane Util. Factor	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00
Frt	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00
Satd. Flow (prot)	1752	3505	1541
Flt Permitted	0.95	1.00	1.00
Satd. Flow (perm)	1752	3505	1541
Peak-hour factor, PHF	0.95	0.95	0.95
Adj. Flow (vph)	113	888	329
RTOR Reduction (vph)	0	0	184
Lane Group Flow (vph)	138	888	145
Confl. Peds. (#/hr)			4
Turn Type	Prot	NA	Perm
Protected Phases	1	6	
Permitted Phases			6
Actuated Green, G (s)	14.6	35.3	35.3
Effective Green, g (s)	14.6	35.3	35.3
Actuated g/C Ratio	0.10	0.24	0.24
Clearance Time (s)	4.2	5.3	5.3
Vehicle Extension (s)	3.0	3.0	3.0
Lane Grp Cap (vph)	174	845	371
v/s Ratio Prot	0.08	c0.25	
v/s Ratio Perm			0.09
v/c Ratio	0.79	1.05	0.39
Uniform Delay, d1	64.4	55.6	46.5
Progression Factor	1.00	1.00	1.00
Incremental Delay, d2	21.5	45.2	0.7
Delay (s)	85.9	100.7	47.2
Level of Service	F	F	D
Approach Delay (s)		86.2	
Approach LOS		F	

Intersection Summary

Intersection: 1: State Route 59 & Santa Fe Drive/Olive Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	B6
Directions Served	L	T	T	R	L	T	T	R	L	T	R	T
Maximum Queue (ft)	296	408	450	325	600	758	613	108	250	477	250	237
Average Queue (ft)	71	290	302	121	433	260	168	54	95	444	240	200
95th Queue (ft)	157	409	444	323	666	654	324	96	243	464	300	263
Link Distance (ft)		969	969			5167	5167	5167		367		130
Upstream Blk Time (%)										39		37
Queuing Penalty (veh)										0		0
Storage Bay Dist (ft)	400			225	500				200		175	
Storage Blk Time (%)		1	34		23					52	1	
Queuing Penalty (veh)		0	47		82					300	3	

Intersection: 1: State Route 59 & Santa Fe Drive/Olive Avenue

Movement	B7	B8	B9	SB	SB	SB
Directions Served	T	T	T	L	T	R
Maximum Queue (ft)	386	567	390	200	427	82
Average Queue (ft)	287	209	34	121	248	16
95th Queue (ft)	486	525	205	209	365	44
Link Distance (ft)	278	459	416		4512	
Upstream Blk Time (%)	27	6				
Queuing Penalty (veh)	0	0				
Storage Bay Dist (ft)				100		275
Storage Blk Time (%)				19	44	
Queuing Penalty (veh)				86	73	

Intersection: 2: Olive Avenue & MHS Driveway

Movement	EB	WB	WB	SB
Directions Served	UL	U	TR	R
Maximum Queue (ft)	87	30	20	75
Average Queue (ft)	33	7	1	29
95th Queue (ft)	72	25	10	56
Link Distance (ft)			664	432
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	150	60		
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: Park Avenue & Olive Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	UL	T	T	TR	UL	T	T	TR	LT	R	LT	R
Maximum Queue (ft)	347	402	271	298	167	259	302	344	397	150	115	118
Average Queue (ft)	204	259	166	147	78	149	188	214	173	56	64	39
95th Queue (ft)	325	390	271	216	151	245	288	326	314	144	108	80
Link Distance (ft)		664	664	664		929	929	929	1266		286	286
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	500				350					75		
Storage Blk Time (%)									37	0		
Queuing Penalty (veh)									33	0		

Intersection: 4: "G" Street & Olive Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	B6	B6	NB	NB	NB
Directions Served	UL	T	T	R	L	T	TR	T	T	UL	T	T
Maximum Queue (ft)	400	932	868	249	230	387	391	121	160	325	799	788
Average Queue (ft)	397	710	585	95	194	277	270	17	14	296	466	461
95th Queue (ft)	416	1005	966	218	265	435	406	74	76	383	815	792
Link Distance (ft)		929	929	929		315	315	559	559		3054	3054
Upstream Blk Time (%)		0				13	9					
Queuing Penalty (veh)		0				0	0					
Storage Bay Dist (ft)	300				170					250		
Storage Blk Time (%)	68	15			20	25				41	18	38
Queuing Penalty (veh)	211	60			52	69				168	62	104

Intersection: 4: "G" Street & Olive Avenue

Movement	NB	SB	SB	SB	SB
Directions Served	R	UL	T	T	R
Maximum Queue (ft)	290	220	1333	1415	370
Average Queue (ft)	180	169	778	814	339
95th Queue (ft)	364	272	1301	1334	482
Link Distance (ft)			2914	2914	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	170	120			250
Storage Blk Time (%)		23	73	62	3
Queuing Penalty (veh)		97	95	194	14

Zone Summary

Zone wide Queuing Penalty: 1157

Appendix I: Signal Warrants

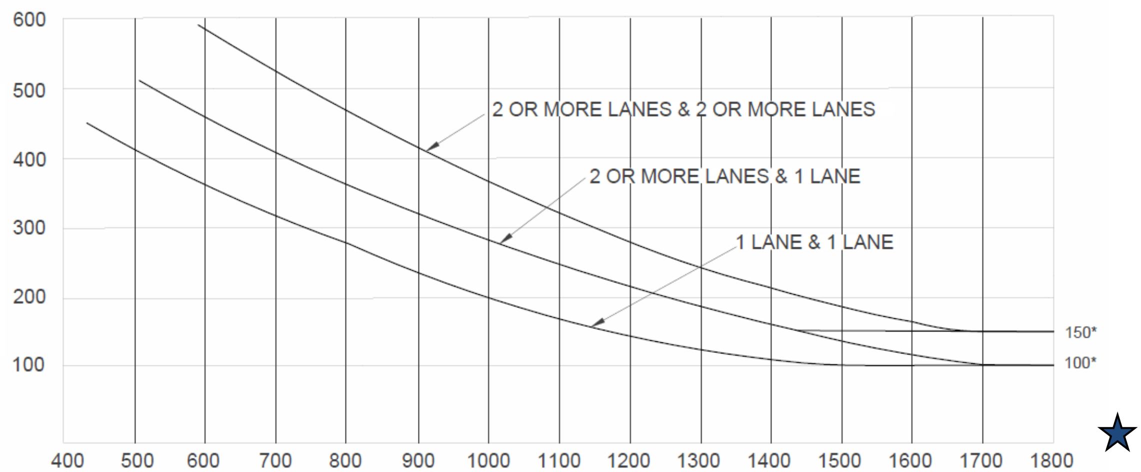
Warrant 3: Peak Hour (Urban)

Existing Traffic Conditions
2. MHS Driveway / Olive Avenue
PM Peak Hour

MHS Driveway

Highest Approach Volume =

9 VPH



Olive Avenue Total of Both Approaches =

1932 VPH

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approach with one lane.

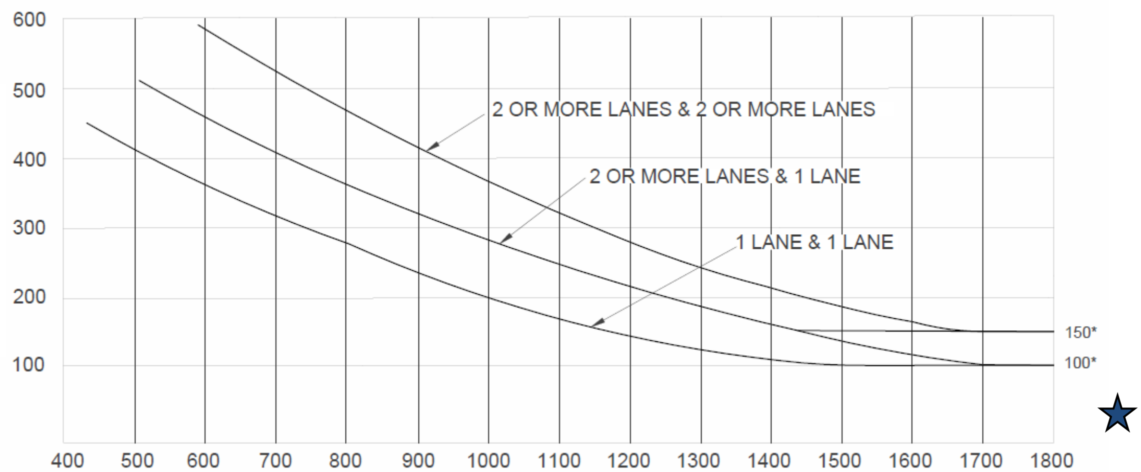
★ **PM Peak Hour – Signal Warrant is Not Met**

Source: California Manual of Uniform Traffic Control Devices (CA MUTCD 2014 Edition)
Chapter 4C: Traffic Control Signal Needs Studies
Part 4: Highway Traffic Signals
November 7, 2014

Warrant 3: Peak Hour (Urban)

Existing plus Project Traffic Conditions
2. MHS Driveway / Olive Avenue
PM Peak Hour

MHS Driveway
Highest Approach Volume =
38 VPH



Olive Avenue Total of Both Approaches =
2324 VPH

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approach with one lane.

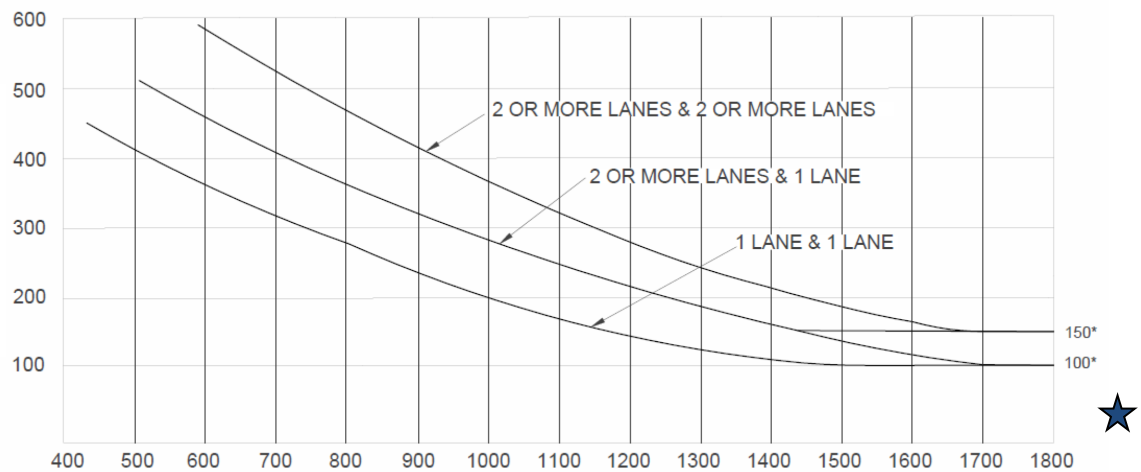
★ **PM Peak Hour – Signal Warrant is Not Met**

Source: California Manual of Uniform Traffic Control Devices (CA MUTCD 2014 Edition)
Chapter 4C: Traffic Control Signal Needs Studies
Part 4: Highway Traffic Signals
November 7, 2014

Warrant 3: Peak Hour (Urban)

Near Term plus Project Traffic Conditions
2. MHS Driveway / Olive Avenue
PM Peak Hour

MHS Driveway Highest Approach Volume = 38 VPH



Olive Avenue Total of Both Approaches = 2436 VPH

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approach with one lane.

★ **PM Peak Hour – Signal Warrant is Not Met**

Source: California Manual of Uniform Traffic Control Devices (CA MUTCD 2014 Edition)
Chapter 4C: Traffic Control Signal Needs Studies
Part 4: Highway Traffic Signals
November 7, 2014

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Fresno, CA 93704
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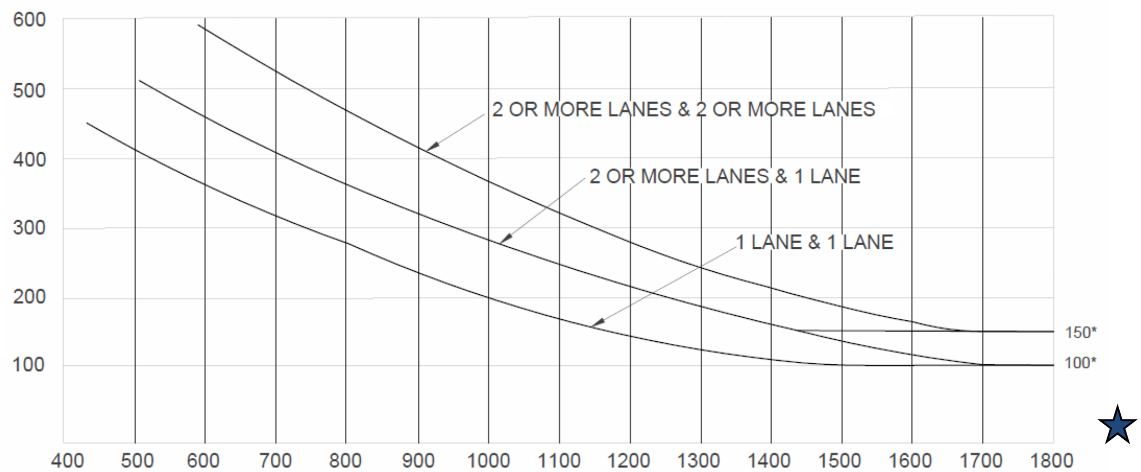
Warrant 3: Peak Hour (Urban)

Cumulative Year 2039 No Project Traffic Conditions
2. MHS Driveway / Olive Avenue
PM Peak Hour

MHS Driveway Highest Approach Volume = 10 VPH



Olive Avenue Total of Both Approaches = 2220 VPH

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approach with one lane.

★ **PM Peak Hour – Signal Warrant is Not Met**

Source: California Manual of Uniform Traffic Control Devices (CA MUTCD 2014 Edition)
Chapter 4C: Traffic Control Signal Needs Studies
Part 4: Highway Traffic Signals
November 7, 2014

Warrant 3: Peak Hour (Urban)

Cumulative Year 2039 plus Project Traffic Conditions

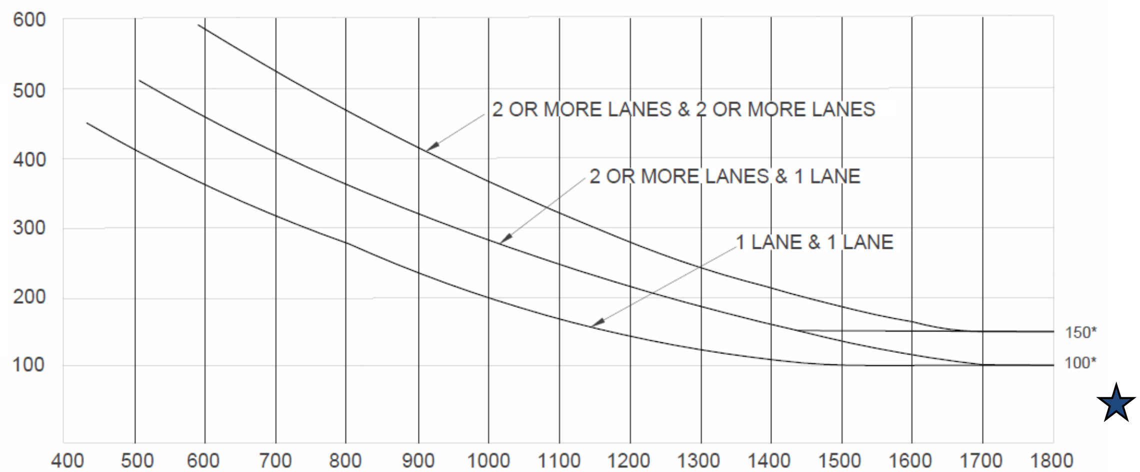
2. MHS Driveway / Olive Avenue

PM Peak Hour

MHS Driveway

Highest Approach Volume =

40 VPH



Olive Avenue Total of Both Approaches =

2612 VPH

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approach with one lane.

★ **PM Peak Hour – Signal Warrant is Not Met**

Source: California Manual of Uniform Traffic Control Devices (CA MUTCD 2014 Edition)
Chapter 4C: Traffic Control Signal Needs Studies
Part 4: Highway Traffic Signals
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