Kunzman Associates, Inc.

CANYON HILLS - CHRISTENSEN PROPERTY

AIR QUALITY AND GLOBAL CLIMATE CHANGE IMPACT ANALYSIS

May 29, 2014

Traffic Engineering | Transportation Planning | Parking | Noise/Vibration | Expert Witness
Air Quality | Global Climate Change | Health Risk Assessment

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I. Executive Summary

A. Purpose and Objectives

This study was performed to address the possibility of regional and local air quality impacts, and global climate change impacts, from air emissions. The objectives of the study include:

- documentation of the atmospheric setting
- discussion of criteria pollutants and greenhouse gases
- discussion of the air quality and global climate change regulatory framework
- discussion of the air quality, greenhouse gases, and cancer risk thresholds of significance
- analysis of the construction related air quality and greenhouse gas emissions
- analysis of the operations related air quality and greenhouse gas emissions
- analysis of the conformity of the proposed project with the South Coast Air Quality Management District (SCAQMD) Air Quality Management Plan (AQMP)
- recommendations for mitigation measures

The City of Lake Elsinore is the lead agency responsible for preparation of this air quality analysis, in accordance with the California Environmental Quality Act authorizing legislation. Although this is a technical report, every effort has been made to write the report clearly and concisely. To assist the reader with terms unique to air quality and global climate change, a definition of terms has been provided in Appendix A.

B. Project Location

The proposed project is located south of Holland Road and west of Anna Lane in the City of Lake Elsinore. The existing lot number is Tract 36115-1. The site is zoned as Residential Estate and the existing General Plan land use designation is Low-Medium Density Residential. The site is currently vacant. The vicinity map showing the project location is provided on Figure 1.

C. Project Description

The proposed project consists of the construction and operation of 74 single-family detached residential dwelling units in the City of Lake Elsinore. The project will generate a density of 3.66 dwelling units per acre (DU/AC). Figure 2 illustrates the project site plan.

D. Sensitive Receptors in Project Vicinity

Those who are sensitive to air pollution include children, the elderly, and persons with preexisting respiratory or cardiovascular illness. For purposes of CEQA, the SCAQMD defines a sensitive receptor as a land use such as residences, schools, child care centers, athletic facilities, playgrounds, retirement homes and convalescent homes (South Coast Air Quality Management District 2008). Commercial and industrial facilities are not included in the definition because employees do not typically remain on-site for 24 hours.

The nearest sensitive receptors to the project site are the residential uses located directly to the east of the project boundary line, south of Holland Road, west of Anna Lane. There is also another residential dwelling unit to the south of the site, south of Corson Avenue, approximately 52 feet from the southern project boundary line. New residential development is also being constructed to the west of the site.

E. Findings

Construction-Source Emissions
Project construction-source emissions would not exceed applicable regional thresholds of significance established by the SCAQMD. For localized emissions, the project will not exceed applicable Localized Significance Thresholds (LSTs) established by the SCAQMD.

Project construction-source emissions would not conflict with the Basin Air Quality Management Plan (AQMP). As discussed herein, the project will comply with all applicable SCAQMD construction-source emission reduction rules and guidelines. Project construction source emissions would not cause or substantively contribute to violation of the California Ambient Air Quality Standards (CAAQS) or National Ambient Air Quality Standards (NAAQS).

Established requirements addressing construction equipment operations, and construction material use, storage, and disposal requirements act to minimize odor impacts that may result from construction activities. Moreover, construction-source odor emissions would be temporary, short-term, and intermittent in nature and would not result in persistent impacts that would affect substantial numbers of people. Potential construction-source odor impacts are therefore considered less-than-significant. No mitigation is required.

Operational-Source Emissions
Project-operational sourced emissions would not exceed applicable regional thresholds of significance established by the SCAQMD. Project operational-source emissions would not result in or cause a significant localized air quality impact as discussed in the Operations-Related Local Air Quality Impacts section of this report. Additionally, project-related traffic will not cause or result in CO concentrations exceeding applicable state and/or federal standards (CO “hotspots). Project operational-source emissions would therefore not adversely affect sensitive receptors within the vicinity of the project.

Project operational-source emissions would not conflict with the Basin Air Quality Management Plan (AQMP). The project's emissions meet SCAQMD regional thresholds and will not result in a significant cumulative impact. The project does not propose any such uses or activities that would result in potentially significant operational-source odor impacts. Potential operational-source odor impacts are therefore considered less-than significant. Project-related GHG emissions are considered to be less than significant. No mitigation is required.

Figure 1
Project Location Map

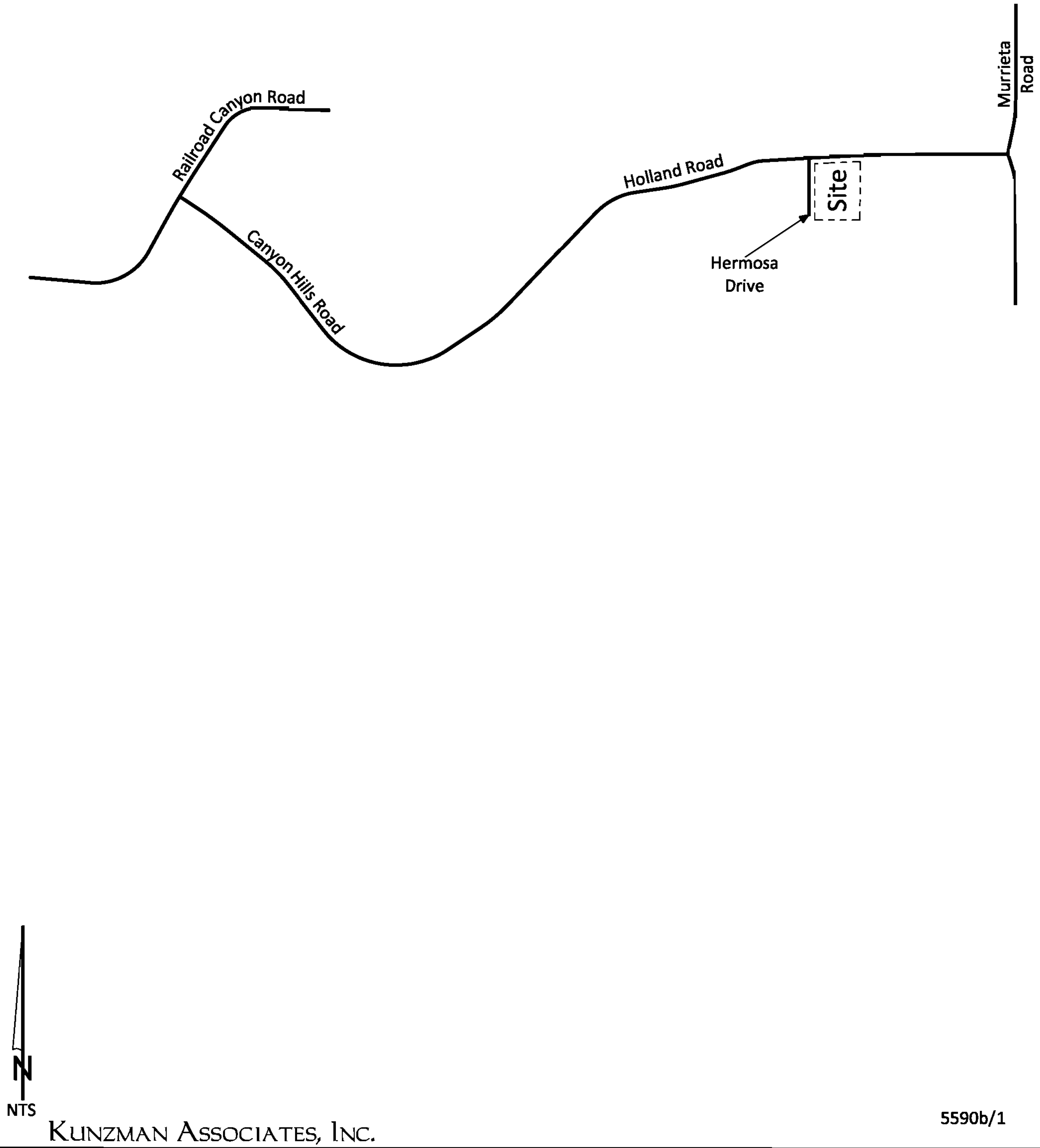

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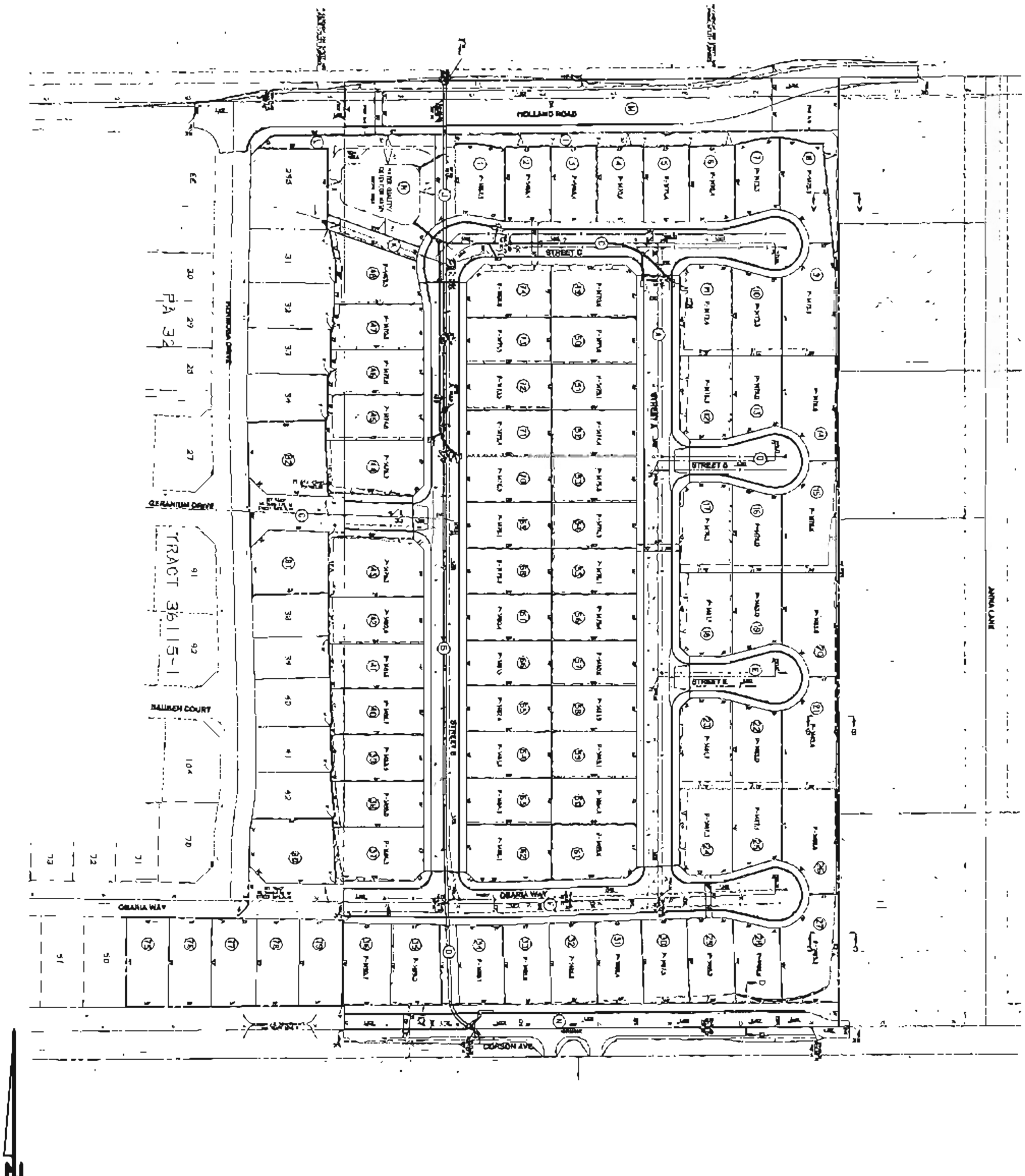
Figure 2
Site Plan



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II. Atmospheric Setting

A. Local Air Quality

The project is located within the City of Lake Elsinore in the portion of Riverside County that lies within the South Coast Air Basin (Basin). The project area is under the jurisdiction of the South Coast Air Quality Management District (SCAQMD). The Basin is a 6,600-square-mile coastal plain bounded by the Pacific Ocean to the southwest and the San Gabriel, San Bernardino, and San Jacinto Mountains to the north and east. The Basin includes the non-desert portions of Los Angeles, Riverside, and San Bernardino counties, and all of Orange County.

The ambient concentrations of air pollutants are determined by the amount of emissions released by sources and the atmosphere's ability to transport and dilute such emissions. Natural factors that affect transport and dilution include terrain, wind, atmospheric stability, and sunlight. Therefore, existing air quality conditions in the area are determined by such natural factors as topography, meteorology, and climate, in addition to the amount of emissions released by existing air pollutant sources.

Atmospheric conditions such as wind speed, wind direction, and air temperature gradients interact with the physical features of the landscape to determine the movement and dispersal of air pollutants. The topography and climate of southern California combine to make the Basin an area of high air pollution potential. The Basin is a coastal plain with connecting broad valleys and low hills, bounded by the Pacific Ocean to the west and high mountains around the rest of the perimeter. The general region lies in the semi-permanent high-pressure zone of the eastern Pacific, resulting in a mild climate tempered by cool sea breezes with light average wind speeds.

The major factors affecting local air pollution conditions in the Lake Elsinore planning area are the extent and types of both region-wide and local emissions, climate, and meteorology. The general climate of Lake Elsinore is characterized by sparse winter rainfall and hot summers tempered by cool ocean breezes. The climate in and around Lake Elsinore, as well as most of Southern California, is controlled largely by the strength and position of the subtropical high pressure cell over the Pacific Ocean. This high-pressure cell produces a typical Mediterranean climate with warm summers, mild winters, and moderate rainfall. This pattern is infrequently interrupted by periods of extremely hot weather brought in by Santa Ana winds. Most of the area's precipitation occurs intermittently between November and April; the area is still dominated by sunny or partly sunny conditions during these months. Cyclic land and sea breezes are the primary factors affecting the region's mild climate. The daytime winds are normally sea breezes, predominantly from the west, that flow at relatively low velocities.

Just south of Lake Elsinore, the Lake Elsinore Convergence Zone acts as an invisible boundary that obstructs much of the inland basin air pollutants from continuing south beyond the Lake Elsinore area. Coastal winds within the Lake Elsinore Convergence Zone are a primary factor for the obstruction. They allow air pollutants to be dispersed just south of the convergence zone and accumulate within the Lake Elsinore area, including surrounding communities to the north and east. Precipitation is greatest during the winter season from December through February. Average temperatures are typically highest during August and lowest during December. The highest and lowest average temperatures recorded were 99 degrees Fahrenheit (ºF) and 38 ºF, respectively (see Table 1).

Table 1

Lake Elsinore Monthly Climate Data[1]

Descriptor	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Avg. Max. Temperature	66	68	72	77	84	91	98	99	94	83	73	65
Avg. Min. Temperature	39	41	43	47	52	57	62	63	59	52	44	38
Avg. Total Precipitation (in.)	3.04	3.01	1.77	0.62	0.14	0.02	0.21	0.01	0.24	0.61	0.86	2.01

[1] Source: http://www.weather.com/weather/wxclimatology/monthly/graph/USCA0580

III. Pollutants

Pollutants are generally classified as either criteria pollutants or non-criteria pollutants. Federal ambient air quality standards have been established for criteria pollutants, whereas no ambient standards have been established for non-criteria pollutants. For some criteria pollutants, separate standards have been set for different periods. Most standards have been set to protect public health. For some pollutants, standards have been based on other values (such as protection of crops, protection of materials, or avoidance of nuisance conditions). A summary of federal and state ambient air quality standards is provided in the Regulatory Framework section.

A. Criteria Pollutants

The criteria pollutants consist of: ozone, nitrogen oxides, carbon monoxide, sulfur oxides, lead, and particulate matter. These pollutants can harm your health and the environment, and cause property damage. The Environmental Protection Agency (EPA) calls these pollutants "criteria" air pollutants because it regulates them by developing human health-based and/or environmentally-based criteria for setting permissible levels. The following provides descriptions of each of the criteria pollutants.

1. Nitrogen Oxides

Nitrogen Oxides (NOx) is the generic term for a group of highly reactive gases which contain nitrogen and oxygen. While most NOx are colorless and odorless, concentrations of nitrogen dioxide (NO_2) can often be seen as a reddish-brown layer over many urban areas. NOx form when fuel is burned at high temperatures, as in a combustion process. The primary manmade sources of NOx are motor vehicles, electric utilities, and other industrial, commercial, and residential sources that burn fuel. NOx reacts with other pollutants to form, ground-level ozone, nitrate particles, acid aerosols, as well as NO_2, which cause respiratory problems. NOx and the pollutants formed from NOx can be transported over long distances, following the patterns of prevailing winds. Therefore controlling NOx is often most effective if done from a regional perspective, rather than focusing on the nearest sources.

2. Ozone

Ozone is not usually emitted directly into the air but at ground-level is created by a chemical reaction between NOx and volatile organic compounds (VOC) in the presence of sunlight. Motor vehicle exhaust, industrial emissions, gasoline vapors, chemical solvents as well as natural sources emit NOx and VOC that help form ozone. Ground-level ozone is the primary constituent of smog. Sunlight and hot weather cause ground-level ozone to form with the greatest concentrations usually occurring downwind from urban areas. Ozone is subsequently considered a regional pollutant. Ground-level ozone is a respiratory irritant and an oxidant that increases susceptibility to respiratory infections and can cause substantial damage to vegetation and other materials. Because NOx and VOC are ozone precursors, the health effects associated with ozone are also indirect health effects associated with significant levels of NOx and VOC emissions.

3. Carbon Monoxide

Carbon monoxide (CO) is a colorless, odorless gas that is formed when carbon in fuel is not burned completely. It is a component of motor vehicle exhaust, which contributes about 56 percent of all CO emissions nationwide. In cities, 85 to 95 percent of all CO emissions may come from motor vehicle exhaust. Other sources of CO emissions include industrial processes (such as metals processing and chemical manufacturing), residential wood burning, and natural sources such as forest fires. Woodstoves, gas stoves, cigarette smoke, and unvented gas and kerosene space heaters are indoor sources of CO. The highest levels of CO in the outside air typically occur during the colder months of the year when inversion conditions are more frequent. The air pollution becomes trapped near the ground beneath a layer of warm air. CO is described as having only a local influence because it dissipates quickly. Since CO concentrations are strongly associated with motor vehicle emissions, high CO concentrations generally occur in the immediate vicinity of roadways with high traffic volumes and traffic congestion, active parking lots, and in automobile tunnels. Areas adjacent to heavily traveled and congested intersections are particularly susceptible to high CO concentrations.

CO is a public health concern because it combines readily with hemoglobin and thus reduces the amount of oxygen transported in the bloodstream. The health threat from lower levels of CO is most serious for those who suffer from heart disease such as angina, clogged arteries, or congestive heart failure. For a person with heart disease, a single exposure to CO at low levels may cause chest pain and reduce that person's ability to exercise; repeated exposures may contribute to other cardiovascular effects. High levels of CO can affect even healthy people. People who breathe high levels of CO can develop vision problems, reduced ability to work or learn, reduced manual dexterity, and difficulty performing complex tasks. At extremely high levels, CO is poisonous and can cause death.

4. Sulfur Oxides

Sulfur Oxide (SOx) gases are formed when fuel containing sulfur, such as coal and oil is burned, and from the refining of gasoline. SOx dissolves easily in water vapor to form acid and interacts with other gases and particles in the air to form sulfates and other products that can be harmful to people and the environment.

5. Lead

Lead is a metal found naturally in the environment as well as manufactured products. The major sources of lead emissions have historically been motor vehicles and industrial sources. Due to the phase out of leaded gasoline, metal processing is now the primary source of lead emissions to the air. High levels of lead in the air are typically only found near lead smelters, waste incinerators, utilities, and lead-acid battery manufacturers. Exposure of fetuses, infants and children to low levels of lead can adversely affect the development and function of the central nervous system, leading to learning disorders, distractibility, inability to follow simple commands, and lower intelligence quotient. In adults, increased lead levels are associated with increased blood pressure.

6. Particulate Matter

Particle matter (PM) is the term for a mixture of solid particles and liquid droplets found in the air. Particle matter 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. Particles that are less than 10 micrometers in diameter (PM10) 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. Particles that are less than 2.5 micrometers in diameter (PM2.5) have been designated as a subset of PM10 due to their increased negative health impacts and its ability to remain suspended in the air longer and travel further.

7. Volatile Organic Compounds (VOC)

Reactive organic gases (ROGs), or VOCs, are defined as any compound of carbon—excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate—that participates in atmospheric photochemical reactions. Although there are slight differences in the definition of ROGs and VOCs, the two terms are often used interchangeably. Indoor sources of VOCs include paints, solvents, aerosol sprays, cleansers, tobacco smoke, etc. Outdoor sources of VOCs are from combustion and fuel evaporation. A reduction in VOC emissions reduces certain chemical reactions that contribute to the formulation of ozone. VOCs are transformed into organic aerosols in the atmosphere, which contribute to higher PM10 and lower visibility.

B. Other Pollutants of Concern

1. Toxic Air Contaminants

In addition to the above-listed criteria pollutants, toxic air contaminants (TACs) are another group of pollutants of concern. Sources of toxic air contaminants include industrial processes such as petroleum refining and chrome plating operations, commercial operations such as gasoline stations and dry cleaners, and motor vehicle exhaust. Cars and trucks release at least forty different toxic air contaminants. The most important of these toxic air contaminants, in terms of health risk, are diesel particulates, benzene, formaldehyde, 1,3-butadiene, and acetaldehyde. Public exposure to toxic air contaminants can result from emissions from normal operations as well as from accidental releases. Health effects of toxic air contaminants include cancer, birth defects, neurological damage, and death.

Toxic air contaminants are less pervasive in the urban atmosphere than criteria air pollutants, however they are linked to short-term (acute) or long-term (chronic or carcinogenic) adverse human health effects. There are hundreds of different types of toxic air contaminants with varying degrees of toxicity. Sources of toxic air contaminants include industrial processes, commercial operations (e.g., gasoline stations and dry cleaners), and motor vehicle exhaust.

According to the 2005 California Almanac of Emissions and Air Quality, the majority of the estimated health risk from toxic air contaminants can be attributed to relatively few compounds, the most important of which is diesel particulate matter (DPM). Diesel particulate matter is a subset of PM2.5 because the size of diesel particles are typically 2.5 microns and smaller. The identification of diesel particulate matter as a toxic air contaminant in 1998 led the California Air Resources Board (CARB) to adopt the Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-fueled Engines and Vehicles in September 2000. The plan's goals are a 75-percent reduction in diesel particulate matter by 2010 and an 85-percent reduction by 2020 from the 2000 baseline. Diesel engines emit a complex mixture of air pollutants, composed of gaseous and solid material. The visible emissions in diesel exhaust are known as particulate matter or PM, which includes carbon particles or "soot." Diesel exhaust also contains a variety of harmful gases and over 40 other cancer-causing substances. California's identification of diesel particulate matter as a toxic air contaminant was based on its potential to cause cancer, premature deaths, and other health problems. Exposure to diesel particulate matter is a health hazard, particularly to children whose lungs are still developing and the elderly who may have other serious health problems. Overall, diesel engine emissions are responsible for the majority of California's potential airborne cancer risk from combustion sources.

2. Asbestos

Asbestos is listed as a TAC by the ARB and as a Hazardous Air Pollutant by the EPA. Asbestos occurs naturally in mineral formations and crushing or breaking these rocks, through construction or other means, can release asbestiform fibers into the air. Asbestos emissions can result from the sale or use of asbestos-containing materials, road surfacing with such materials, grading activities, and surface mining. The risk of disease is dependent upon the intensity and duration of exposure. When inhaled, asbestos fibers may remain in the lungs and with time may be linked to such diseases as asbestosis, lung cancer, and mesothelioma. Naturally occurring asbestos is not present in Riverside County. The nearest likely locations of naturally occurring asbestos, as identified in the General Location Guide for Ultramafic Rocks in California prepared by the California Division of Mines and Geology, is located in Santa Barbara County. Due to the distance to the nearest natural occurrences of asbestos, the project site is not likely to contain asbestos.

C. Greenhouse Gases

Constituent gases of the Earth's atmosphere, called atmospheric greenhouse gases (GHG), play a critical role in the Earth's radiation amount by trapping infrared radiation emitted from the Earth's surface, which otherwise would have escaped to space. Prominent greenhouse gases contributing to this process include carbon dioxide (CO_2), methane (CH_4), ozone, water vapor, nitrous oxide (N_2O), and chlorofluorocarbons (CFCs). This phenomenon, known as the Greenhouse Effect, is responsible for maintaining a habitable climate. Anthropogenic (caused or produced by humans) emissions of these greenhouse gases in excess of natural ambient concentrations are responsible for the enhancement of the Greenhouse Effect and have led to a trend of unnatural warming of the Earth's natural climate, known as global warming or climate change. Emissions of gases that induce global warming are attributable to human activities associated with industrial/manufacturing, agriculture, utilities, transportation, and residential land uses. Transportation is responsible for 41 percent of the State's greenhouse gas emissions, followed by electricity generation. Emissions of CO_2 and nitrous oxide (NOx) are byproducts of fossil fuel combustion. Methane, a potent greenhouse gas, results from off-gassing associated with agricultural practices and landfills. Sinks of CO_2, where CO_2 is stored outside of the atmosphere, include uptake by vegetation and dissolution into the ocean. The following provides a description of each of the greenhouse gases and their global warming potential.

1. <u>Water Vapor</u>

Water vapor is the most abundant, important, and variable GHG in the atmosphere. Water vapor is not considered a pollutant; in the atmosphere it maintains a climate necessary for life. Changes in its concentration are primarily considered a result of climate feedbacks related to the warming of the atmosphere rather than a direct result of industrialization. The feedback loop in which water is involved is critically important to projecting future climate change. As the temperature of the atmosphere rises, more water is evaporated from ground storage (rivers, oceans, reservoirs, soil). Because the air is warmer, the relative humidity can be higher (in essence, the air is able to "hold" more water when it is warmer), leading to more water vapor in the atmosphere. As a GHG, the higher concentration of water vapor is then able to absorb more thermal indirect energy radiated from the Earth, thus further warming the atmosphere. The warmer atmosphere can then hold more water vapor and so on and so on. This is referred to as a "positive feedback loop." The extent to which this positive feedback loop will continue is unknown as there is also dynamics that put the positive feedback loop in check. As an example, when water vapor increases in the atmosphere, more of it will eventually also condense into clouds, which are more able to reflect incoming solar radiation (thus allowing less energy to reach the Earth's surface and heat it up).

2. <u>Carbon Dioxide</u>

The natural production and absorption of CO_2 is achieved through the terrestrial biosphere and the ocean. However, humankind has altered the natural carbon cycle by burning coal, oil, natural gas, and wood. Since the industrial revolution began in the mid 1700s. Each of these activities has increased in scale and distribution. CO_2 was the first GHG demonstrated to be increasing in atmospheric concentration with the first conclusive measurements being made in the last half of the 20th century. Prior to the industrial revolution, concentrations were fairly stable at 280 parts per million (ppm). The International Panel on Climate Change (IPCC) indicates that concentrations were 379 ppm in 2005, an increase of more than 30 percent. Left unchecked, the IPCC projects that concentration of carbon dioxide in the atmosphere is projected to increase to a minimum of 540 ppm by 2100 as a direct result of anthropogenic sources. This could result in an average global temperature rise of at least two degrees Celsius or 3.6 degrees Fahrenheit.

3. Methane

CH_4 is an extremely effective absorber of radiation, although its atmospheric concentration is less than that of CO_2. Its lifetime in the atmosphere is brief (10 to 12 years), compared to some other GHGs (such as CO_2, N_2O, and Chlorofluorocarbons (CFCs). CH_4 has both natural and anthropogenic sources. It is released as part of the biological processes in low oxygen environments, such as in swamplands or in rice production (at the roots of the plants). Over the last 50 years, human activities such as growing rice, raising cattle, using natural gas, and mining coal have added to the atmospheric concentration of methane. Other anthropocentric sources include fossil-fuel combustion and biomass burning.

4. Nitrous Oxide

Concentrations of N_2O also began to rise at the beginning of the industrial revolution. In 1998, the global concentration of this GHG was documented at 314 parts per billion (ppb). N_2O is produced by microbial processes in soil and water, including those reactions which occur in fertilizer containing nitrogen. In addition to agricultural sources, some industrial processes (fossil fuel-fired power plants, nylon production, nitric acid production, and vehicle emissions) also contribute to its atmospheric load. It is also commonly used as an aerosol spray propellant, (i.e., in whipped cream bottles, in potato chip bags to keep chips fresh, and in rocket engines and in race cars).

5. Chlorofluorocarbons

CFCs are gases formed synthetically by replacing all hydrogen atoms in methane or ethane (C_2H_6) with chlorine and/or fluorine atoms. CFCs are nontoxic, nonflammable, insoluble, and chemically unreactive in the troposphere (the level of air at the Earth's surface). CFCs have no natural source, but were first synthesized in 1928. It was used for refrigerants, aerosol propellants, and cleaning solvents. Due to the discovery that they are able to destroy stratospheric ozone, a global effort to halt their production was undertaken and in 1989 the European Community agreed to ban CFCs by 2000 and subsequent treaties banned CFCs worldwide by 2010. This effort was extremely successful, and the levels of the major CFCs are now remaining level or declining. However, their long atmospheric lifetimes mean that some of the CFCs will remain in the atmosphere for over 100 years.

6. Hydrofluorocarbons

HFCs are synthetic man-made chemicals that are used as a substitute for CFCs. Out of all the GHGs, they are one of three groups with the highest global warming potential. The HFCs with the largest measured atmospheric abundances are (in order), HFC-23 (CHF_3), HFC-134a (CF_3CH_2F), and HFC-152a (CH_3CHF_2). Prior to 1990, the only significant emissions were HFC-23. HFC-134a use is increasing due to its use as a refrigerant. Concentrations of HFC-23 and HFC-134a in the atmosphere are now about

10 parts per trillion (ppt) each. Concentrations of HFC-152a are about 1 ppt. HFCs are manmade for applications such as automobile air conditioners and refrigerants.

7. Perfluorocarbons

PFCs have stable molecular structures and do not break down through the chemical processes in the lower atmosphere. High-energy ultraviolet rays about 60 kilometers above Earth's surface are able to destroy the compounds. Because of this, PFCs have very long lifetimes, between 10,000 and 50,000 years. Two common PFCs are tetrafluoromethane (CF_4) and hexafluoroethane (C_2F_6). Concentrations of CF_4 in the atmosphere are over 70 ppt. The two main sources of PFCs are primary aluminum production and semiconductor manufacturing.

8. Sulfur Hexafluoride

SF_6 is an inorganic, odorless, colorless, nontoxic, nonflammable gas. SF_6 has the highest global warming potential of any gas evaluated; 23,900 times that of CO_2. Concentrations in the 1990s were about 4 ppt. Sulfur hexafluoride is used for insulation in electric power transmission and distribution equipment, in the magnesium industry, in semiconductor manufacturing, and as a tracer gas for leak detection.

9. Aerosols

Aerosols are particles emitted into the air through burning biomass (plant material) and fossil fuels. Aerosols can warm the atmosphere by absorbing and emitting heat and can cool the atmosphere by reflecting light. Cloud formation can also be affected by aerosols. Sulfate aerosols are emitted when fuel containing sulfur is burned. Black carbon (or soot) is emitted during biomass burning due to the incomplete combustion of fossil fuels. Particulate matter regulation has been lowering aerosol concentrations in the United States; however, global concentrations are likely increasing.

10. Global Warming Potential

GHGs have varying global warming potential (GWP). The global warming potential is the potential of a gas or aerosol to trap heat in the atmosphere; it is the cumulative radiative forcing effects of a gas over a specified time horizon resulting from the emission of a unit mass of gas relative to the reference gas, CO_2. One teragram of carbon dioxide equivalent (Tg CO_2e) is essentially the emissions of the gas multiplied by the global warming potential. One teragram is equal to one million metric tons. The carbon dioxide equivalent is a good way to assess emissions because it gives weight to the global warming potential of the gas. A summary of the atmospheric lifetime and the global warming potential of selected gases are summarized in Table 2. As shown in Table 2, the global warming potential of GHGs ranges from 1 to 23,900.

Table 2

Global Warming Potentials and Atmospheric Lifetimes[1]

Gas	Atmospheric Lifetime (years)	Global Warming Potential[2] (100 Year Horizon)
Carbon Dioxide	50-200	1
Methane	12 ± 3	21
Nitrous Oxide	120	310
HFC-23	264	11,700
HFC-134a	14.6	1,300
HFC-152a	1.5	140
PFC: Tetrafluoromethane	50,000	6,500
PFC: Hexafluoroethane	10,000	9,200
Sulfur Hexafluoride	3,200	23,900

[1] Source: United States Environmental Protection Agency, 2006.

[2] Compared to the same quantity of CO_2 emissions.

IV. Air Quality Management

A. Regulatory Setting

The proposed project is addressed through the efforts of various international, federal, state, regional, and local government agencies. These agencies work jointly, as well as individually, to improve air quality through legislation, regulations, planning, policy-making, education, and a variety of programs. The agencies responsible for improving the air quality are discussed below.

1. International

In 1988, the United Nations established the Intergovernmental Panel on Climate Change (IPCC) to evaluate the impacts of global climate change and to develop strategies that nations could implement to curtail global climate change. In 1992, the United States joined other countries around the world in signing the United Nations' Framework Convention on Climate Change (UNFCCC) agreement with the goal of controlling GHG emissions. As a result, the Climate Change Action Plan was developed to address the reduction of GHGs in the United States. The plan consists of more than 50 voluntary programs.

Additionally, the Montreal Protocol was originally signed in 1987 and substantially amended in 1990 and 1992. The Montreal Protocol stipulates that the production and consumption of compounds that deplete ozone in the stratosphere—CFCs, halons, carbon tetrachloride, and methyl chloroform—were to be phased out, with the first three by the year 2000 and methyl chloroform by 2005.

2. Federal - United States Environmental Protection Agency

The United States Environmental Protection Agency (EPA) is responsible for setting and enforcing the National Ambient Air Quality Standards (NAAQS) for atmospheric pollutants. It regulates emission sources that are under the exclusive authority of the federal government, such as aircraft, ships, and certain locomotives. The National Ambient Air Quality Standards (NAAQS) pollutants were identified using medical evidence and are shown below in Table 3.

As part of its enforcement responsibilities, the EPA requires each state with federal nonattainment areas to prepare and submit a State Implementation Plan (SIP) that demonstrates the means to attain the national standards. The State Implementation Plan (SIP) must integrate federal, state, and local components and regulations to identify specific measures to reduce pollution, using a combination of performance standards and market-based programs within the timeframe identified in the State Implementation Plan (SIP).

As indicated below in Table 4, the Basin has been designated by the EPA as a non-attainment area for ozone (O_3) and suspended particulates (PM10 and PM2.5).

Currently, the Basin is in attainment with the ambient air quality standards for carbon monoxide (CO), lead, sulfur dioxide (SO_2), and nitrogen dioxide (NO_2).

In 2011, the Basin exceeded federal standards for either ozone or PM2.5 at one or more locations on a total of 124 days, based on the current federal standards for 8-hour ozone and 24-hour PM2.5. Despite substantial improvements in air quality over the past few decades, some air monitoring stations in the Basin still exceed the NAAQS for ozone more frequently than any other stations in the U.S. In 2011, three of the top five stations that exceeded the 8-hour ozone NAAQS were located in the Basin (Central San Bernardino Mountains, East San Bernardino Valley, and Metropolitan Riverside County).

PM2.5 in the Basin has improved significantly in recent years, with 2010 and 2011 being the cleanest years on record. In 2011, only one station in the Basin (Metropolitan Riverside County at Mira Loma) exceeded the annual PM2.5 NAAQS and the 98th percentile form of the 24-hour PM2.5 NAAQS, as well as the 3-year design values for these standards. Basin-wide, the federal PM2.5 24-hour standard level was exceeded in 2011 on 17 sampling days.

The Basin is currently in attainment for the federal standards for carbon monoxide (CO), lead, sulfur dioxide (SO_2), and nitrogen dioxide (NO_2). While the concentration level of the new 1-hour NO_2 federal standard (100 ppb) was exceeded in the Basin at two stations (Central Los Angeles and Long Beach) on the same day in 2011, the NAAQS NO_2 design value has not been exceeded. Therefore, the Basin remains in attainment of the NO_2 NAAQS.

The EPA designated the Los Angeles County portion of the Basin as nonattainment for the recently revised (2008) federal lead standard (0.15 μg/m3, rolling 3-month average), due to the addition of source-specific monitoring under the new federal regulation. This designation was based on two source-specific monitors in Vernon and the City of Industry exceeding the new standard in the 2007-2009 period of data used. For the most recent 2009-2011 data period, only one of these stations (Vernon) still exceeded the lead standard.

In Massachusetts v. Environmental Protection Agency (Docket No. 05–1120), argued November 29, 2006 and decided April 2, 2007, the U.S. Supreme Court held that not only did the EPA have authority to regulate greenhouse gases, but the EPA's reasons for not regulating this area did not fit the statutory requirements. As such, the U.S. Supreme Court ruled that the EPA should be required to regulate CO_2 and other greenhouse gases as pollutants under the federal Clean Air Act (CAA).

In response to the FY2008 Consolidations Appropriations Act (H.R. 2764; Public Law 110-161), EPA proposed a rule on March 10, 2009 that requires mandatory reporting of GHG emissions from large sources in the United States. On September 22, 2009, the Final Mandatory Reporting of GHG Rule was signed and published in the Federal Register on October 30, 2009. The rule became effective on December 29, 2009. This rule requires suppliers of fossil fuels or industrial GHGs, manufacturers of vehicles and engines, and facilities that emit 25,000 metric tons or more per year of GHG emissions to submit annual reports to EPA.

On December 7, 2009, the EPA Administrator signed two distinct findings under section 202(a) of the Clean Air Act. One is an endangerment finding that finds concentrations of the six GHGs in the atmosphere threaten the public health and welfare of current and future generations. The other is a cause or contribute finding, that finds emissions from new motor vehicles and new motor vehicle engines contribute to the GHG pollution which threatens public health and welfare. These actions will not themselves impose any requirements on industry or other entities. However, it is a prerequisite to finalizing the EPA's proposed GHG emission standards for light-duty vehicles, which were jointly proposed by the EPA and Department of Transportation on September 15, 2009.

3. State – California Air Resources Board

The California Air Resources Board (CARB), which is a part of the California Environmental Protection Agency, is responsible for the coordination and administration of both federal and state air pollution control programs within California. In this capacity, the CARB conducts research, sets the California Ambient Air Quality Standards (CAAQS), compiles emission inventories, develops suggested control measures, provides oversight of local programs, and prepares the State Implementation Plan (SIP). The California Ambient Air Quality Standards (CAAQS) for criteria pollutants are shown in Table 3. In addition, the CARB establishes emission standards for motor vehicles sold in California, consumer products (e.g. hairspray, aerosol paints, and barbeque lighter fluid), and various types of commercial equipment. It also sets fuel specifications to further reduce vehicular emissions.

The South Coast Air Basin has been designated by the CARB as a nonattainment area for ozone, PM10 and PM2.5. Currently, the South Coast Air Basin is in attainment with the ambient air quality standards for CO, lead, SO_2, NO_2, and sulfates and is unclassified for visibility reducing particles and Hydrogen Sulfide.

On June 20, 2002, the CARB revised the PM10 annual average standard to 20 µg/m3 and established an annual average standard for PM2.5 of 12 µg/m3. These standards were approved by the Office of Administrative Law in June 2003 and are now effective. On September 27, 2007 CARB approved the South Coast Air Basin and the Coachella Valley 2007 Air Quality Management Plan for Attaining the Federal 8-hour Ozone and PM2.5 Standards. The plan projects attainment for the 8-hour Ozone standard by 2024 and the PM2.5 standard by 2015.

On December 12, 2008 the CARB adopted Resolution 08-43, which limits NOx, PM10 and PM2.5 emissions from on-road diesel truck fleets that operate in California. On October 12, 2009 Executive Order R-09-010 was adopted that codified Resolution 08-43 into Section 2025, title 13 of the California Code of Regulations. This regulation requires that by the year 2023 all commercial diesel trucks that operate in California shall meet model year 2010 (Tier 4) or latter emission standards. In the interim period, this regulation provides annual interim targets for fleet owners to meet. This regulation also provides a few exemptions including a onetime per year 3-day pass for trucks registered outside of California.

The CARB is also responsible for regulations pertaining to toxic air contaminants. The Air Toxics "Hot Spots" Information and Assessment Act (AB 2588, 1987, Connelly) was enacted in 1987 as a means to establish a formal air toxics emission inventory risk quantification program. AB 2588, as amended, establishes a process that requires stationary sources to report the type and quantities of certain substances their facilities routinely release into the South Coast Air Basin. The data is ranked by high, intermediate, and low categories, which are determined by: the potency, toxicity, quantity, volume, and proximity of the facility to nearby receptors.

The CARB also proposed interim statewide CEQA thresholds for GHG emissions and released Recommended Approaches for Setting Interim Significance Thresholds for Greenhouse Gases under the California Environmental Quality Act, on October 24, 2008. The State currently has no regulations that establish ambient air quality standards for GHGs. However, the State has passed laws directing CARB to develop actions to reduce GHG emissions, which are listed below.

Assembly Bill 1493

California Assembly Bill 1493 (also known as the Pavley Bill, in reference to its author Fran Pavley) was enacted on July 22, 2002 and required CARB to develop and adopt regulations that reduce GHGs emitted by passenger vehicles and light duty trucks. In 2004, CARB approved the "Pavley I" regulations limiting the amount of GHGs that may be released from new passenger automobiles that are being phased in between model years 2009 through 2016. This regulation will reduce GHG emissions by 30 percent from 2002 levels by 2016. The second set of regulations "Pavley II" is currently in development and will be phased in between model years 2017 through 2025 and will reduce emissions by 45 percent by the year 2020. The Pavley II standards are being developed by linking the GHG emissions and formerly separate toxic tailpipe emissions standards previously known as the "LEV III" (third stage of the Low Emission Vehicle standards) into a single regulatory framework.

In 2005, the CARB submitted a "waiver" request to the EPA in order to implement the GHG standards and in March of 2008, the U.S. EPA denied the request. However, in June 2009, the decision was reversed and the U.S. EPA granted California the authority to implement the GHG standards for passenger cars, pickup trucks and sport utility vehicles. In September 2009, the Pavley I regulations were adopted by CARB.

Executive Order S-3-05

The California Governor issued Executive Order S-3-05, GHG Emission, in June 2005, which established the following reduction targets:

- 2010: Reduce greenhouse gas emissions to 2000 levels
- 2020: Reduce greenhouse gas emissions to 1990 levels
- 2050: Reduce greenhouse gas emissions to 80 percent below 1990 levels.

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. To comply with the Executive Order, the secretary of CalEPA created the California Climate Action Team (CAT), made up of members from various state agencies and commissions. The team released its first report in March 2006. The report proposed to achieve the targets by building on the voluntary actions of businesses, local governments, and communities and through State incentive and regulatory programs.

Assembly Bill 32

In 2006, the California State Legislature adopted Assembly Bill 32 (AB 32), the California Global Warming Solutions Act of 2006. AB 32 requires CARB, to adopt rules and regulations that would achieve GHG emissions equivalent to statewide levels in 1990 by 2020 through an enforceable statewide emission cap which will be phased in starting in 2012. Emission reductions shall include carbon sequestration projects that would remove carbon from the atmosphere and best management practices that are technologically feasible and cost effective.

On December 6, 2007 CARB released the calculated Year 1990 GHG emissions of 427 million metric tons of CO_2e ($MMTCO_2e$). The 2020 target of 427 $MMTCO_2e$ requires the reduction of 169 $MMTCO_2e$, or approximately 30 percent from the State's projected 2020 business as usual emissions of 596 $MMTCO_2e$ and the reduction of 42 $MMTCO_2e$, or almost 10 percent from the 2002-2004 average GHG emissions. Under AB 32, CARB was required to adopt regulations by January 1, 2011 to achieve reductions in GHGs to meet the 1990 cap by 2020. Early measures CARB took to lower GHG emissions included requiring operators of the largest industrial facilities that emit 25,000 metric tons of CO_2 in a calendar year to submit verification of GHG emissions by December 1, 2010. The CARB Board also approved nine discrete early action measures that include regulations affecting landfills, motor vehicle fuels, refrigerants in cars, port operations and other sources that became enforceable on or before January 1, 2010.

On December 11, 2008 the CARB Board approved a Scoping Plan, with final adoption May 11, 2009 that proposed a variety of measures including direct regulations, alternative compliance mechanisms, monetary and non-monetary incentives, voluntary actions, a market-based cap-and-trade system, and a fee regulation to fund the program. In current pending litigation, Association of Irritated Residents v. California Air Resources Board, a California State trial court found that the analysis of the alternatives identified in the AB 32 Scoping Plan Functional Equivalent Document (FED) was not sufficient for informed decision-making and public review under CEQA. In response, CARB has appealed the decision. In addition, CARB prepared the *Supplement to the AB 32 Scoping Plan Functional Equivalent Document,* June 13, 2011. On August 24, 2011 CARB recertified the complete AB 32 Scoping Plan Functional Equivalent Environmental Document revised by the Final Supplement. In December, 2011 the Final Supplement was accepted as sufficient to fulfill the trial court's March order.

Senate Bill 1368

Senate Bill 1368 (SB 1368) is the companion Bill of AB 32 and was adopted September, 2006. SB 1368 requires the California Public Utilities Commission (CPUC) to establish a performance standard for baseload generation of GHG emissions by investor-owned utilities by February 1, 2007 and for local publicly owned utilities by June 30, 2007. These standards could not exceed the GHG emissions rate from a baseload combined-cycle, natural gas-fired plant. Furthermore, the legislation states that all electricity provided to the State, including imported electricity, must be generated by plants that meet the standards set by California Public Utilities Commission (CPUC) and California Energy Commission (CEC).

Executive Order S-1-07

Executive Order S-1-07 was issued in 2007 and proclaims that the transportation sector is the main source of GHG emissions in the State, since it generates more than 40 percent of the State's GHG emissions. It establishes a goal to reduce the carbon intensity of transportation fuels sold in the State by at least ten percent by 2020. This Order also directs CARB to determine whether this Low Carbon Fuel Standard (LCFS) could be adopted as a discrete early-action measure as part of the effort to meet the mandates in AB 32.

On April 23, 2009 CARB approved the proposed regulation to implement the low carbon fuel standard. The low carbon fuel standard is anticipated to reduce GHG emissions by about 16 MMT per year by 2020. The low carbon fuel standard is designed to provide a framework that uses market mechanisms to spur the steady introduction of lower carbon fuels. The framework establishes performance standards that fuel producers and importers must meet each year beginning in 2011. Separate standards are established for gasoline and diesel fuels and the alternative fuels that can replace each. The standards are "back-loaded", with more reductions required in the last five years, than during the first five years. This schedule allows for the development of advanced fuels that are lower in carbon than today's fuels and the market penetration of plug-in hybrid electric vehicles, battery electric vehicles, fuel cell vehicles, and flexible fuel vehicles. It is anticipated that compliance with the low carbon fuel standard will be based on a combination of both lower carbon fuels and more efficient vehicles.

Reformulated gasoline mixed with corn-derived ethanol at ten percent by volume and low sulfur diesel fuel represent the baseline fuels. Lower carbon fuels may be ethanol, biodiesel, renewable diesel, or blends of these fuels with gasoline or diesel as appropriate. Compressed natural gas and liquefied natural gas also may be low carbon fuels. Hydrogen and electricity, when used in fuel cells or electric vehicles are also considered as low carbon fuels for the low carbon fuel standard.

Senate Bill 97

Senate Bill 97 (SB 97) was adopted August 2007 and acknowledges that climate change is a prominent environmental issue that requires analysis under CEQA.

SB 97 directed the Governor's Office of Planning and Research (OPR), which is part of the State Natural Resources Agency, to prepare, develop, and transmit to CARB guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions, as required by CEQA, by July 1, 2009. The Natural Resources Agency was required to certify and adopt those guidelines by January 1, 2010.

Pursuant to the requirements of SB 97 as stated above, on December 30, 2009 the Natural Resources Agency adopted amendments to the state CEQA guidelines that address GHG emissions. The CEQA Guidelines Amendments changed 14 sections of the CEQA Guidelines and incorporate GHG language throughout the Guidelines. However, no GHG emissions thresholds of significance were provided and no specific mitigation measures were identified. The GHG emission reduction amendments went into effect on March 18, 2010 and are summarized below:

- Climate action plans and other greenhouse gas reduction plans can be used to determine whether a project has significant impacts, based upon its compliance with the plan.
- Local governments are encouraged to quantify the greenhouse gas emissions of proposed projects, noting that they have the freedom to select the models and methodologies that best meet their needs and circumstances. The section also recommends consideration of several qualitative factors that may be used in the determination of significance, such as the extent to which the given project complies with state, regional, or local GHG reduction plans and policies. OPR does not set or dictate specific thresholds of significance. Consistent with existing CEQA Guidelines, OPR encourages local governments to develop and publish their own thresholds of significance for GHG impacts assessment.
- When creating their own thresholds of significance, local governments may consider the thresholds of significance adopted or recommended by other public agencies, or recommended by experts.
- New amendments include guidelines for determining methods to mitigate the effects of greenhouse gas emissions in Appendix F of the CEQA Guidelines.
- OPR is clear to state that "to qualify as mitigation, specific measures from an existing plan must be identified and incorporated into the project; general compliance with a plan, by itself, is not mitigation."
- OPR's emphasizes the advantages of analyzing GHG impacts on an institutional, programmatic level. OPR therefore approves tiering of environmental analyses and highlights some benefits of such an approach.
- Environmental impact reports (EIRs) must specifically consider a project's energy use and energy efficiency potential.

Senate Bills 1078, 107, and X1-2 and Executive Orders S-14-08 and S-21-09
Senate Bill 1078 (SB 1078) requires retail sellers of electricity, including investor-owned utilities and community choice aggregators, to provide at least 20 percent of their supply from renewable sources by 2017. Senate Bill 107 (SB 107) changed the target date to 2010. Executive Order S-14-08 was signed on

November 2008 and expands the State's Renewable Energy Standard to 33 percent renewable energy by 2020. Executive Order S-21-09 directed CARB to adopt regulations by July 31, 2010 to enforce S-14-08. Senate Bill X1-2 codifies the 33 percent renewable energy requirement by 2020.

Senate Bill 375

Senate Bill 375 (SB 375) was adopted September 2008 and aligns regional transportation planning efforts, regional GHG emission reduction targets, and land use and housing allocation. SB 375 requires Metropolitan Planning Organizations (MPO) to adopt a sustainable communities strategy (SCS) or alternate planning strategy (APS) that will prescribe land use allocation in that MPOs Regional Transportation Plan (RTP). CARB, in consultation with each MPO, will provide each affected region with reduction targets for GHGs emitted by passenger cars and light trucks in the region 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. CARB is also charged with reviewing each MPO's sustainable communities strategy or alternate planning strategy for consistency with its assigned targets.

The proposed project is located within the Southern California Association of Governments (SCAG) jurisdiction, which has authority to develop the SCS or APS. For the SCAG region, the targets set by CARB are at eight percent below 2005 per capita GHG emissions levels by 2020 and 13 percent below 2005 per capita GHG emissions levels by 2035. On April 4, 2012, SCAG adopted the 2012-2035 Regional Transportation Plan / Sustainable Communities Strategy (RTP/SCS), which meets the CARB emission reduction requirements. The Housing Element Update is required by the State to be completed within 18 months after RTP/SCS adoption or by October 2013.

City and County land use policies, including General Plans, are not required to be consistent with the RTP and associated SCS or APS. However, new provisions of CEQA would incentivize, through streamlining and other provisions, qualified projects that are consistent with an approved SCS or APS and categorized as "transit priority projects."

Senate Bill X7-7

Senate Bill X7-7 (SB X7-7), enacted on November 9, 2009, mandates water conservation targets and efficiency improvements for urban and agricultural water suppliers. SB X7-7 requires the Department of Water Resources (DWR) to develop a task force and technical panel to develop alternative best management practices for the water sector. In addition SB X7-7 required the DWR to develop criteria for baseline uses for residential, commercial, and industrial uses for both indoor and landscaped area uses. The DWR was also required to develop targets and regulations that achieve a statewide 20 percent reduction in water usage.

Assembly Bill 939 and Senate Bill 1374

Assembly Bill 939 (AB 939) requires that each jurisdiction in California to divert at least 50 percent of its waste away from landfills, whether through waste reduction, recycling or other means. Senate Bill 1374 (SB 1374) requires the California Integrated Waste Management Board to adopt a model ordinance by March 1, 2004 suitable for adoption by any local agency to require 50 to 75 percent diversion of construction and demolition of waste materials from landfills.

California Code of Regulations (CCR) Title 24, Part 6

CCR Title 24, Part 6: California's Energy Efficiency Standards for Residential and Nonresidential Buildings (Title 24) were first established in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficiency technologies and methods. Although it was not originally intended to reduce GHG emissions, electricity production by fossil fuels results in GHG emissions and energy efficient buildings require less electricity. Therefore, increased energy efficiency results in decreased GHG emissions.

The Energy Commission adopted 2008 Standards on April 23, 2008 and Building Standards Commission approved them for publication on September 11, 2008. These updates became effective on August 1, 2009.

All buildings for which an application for a building permit is submitted on or after July 1, 2014 must follow the 2013 standards. The 2013 standards are estimated to be 30 percent more efficient than the 2008 standard. Energy efficient buildings require less electricity; therefore, increased energy efficiency reduces fossil fuel consumption and decreases greenhouse gas emissions.

California Green Building Standards

On January 12, 2010, the State Building Standards Commission unanimously adopted updates to the California Green Building Standards Code, which went into effect on January 1, 2011. The Code is a comprehensive and uniform regulatory code for all residential, commercial and school buildings.

The California Green Building Standards Code does not prevent a local jurisdiction from adopting a more stringent code as state law provides methods for local enhancements. The Code recognizes that many jurisdictions have developed existing construction and demolition ordinances, and defers to them as the ruling guidance provided they provide a minimum 50-percent diversion requirement. The code also provides exemptions for areas not served by construction and demolition recycling infrastructure. State building code provides the minimum standard that buildings need to meet in order to be certified for occupancy. Enforcement is generally through the local building official.

CCR Title 24, Part 11: California Green Building Standards (Title 24) became effective in 2001 in response to continued efforts to reduce GHG emissions associated with energy consumption. CCR Title 24, Part 11 now require that new buildings reduce water consumption, employ building commissioning to increase building system efficiencies, divert construction waste from landfills, and install low pollutant-emitting finish materials. One focus of CCR Title 24, Part 11 is water conservation measures, which reduce GHG emissions by reducing electrical consumption associated with pumping and treating water. CCR Title 24, Part 11 has approximately 52 nonresidential mandatory measures and an additional 130 provisions for optional use. Some key mandatory measures for commercial occupancies include specified parking for clean air vehicles, a 20 percent reduction of potable water use within buildings, a 50 percent construction waste diversion from landfills, use of building finish materials that emit low levels of volatile organic compounds, and commissioning for new, nonresidential buildings over 10,000 square feet.

4. Regional

The SCAQMD is the agency principally responsible for comprehensive air pollution control in the South Coast Air Basin. To that end, as a regional agency, the SCAQMD works directly with the Southern California Association of Governments (SCAG), county transportation commissions, and local governments and cooperates actively with all federal and state agencies.

South Coast Air Quality Management District
The SCAQMD develops rules and regulations, establishes permitting requirements for stationary sources, inspects emission sources, and enforces such measures through educational programs or fines, when necessary. The SCAQMD is directly responsible for reducing emissions from stationary, mobile, and indirect sources. It has responded to this requirement by preparing a sequence of AQMPs. A revised draft of the 2012 AQMP was released on September, 2012, was adopted by the SCAQMD Board on December 7, 2012, and was adopted by CARB via Resolution 13-3 on January 25, 2013. The 2012 AQMP was prepared in order to meet the federal Clean Air Act requirement that all 24-hour PM2.5 non-attainment areas prepare a SIP, that were required to be submitted to the U.S. EPA by December 14, 2012 and demonstrate attainment with the 24-hour PM2.5 standard by 2014. The 2012 AQMP demonstrates attainment of the federal 24-hour PM2.5 standard by 2014 in the Basin through adoption of all feasible measures, and therefore, no extension of the attainment date is needed.

The 2007 AQMP demonstrated attainment with the 1997 8-hour ozone (80 ppb) standard by 2023, through implementation of future improvements in control techniques and technologies. These “black box” emissions reductions represent 65 percent of the remaining NOx emission reductions by 2023 in order to show attainment with the 1997 8-hour ozone NAAQS. Given the magnitude of these needed emissions reductions, additional NOx control measures have been provided in this AQMP even though the primary purpose of this AQMP is to show compliance with 24-hour PM2.5 emissions standards.

The 2012 AQMP is designed to satisfy the California Clean Air Act's (CCAA) emission reductions of five percent per year or adoption of all feasible measures requirements and fulfill the EPA's requirement to update transportation conformity emissions budgets based on the latest approved motor vehicle emissions model and planning assumptions. The 2012 AQMP updates and revises the previous 2007 AQMP. The 2012 AQMP was prepared to comply with the Federal and State CCAA and amendments, to accommodate growth, to reduce the high pollutant levels in the Basin, to meet Federal and State ambient air quality standards, and to minimize the fiscal impact that pollution control measures have on the local economy. The purpose of the 2012 AQMP for the Basin is to set forth a comprehensive program that will lead this area into compliance with all federal and state air-quality planning requirements.

The 2012 AQMP builds upon the approaches taken in the 2007 AQMP for the attainment of federal PM and ozone standards, and highlights the significant amount of reductions needed and the need to engage in interagency coordinated planning of mobile sources to meet all of the federal criteria pollutant standards. Compared with the 2007 AQMP, the 2012 AQMP utilizes revised emissions inventory projections that use 2008 as the base year. On-road emissions are calculated using CARB EMFAC2011 emission factors and the transportation activity data provided by SCAG from their 2012 Regional Transportation Plan (2012 RTP). Off-road emissions were updated using CARB's 2011 In-Use Off-Road Fleet Inventory Model. Since the 2007 AQMP was finalized new area source categories such as liquid propane gas (LPG) transmission losses, storage tank and pipeline cleaning and degassing, and architectural colorants, were created and included in the emissions inventories. The 2012 AQMP also includes analysis of several additional sources of GHG emissions such as landfills and could also assist in reaching the GHG target goals in the AB32 Scoping Plan.

The control measures in the 2012 AQMP consist of three components: 1) Basin-wide and episodic short-term PM2.5 measures; 2) Section 182(e)(5) implementation measures; and 3) Transportation control measures. Many of the control measures are not based on command and control regulations, but instead focus on incentives, outreach, and education to bring about emissions reductions through voluntary participation and behavioral changes. More broadly, a transition to zero- and near-zero emission technologies is necessary to meet 2023 and 2032 air quality standards and 2050 climate goals. Many of the same technologies will address both air quality and climate needs.

During construction and operation, the project must comply with applicable rules and regulations. The following are rules the project may be required to comply with, either directly, or indirectly:

SCAQMD Rule 402 prohibits a person from discharging from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property.

SCAQMD Rule 403 governs emissions of fugitive dust during construction and operation activities. Compliance with this rule is achieved through application of standard Best Management Practices, such as application of water or chemical stabilizers to disturbed soils, covering haul vehicles, restricting vehicle speeds on unpaved roads to 15 miles per hour, sweeping loose dirt from paved site access roadways, cessation of construction activity when winds exceed 25 mph, and establishing a permanent ground cover on finished sites.

Rule 403 requires that fugitive dust be controlled with best available control measures so that the presence of such dust does not remain visible in the atmosphere beyond the property line of the emission source. In addition, SCAQMD Rule 403 requires implementation of dust suppression techniques to prevent fugitive dust from creating a nuisance off site. Applicable dust suppression techniques from Rule 403 are summarized below. Implementation of these dust suppression techniques can reduce the fugitive dust generation (and thus the PM_{10} component). Compliance with these rules would reduce impacts on nearby sensitive receptors. Rule 403 measures may include but are not limited to the following:

- Apply nontoxic chemical soil stabilizers according to manufacturers' specifications to all inactive construction areas (previously graded areas inactive for 10 days or more).
- Water active sites at least three times daily. (Locations where grading is to occur will be thoroughly watered prior to earthmoving.)
- Cover all trucks hauling dirt, sand, soil, or other loose materials, or maintain at least 0.6 meters (2 feet) of freeboard (vertical space between the top of the load and top of the trailer) in accordance with the requirements of California Vehicle Code section 23114.
- Reduce traffic speeds on all unpaved roads to 15 miles per hour (mph) or less.
- Suspension of all grading activities when wind speeds (including instantaneous wind gusts) exceed 25 mph.
- Bumper strips or similar best management practices shall be provided where vehicles enter and exit the construction site onto paved roads or wash off trucks and any equipment leaving the site each trip.
- Replanting disturbed areas as soon as practical.
- During all construction activities, construction contractors shall sweep on-site and off-site streets if silt is carried to adjacent public thoroughfares, to reduce the amount of particulate matter on public streets. All sweepers shall be compliant with SCAQMD Rule 1186.1, Less Polluting Sweepers.

SCAQMD Rule 445 prohibits permanently installed wood burning devices into any new development. A wood burning device means any fireplace, wood burning heater, or pellet-fueled wood heater, or any similarly enclosed, permanently installed, indoor or outdoor device burning any solid fuel for aesthetic or space-heating purposes, which has a heat input of less than one million British thermal units per hour.

SCAQMD Rule 481 applies to all spray painting and spray coating operations and equipment. The rule states that a person shall not use or operate any spray painting or spray coating equipment unless one of the following conditions is met:

(1) The spray coating equipment is operated inside a control enclosure, which is approved by the Executive Officer. Any control enclosure for which an application for permit for new construction, alteration, or change of ownership or location is submitted after the date of adoption of this rule shall be exhausted only through filters at a design face velocity not less than 100 feet per minute nor greater than 300 feet per minute, or through a water wash system designed to be equally effective for the purpose of air pollution control.

(2) Coatings are applied with high-volume low-pressure, electrostatic and/or airless spray equipment.

(3) An alternative method of coating application or control is used which has effectiveness equal to or greater than the equipment specified in the rule.

SCAQMD Rule 1108 governs the sale, use, and manufacturing of asphalt and limits the volatile organic compound (VOC) content in asphalt used in the South Coast Air Basin. This rule would regulate the VOC content of asphalt used during construction. Therefore, all asphalt used during construction of the project must comply with SCAQMD Rule 1108.

SCAQMD Rule 1113 governs the sale, use, and manufacturing of architectural coating and limits the VOC content in paints and paint solvents. This rule regulates the VOC content of paints available during construction. Therefore, all paints and solvents used during construction and operation of the project must comply with SCAQMD Rule 1113.

SCAQMD Rule 1143 governs the manufacture, sale, and use of paint thinners and solvents used in thinning of coating materials, cleaning of coating application equipment, and other solvent cleaning operations by limiting their VOC content. This rule regulates the VOC content of solvents used during construction. Solvents used during the construction phase must comply with this rule.

SCAQMD Rule 1186 limits the presence of fugitive dust on paved and unpaved roads and sets certification protocols and requirements for street sweepers that are under contract to provide sweeping services to any federal, state, county, agency or special district such as water, air, sanitation, transit, or school district.

SCAQMD Rule 1303 governs the permitting of re-located or new major emission sources, requiring Best Available Control Measures and setting significance limits for PM_{10} among other pollutants.

SCAQMD Rule 1401, New Source Review of Toxic Air Contaminants, specifies limits for maximum individual cancer risk, cancer burden, and non-cancer acute and chronic hazard index from new permit units, relocations, or modifications to existing permit units, which emit toxic air contaminants.

SCAQMD Rule 2202, On-Road Motor Vehicle Mitigation Options, is to provide employers with a menu of options to reduce mobile source emissions generated from employee commutes, to comply with federal and state Clean Air Act requirements, Health & Safety Code Section 40458, and Section 182(d)(1)(B) of the federal Clean Air Act. It applies to any employer who employs 250 or more employees on a full or part-time basis at a worksite for a consecutive six-month period calculated as a monthly average.

In order to assist local agencies with direction on GHG emissions, the SCAQMD organized a working group and adopted Rules 2700, 2701, 2702, and 3002 which are described below.

Rule 3002

The SCAQMD amended Rule 3002 on November 5, 2010 to include facilities that emit greater than 100,000 tons per year of CO_2e are required to apply for a Title V permit by July 1, 2011. A Title V permit is for facilities that are considered major sources of emissions.

Although the SCAQMD is responsible for regional air quality planning efforts, it does not have the authority to directly regulate air quality issues associated with plans and new development projects throughout the South Coast Air Basin. Instead, this is controlled through local jurisdictions in accordance to the California Environmental Quality Act (CEQA). In order to assist local jurisdictions with air quality compliance issues the CEQA Air Quality Handbook (SCAQMD CEQA Handbook), prepared by the SCAQMD, 1993, with the most current updates found at http://www.aqmd.gov/ceqa/hdbk.html, was developed in accordance with the projections and programs of the AQMP. The purpose of the SCAQMD CEQA Handbook is to assist Lead Agencies, as well as consultants, project proponents, and other interested parties in evaluating a proposed project's potential air quality impacts. Specifically, the SCAQMD CEQA Handbook explains the procedures that the SCAQMD recommends be followed for the environmental review process required by CEQA. The SCAQMD CEQA Handbook provides direction on how to evaluate potential air quality impacts, how to determine whether these impacts are significant, and how to mitigate these impacts. The SCAQMD intends that by providing this guidance, the air quality impacts of plans and development proposals will be analyzed accurately and consistently throughout the South Coast Air Basin, and adverse impacts will be minimized.

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SCAQMD Working Group

Since neither CARB nor the OPR has developed GHG emissions threshold, the SCAQMD formed a Working Group to develop significance thresholds related to GHG emissions. At the September 28, 2010 Working Group meeting, the SCAQMD released its most current version of the draft GHG emissions thresholds, which recommends a tiered approach that provides a quantitative annual thresholds of 10,000 MTCO2e for industrial uses.

Rules 2700 and 2701

The SCAQMD adopted Rules 2700 and 2701 on December 5, 2008, which establishes the administrative structure for a voluntary program designed to quantify GHG emission reductions. Rule 2700 establishes definitions for the various terms used in Regulation XXVII – Global Climate Change. Rule 2701 provides specific protocols for private parties to follow to generate certified GHG emission reductions for projects within the district. Approved protocols include forest projects, urban tree planting, and manure management. The SCAQMD is currently developing additional protocols for other reduction measures. For a GHG emission reduction project to qualify, it must be verified and certified by the SCAQMD Executive Officer, who has 60 days to approve or deny the Plan to reduce GHG emissions. Upon approval of the Plan, the Executive Officer issues required to issue a certified receipt of the GHG emission reductions within 90 days.

Rule 2702

The SCAQMD adopted Rule 2702 on February 6, 2009, which establishes a voluntary air quality investment program from which SCAQMD can collect funds from parties that desire certified GHG emission reductions, pool those funds, and use them to purchase or fund GHG emission reduction projects within two years, unless extended by the Governing Board. Priority will be given to projects that result in co-benefit emission reductions of GHG emissions and criteria or toxic air pollutants within environmental justice areas. Further, this voluntary program may compete with the cap-and-trade program identified for implementation in CARB's Scoping Plan, or a Federal cap and trade program.

Rule 3002

The SCAQMD amended Rule 3002 on November 5, 2010 to include facilities that emit greater than 100,000 tons per year of CO_2e are required to apply for a Title V permit by July 1, 2011. A Title V permit is for facilities that are considered major sources of emissions.

Although the SCAQMD is responsible for regional air quality planning efforts, it does not have the authority to directly regulate air quality issues associated with plans and new development projects throughout the South Coast Air Basin. Instead, this is controlled through local jurisdictions in accordance with the California Environmental Quality Act (CEQA). In order to assist local jurisdictions with air quality compliance issues the CEQA Air Quality Handbook (SCAQMD CEQA Handbook), prepared by the SCAQMD, 1993, with the most current updates found at http://www.aqmd.gov/ceqa/hdbk.html, was developed in accordance with the projections and programs of the AQMP. The purpose of the SCAQMD CEQA Handbook is to assist Lead Agencies, as well as consultants, project proponents, and other interested parties in evaluating a proposed project's potential air quality impacts. Specifically, the SCAQMD CEQA Handbook explains the procedures that the SCAQMD recommends be followed for the environmental review process required by CEQA. The SCAQMD CEQA Handbook provides direction on how to evaluate potential air quality impacts, how to determine whether these impacts are significant, and how to mitigate these impacts. The SCAQMD intends that by providing this guidance, the air quality impacts of plans and development proposals will be analyzed accurately and consistently throughout the South Coast Air Basin, and adverse impacts will be minimized.

Southern California Association of Governments

The SCAG is the regional planning agency for Los Angeles, Orange, Ventura, Riverside, San Bernardino and Imperial Counties and addresses regional issues relating to transportation, the economy, community development and the environment. SCAG is the Federally designated MPO for the majority of the southern California region and is the largest MPO in the nation. With respect to air quality planning, SCAG has prepared the Regional Transportation Plan and Regional Transportation Improvement Plan (RTIP), which addresses regional development and growth forecasts. These plans form the basis for the land use and transportation components of the AQMP, which are utilized in the preparation of air quality forecasts and in the consistency analysis included in the AQMP. The Regional Transportation Plan, Regional Transportation Improvement Plan, and AQMP are based on projections originating within the City and County General Plans.

5. <u>Local – City of Lake Elsinore</u>

Local jurisdictions, such as the City of Lake Elsinore, have the authority and responsibility to reduce air pollution through its police power and decision-making authority. Specifically, the City is responsible for the assessment and mitigation of air emissions resulting from its land use decisions. The City is also responsible for the implementation of transportation control measures as outlined in the 2007 AQMP. Examples of such measures include bus turnouts, energy-efficient streetlights, and synchronized traffic signals. In accordance with CEQA requirements and the CEQA review process, the City assesses the air quality impacts of new development projects, requires mitigation of potentially significant air quality impacts by conditioning discretionary permits, and monitors and enforces implementation of such mitigation.

In accordance with the CEQA requirements, the City does not, however, have the expertise to develop plans, programs, procedures, and methodologies to ensure that air quality within the City and region will meet federal and state standards. Instead, the County relies on the expertise of the SCAQMD and utilizes the SCAQMD CEQA Handbook as the guidance document for the environmental review of plans and development proposals within its jurisdiction.

The City of Lake Elsinore General Plan contains the following air quality-related goals and policies that are applicable to the proposed project:

Goal 2 Work with regional and state governments to develop effective mitigation measures to improve air quality.

Policy 2.1 Support the SCAQMD in its development of improved ambient air quality monitoring capabilities and establishment of standards, thresholds, and rules to address, and where necessary mitigate, the air quality impacts of new development.

The City of Lake Elsinore has also adopted a Climate Action Plan that has adopted a GHG emissions reduction target based on a community-wide emissions reduction to 6.6 $MTCO_2e$ per service population per year by 2020. This is a 22.3 percent reduction from the 2008 rate of 8.5 $MTCO_2e$ per service population. The City of Lake Elsinore Climate Action Plan contains the following GHG-related measures that are applicable to the proposed project:

T-1.2 Pedestrian Infrastructure. Through the development review process, require the installation of sidewalks along new and reconstructed streets. Also require new subdivisions and large developments to provide sidewalks or paths to internally link all uses where applicable and provide connections to neighborhood activity centers, major destinations, and transit facilities contiguous with the project site; implement through conditions of approval.

T-1.4 Bicycle Infrastructure. Through the development review process, require new development, as applicable, to implement and connect to the network of Class I, II and III bikeways, trails and safety features identified in the General Plan, Bike Lane Master Plan, Trails Master Plan and Western Riverside County Non-Motorized Transportation plan; implement through conditions of approval. The City will also continue to pursue and utilize funding when needed to implement portions of these plans.

T-1.5 Bicycle Parking Standards. Through the development review process, enforce the following short-term and long-term bicycle parking standards for new non-residential development (consistent with 2010 California Green Building Code [CalGreen], Section 5.106.4), and implement through conditions of approval:

- *Short-Term Bicycle Parking:* If the project is anticipated to generate visitor traffic, provide permanently anchored bicycle racks within 200 feet of the visitor entrance, readily visible to passers-by, for 5% of visitor motorized vehicle parking capacity, with a minimum of one two-bike capacity rack.

- *Long-Term Bicycle Parking:* For buildings with over 10 tenant occupants, provide secure bicycle parking for 5% of tenant-occupied motorized vehicle parking capacity, with a minimum of one space.

E-1.1 Tree Planting Requirements. Through the development review process, require new development to plant at minimum one 15-gallon nondeciduous, umbrella-form tree per 30 linear feet of boundary length near buildings, per the Municipal Code. Trees shall be planted in strategic locations around buildings or to shade pavement in parking lots and streets.

E-1.3 Energy Efficient Building Standards. Adopt an ordinance requiring that all new construction exceed the California Energy Code requirements, based on the 2008 Energy Efficiency Standards by 15% (consistent with CalGreen Tier 1), through either the performance based or prescriptive approach described in the California Green Building Code; implement through conditions of approval. Alternately, a solar photovoltaic system and/or solar water heating may be used to assist in meeting all or a portion of the 15% requirement.

E-4.1 Landscaping Ordinance. Through the development review process, enforce the City's Assembly Bill 1881 Landscaping Ordinance; implement through conditions of approval.

E-4.2 Indoor Water Conservation Requirements. Amend the City's Uniform Building Code to require development projects to reduce indoor water consumption by 30% (consistent with CalGreen Tier 1, Section A5.303.2.3.1), and implement through conditions of approval.

B. Monitored Air Quality

The air quality at any site is dependent on the regional air quality and local pollutant sources. Regional air quality is determined by the release of pollutants throughout the air basin. Estimates of the existing emissions in the Basin provided in the Final 2012 Air Quality Management Plan, prepared by SCAQMD, December 2012, indicate that collectively, mobile sources account for 59 percent of the VOC, 88 percent of the NOx emissions and 40 percent of directly emitted PM2.5, with another 10 percent of PM2.5 from road dust.

The EPA and the ARB designate air basins where ambient air quality standards are exceeded as "nonattainment" areas. If standards are met, the area is designated as an "attainment" area. If there is inadequate or inconclusive data to make a definitive attainment designation, they are considered "unclassified." National nonattainment areas are further designated as marginal, moderate, serious, severe, or extreme as a function of deviation from standards. Each standard has a different definition, or 'form' of what constitutes attainment, based on specific air quality statistics. For example, the Federal 8-hour CO standard is not to be exceeded more than once per year; therefore, an area is in attainment of the CO standard if no more than one 8-hour ambient air monitoring values exceeds the threshold per year. In contrast, the Federal annual PM2.5 standard is met if the three-year average of the annual average PM2.5 concentration is less than or equal to the standard. Attainment status is shown in Table 4.

The local air quality can be evaluated by reviewing relevant air pollution concentrations near the project area. For evaluation purposes, the SCAQMD has divided the District into 36 Source Receptor Areas (SRAs), operating monitoring stations in most of the areas. These SRAs are designated to provide a general representation of the local meteorological, terrain, and air quality conditions within the particular geographical area. The project is within Source Receptor Area 25. SCAQMD operates one air monitoring station in SRA 25, Lake Elsinore, approximately 6.5 miles west of the project site.

Table 5 summarizes 2010 through 2012 published monitoring data, which is the most recent 3-year period available. The data shows that during the past few years, the project area has exceeded the ozone, and PM10 standards. However, it should be noted that due to the air monitoring station distance from the project site, recorded air pollution levels at the air monitoring station reflect with varying degrees of accuracy, local air quality conditions at the project site.

The monitoring data presented in Table 5 shows that ozone is the air pollutants of primary concern in the project area.

Ozone

Ozone is a secondary pollutant as it is not directly emitted. Ozone is the result of chemical reactions between other pollutants, most importantly hydrocarbons and NO_2, which occur only in the presence of bright sunlight. Pollutants emitted from upwind cities react during transport downwind to produce the oxidant concentrations experienced in the area. Many areas of the SCAQMD contribute to the ozone levels experienced at the monitoring station, with the more significant areas being those directly upwind.

Carbon Monoxide

CO is another important pollutant that is due mainly to motor vehicles. The Lake Elsinore Station did not record an exceedance of the state or federal 1-hour or 8-hour CO standards for the last three years.

Nitrogen Dioxide

The Lake Elsinore did not record an exceedance of the State or Federal NO_2 standards for the last three years.

Particulate Matter

According to the EPA, some people are much more sensitive than others to breathing fine particles (PM10 and PM2.5). People with influenza, chronic respiratory and cardiovascular diseases, and the elderly may suffer worsening illness and premature death due to breathing these fine particles. People with bronchitis can expect aggravated symptoms from breathing in fine particles. Children may experience decline in lung function due to breathing in PM10 and PM2.5. Other groups considered sensitive are smokers and people who cannot breathe well through their noses. Exercising athletes are also considered sensitive, because many breathe through their mouths during exercise.

Table 3

State and Federal Criteria Pollutant Standards

Air Pollutant	Concentration / Averaging Time: California Standards	Concentration / Averaging Time: Federal Primary Standards	Most Relevant Effects
Ozone (O_3)	0.09 ppm/1-hour 0.07 ppm/8-hour	0.075 ppm/8-hour	(a) Decline in pulmonary function and localized lung edema in humans and animals; (b) Risk to public health implied by alterations in pulmonary morphology and host defense in animals; (c) Increased mortality risk; (d) Risk to public health implied by altered connective tissue metabolism and altered pulmonary morphology in animals after long-term exposures and pulmonary function decrements in chronically exposed humans; (e) Vegetation damage; and (f) Property damage.
Carbon Monoxide (CO)	20.0 ppm/1-hour 9.0 ppm/8-hour	35.0 ppm/1-hour 9.0 ppm/8-hour	(a) Aggravation of angina pectoris and other aspects of coronary heart disease; (b) Decreased exercise tolerance in persons with peripheral vascular disease and lung disease; (c) Impairment of central nervous system functions; and (d) Possible increased risk to fetuses.
Nitrogen Dioxide (NO_2)	0.18 ppm/1-hour 0.03 ppm/annual	100 ppb/1-hour 0.053 ppm/annual	(a) Potential to aggravate chronic respiratory disease and respiratory symptoms in sensitive groups; (b) Risk to public health implied by pulmonary and extra-pulmonary biochemical and cellular changes and pulmonary structural changes; and (c) Contribution to atmospheric discoloration.
Sulfur Dioxide (SO_2)	0.25 ppm/1-hour 0.04 ppm/24-hour	75 ppb/1-hour 0.14 ppm/annual	(a) Bronchoconstriction accompanied by symptoms which may include wheezing, shortness of breath and chest tightness, during exercise or physical activity in persons with asthma.
Suspended Particulate Matter (PM_{10})	50 µg/m^3/24-hour 20 µg/m^3/annual	150 µg/m^3/24-hour	(a) Exacerbation of symptoms in sensitive patients with respiratory or cardiovascular disease; (b) Declines in pulmonary function growth in children; (c) Increased risk of premature death from heart or lung diseases in elderly.
Suspended Particulate Matter ($PM_{2.5}$)	12 µg/m^3 / annual	35 µg/m^3/24-hour 15 µg/m^3/annual	
Sulfates	25 µg/m^3/24-hour	No Federal Standards	(a) Decrease in ventilatory function; (b) Aggravation of asthmatic symptoms; (c) Aggravation of cardio-pulmonary disease; (d) Vegetation damage; (e) Degradation of visibility; (f) property damage.
Lead	1.5 µg/m^3/30-day	0.15 µg/m^3/3-month rolling	(a) Learning disabilities; (b) Impairment of blood formation and nerve conduction.
Visibility Reducing Particles	Extinction coefficient of 0.23 per kilometer-visibility of 10 miles or more due to particles when humidity is less than 70 percent.	No Federal Standards	Visibility impairment on days when relative humidity is less than 70 percent.

[1] Source: http://www.arb.ca.gov/research/aaqs/aaqs2.pdf .

Table 4

South Coast Air Basin Attainment Status

Pollutant	Averaging Time	National Standards[1]	Attainment Date[2]	California Standards[3]
1979 1-Hour Ozone[4]	1-Hour (0.12 ppm)	Nonattainment (Extreme)	11/15/2010 (Not attained[4])	Extreme Nonattainment
1997 8-Hour Ozone[5]	8-Hour (0.08 ppm)	Nonattainment (Extreme)	6/15/2024	Nonattainment
2008 8-Hour Ozone	8-Hour (0.075 ppm)	Nonattainment (Extreme)	12/31/2032	
CO	1-Hour (35 ppm) 8-Hour (9 ppm)	Attainment (Maintenance)	6/11/2007 (Attained)	Maintenance
NO_2[6]	1-Hour (100 ppb) Annual (0.053 ppm)	Attainment (Maintenance)	9/22/1998 (Attained)	Attainment
SO_2[7]	1-Hour (75 ppb)	Designations Pending	Pending	Attainment
	24-Hour (0.14 ppm) Annual (0.03 ppm)	Unclassified/ Attainment	3/19/1979 (Attained)	
PM10	24-Hour (150 µg/m^3)	Nonattainment (Serious)[8]	12/31/2006 (Redesignation request submitted)[8]	Nonattainment
PM2.5	24-Hour (35 µg/m^3)	Unclassified/ Attainment/ Nonattainment[9]	4/2014-2020	Unclassified/ Nonattainment[9]
Lead	3-Months Rolling (0.15 µg/m^3)	Attainment/ Nonattainment[10]	12/31/2015[10]	Attainment/ Nonattainment[10]

[1] Obtained from Draft 2012 AQMP, SCAQMD, 2012. EPA often only declares Nonattainment areas; everywhere else is listed as Unclassified/Attainment or Unclassifiable.

[2] A design value below the NAAQS for data through the full year or smog season prior to the attainment date is typically required for attainment demonstration.

[3] Obtained from http://www.arb.ca.gov/desig/adm/adm.htm.

[4] 1-hour O_3 standard (0.13 ppm) was revoked, effective June 15, 2005; however, the Basin has not attained this standard based on 2008-2010 data has some continuing obligations under the former standard.

[5] 1997 8-hour O_3 standard (0.08 ppm) was reduced (0.075 ppm), effective May 27, 2008; the 1997 O3 standard and most related implementation rules remain in place until the 1997 standard is revoked by U.S. EPA.

[6] New NO_2 1-hour standard, effective August 2, 2010; attainment designations January 20, 2012; annual NO_2 standard retained.

[7] The 1971 annual and 24-hour SO_2 standards were revoked, effective August 23, 2010; however, these 1971 standards will remain in effect until one year after U.S. EPA promulgates area designations for the 2010 SO_2 1-hour standard. Area designations expected in 2012, with SSAB designated Unclassifiable/Attainment.

[8] Annual PM10 standard was revoked, effective December 18, 2006; redesignation request to Attainment of the 24-hour PM10 standard is pending with U.S. EPA

[9] Nonattainment designation - Los Angeles, Orange, and Western Riverside County portion of Basin only.

[10] Nonattainment designation - Los Angeles County portion of Basin only.

Table 5

Air Quality Monitoring Summary[1]

Pollutant (Standard)[2]	Year 2010	2011	2012
Ozone:			
Maximum 1-Hour Concentration (ppm)	0.107	0.133	0.111
Days > CAAQS (0.09 ppm)	15	19	10
Maximum 8-Hour Concentration (ppm)	0.091	0.106	0.089
Days > NAAQS (0.08 ppm)	24	28	17
Days > CAAQS (0.070 ppm)	40	45	32
Carbon Monoxide:[3]			
Maximum 8-Hour Concentration (ppm)	0.67	0.67	0.52
Days > CAAQS (9 ppm)	0	0	0
Days > NAAQS (9 ppm)	0	0	0
Nitrogen Dioxide:[3]			
Annual Average (ppm)	0.01	0.009	0.01
1-Hour 98th Percentile	0.04	0.04	0.04
Maximum 1-Hour Concentration (ppm)	0.051	0.05	0.048
Days > CAAQS (0.18 ppm)	0	0	0
Inhalable Particulates (PM10):			
Maximum 24-Hour Concentration (ug/m^3)	54.4	99.8	65.5
Days > NAAQS (150 ug/m^3)	0	0	0
Days > CAAQS (50 ug/m^3)	--	--	--
Annual Average (ug/m^3)	23.7	24.7	21.9
Ultra-Fine Particulates (PM2.5):			
Maximum 24-Hour Concentration (ug/m^3)	29.8	40.7	24.9
Days > NAAQS (35 ug/m^3)	--	--	--
Annual Average (ug/m^3)	--	10.8	10.5

[1] Source: http://www.arb.ca.gov/adam/topfour/topfour1.php

Data from Lake Elsinore-W Flint St monitoring station unless noted.

[2] CAAQS = California Ambient Air Quality Standard; NAAQS = National Ambient Air Quality Standard; ppm = parts per million

[3] -- means no data available

V. Air Quality Standards

A. Regional Air Quality

Many air quality impacts that derive from dispersed mobile sources, which are the dominate pollution generators in the basin, often occurs hours later and miles away after photochemical processes have converted primary exhaust pollutants into secondary contaminants such as ozone. The incremental regional air quality impact of an individual project is generally very small and difficult to measure. Therefore, the SCAQMD has developed significance thresholds based on the volume of pollution emitted rather than on actual ambient air quality because the direct air quality impact of a project is not quantifiable on a regional scale. The SCAQMD CEQA Handbook states that any project in the South Coast Air Basin with daily emissions that exceed any of the identified significance thresholds should be considered as having an individually and cumulatively significant air quality impact. For the purposes to this air quality impact analysis, a regional air quality impact would be considered significant if emissions exceed the SCAQMD significance thresholds identified in Table 6.

B. Local Air Quality

Project-related construction air emissions may have the potential to exceed the State and Federal air quality standards in the project vicinity, even though these pollutant emissions may not be significant enough to create a regional impact to the South Coast Air Basin. In order to assess local air quality impacts the SCAQMD has developed Localized Significant Thresholds (LSTs) to assess the project-related air emissions in the project vicinity. The SCAQMD has also provided Final Localized Significant Threshold Methodology (LST Methodology), June 2003, which details the methodology to analyze local air emission impacts. The Localized Significant Threshold Methodology found that the primary emissions of concern are NO_2 (converted from emissions of NOx), CO, PM10, and PM2.5.

The significance thresholds for the local emissions of NO_2 and CO are determined by subtracting the highest background concentration from the last three years of these pollutants from Table 5 above, from the most restrictive ambient air quality standards for these pollutants that are outlined in the Localized Significant Thresholds. Since PM10 and PM2.5 currently exceed the most restrictive ambient air quality standards in the Basin, their thresholds have been directly related to the Localized Significant Thresholds and background concentrations of PM10 and PM2.5 are not factored into the threshold. Table 6 shows the ambient air quality standards for NO_X, CO, and PM10 and PM2.5.

C. Toxic Air Contaminants

Construction

The construction equipment would emit DPM, which is a carcinogen. However, the DPM emissions are short-term in nature. Determination of risk from DPM is considered over a 70-year exposure period because carcinogenic risk is directly related to sustain exposure. In contrast, construction activities would be limited to a period of approximately 18 months.

Thus, duration of construction activities would represent a fraction of the 70-year exposure period used as the basis for assessing the significance of carcinogenic risk exposure and, therefore, would not represent a source of sustained DPM emissions. Therefore, considering the short time frame, exposure to DPM is anticipated to be less than significant.

Operation
The project proposes to construct residential land uses. The project will not be a source of toxic air contaminants and sensitive receptors would not be exposed to toxic sources of air pollution.

D. Odor Impacts

The SCAQMD CEQA Handbook states that an odor impact would occur if the proposed project creates an odor nuisance pursuant to SCAQMD Rule 402, which states:

> A person shall not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property.
>
> The provisions of this rule shall not apply to odors emanating from agricultural operations necessary for the growing of crops or the raising of fowl or animals.

If the proposed project results in a violation of Rule 402 with regards to odor impacts, then the proposed project would create a significant odor impact.

E. Greenhouse Gases

The City of Lake Elsinore has adopted a Climate Action Plan (CAP) that has adopted a GHG emissions reduction target based on a community-wide emissions reduction to 6.6 MTCO2e per service population per year by 2020. This is a 22.3 percent reduction from the 2008 rate of 8.5 MTCO2e per service population. These efficiency-based targets were derived by dividing the statewide AB 32 targeted emissions levels for 2020 and statewide Executive Order S-3-05 targeted emissions level for 2030 by the 2020 and 2030 statewide service population respectively. These targets represent the maximum quantity of emissions each resident and employee in the State of California could emit in 2020 and 2030 based on emissions levels necessary to achieve the statewide AB 32 and Executive Order S-3-05 GHG emissions reduction goals.

The project is also within the South Coast Air Basin, which is under the jurisdiction of the South Coast Air Quality Management District (SCAQMD).

SCAQMD Regulation XXVII, Climate Change. SCAQMD Regulation XXVII currently includes three rules:

- The purpose of Rule 2700 is to define terms and post global warming potentials.

- The purpose of Rule 2701, SoCal Climate Solutions Exchange, is to establish a voluntary program to encourage, quantify, and certify voluntary, high quality certified greenhouse gas emission reductions in the SCAQMD.
- Rule 2702, Greenhouse Gas Reduction Program, was adopted on February 6, 2009. The purpose of this rule is to create a Greenhouse Gas Reduction Program for greenhouse gas emission reductions in the SCAQMD. The SCAQMD will fund projects through contracts in response to requests for proposals or purchase reductions from other parties.

A variety of agencies have developed greenhouse gas emission thresholds and/or have made recommendations for how to identify a threshold. However, the thresholds for projects in the jurisdiction of the SCAQMD remain in flux. The California Air Pollution Control Officers Association explored a variety of threshold approaches, but did not recommend one approach (2008). The ARB recommended approaches for setting interim significance thresholds (California Air Resources Board 2008b), in which a draft industrial project threshold suggests that non-transportation related emissions under 7,000 MTCO2e per year would be less than significant; however, the ARB has not approved those thresholds and has not published anything since then. The Bay Area Air Quality Management District and the San Joaquin Valley Air Pollution Control District have both developed greenhouse gas thresholds. However, those thresholds are not applicable to the project since the project is under the jurisdiction of the SCAQMD. The SCAQMD is in the process of developing thresholds, as discussed below.

SCAQMD Threshold Development. On December 5, 2008, the SCAQMD Governing Board adopted an interim greenhouse gas significance threshold for stationary sources, rules, and plans where the SCAQMD is lead agency (SCAQMD permit threshold). The SCAQMD permit threshold consists of five tiers. However, the SCAQMD is not the lead agency for this project. Therefore, the five permit threshold tiers do not apply to the proposed project.

The SCAQMD is in the process of preparing recommended significance thresholds for greenhouse gases for local lead agency consideration ("SCAQMD draft local agency threshold"); however, the SCAQMD Board has not approved the thresholds as of the date of the Notice of Preparation. The current draft thresholds consist of the following tiered approach:

- Tier 1 consists of evaluating whether or not the project qualifies for any applicable exemption under CEQA.
- Tier 2 consists of determining whether the project is consistent with a greenhouse gas reduction plan. If a project is consistent with a qualifying local greenhouse gas reduction plan, it does not have significant greenhouse gas emissions.
- Tier 3 consists of screening values, which the lead agency can choose, but must be consistent with all projects within its jurisdiction. A project's construction emissions are averaged over 30 years and are added to a project's operational emissions. If a project's emissions are under one of the following screening thresholds, then the project is less than significant:
    - All land use types: 3,000 MTCO2e per year
    - Based on land use type: residential: 3,500 MTCO2e per year; commercial: 1,400 MTCO2e per year; or mixed use: 3,000 MTCO2e per year.

- Tier 4 has the following options:
  - Option 1: Reduce emissions from business as usual (BAU) by a certain percentage; this percentage is currently undefined (Lake Elsinore CAP calls for a community-wide reduction of 22.3% from 2008 BAU emissions by 2020).
  - Option 2: Early implementation of applicable AB 32 Scoping Plan measures.
  - Option 3, 2020 target for service populations (SP), which includes residents and employees: 4.8 MTCO2e/SP/year for projects and 6.6 MTCO2e/SP/year for plans;
  - Option 3, 2035 target: 3.0 MTCO2e/SP/year for projects and 4.1 MTCO2e/SP/year for plans
- Tier 5 involves mitigation offsets to achieve target significance threshold.

The SCAQMD's draft threshold uses the Executive Order S-3-05 goal as the basis for the Tier 3 screening level. Achieving the Executive Order's objective would contribute to worldwide efforts to cap carbon dioxide concentrations at 450 ppm, thus stabilizing global climate.

The project will also be subject to the requirements of the California Green Building Code and 2013 Title 24 Building Energy Efficiency Standards which would reduce project-related greenhouse gas emissions.

To determine whether the project is significant, this project uses the SCAQMD draft local agency tier 3 threshold of 3,000 MTCO2e per year for all land use types.

Table 6

SCAQMD Air Quality Significance Thresholds[1]

Mass Daily Thresholds		
Pollutant	Construction (lbs/day)	Operation (lbs/day)
NOx	100	55
VOC	75	55
PM10	150	150
PM2.5	55	55
SOx	150	150
CO	550	550
Lead	3	3
Toxic Air Contaminants, Odor and GHG Thresholds		
TACs	Maximum Incremental Cancer Risk ≥ 10 in 1 million Cancer Burden > 0.5 excess cancer cases (in areas ≥ 1 in 1 million) Chronic & Acute Hazard Index > 1.0 (project increment)	
Odor	Project creates an odor nuisance pursuant to SCAQMD Rule 402	
GHG	10,000 MT/yr CO2e for industrial facilities	
Ambient Air Quality Standards		
Pollutant	SCAQMD Standards	
NO2 -1-hour average	0.18 ppm (338 µg/m^3)	
PM10 -24-hour average Construction Operations	10.4 µg/m^3 2.5 ug/m^3	
PM2.5 -24-hour average Construction Operations	10.4 µg/m^3 2.5 µg/m^3	
SO2 1-hour average 24-hour average	0.25 ppm 0.04 ppm	
CO 1-hour average 8-hour average	20 ppm (23,000 µg/m^3) 9 ppm (10,000 µg/m^3)	
Lead 30-day average Rolling 3-month average Quarterly average	1.5 µg/m^3 0.15 µg/m^3 1.5 µg/m^3	

[1] Source: http://www.aqmd.gov/ceqa/handbook/signthres.pdf

VI. Short-Term Construction Impacts

Construction activities associated with the proposed project would have the potential to generate air emissions, toxic air contaminant emissions, and odor impacts. Assumptions for the duration of the construction of the proposed project were obtained from the project applicant. The construction activities for the proposed project are anticipated to include: grading of 20.2 acres and the building construction of 74 single-family detached residential dwelling units. The proposed project is anticipated to start construction no sooner than June 2015 and be completed in December 2016.

A. Construction-Related Regional Impacts

The construction-related regional air quality impacts have been analyzed for both criteria pollutants and GHGs.

1. Construction-Related Criteria Pollutants Analysis

The following provides a discussion of the methodology used to calculate regional construction air emissions and an analysis of the proposed project's short-term construction emissions for the criteria pollutants.

Methodology

The Project will be required to comply with existing SCAQMD rules for the reduction of fugitive dust emissions. SCAQMD Rule 403 establishes these procedures. Compliance with this rule is achieved through application of standard best management practices in construction and operation activities, such as application of water or chemical stabilizers to disturbed soils, managing haul road dust by application of water, covering haul vehicles, restricting vehicle speeds on unpaved roads to 15 mph, sweeping loose dirt from paved site access roadways, cessation of construction activity when winds exceed 25 mph and establishing a permanent, stabilizing ground cover on finished sites. In addition, projects that disturb 50 acres or more of soil or move 5,000 cubic yards of materials per day are required to submit a Fugitive Dust Control Plan or a Large Operation Notification Form to SCAQMD. Based on the size of the Project area (approximately 20.2 acres total) a Fugitive Dust Control Plan or Large Operation Notification would not be required.

The phases of the construction activities which have been analyzed in the tables below are: 1) grading, 2) building construction, 3) paving, and 4) application of architectural coatings. See CalEEMod Output (Appendix B) for details.

Per SCAQMD Rule 1113 as amended on June 3, 2011, the architectural coatings that would be applied after January 1, 2014 will be limited to an average of 50 grams per liter or less and the CalEEMod model default VOC emissions have been adjusted accordingly.

Project Impacts

The construction-related criteria pollutant emissions for each phase are shown below in Table 7. Table 7 shows that none of the analyzed criteria pollutants would exceed the regional emissions thresholds. Therefore, a less than significant regional air quality impact would occur from construction of the proposed project.

B. <u>Construction-Related Local Impacts</u>

Construction-related air emissions may have the potential to exceed the State and Federal air quality standards in the project vicinity, even though these pollutant emissions may not be significant enough to create a regional impact to the South Coast Air Basin. The proposed project has been analyzed for the potential local air quality impacts created from: construction-related fugitive dust and diesel emissions; from toxic air contaminants; and from construction-related odor impacts.

1. <u>Local Air Quality Impacts from Construction</u>

The SCAQMD has published a "Fact Sheet for Applying CalEEMod to Localized Significance Thresholds" (South Coast Air Quality Management District 2011b). CalEEMod calculates construction emissions based on the number of equipment hours and the maximum daily disturbance activity possible for each piece of equipment. In order to compare CalEEMod reported emissions against the localized significance threshold lookup tables, the CEQA document should contain in its project design features or its mitigation measures the following parameters:

1) The off-road equipment list (including type of equipment, horsepower, and hours of operation) assumed for the day of construction activity with maximum emissions.
2) The maximum number of acres disturbed on the peak day.
3) Any emission control devices added onto off-road equipment.
4) Specific dust suppression techniques used on the day of construction activity with maximum emissions.

The CalEEMod output in Appendix B show the equipment used for this analysis.

As shown in Table 8, the maximum number of acres disturbed in a day would be five acres.

The local air quality emissions from construction were analyzed using the SCAQMD's Mass Rate Localized Significant Threshold Look-up Tables and the methodology described in <u>Localized Significance Threshold Methodology</u>, prepared by SCAQMD, revised July 2008. The Look-up Tables were developed by the SCAQMD in order to readily determine if the daily emissions of CO, NOx, PM10, and PM2.5 from the proposed project could result in a significant impact to the local air quality. The emission thresholds were calculated based on the Lake Elsinore source receptor area (SRA) 25 and a disturbance of five acres per day. According to LST Methodology, any receptor located closer than 25 meters (82 feet) shall be based on the 25 meter thresholds. The nearest sensitive receptors are the existing residential use directly adjacent to the western and southern boundary of the site; therefore, the SCAQMD Look-up Tables for 25 meters was used. Table 9 shows the on-site emissions from the CalEEMod model for the different construction phases and the calculated emissions thresholds.

The data provided in Table 9 shows that none of the analyzed criteria pollutants would not exceed the calculated local emissions thresholds at the nearest sensitive receptors. Therefore, a less than significant local air quality impact would occur from construction of the proposed project.

2. <u>Construction-Related Toxic Air Contaminant Impacts</u>

The greatest potential for toxic air contaminant emissions would be related to diesel particulate emissions associated with heavy equipment operations during construction of the proposed project. According to SCAQMD methodology, health effects from carcinogenic air toxics are usually described in terms of “individual cancer risk”. “Individual Cancer Risk” is the likelihood that a person exposed to concentrations of toxic air contaminants over a 70 year lifetime will contract cancer, based on the use of standard risk-assessment methodology. Given the relatively limited number of heavy-duty construction equipment and the short-term construction schedule, the proposed project would not result in a long-term (i.e., 70 years) substantial source of toxic air contaminant emissions and corresponding individual cancer risk. Therefore, no significant short-term toxic air contaminant impacts would occur during construction of the proposed project.

3. <u>Construction-Related Odor Impacts</u>

Potential sources that may emit odors during construction activities include the application of materials such as asphalt pavement. The objectionable odors that may be produced during the construction process are of short-term in nature and the odor emissions are expected cease upon the drying or hardening of the odor producing materials. Due to the short-term nature and limited amounts of odor producing materials being utilized, no significant impact related to odors would occur during construction of the proposed project.

Table 7

Construction-Related Regional Criteria Pollutant Emissions [1]

Activity	Pollutant Emissions (pounds/day)					
	VOC	NOx	CO	SO_2	PM10	PM2.5
Grading						
On-Site	6.78	79.05	50.84	0.06	6.34	4.81
Off-Site	0.11	0.54	1.52	0.00	0.26	0.08
Subtotal	6.88	79.58	52.36	0.06	6.60	4.89
Building Construction						
On-Site	3.66	30.03	18.74	0.03	2.12	1.99
Off-Site	0.19	0.90	2.46	0.00	0.37	0.11
Subtotal	3.84	30.93	21.20	0.03	2.49	2.10
Paving						
On-Site	1.04	11.19	7.41	0.01	0.63	0.58
Off-Site	0.06	0.07	0.85	0.00	0.17	0.05
Subtotal	1.10	11.26	8.26	0.01	0.80	0.63
Architectural Coating						
On-Site	10.06	2.37	1.88	0.00	0.20	0.20
Off-Site	0.02	0.02	0.28	0.00	0.06	0.02
Subtotal	10.08	2.39	2.17	0.00	0.25	0.21
Total of Overlapping Phases[4]	**15.03**	**44.59**	**31.63**	**0.04**	**3.54**	**2.94**
SCAQMD Thresholds	**75**	**100**	**550**	**150**	**150**	**55**
Exceeds Thresholds?	No	No	No	No	No	No

[1] Source: CalEEMod Version 2013.2.2

[2] On-site emissions from equipment operated on-site that is not operated on public roads.

[3] Off-site emissions from equipment operated on public roads.

[4] Construction phase, paving phase and painting phase may overlap.

Table 8

Maximum Number of Acres Disturbed Per Day[1]

Activity	Equipment	Number	Acres/8hr-day	Total Acres
Site Grading	Graders	1	0.5	0.5
	Rubber Tired Dozers	1	0.5	0.5
	Excavators	2	0.5	1
	Scrapers	2	1	2
	Tractors/Loaders/Backhoes	2	0.5	1
Total per phase		-	-	**5**

[1] Source: South Coast AQMD, Fact Sheet for Applying CalEEMod to Localized Significance Thresholds, 2011b.

Table 9

Local Construction Emissions at the Nearest Receptors[1]

Phase	On-Site Pollutant Emissions (pounds/day)			
	NOx	CO	PM10	PM2.5
Grading	79.05	50.84	6.34	4.81
Building Construction	30.03	18.74	2.12	1.99
Paving	11.19	7.41	0.63	0.58
Architectural Coating	2.37	1.88	0.20	0.20
SCAQMD Thresholds[2]	**371**	**1,965**	**13**	**8**
Exceeds Threshold?	No	No	No	No

[1] Source: Calculated from CalEEMod and SCAQMD's Mass Rate Look-up Tables for five acres at a distance of 25 m in Lake Elsinore.

VII. Long-Term Air Quality Operational Impacts

The on-going operation of the proposed project would result in a long-term increase in air quality emissions. This increase would be due to emissions from the project-generated vehicle trips and through operational emissions from the on-going use of the proposed project. The following section provides an analysis of potential long-term air quality impacts due to: regional air quality and local air quality impacts with the on-going operations of the proposed project.

A. Operations-Related Regional Air Quality Impacts

The potential operations-related air emissions have been analyzed below for the criteria pollutants and cumulative impacts.

1. Operations-Related Criteria Pollutant Analysis

The operations-related criteria air quality impacts created by the proposed project have been analyzed through use of the CalEEMod model. The operating emissions were based on the year 2016, which is the anticipated opening year for the proposed project. The operations daily emissions printouts from the CalEEMod model are provided in Appendix C. The CalEEMod analyzes operational emissions from area sources, energy usage, and mobile sources, which are discussed below.

Mobile Sources
Mobile sources include emissions from the additional vehicle miles generated from the proposed project. The vehicle trips associated with the proposed project were obtained from the traffic analysis for the project. The traffic analysis showed that the project would generate 9.52 trips per single-family detached residential dwelling unit.

Area Sources
Area sources include emissions from consumer products, landscape equipment and architectural coatings. Landscape maintenance includes fuel combustion emissions from equipment such as lawn mowers, rototillers, shredders/grinders, blowers, trimmers, chain saws, and hedge trimmers, as well as air compressors, generators, and pumps. As specifics were not known about the landscaping equipment fleet, CalEEMod defaults were used to estimate emissions from landscaping equipment.

Per SCAQMD Rule 1113 as amended on June 3, 2011, the architectural coatings that would be applied after January 1, 2014 will be limited to an average of 50 grams per liter or less and the CalEEMod model default VOC emissions have been adjusted accordingly. No other changes were made to the default area source parameters.

Energy Usage
Energy usage includes emissions from the generation of electricity and natural gas used on-site. No changes were made to the default energy usage parameters.

Project Impacts

The higher of either summer or winter criteria pollutant emissions created from the proposed project's long-term operations have been calculated and are summarized below in Table 10. Table 10 shows that none of the analyzed criteria pollutants would exceed the regional emissions thresholds. Therefore, a less than significant regional air quality impact would occur from operation of the proposed project.

2. Cumulative Regional Air Quality Impacts

Cumulative projects include local development as well as general growth within the project area. However, as with most development, the greatest source of emissions is from mobile sources, which travel well out of the local area. Therefore, from an air quality standpoint, the cumulative analysis would extend beyond any local projects and when wind patterns are considered would cover an even larger area. Accordingly, the cumulative analysis for the project's air quality must be generic by nature.

The project area is out of attainment for both ozone and particulate matter (PM-10 and PM-2.5). Construction and operation of cumulative projects will further degrade the local air quality, as well as the air quality of the South Coast Air Basin. The greatest cumulative impact on the quality of regional air cell will be the incremental addition of pollutants mainly from increased traffic from residential, commercial, and industrial development and the use of heavy equipment and trucks associated with the construction of these projects. Air quality will be temporarily degraded during construction activities that occur separately or simultaneously. However, in accordance with the SCAQMD methodology, projects that do not exceed the SCAQMD criteria or can be mitigated to less than criteria levels are not significant and do not add to the overall cumulative impact. With respect to long-term emissions, this project would create a less than significant cumulative impact.

B. Operations-Related Local Air Quality Impacts

Project-related air emissions may have the potential to exceed the State and Federal air quality standards in the project vicinity, even though these pollutant emissions may not be significant enough to create a regional impact to the South Coast Air Basin. The proposed project has been analyzed for the potential local CO emission impacts from the project-generated vehicular trips and from the potential local air quality impacts from on-site operations. The following analysis analyzes the vehicular CO emissions, local impacts from on-site operations, and odor impacts.

1. Local CO Emission Impacts from Project-Generated Vehicular Trips

CO is the pollutant of major concern along roadways because the most notable source of CO is motor vehicles. For this reason, CO concentrations are usually indicative of the local air quality generated by a roadway network and are used as an indicator of potential local air quality impacts. Local air quality impacts can be assessed by comparing future without and with project CO levels to the State and Federal CO standards which were presented in above in Section V.

To determine if the proposed project could cause emission levels in excess of the CO standards discussed above in Section V, a sensitivity analysis is typically conducted to determine the potential for CO "hot spots" at a number of intersections in the general project vicinity. Because of reduced speeds and vehicle queuing, "hot spots" potentially can occur at high traffic volume intersections with a Level of Service E or worse.

The Traffic Analysis showed that the highest existing traffic volumes at studied intersections within the project vicinity would be 1,576 vehicles (at the intersection of Railroad Canyon Road and Canyon Hills Road), the project would add 24 vehicles per day to this intersection, for a maximum of 1,600 vehicles at this intersection. Furthermore, the project would only generate a total of 704 trips per day. The 1992 Federal Attainment Plan for Carbon Monoxide (1992 CO Plan) showed that an intersection which has a daily traffic volume of approximately 100,000 vehicles per day would not violate the CO standard. When project traffic is added to the existing traffic, the volume (1,600 vehicles) at the busiest intersection is much less than 100,000 vehicles. Therefore no CO "hot spot" modeling was performed and no significant long-term air quality impact is anticipated to local air quality with the on-going use of the proposed project.

2. Local Air Quality Impacts from On-Site Operations

Project-related air emissions from on-site sources such as architectural coatings, landscaping equipment, on-site usage of natural gas appliances as well as the operation of vehicles on-site may have the potential to exceed the State and Federal air quality standards in the project vicinity, even though these pollutant emissions may not be significant enough to create a regional impact to the Air Basin. The nearest sensitive receptors to the project site are the residential uses located directly to the east of the project boundary line, south of Holland Road, west of Anna Lane. There is also another residential dwelling unit to the south of the site, south of Corson Avenue, approximately 52 feet from the southern project boundary line. New residential development is also being constructed to the west of the site.

According to SCAQMD LST methodology, LSTs would apply to the operational phase of a project, if the project includes stationary sources, or attracts mobile sources (such as heavy-duty trucks) that may spend long periods queuing and idling at the site; such as industrial warehouse/transfer facilities. The proposed project does not include such uses. Therefore, due the lack of stationary source emissions, no long-term localized significance threshold analysis is warranted.

3. Operations-Related Odor Impacts

The SCAQMD recommends that odor impacts be addressed in a qualitative manner. Such an analysis shall determine whether the project would result in excessive nuisance odors, as defined under the California Code of Regulations and Section 41700 of the California Health and Safety Code, and thus would constitute a public nuisance related to air quality.

Land uses typically considered associated with odors include wastewater treatment facilities, waste-disposal facilities, or agricultural operations. The project does not contain land uses typically associated with emitting objectionable odors. Diesel exhaust and VOCs would be emitted during construction of the project, which are objectionable to some; however, emissions would disperse rapidly from the project site and therefore should not reach an objectionable level at the nearest sensitive receptors.

Table 10

Operational Criteria Pollutants Regional Air Emissions[1]

Maximum Daily Emissions						
	Pollutant Emissions (pounds/day)					
Activity	VOC	NOx	CO	SO2	PM10	PM2.5
Area Sources[2]	22.51	0.56	43.39	0.06	5.69	5.69
Energy Usage[3]	0.07	0.63	0.27	0.00	0.05	0.50
Mobile Sources[4]	2.73	8.98	30.72	0.08	5.23	1.48
Total Emissions	**25.31**	**10.17**	**74.37**	**0.13**	**10.96**	**7.66**
SCAQMD Thresholds	**55**	**55**	**550**	**150**	**150**	**55**
Exceeds Threshold?	No	No	No	No	No	No

[1] Source: CalEEMod Version 2013.2.2

[2] Area sources consist of emissions from consumer products, architectural coatings, and landscaping equipment.

[3] Energy usage consists of emissions from generation of electricity and on-site natural gas usage.

[4] Mobile sources consist of emissions from vehicles and road dust.

VIII. Global Climate Change Analysis

The proposed project is anticipated to generate GHG emissions from area sources, energy usage, mobile sources, waste, water, and construction equipment. The following provides the methodology used to calculate the project-related GHG emissions, the project impacts and a consistency analysis of the proposed project with any applicable GHG reduction plans, policies or regulations.

A. Methodology

CalEEMod Version 2013.2.2 was used to calculate the GHG emissions from the proposed project. The project's emissions were compared to the screening SCAQMD draft threshold of 3,000 metric tons CO2e per year for all land uses. Each source of GHG emissions is described in greater detail below.

1. Area Sources

Area sources include emissions from consumer products, landscape equipment and architectural coatings. Area sources were analyzed in the manner described in Section VII above.

2. Energy Usage

Energy usage includes emissions from the generation of electricity and natural gas used on-site. No changes were made to the default energy usage parameters.

3. Mobile Sources

Mobile sources were analyzed in the manner described in Section VII above. CalEEMod defaults were used in the analysis.

4. Waste

Waste includes the GHG emissions generated from the processing of waste from the proposed project as well as the GHG emissions from the waste once it is interred into a landfill. The CalEEMod default value for waste generated was used in the analysis.

5. Water

Water includes the water used for the interior of the building as well as for landscaping and is based on the GHG emissions associated with the energy used to transport and filter the water. CalEEMod defaults were used.

6. Construction

The construction-related GHG emissions were also included in the analysis and were based on a 30 year amortization rate as recommended in the SCAQMD GHG Working Group meeting on November 19, 2009. The construction-related GHG emissions were calculated by CalEEMod and detailed above in Section VI.

B. Project Greenhouse Gas Emissions

The GHG emissions have been calculated based on the parameters described above. A summary of the results are shown above in Table 11 and the CalEEMod Model run for the proposed project is provided in Appendix C. Table 11 shows that the proposed project would generate approximately 1,440.74 $MTCO_2e$ per year. According to the thresholds of significance established above in Section 5.0, a cumulative global climate change impact would occur if the GHG emissions created from the on-going operations would exceed 3,000 metric tons per year of CO_2e. Therefore, operation of the proposed project would not create a significant cumulative impact to global climate change.

C. Greenhouse Gas Plan Consistency

The City of Lake Elsinore has also adopted a Climate Action Plan that has adopted a GHG emissions reduction target based on a community-wide emissions reduction to 6.6 $MTCO_2e$ per service population per year by 2020. This is a 22.3 percent reduction from the 2008 rate of 8.5 $MTCO_2e$ per service population. The City of Lake Elsinore Climate Action Plan contains the following GHG-related measures that are applicable to the proposed project:

T-1.2 Pedestrian Infrastructure. Through the development review process, require the installation of sidewalks along new and reconstructed streets. Also require new subdivisions and large developments to provide sidewalks or paths to internally link all uses where applicable and provide connections to neighborhood activity centers, major destinations, and transit facilities contiguous with the project site; implement through conditions of approval.

T-1.4 Bicycle Infrastructure. Through the development review process, require new development, as applicable, to implement and connect to the network of Class I, II and III bikeways, trails and safety features identified in the General Plan, Bike Lane Master Plan, Trails Master Plan and Western Riverside County Non-Motorized Transportation plan; implement through conditions of approval. The City will also continue to pursue and utilize funding when needed to implement portions of these plans.

T-1.5 Bicycle Parking Standards. Through the development review process, enforce the following short-term and long-term bicycle parking standards for new non-residential development (consistent with 2010 California Green Building Code [CalGreen], Section 5.106.4), and implement through conditions of approval:

- *Short-Term Bicycle Parking:* If the project is anticipated to generate visitor traffic, provide permanently anchored bicycle racks within 200 feet of the visitor entrance, readily visible to passers-by, for 5% of visitor motorized vehicle parking capacity, with a minimum of one two-bike capacity rack.

- *Long-Term Bicycle Parking:* For buildings with over 10 tenant occupants, provide secure bicycle parking for 5% of tenant-occupied motorized vehicle parking capacity, with a minimum of one space.

E-1.1 Tree Planting Requirements. Through the development review process, require new development to plant at minimum one 15-gallon nondeciduous, umbrella-form tree per 30 linear feet of boundary length near buildings, per the Municipal Code. Trees shall be planted in strategic locations around buildings or to shade pavement in parking lots and streets.

E-1.3 Energy Efficient Building Standards. Adopt an ordinance requiring that all new construction exceed the California Energy Code requirements, based on the 2008 Energy Efficiency Standards by 15% (consistent with CalGreen Tier 1), through either the performance based or prescriptive approach described in the California Green Building Code; implement through conditions of approval. Alternately, a solar photovoltaic system and/or solar water heating may be used to assist in meeting all or a portion of the 15% requirement.

E-4.1 Landscaping Ordinance. Through the development review process, enforce the City's Assembly Bill 1881 Landscaping Ordinance; implement through conditions of approval.

E-4.2 Indoor Water Conservation Requirements. Amend the City's Uniform Building Code to require development projects to reduce indoor water consumption by 30% (consistent with CalGreen Tier 1, Section A5.303.2.3.1), and implement through conditions of approval.

The project is anticipated to comply with all the applicable CAP measures as stated in Appendix D of the City of Lake Elsinore Climate Action Plan. The project will be subject to 2013 Title 24 standards which are 30% more efficient than 2008 Title 24 standards. The project will also comply with CalGreen Standards. The project is anticipated to plant at least two trees per residential lot and include landscaping that complies with the City's AB1881 Landscape Ordinance. It is anticipated that the project will divert 65% or more of nonhazardous construction and demolition debris generated at the site.

The project-related GHG emissions are well under the screening SCAQMD draft threshold of 3,000 metric tons CO_2e per year for all land uses and is consistent will applicable measure of the City of Lake Elsinore CAP. Impacts to global climate change are considered to be less than significant.

Table 11

Project-Related Greenhouse Gas Emissions[1]

Category	Greenhouse Gas Emissions (Metric Tons/Year)					
	Bio-CO2	NonBio-CO_2	CO_2	CH_4	N_2O	CO_2e
Area Sources[2]	7.86	16.35	24.21	0.02	0.00	24.90
Energy Usage[3]	0.00	295.97	295.97	0.01	0.00	297.42
Mobile Sources[4]	0.00	1,024.20	1,024.20	0.04	0.00	1,024.94
Solid Waste[5]	17.64	0.00	17.64	1.04	0.00	39.54
Water[6]	1.53	27.63	29.16	0.16	0.00	33.72
Construction[7]	0.00	20.13	20.13	0.00	0.00	20.23
Total Emissions	27.03	1,384.28	1,411.32	1.27	0.00	**1,440.74**
Threshold						**3,000**
Exceeds Threshold?						**No**

[1] Source: CalEEMod Version 2013.2.1

[2] Area sources consist of GHG emissions from consumer products, architectural coatings, and landscape equipment.

[3] Energy usage consist of GHG emissions from electricity and natural gas usage.

[4] Mobile sources consist of GHG emissions from vehicles.

[5] Solid waste includes the CO_2 and CH_4 emissions created from the solid waste placed in landfills.

[6] Water includes GHG emissions from electricity used for transport of water and processing of wastewater.

[7] Construction GHG emissions CO2e based on a 30 year amortization rate.

IX. Air Quality Compliance

The California Environmental Quality Act (CEQA) requires a discussion of any inconsistencies between a proposed project and applicable General Plans and Regional Plans (CEQA Guidelines Section 15125). The regional plan that applies to the proposed project includes the SCAQMD Air Quality Management Plan (AQMP). Therefore, this section discusses any potential inconsistencies of the proposed project with the AQMP.

The purpose of this discussion is to set forth the issues regarding consistency with the assumptions and objectives of the AQMP and discuss whether the proposed project would interfere with the region's ability to comply with Federal and State air quality standards. If the decision-makers determine that the proposed project is inconsistent, the lead agency may consider project modifications or inclusion of mitigation to eliminate the inconsistency.

The SCAQMD CEQA Handbook states that "New or amended General Plan Elements (including land use zoning and density amendments), Specific Plans, and significant projects must be analyzed for consistency with the AQMP." Strict consistency with all aspects of the plan is usually not required A proposed project should be considered to be consistent with the AQMP if it furthers one or more policies and does not obstruct other policies. The SCAQMD CEQA Handbook identifies two key indicators of consistency:

(1) Whether the project will result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations, or delay timely attainment of air quality standards or the interim emission reductions specified in the AQMP.

(2) Whether the project will exceed the assumptions in the AQMP in 2012 or increments based on the year of project buildout and phase.

Both of these criteria are evaluated in the following sections.

A. Criterion 1 - Increase in the Frequency or Severity of Violations

Based on the air quality modeling analysis contained in this Air Analysis, short-term construction impacts will not result in significant impacts based on the SCAQMD regional and local thresholds of significance. This Air Analysis also found that long-term operations impacts will not result in significant impacts based on the SCAQMD local and regional thresholds of significance.

Therefore, the proposed project is not projected to contribute to the exceedance of any air pollutant concentration standards and is found to be consistent with the AQMP for the first criterion.

B. Criterion 2 - Exceed Assumptions in the AQMP?

Consistency with the AQMP assumptions is determined by performing an analysis of the proposed project with the assumptions in the AQMP. The emphasis of this criterion is to insure that the analyses conducted for the proposed project are based on the same forecasts as the AQMP. The 2012-2035 Regional Transportation/Sustainable Communities Strategy, prepared by SCAG, 2012, consists of three sections: Core Chapters, Ancillary Chapters, and Bridge Chapters. The Growth Management, Regional Mobility, Air Quality, Water Quality, and Hazardous Waste Management chapters constitute the Core Chapters of the document. These chapters currently respond directly to federal and state requirements placed on SCAG. Local governments are required to use these as the basis of their plans for purposes of consistency with applicable regional plans under CEQA. For this project, the County Land Use Plan defines the assumptions that are represented in the AQMP.

The site is zoned as RE (Residential Estate) and the existing General Plan land use designation is Low-Medium Residential. The proposed single-family detached residential dwelling units would be consistent with the current General Plan land use designation. Therefore, the proposed project would not result in an inconsistency with the current land use designation in the City's General Plan. Therefore, the proposed project is not anticipated to exceed the AQMP assumptions for the project site and is found to be consistent with the AQMP for the second criterion.

Based on the above, the proposed project will not result in an inconsistency with the SCAQMD AQMP. Therefore, a less than significant impact will occur.

X. Mitigation Measures

A. Construction Measures

No construction mitigation is required.

B. Operational Measures

No operational mitigation is required.

XI. References

California Air Resources Board

2008 Resolution 08-43

2008 Recommended Approaches for Setting Interim Significance Thresholds for Greenhouse Gases under the California Environmental Quality Act

2011 Supplement to the AB 32 Scoping Plan Functional Equivalent Document

2013 Historical Air Quality, Top 4 Summary

City of Lake Elsinore

2011 City of Lake Elsinore Climate Action Plan

2011 City of Lake Elsinore Lake Elsinore Hills District Plan

2011 City of Lake Elsinore General Plan

Governor's Office of Planning and Research

2008 CEQA and Climate: Addressing Climate Change Through California Environmental Quality Act (CEQA) Review

2009 CEQA Guideline Sections to be Added or Amended

Kunzman Associates, Inc.

2014 Canyon Hills – Christensen Property Traffic Impact Analysis.

South Coast Air Quality Management District

1993 CEQA Air Quality Handbook

2005 Rule 403 Fugitive Dust

2007 2007 Air Quality Management Plan

2008 Final Localized Significance Threshold Methodology, Revised

2011 Appendix A Calculation Details for CalEEMod

2012 Revised Draft 2012 Air Quality Management Plan

Southern California Association of Governments

2012 2012-2035 Regional Transportation Plan/Sustainable Communities Strategy

Appendices

Appendix A – Glossary of Terms

Appendix B – CalEEMod Model Daily Emissions Printouts

Appendix C – CalEEMod Model Annual Emissions Printouts

APPENDIX A

Glossary of Terms

AQMP	Air Quality Management Plan
BACT	Best Available Control Technologies
CAAQS	California Ambient Air Quality Standards
CalEPA	California Environmental Protection Agency
CARB	California Air Resources Board
CCAA	California Clean Air Act
CCAR	California Climate Action Registry
CEQA	California Environmental Quality Act
CFCs	Chlorofluorocarbons
CH_4	Methane
CNG	Compressed natural gas
CO	Carbon monoxide
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
DPM	Diesel particulate matter
EPA	U.S. Environmental Protection Agency
GHG	Greenhouse gas
GWP	Global warming potential
HIDPM	Hazard Index Diesel Particulate Matter
HFCs	Hydrofluorocarbons
IPCC	International Panel on Climate Change
LCFS	Low Carbon Fuel Standard
LST	Localized Significant Thresholds
$MTCO_2e$	Metric tons of carbon dioxide equivalent
$MMTCO_2e$	Million metric tons of carbon dioxide equivalent
MPO	Metropolitan Planning Organization
NAAQS	National Ambient Air Quality Standards
NOx	Nitrogen Oxides
NO_2	Nitrogen dioxide
N_2O	Nitrous oxide
O_3	Ozone
OPR	Governor’s Office of Planning and Research
PFCs	Perfluorocarbons
PM	Particle matter
PM10	Particles that are less than 10 micrometers in diameter
PM2.5	Particles that are less than 2.5 micrometers in diameter
PMI	Point of maximum impact
PPM	Parts per million
PPB	Parts per billion
RTIP	Regional Transportation Improvement Plan
RTP	Regional Transportation Plan
SANBAG	San Bernardino Association of Governments
SCAB	South Coast Air Basin
SCAG	Southern California Association of Governments

SCAQMD	South Coast Air Quality Management District
SF_6	Sulfur hexafluoride
SIP	State Implementation Plan
SOx	Sulfur Oxides
TAC	Toxic air contaminants
VOC	Volatile organic compounds

APPENDIX B

CalEEMod Model Daily Emissions Printouts

Canyon Hills - 5590b

Riverside-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	74.00	Dwelling Unit	20.20	133,200.00	212

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2016
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	630.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation

Project Characteristics -

Land Use - 20.2 acres

Construction Phase - Construction schedule from developer.

Off-road Equipment - Approx. 5 acres paved

Trips and VMT -

Grading - grading over 20.2 acres. 29,700 CY material imported over 45 days of grading = 660 CY per day.

Architectural Coating - SCAQMD rule 1113

Vehicle Trips - trip rate 9.52/du per TIA

Area Coating - SCAQMD rule 1113

Sequestration - Est. 2 trees per lot

Construction Off-road Equipment Mitigation -

Mobile Land Use Mitigation -

Mobile Commute Mitigation -

Area Mitigation - SCAQMD rule 1113

Energy Mitigation - 2013 Title 24 standards 30% more efficient than 2008 Title 24 standards
Energy star appliances will be used

Water Mitigation - Green Bldg standards

Waste Mitigation -

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Residential_Exterior	100.00	50.00
tblAreaMitigation	UseLowVOCPaintResidentialExteriorValue	100	50
tblConstructionPhase	NumDays	20.00	86.00
tblConstructionPhase	NumDays	370.00	284.00
tblConstructionPhase	NumDays	35.00	45.00
tblConstructionPhase	NumDays	20.00	86.00
tblConstructionPhase	PhaseEndDate	5/1/2017	12/31/2016
tblConstructionPhase	PhaseStartDate	12/31/2016	9/2/2016
tblGrading	AcresOfGrading	112.50	20.20
tblGrading	MaterialImported	0.00	660.00
tblLandUse	LotAcreage	24.03	20.20
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblProjectCharacteristics	OperationalYear	2014	2016
tblSequestration	NumberOfNewTrees	0.00	148.00
tblVehicleTrips	ST_TR	10.08	9.52
tblVehicleTrips	SU_TR	8.77	9.52
tblVehicleTrips	WD_TR	9.57	9.52

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					
2015	6.8848	79.5834	52.3624	0.0655	6.7469	3.8122	10.5591	3.4278	3.5072	6.9351	0.0000	6,821.4926	6,821.4926	1.9476	0.0000	6,862.3928
2016	11.1546	29.2998	20.7408	0.0321	0.3521	1.9823	2.3344	0.0944	1.8622	1.9566	0.0000	3,137.8976	3,137.8976	0.6761	0.0000	3,152.0946
Total	**18.0394**	**108.8832**	**73.1032**	**0.0976**	**7.0990**	**5.7945**	**12.8935**	**3.5222**	**5.3694**	**8.8916**	**0.0000**	**9,959.3901**	**9,959.3901**	**2.6237**	**0.0000**	**10,014.4875**

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					
2015	6.8848	79.5834	52.3624	0.0655	2.7830	3.8122	6.5952	1.3772	3.5072	4.8845	0.0000	6,821.4926	6,821.4926	1.9476	0.0000	6,862.3928
2016	11.1546	29.2998	20.7408	0.0321	0.3521	1.9823	2.3344	0.0944	1.8622	1.9566	0.0000	3,137.8976	3,137.8976	0.6761	0.0000	3,152.0946
Total	**18.0394**	**108.8832**	**73.1032**	**0.0976**	**3.1352**	**5.7945**	**8.9297**	**1.4716**	**5.3694**	**6.8410**	**0.0000**	**9,959.3901**	**9,959.3901**	**2.6237**	**0.0000**	**10,014.4875**

	ROG	**NOx**	**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**	**55.84**	**0.00**	**30.74**	**58.22**	**0.00**	**23.06**	**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	22.5084	0.5644	43.3857	0.0595		5.6861	5.6861		5.6852	5.6852	693.1520	1,342.9929	2,036.1448	2.0783	0.0471	2,094.3738
Energy	0.0738	0.6309	0.2685	4.0300e-003		0.0510	0.0510		0.0510	0.0510		805.3995	805.3995	0.0154	0.0148	810.3011
Mobile	2.7290	8.6085	30.7191	0.0750	5.1003	0.1251	5.2254	1.3611	0.1150	1.4761		6,569.1811	6,569.1811	0.2134		6,573.6620
Total	**25.3112**	**9.8038**	**74.3732**	**0.1386**	**5.1003**	**5.8622**	**10.9625**	**1.3611**	**5.8513**	**7.2124**	**693.1520**	**8,717.5735**	**9,410.7255**	**2.3071**	**0.0618**	**9,478.3369**

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	3.1899	0.0724	6.1972	3.2000e-004		0.1227	0.1227		0.1218	0.1218	0.0000	1,421.3458	1,421.3458	0.0382	0.0259	1,430.1642
Energy	0.0556	0.4750	0.2021	3.0300e-003		0.0384	0.0384		0.0384	0.0384		606.3560	606.3560	0.0116	0.0111	610.0462
Mobile	2.7118	8.4614	30.2493	0.0736	5.0001	0.1227	5.1228	1.3344	0.1129	1.4472		6,443.4831	6,443.4831	0.2096		6,447.8843
Total	**5.9574**	**9.0088**	**36.6487**	**0.0769**	**5.0001**	**0.2839**	**5.2839**	**1.3344**	**0.2730**	**1.6074**	**0.0000**	**8,471.1849**	**8,471.1849**	**0.2594**	**0.0370**	**8,488.0948**

	ROG	NOx	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	76.46	8.11	50.72	44.47	1.96	95.16	51.80	1.96	95.33	77.71	100.00	2.83	9.98	88.76	40.18	10.45

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Grading	Grading	6/1/2015	7/31/2015	5	45	
2	Building Construction	Building Construction	8/1/2015	9/1/2016	5	284	
3	Paving	Paving	9/2/2016	12/30/2016	5	86	
4	Architectural Coating	Architectural Coating	9/2/2016	12/31/2016	5	86	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 20.2

Acres of Paving: 0

Residential Indoor: 269,730; Residential Outdoor: 89,910; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Grading	Excavators	2	8.00	162	0.38
Grading	Graders	1	8.00	174	0.41
Grading	Rubber Tired Dozers	1	8.00	255	0.40
Grading	Scrapers	2	8.00	361	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	226	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	Pavers	1	8.00	125	0.42
Paving	Paving Equipment	1	8.00	130	0.36
Paving	Rollers	1	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Grading	8	20.00	0.00	65.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	27.00	8.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	3	8.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	5.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Grading - 2015

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					6.4981	0.0000	6.4981	3.3616	0.0000	3.3616			0.0000			0.0000
Off-Road	6.7751	79.0467	50.8400	0.0618		3.8022	3.8022		3.4980	3.4980		6,486.2433	6,486.2433	1.9364		6,526.9080
Total	**6.7751**	**79.0467**	**50.8400**	**0.0618**	**6.4981**	**3.8022**	**10.3003**	**3.3616**	**3.4980**	**6.8596**		**6,486.2433**	**6,486.2433**	**1.9364**		**6,526.9080**

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	0.0245	0.4357	0.2602	1.0300e-003	0.0252	8.5800e-003	0.0338	6.9000e-003	7.8900e-003	0.0148		104.9430	104.9430	7.4000e-004		104.9585
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	0.0852	0.1010	1.2622	2.6800e-003	0.2236	1.4600e-003	0.2250	0.0593	1.3400e-003	0.0606		230.3063	230.3063	0.0105		230.5263
Total	**0.1097**	**0.5367**	**1.5224**	**3.7100e-003**	**0.2488**	**0.0100**	**0.2588**	**0.0662**	**9.2300e-003**	**0.0754**		**335.2493**	**335.2493**	**0.0112**		**335.4848**

3.2 Grading - 2015

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					2.5343	0.0000	2.5343	1.3110	0.0000	1.3110			0.0000			0.0000
Off-Road	6.7751	79.0467	50.8400	0.0618		3.8022	3.8022		3.4980	3.4980	0.0000	6,486.2433	6,486.2433	1.9364		6,526.9080
Total	**6.7751**	**79.0467**	**50.8400**	**0.0618**	**2.5343**	**3.8022**	**6.3365**	**1.3110**	**3.4980**	**4.8090**	**0.0000**	**6,486.2433**	**6,486.2433**	**1.9364**		**6,526.9080**

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	0.0245	0.4357	0.2602	1.0300e-003	0.0252	8.5800e-003	0.0338	6.9000e-003	7.8900e-003	0.0148		104.9430	104.9430	7.4000e-004		104.9585
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	0.0852	0.1010	1.2622	2.6800e-003	0.2236	1.4600e-003	0.2250	0.0593	1.3400e-003	0.0606		230.3063	230.3063	0.0105		230.5263
Total	**0.1097**	**0.5367**	**1.5224**	**3.7100e-003**	**0.2488**	**0.0100**	**0.2588**	**0.0662**	**9.2300e-003**	**0.0754**		**335.2493**	**335.2493**	**0.0112**		**335.4848**

3.3 Building Construction - 2015

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	3.6591	30.0299	18.7446	0.0268		2.1167	2.1167		1.9904	1.9904		2,689.5771	2,689.5771	0.6748		2,703.7483
Total	**3.6591**	**30.0299**	**18.7446**	**0.0268**		**2.1167**	**2.1167**		**1.9904**	**1.9904**		**2,689.5771**	**2,689.5771**	**0.6748**		**2,703.7483**

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	0.0702	0.7636	0.7554	1.6900e-003	0.0503	0.0154	0.0658	0.0144	0.0142	0.0286		171.0149	171.0149	1.2300e-003		171.0407
Worker	0.1150	0.1364	1.7040	3.6200e-003	0.3018	1.9700e-003	0.3038	0.0800	1.8000e-003	0.0818		310.9135	310.9135	0.0141		311.2105
Total	**0.1852**	**0.9000**	**2.4594**	**5.3100e-003**	**0.3521**	**0.0174**	**0.3695**	**0.0944**	**0.0160**	**0.1104**		**481.9284**	**481.9284**	**0.0154**		**482.2512**

3.3 Building Construction - 2015

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	3.6591	30.0299	18.7446	0.0268		2.1167	2.1167		1.9904	1.9904	0.0000	2,689.5771	2,689.5771	0.6748		2,703.7483
Total	**3.6591**	**30.0299**	**18.7446**	**0.0268**		**2.1167**	**2.1167**		**1.9904**	**1.9904**	**0.0000**	**2,689.5771**	**2,689.5771**	**0.6748**		**2,703.7483**

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	0.0702	0.7636	0.7554	1.6900e-003	0.0503	0.0154	0.0658	0.0144	0.0142	0.0286		171.0149	171.0149	1.2300e-003		171.0407
Worker	0.1150	0.1364	1.7040	3.6200e-003	0.3018	1.9700e-003	0.3038	0.0800	1.8000e-003	0.0818		310.9135	310.9135	0.0141		311.2105
Total	**0.1852**	**0.9000**	**2.4594**	**5.3100e-003**	**0.3521**	**0.0174**	**0.3695**	**0.0944**	**0.0160**	**0.1104**		**481.9284**	**481.9284**	**0.0154**		**482.2512**

3.3 Building Construction - 2016

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	3.4062	28.5063	18.5066	0.0268		1.9674	1.9674		1.8485	1.8485		2,669.2864	2,669.2864	0.6620		2,683.1890
Total	**3.4062**	**28.5063**	**18.5066**	**0.0268**		**1.9674**	**1.9674**		**1.8485**	**1.8485**		**2,669.2864**	**2,669.2864**	**0.6620**		**2,683.1890**

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	0.0622	0.6713	0.7030	1.6800e-003	0.0503	0.0130	0.0634	0.0144	0.0120	0.0264		169.0241	169.0241	1.1000e-003		169.0472
Worker	0.1035	0.1222	1.5312	3.6200e-003	0.3018	1.8900e-003	0.3037	0.0800	1.7300e-003	0.0818		299.5870	299.5870	0.0129		299.8584
Total	**0.1657**	**0.7935**	**2.2342**	**5.3000e-003**	**0.3521**	**0.0149**	**0.3670**	**0.0944**	**0.0137**	**0.1081**		**468.6112**	**468.6112**	**0.0140**		**468.9056**

3.3 Building Construction - 2016

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	3.4062	28.5063	18.5066	0.0268		1.9674	1.9674		1.8485	1.8485	0.0000	2,669.2864	2,669.2864	0.6620		2,683.1890
Total	**3.4062**	**28.5063**	**18.5066**	**0.0268**		**1.9674**	**1.9674**		**1.8485**	**1.8485**	**0.0000**	**2,669.2864**	**2,669.2864**	**0.6620**		**2,683.1890**

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	0.0622	0.6713	0.7030	1.6800e-003	0.0503	0.0130	0.0634	0.0144	0.0120	0.0264		169.0241	169.0241	1.1000e-003		169.0472
Worker	0.1035	0.1222	1.5312	3.6200e-003	0.3018	1.8900e-003	0.3037	0.0800	1.7300e-003	0.0818		299.5870	299.5870	0.0129		299.8584
Total	**0.1657**	**0.7935**	**2.2342**	**5.3000e-003**	**0.3521**	**0.0149**	**0.3670**	**0.0944**	**0.0137**	**0.1081**		**468.6112**	**468.6112**	**0.0140**		**468.9056**

3.4 Paving - 2016

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	1.0449	11.1930	7.4088	0.0111		0.6305	0.6305		0.5800	0.5800		1,158.1884	1,158.1884	0.3494		1,165.5247
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0449**	**11.1930**	**7.4088**	**0.0111**		**0.6305**	**0.6305**		**0.5800**	**0.5800**		**1,158.1884**	**1,158.1884**	**0.3494**		**1,165.5247**

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	0.0307	0.0362	0.4537	1.0700e-003	0.0894	5.6000e-004	0.0900	0.0237	5.1000e-004	0.0242		88.7665	88.7665	3.8300e-003		88.8469
Total	**0.0307**	**0.0362**	**0.4537**	**1.0700e-003**	**0.0894**	**5.6000e-004**	**0.0900**	**0.0237**	**5.1000e-004**	**0.0242**		**88.7665**	**88.7665**	**3.8300e-003**		**88.8469**

3.4 Paving - 2016

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	1.0449	11.1930	7.4088	0.0111		0.6305	0.6305		0.5800	0.5800	0.0000	1,158.1884	1,158.1884	0.3494		1,165.5247
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0449**	**11.1930**	**7.4088**	**0.0111**		**0.6305**	**0.6305**		**0.5800**	**0.5800**	**0.0000**	**1,158.1884**	**1,158.1884**	**0.3494**		**1,165.5247**

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	0.0307	0.0362	0.4537	1.0700e-003	0.0894	5.6000e-004	0.0900	0.0237	5.1000e-004	0.0242		88.7665	88.7665	3.8300e-003		88.8469
Total	**0.0307**	**0.0362**	**0.4537**	**1.0700e-003**	**0.0894**	**5.6000e-004**	**0.0900**	**0.0237**	**5.1000e-004**	**0.0242**		**88.7665**	**88.7665**	**3.8300e-003**		**88.8469**

3.5 Architectural Coating - 2016

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					
Archit. Coating	9.6915					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.3685	2.3722	1.8839	2.9700e-003		0.1966	0.1966		0.1966	0.1966		281.4481	281.4481	0.0332		282.1449
Total	**10.0599**	**2.3722**	**1.8839**	**2.9700e-003**		**0.1966**	**0.1966**		**0.1966**	**0.1966**		**281.4481**	**281.4481**	**0.0332**		**282.1449**

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	0.0192	0.0226	0.2836	6.7000e-004	0.0559	3.5000e-004	0.0562	0.0148	3.2000e-004	0.0151		55.4791	55.4791	2.3900e-003		55.5293
Total	**0.0192**	**0.0226**	**0.2836**	**6.7000e-004**	**0.0559**	**3.5000e-004**	**0.0562**	**0.0148**	**3.2000e-004**	**0.0151**		**55.4791**	**55.4791**	**2.3900e-003**		**55.5293**

3.5 Architectural Coating - 2016

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					
Archit. Coating	9.6915					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.3685	2.3722	1.8839	2.9700e-003		0.1966	0.1966		0.1966	0.1966	0.0000	281.4481	281.4481	0.0332		282.1449
Total	**10.0599**	**2.3722**	**1.8839**	**2.9700e-003**		**0.1966**	**0.1966**		**0.1966**	**0.1966**	**0.0000**	**281.4481**	**281.4481**	**0.0332**		**282.1449**

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	0.0192	0.0226	0.2836	6.7000e-004	0.0559	3.5000e-004	0.0562	0.0148	3.2000e-004	0.0151		55.4791	55.4791	2.3900e-003		55.5293
Total	**0.0192**	**0.0226**	**0.2836**	**6.7000e-004**	**0.0559**	**3.5000e-004**	**0.0562**	**0.0148**	**3.2000e-004**	**0.0151**		**55.4791**	**55.4791**	**2.3900e-003**		**55.5293**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Increase Density

Improve Pedestrian Network

Implement School Bus Program

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	2.7118	8.4614	30.2493	0.0736	5.0001	0.1227	5.1228	1.3344	0.1129	1.4472		6,443.4831	6,443.4831	0.2096		6,447.8843
Unmitigated	2.7290	8.6085	30.7191	0.0750	5.1003	0.1251	5.2254	1.3611	0.1150	1.4761		6,569.1811	6,569.1811	0.2134		6,573.6620

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Single Family Housing	704.48	704.48	704.48	2,407,315	2,360,025
Total	704.48	704.48	704.48	2,407,315	2,360,025

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
Single Family Housing	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.462438	0.069856	0.176572	0.170752	0.045136	0.007399	0.012745	0.042494	0.000970	0.001060	0.006446	0.000893	0.003237

5.0 Energy Detail

4.4 Fleet Mix

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

Install Energy Efficient Appliances

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					
NaturalGas Mitigated	0.0556	0.4750	0.2021	3.0300e-003		0.0384	0.0384		0.0384	0.0384		606.3560	606.3560	0.0116	0.0111	610.0462
NaturalGas Unmitigated	0.0738	0.6309	0.2685	4.0300e-003		0.0510	0.0510		0.0510	0.0510		805.3995	805.3995	0.0154	0.0148	810.3011

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					
Single Family Housing	6845.9	0.0738	0.6309	0.2685	4.0300e-003		0.0510	0.0510		0.0510	0.0510		805.3995	805.3995	0.0154	0.0148	810.3011
Total		**0.0738**	**0.6309**	**0.2685**	**4.0300e-003**		**0.0510**	**0.0510**		**0.0510**	**0.0510**		**805.3995**	**805.3995**	**0.0154**	**0.0148**	**810.3011**

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					
Single Family Housing	5.15403	0.0556	0.4750	0.2021	3.0300e-003		0.0384	0.0384		0.0384	0.0384		606.3560	606.3560	0.0116	0.0111	610.0462
Total		**0.0556**	**0.4750**	**0.2021**	**3.0300e-003**		**0.0384**	**0.0384**		**0.0384**	**0.0384**		**606.3560**	**606.3560**	**0.0116**	**0.0111**	**610.0462**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Residential Exterior

Use only Natural Gas Hearths

	ROG	NOx	CO	SO2	Fugitive 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	3.1899	0.0724	6.1972	3.2000e-004		0.1227	0.1227		0.1218	0.1218	0.0000	1,421.3458	1,421.3458	0.0382	0.0259	1,430.1642
Unmitigated	22.5084	0.5644	43.3857	0.0595		5.6861	5.6861		5.6852	5.6852	693.1520	1,342.9929	2,036.1448	2.0783	0.0471	2,094.3738

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					
Consumer Products	2.6374					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	19.3907	0.4920	37.1955	0.0592		5.6527	5.6527		5.6519	5.6519	693.1520	1,332.0000	2,025.1520	2.0671	0.0471	2,083.1457
Landscaping	0.1949	0.0724	6.1902	3.2000e-004		0.0334	0.0334		0.0334	0.0334		10.9929	10.9929	0.0112		11.2281
Architectural Coating	0.2854					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**22.5084**	**0.5644**	**43.3857**	**0.0595**		**5.6861**	**5.6861**		**5.6852**	**5.6852**	**693.1520**	**1,342.9929**	**2,036.1448**	**2.0783**	**0.0471**	**2,094.3738**

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					
Consumer Products	2.6374					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.1293	1.0000e-005	7.0500e-003	0.0000		0.0893	0.0893		0.0884	0.0884	0.0000	1,410.3529	1,410.3529	0.0270	0.0259	1,418.9361
Landscaping	0.1949	0.0724	6.1902	3.2000e-004		0.0334	0.0334		0.0334	0.0334		10.9929	10.9929	0.0112		11.2281
Architectural Coating	0.2284					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**3.1899**	**0.0724**	**6.1972**	**3.2000e-004**		**0.1227**	**0.1227**		**0.1218**	**0.1218**	**0.0000**	**1,421.3458**	**1,421.3458**	**0.0382**	**0.0259**	**1,430.1642**

7.0 Water Detail

7.1 Mitigation Measures Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

Use Water Efficient Irrigation System

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

Canyon Hills - 5590b

Riverside-South Coast County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	74.00	Dwelling Unit	20.20	133,200.00	212

1.2 Other Project Characteristics

Urbanization Urban **Wind Speed (m/s)** 2.4 **Precipitation Freq (Days)** 28

Climate Zone 10 **Operational Year** 2016

Utility Company Southern California Edison

CO2 Intensity (lb/MWhr) 630.89 **CH4 Intensity (lb/MWhr)** 0.029 **N2O Intensity (lb/MWhr)** 0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - 20.2 acres

Construction Phase - Construction schedule from developer.

Off-road Equipment - Approx. 5 acres paved

Trips and VMT -

Grading - grading over 20.2 acres. 29,700 CY material imported over 45 days of grading = 660 CY per day.

Architectural Coating - SCAQMD rule 1113

Vehicle Trips - trip rate 9.52/du per TIA

Area Coating - SCAQMD rule 1113

Sequestration - Est. 2 trees per lot

Construction Off-road Equipment Mitigation -

Mobile Land Use Mitigation -

Mobile Commute Mitigation -

Area Mitigation - SCAQMD rule 1113

Energy Mitigation - 2013 Title 24 standards 30% more efficient than 2008 Title 24 standards
Energy star appliances will be used

Water Mitigation - Green Bldg standards

Waste Mitigation -

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Residential_Exterior	100.00	50.00
tblAreaMitigation	UseLowVOCPaintResidentialExteriorValue	100	50
tblConstructionPhase	NumDays	20.00	86.00
tblConstructionPhase	NumDays	370.00	284.00
tblConstructionPhase	NumDays	35.00	45.00
tblConstructionPhase	NumDays	20.00	86.00
tblConstructionPhase	PhaseEndDate	5/1/2017	12/31/2016
tblConstructionPhase	PhaseStartDate	12/31/2016	9/2/2016
tblGrading	AcresOfGrading	112.50	20.20
tblGrading	MaterialImported	0.00	660.00
tblLandUse	LotAcreage	24.03	20.20
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblProjectCharacteristics	OperationalYear	2014	2016
tblSequestration	NumberOfNewTrees	0.00	148.00
tblVehicleTrips	ST_TR	10.08	9.52
tblVehicleTrips	SU_TR	8.77	9.52
tblVehicleTrips	WD_TR	9.57	9.52

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					
2015	6.8821	79.6067	52.2144	0.0652	6.7469	3.8122	10.5591	3.4278	3.5073	6.9351	0.0000	6,801.4159	6,801.4159	1.9476	0.0000	6,842.3163
2016	11.1523	29.3247	20.6253	0.0318	0.3521	1.9824	2.3346	0.0944	1.8623	1.9567	0.0000	3,110.6242	3,110.6242	0.6761	0.0000	3,124.8221
Total	**18.0344**	**108.9314**	**72.8397**	**0.0970**	**7.0990**	**5.7947**	**12.8937**	**3.5222**	**5.3695**	**8.8918**	**0.0000**	**9,912.0401**	**9,912.0401**	**2.6237**	**0.0000**	**9,967.1384**

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					
2015	6.8821	79.6067	52.2144	0.0652	2.7830	3.8122	6.5953	1.3772	3.5073	4.8845	0.0000	6,801.4159	6,801.4159	1.9476	0.0000	6,842.3163
2016	11.1523	29.3247	20.6253	0.0318	0.3521	1.9824	2.3346	0.0944	1.8623	1.9567	0.0000	3,110.6242	3,110.6242	0.6761	0.0000	3,124.8221
Total	**18.0344**	**108.9314**	**72.8397**	**0.0970**	**3.1352**	**5.7947**	**8.9298**	**1.4716**	**5.3695**	**6.8412**	**0.0000**	**9,912.0401**	**9,912.0401**	**2.6237**	**0.0000**	**9,967.1384**

	ROG	**NOx**	**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**	**55.84**	**0.00**	**30.74**	**58.22**	**0.00**	**23.06**	**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	22.5084	0.5644	43.3857	0.0595		5.6861	5.6861		5.6852	5.6852	693.1520	1,342.9929	2,036.1448	2.0783	0.0471	2,094.3738
Energy	0.0738	0.6309	0.2685	4.0300e-003		0.0510	0.0510		0.0510	0.0510		805.3995	805.3995	0.0154	0.0148	810.3011
Mobile	2.6651	8.9769	28.5637	0.0700	5.1003	0.1256	5.2259	1.3611	0.1155	1.4766		6,146.3338	6,146.3338	0.2136		6,150.8197
Total	**25.2474**	**10.1722**	**72.2179**	**0.1335**	**5.1003**	**5.8627**	**10.9630**	**1.3611**	**5.8517**	**7.2128**	**693.1520**	**8,294.7262**	**8,987.8782**	**2.3074**	**0.0618**	**9,055.4946**

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	3.1899	0.0724	6.1972	3.2000e-004		0.1227	0.1227		0.1218	0.1218	0.0000	1,421.3458	1,421.3458	0.0382	0.0259	1,430.1642
Energy	0.0556	0.4750	0.2021	3.0300e-003		0.0384	0.0384		0.0384	0.0384		606.3560	606.3560	0.0116	0.0111	610.0462
Mobile	2.6488	8.8224	28.1647	0.0686	5.0001	0.1232	5.1233	1.3344	0.1133	1.4477		6,028.8005	6,028.8005	0.2098		6,033.2067
Total	**5.8943**	**9.3698**	**34.5641**	**0.0720**	**5.0001**	**0.2844**	**5.2844**	**1.3344**	**0.2735**	**1.6079**	**0.0000**	**8,056.5023**	**8,056.5023**	**0.2597**	**0.0370**	**8,073.4172**

	ROG	NOx	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	76.65	7.89	52.14	46.09	1.96	95.15	51.80	1.96	95.33	77.71	100.00	2.87	10.36	88.75	40.18	10.85

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Grading	Grading	6/1/2015	7/31/2015	5	45	
2	Building Construction	Building Construction	8/1/2015	9/1/2016	5	284	
3	Paving	Paving	9/2/2016	12/30/2016	5	86	
4	Architectural Coating	Architectural Coating	9/2/2016	12/31/2016	5	86	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 20.2

Acres of Paving: 0

Residential Indoor: 269,730; Residential Outdoor: 89,910; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Grading	Excavators	2	8.00	162	0.38
Grading	Graders	1	8.00	174	0.41
Grading	Rubber Tired Dozers	1	8.00	255	0.40
Grading	Scrapers	2	8.00	361	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	226	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	Pavers	1	8.00	125	0.42
Paving	Paving Equipment	1	8.00	130	0.36
Paving	Rollers	1	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Grading	8	20.00	0.00	65.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	27.00	8.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	3	8.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	5.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Grading - 2015

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					6.4981	0.0000	6.4981	3.3616	0.0000	3.3616			0.0000			0.0000
Off-Road	6.7751	79.0467	50.8400	0.0618		3.8022	3.8022		3.4980	3.4980		6,486.2433	6,486.2433	1.9364		6,526.9080
Total	**6.7751**	**79.0467**	**50.8400**	**0.0618**	**6.4981**	**3.8022**	**10.3003**	**3.3616**	**3.4980**	**6.8596**		**6,486.2433**	**6,486.2433**	**1.9364**		**6,526.9080**

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	0.0255	0.4524	0.2840	1.0300e-003	0.0252	8.6100e-003	0.0338	6.9000e-003	7.9200e-003	0.0148		104.6856	104.6856	7.5000e-004		104.7014
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	0.0814	0.1077	1.0905	2.4500e-003	0.2236	1.4600e-003	0.2250	0.0593	1.3400e-003	0.0606		210.4869	210.4869	0.0105		210.7069
Total	**0.1069**	**0.5601**	**1.3745**	**3.4800e-003**	**0.2488**	**0.0101**	**0.2588**	**0.0662**	**9.2600e-003**	**0.0754**		**315.1726**	**315.1726**	**0.0112**		**315.4083**

3.2 Grading - 2015

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					2.5343	0.0000	2.5343	1.3110	0.0000	1.3110			0.0000			0.0000
Off-Road	6.7751	79.0467	50.8400	0.0618		3.8022	3.8022		3.4980	3.4980	0.0000	6,486.2433	6,486.2433	1.9364		6,526.9080
Total	**6.7751**	**79.0467**	**50.8400**	**0.0618**	**2.5343**	**3.8022**	**6.3365**	**1.3110**	**3.4980**	**4.8090**	**0.0000**	**6,486.2433**	**6,486.2433**	**1.9364**		**6,526.9080**

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	0.0255	0.4524	0.2840	1.0300e-003	0.0252	8.6100e-003	0.0338	6.9000e-003	7.9200e-003	0.0148		104.6856	104.6856	7.5000e-004		104.7014
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	0.0814	0.1077	1.0905	2.4500e-003	0.2236	1.4600e-003	0.2250	0.0593	1.3400e-003	0.0606		210.4869	210.4869	0.0105		210.7069
Total	**0.1069**	**0.5601**	**1.3745**	**3.4800e-003**	**0.2488**	**0.0101**	**0.2588**	**0.0662**	**9.2600e-003**	**0.0754**		**315.1726**	**315.1726**	**0.0112**		**315.4083**

3.3 Building Construction - 2015

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	3.6591	30.0299	18.7446	0.0268		2.1167	2.1167		1.9904	1.9904		2,689.5771	2,689.5771	0.6748		2,703.7483
Total	**3.6591**	**30.0299**	**18.7446**	**0.0268**		**2.1167**	**2.1167**		**1.9904**	**1.9904**		**2,689.5771**	**2,689.5771**	**0.6748**		**2,703.7483**

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	0.0748	0.7835	0.8507	1.6700e-003	0.0503	0.0156	0.0659	0.0144	0.0143	0.0287		169.5426	169.5426	1.2700e-003		169.5693
Worker	0.1099	0.1454	1.4721	3.3100e-003	0.3018	1.9700e-003	0.3038	0.0800	1.8000e-003	0.0818		284.1574	284.1574	0.0141		284.4544
Total	**0.1848**	**0.9289**	**2.3228**	**4.9800e-003**	**0.3521**	**0.0176**	**0.3697**	**0.0944**	**0.0161**	**0.1106**		**453.7000**	**453.7000**	**0.0154**		**454.0236**

3.3 Building Construction - 2015

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	3.6591	30.0299	18.7446	0.0268		2.1167	2.1167		1.9904	1.9904	0.0000	2,689.5771	2,689.5771	0.6748		2,703.7483
Total	**3.6591**	**30.0299**	**18.7446**	**0.0268**		**2.1167**	**2.1167**		**1.9904**	**1.9904**	**0.0000**	**2,689.5771**	**2,689.5771**	**0.6748**		**2,703.7483**

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	0.0748	0.7835	0.8507	1.6700e-003	0.0503	0.0156	0.0659	0.0144	0.0143	0.0287		169.5426	169.5426	1.2700e-003		169.5693
Worker	0.1099	0.1454	1.4721	3.3100e-003	0.3018	1.9700e-003	0.3038	0.0800	1.8000e-003	0.0818		284.1574	284.1574	0.0141		284.4544
Total	**0.1848**	**0.9289**	**2.3228**	**4.9800e-003**	**0.3521**	**0.0176**	**0.3697**	**0.0944**	**0.0161**	**0.1106**		**453.7000**	**453.7000**	**0.0154**		**454.0236**

3.3 Building Construction - 2016

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	3.4062	28.5063	18.5066	0.0268		1.9674	1.9674		1.8485	1.8485		2,669.2864	2,669.2864	0.6620		2,683.1890
Total	**3.4062**	**28.5063**	**18.5066**	**0.0268**		**1.9674**	**1.9674**		**1.8485**	**1.8485**		**2,669.2864**	**2,669.2864**	**0.6620**		**2,683.1890**

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	0.0663	0.6882	0.7993	1.6700e-003	0.0503	0.0132	0.0635	0.0144	0.0121	0.0265		167.5613	167.5613	1.1400e-003		167.5852
Worker	0.0987	0.1301	1.3194	3.3100e-003	0.3018	1.8900e-003	0.3037	0.0800	1.7300e-003	0.0818		273.7765	273.7765	0.0129		274.0478
Total	**0.1650**	**0.8183**	**2.1186**	**4.9800e-003**	**0.3521**	**0.0150**	**0.3672**	**0.0944**	**0.0138**	**0.1082**		**441.3378**	**441.3378**	**0.0141**		**441.6330**

3.3 Building Construction - 2016

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	3.4062	28.5063	18.5066	0.0268		1.9674	1.9674		1.8485	1.8485	0.0000	2,669.2864	2,669.2864	0.6620		2,683.1890
Total	**3.4062**	**28.5063**	**18.5066**	**0.0268**		**1.9674**	**1.9674**		**1.8485**	**1.8485**	**0.0000**	**2,669.2864**	**2,669.2864**	**0.6620**		**2,683.1890**

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	0.0663	0.6882	0.7993	1.6700e-003	0.0503	0.0132	0.0635	0.0144	0.0121	0.0265		167.5613	167.5613	1.1400e-003		167.5852
Worker	0.0987	0.1301	1.3194	3.3100e-003	0.3018	1.8900e-003	0.3037	0.0800	1.7300e-003	0.0818		273.7765	273.7765	0.0129		274.0478
Total	**0.1650**	**0.8183**	**2.1186**	**4.9800e-003**	**0.3521**	**0.0150**	**0.3672**	**0.0944**	**0.0138**	**0.1082**		**441.3378**	**441.3378**	**0.0141**		**441.6330**

3.4 Paving - 2016

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	1.0449	11.1930	7.4088	0.0111		0.6305	0.6305		0.5800	0.5800		1,158.1884	1,158.1884	0.3494		1,165.5247
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0449**	**11.1930**	**7.4088**	**0.0111**		**0.6305**	**0.6305**		**0.5800**	**0.5800**		**1,158.1884**	**1,158.1884**	**0.3494**		**1,165.5247**

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	0.0292	0.0386	0.3909	9.8000e-004	0.0894	5.6000e-004	0.0900	0.0237	5.1000e-004	0.0242		81.1190	81.1190	3.8300e-003		81.1994
Total	**0.0292**	**0.0386**	**0.3909**	**9.8000e-004**	**0.0894**	**5.6000e-004**	**0.0900**	**0.0237**	**5.1000e-004**	**0.0242**		**81.1190**	**81.1190**	**3.8300e-003**		**81.1994**

3.4 Paving - 2016

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	1.0449	11.1930	7.4088	0.0111		0.6305	0.6305		0.5800	0.5800	0.0000	1,158.1884	1,158.1884	0.3494		1,165.5247
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0449**	**11.1930**	**7.4088**	**0.0111**		**0.6305**	**0.6305**		**0.5800**	**0.5800**	**0.0000**	**1,158.1884**	**1,158.1884**	**0.3494**		**1,165.5247**

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	0.0292	0.0386	0.3909	9.8000e-004	0.0894	5.6000e-004	0.0900	0.0237	5.1000e-004	0.0242		81.1190	81.1190	3.8300e-003		81.1994
Total	**0.0292**	**0.0386**	**0.3909**	**9.8000e-004**	**0.0894**	**5.6000e-004**	**0.0900**	**0.0237**	**5.1000e-004**	**0.0242**		**81.1190**	**81.1190**	**3.8300e-003**		**81.1994**

3.5 Architectural Coating - 2016

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					
Archit. Coating	9.6915					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.3685	2.3722	1.8839	2.9700e-003		0.1966	0.1966		0.1966	0.1966		281.4481	281.4481	0.0332		282.1449
Total	**10.0599**	**2.3722**	**1.8839**	**2.9700e-003**		**0.1966**	**0.1966**		**0.1966**	**0.1966**		**281.4481**	**281.4481**	**0.0332**		**282.1449**

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	0.0183	0.0241	0.2443	6.1000e-004	0.0559	3.5000e-004	0.0562	0.0148	3.2000e-004	0.0151		50.6994	50.6994	2.3900e-003		50.7496
Total	**0.0183**	**0.0241**	**0.2443**	**6.1000e-004**	**0.0559**	**3.5000e-004**	**0.0562**	**0.0148**	**3.2000e-004**	**0.0151**		**50.6994**	**50.6994**	**2.3900e-003**		**50.7496**

3.5 Architectural Coating - 2016

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					
Archit. Coating	9.6915					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.3685	2.3722	1.8839	2.9700e-003		0.1966	0.1966		0.1966	0.1966	0.0000	281.4481	281.4481	0.0332		282.1449
Total	**10.0599**	**2.3722**	**1.8839**	**2.9700e-003**		**0.1966**	**0.1966**		**0.1966**	**0.1966**	**0.0000**	**281.4481**	**281.4481**	**0.0332**		**282.1449**

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	0.0183	0.0241	0.2443	6.1000e-004	0.0559	3.5000e-004	0.0562	0.0148	3.2000e-004	0.0151		50.6994	50.6994	2.3900e-003		50.7496
Total	**0.0183**	**0.0241**	**0.2443**	**6.1000e-004**	**0.0559**	**3.5000e-004**	**0.0562**	**0.0148**	**3.2000e-004**	**0.0151**		**50.6994**	**50.6994**	**2.3900e-003**		**50.7496**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Increase Density

Improve Pedestrian Network

Implement School Bus Program

	ROG	NOx	CO	SO2	Fugitive 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	2.6488	8.8224	28.1647	0.0686	5.0001	0.1232	5.1233	1.3344	0.1133	1.4477		6,028.8005	6,028.8005	0.2098		6,033.2067
Unmitigated	2.6651	8.9769	28.5637	0.0700	5.1003	0.1256	5.2259	1.3611	0.1155	1.4766		6,146.3338	6,146.3338	0.2136		6,150.8197

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Single Family Housing	704.48	704.48	704.48	2,407,315	2,360,025
Total	704.48	704.48	704.48	2,407,315	2,360,025

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
Single Family Housing	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.462438	0.069856	0.176572	0.170752	0.045136	0.007399	0.012745	0.042494	0.000970	0.001060	0.006446	0.000893	0.003237

5.0 Energy Detail

4.4 Fleet Mix

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

Install Energy Efficient Appliances

	ROG	NOx	CO	SO2	Fugitive 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	0.0556	0.4750	0.2021	3.0300e-003		0.0384	0.0384		0.0384	0.0384		606.3560	606.3560	0.0116	0.0111	610.0462
NaturalGas Unmitigated	0.0738	0.6309	0.2685	4.0300e-003		0.0510	0.0510		0.0510	0.0510		805.3995	805.3995	0.0154	0.0148	810.3011

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					
Single Family Housing	6845.9	0.0738	0.6309	0.2685	4.0300e-003		0.0510	0.0510		0.0510	0.0510		805.3995	805.3995	0.0154	0.0148	810.3011
Total		**0.0738**	**0.6309**	**0.2685**	**4.0300e-003**		**0.0510**	**0.0510**		**0.0510**	**0.0510**		**805.3995**	**805.3995**	**0.0154**	**0.0148**	**810.3011**

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					
Single Family Housing	5.15403	0.0556	0.4750	0.2021	3.0300e-003		0.0384	0.0384		0.0384	0.0384		606.3560	606.3560	0.0116	0.0111	610.0462
Total		**0.0556**	**0.4750**	**0.2021**	**3.0300e-003**		**0.0384**	**0.0384**		**0.0384**	**0.0384**		**606.3560**	**606.3560**	**0.0116**	**0.0111**	**610.0462**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Residential Exterior

Use only Natural Gas Hearths

	ROG	NOx	CO	SO2	Fugitive 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	3.1899	0.0724	6.1972	3.2000e-004		0.1227	0.1227		0.1218	0.1218	0.0000	1,421.3458	1,421.3458	0.0382	0.0259	1,430.1642
Unmitigated	22.5084	0.5644	43.3857	0.0595		5.6861	5.6861		5.6852	5.6852	693.1520	1,342.9929	2,036.1448	2.0783	0.0471	2,094.3738

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	0.2854					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	2.6374					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	19.3907	0.4920	37.1955	0.0592		5.6527	5.6527		5.6519	5.6519	693.1520	1,332.0000	2,025.1520	2.0671	0.0471	2,083.1457
Landscaping	0.1949	0.0724	6.1902	3.2000e-004		0.0334	0.0334		0.0334	0.0334		10.9929	10.9929	0.0112		11.2281
Total	**22.5084**	**0.5644**	**43.3857**	**0.0595**		**5.6861**	**5.6861**		**5.6852**	**5.6852**	**693.1520**	**1,342.9929**	**2,036.1448**	**2.0783**	**0.0471**	**2,094.3738**

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					
Consumer Products	2.6374					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.1293	1.0000e-005	7.0500e-003	0.0000		0.0893	0.0893		0.0884	0.0884	0.0000	1,410.3529	1,410.3529	0.0270	0.0259	1,418.9361
Landscaping	0.1949	0.0724	6.1902	3.2000e-004		0.0334	0.0334		0.0334	0.0334		10.9929	10.9929	0.0112		11.2281
Architectural Coating	0.2284					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**3.1899**	**0.0724**	**6.1972**	**3.2000e-004**		**0.1227**	**0.1227**		**0.1218**	**0.1218**	**0.0000**	**1,421.3458**	**1,421.3458**	**0.0382**	**0.0259**	**1,430.1642**

7.0 Water Detail

7.1 Mitigation Measures Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

Use Water Efficient Irrigation System

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation

APPENDIX C

CalEEMod Model Annual Emissions Printouts

Canyon Hills - 5590b

Riverside-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	74.00	Dwelling Unit	20.20	133,200.00	212

1.2 Other Project Characteristics

Urbanization Urban **Wind Speed (m/s)** 2.4 **Precipitation Freq (Days)** 28

Climate Zone 10 **Operational Year** 2016

Utility Company Southern California Edison

CO2 Intensity (lb/MWhr) 630.89 **CH4 Intensity (lb/MWhr)** 0.029 **N2O Intensity (lb/MWhr)** 0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - 20.2 acres

Construction Phase - Construction schedule from developer.

Off-road Equipment - Approx. 5 acres paved

Trips and VMT -

Grading - grading over 20.2 acres. 29,700 CY material imported over 45 days of grading = 660 CY per day.

Architectural Coating - SCAQMD rule 1113

Vehicle Trips - trip rate 9.52/du per TIA

Area Coating - SCAQMD rule 1113

Sequestration - Est. 2 trees per lot

Construction Off-road Equipment Mitigation -

Mobile Land Use Mitigation -

Mobile Commute Mitigation -

Area Mitigation - SCAQMD rule 1113

Energy Mitigation - 2013 Title 24 standards 30% more efficient than 2008 Title 24 standards
Energy star appliances will be used

Water Mitigation - Green Bldg standards

Waste Mitigation -

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Residential_Exterior	100.00	50.00
tblAreaMitigation	UseLowVOCPaintResidentialExteriorValue	100	50
tblConstructionPhase	NumDays	20.00	86.00
tblConstructionPhase	NumDays	370.00	284.00
tblConstructionPhase	NumDays	35.00	45.00
tblConstructionPhase	NumDays	20.00	86.00
tblConstructionPhase	PhaseEndDate	5/1/2017	12/31/2016
tblConstructionPhase	PhaseStartDate	12/31/2016	9/2/2016
tblGrading	AcresOfGrading	112.50	20.20
tblGrading	MaterialImported	0.00	660.00
tblLandUse	LotAcreage	24.03	20.20
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblProjectCharacteristics	OperationalYear	2014	2016
tblSequestration	NumberOfNewTrees	0.00	148.00
tblVehicleTrips	ST_TR	10.08	9.52
tblVehicleTrips	SU_TR	8.77	9.52
tblVehicleTrips	WD_TR	9.57	9.52

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					
2015	0.3638	3.4798	2.3283	3.2000e-003	0.1706	0.2021	0.3727	0.0822	0.1883	0.2704	0.0000	294.5318	294.5318	0.0739	0.0000	296.0833
2016	0.7913	3.1537	2.2388	3.4600e-003	0.0365	0.2091	0.2455	9.7700e-003	0.1964	0.2062	0.0000	308.6518	308.6518	0.0688	0.0000	310.0972
Total	**1.1552**	**6.6335**	**4.5670**	**6.6600e-003**	**0.2070**	**0.4112**	**0.6182**	**0.0919**	**0.3846**	**0.4766**	**0.0000**	**603.1836**	**603.1836**	**0.1427**	**0.0000**	**606.1805**

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					
2015	0.3638	3.4798	2.3283	3.2000e-003	0.0814	0.2021	0.2835	0.0360	0.1883	0.2243	0.0000	294.5315	294.5315	0.0739	0.0000	296.0830
2016	0.7913	3.1537	2.2387	3.4600e-003	0.0365	0.2091	0.2455	9.7700e-003	0.1964	0.2062	0.0000	308.6514	308.6514	0.0688	0.0000	310.0969
Total	**1.1552**	**6.6335**	**4.5670**	**6.6600e-003**	**0.1179**	**0.4112**	**0.5290**	**0.0458**	**0.3846**	**0.4305**	**0.0000**	**603.1829**	**603.1829**	**0.1427**	**0.0000**	**606.1798**

	ROG	**NOx**	**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**	**43.08**	**0.00**	**14.43**	**50.18**	**0.00**	**9.68**	**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	tons/yr										MT/yr					
Area	0.8002	0.0152	1.2387	7.8000e-004		0.0748	0.0748		0.0748	0.0748	7.8602	16.3512	24.2114	0.0247	5.3000e-004	24.8957
Energy	0.0135	0.1151	0.0490	7.3000e-004		9.3100e-003	9.3100e-003		9.3100e-003	9.3100e-003	0.0000	295.9697	295.9697	0.0100	3.9900e-003	297.4176
Mobile	0.4640	1.6695	5.3663	0.0129	0.9130	0.0228	0.9358	0.2440	0.0209	0.2649	0.0000	1,024.2030	1,024.2030	0.0352	0.0000	1,024.9423
Waste						0.0000	0.0000		0.0000	0.0000	17.6440	0.0000	17.6440	1.0427	0.0000	39.5413
Water						0.0000	0.0000		0.0000	0.0000	1.5296	27.6292	29.1588	0.1584	3.9700e-003	33.7161
Total	**1.2776**	**1.7998**	**6.6540**	**0.0144**	**0.9130**	**0.1069**	**1.0199**	**0.2440**	**0.1051**	**0.3491**	**27.0338**	**1,364.1530**	**1,391.1868**	**1.2711**	**8.4900e-003**	**1,420.5130**

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	0.5490	9.0500e-003	0.7739	4.0000e-005		5.2900e-003	5.2900e-003		5.2800e-003	5.2800e-003	0.0000	17.2397	17.2397	1.5800e-003	2.9000e-004	17.3637
Energy	0.0101	0.0867	0.0369	5.5000e-004		7.0100e-003	7.0100e-003		7.0100e-003	7.0100e-003	0.0000	251.8757	251.8757	8.8900e-003	3.2800e-003	253.0794
Mobile	0.4609	1.6408	5.2912	0.0126	0.8951	0.0224	0.9174	0.2392	0.0206	0.2597	0.0000	1,004.6257	1,004.6257	0.0346	0.0000	1,005.3519
Waste						0.0000	0.0000		0.0000	0.0000	8.8220	0.0000	8.8220	0.5214	0.0000	19.7706
Water						0.0000	0.0000		0.0000	0.0000	1.2237	23.4466	24.6703	0.1267	3.1900e-003	28.3194
Total	**1.0201**	**1.7365**	**6.1020**	**0.0132**	**0.8951**	**0.0347**	**0.9297**	**0.2392**	**0.0328**	**0.2720**	**10.0457**	**1,297.1876**	**1,307.2333**	**0.6932**	**6.7600e-003**	**1,323.8851**

	ROG	NOx	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	**20.16**	**3.52**	**8.30**	**8.14**	**1.96**	**67.59**	**8.84**	**1.96**	**68.74**	**22.07**	**62.84**	**4.91**	**6.03**	**45.47**	**20.38**	**6.80**

2.3 Vegetation

Vegetation

	CO2e
Category	MT
New Trees	104.7840
Total	**104.7840**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Grading	Grading	6/1/2015	7/31/2015	5	45	
2	Building Construction	Building Construction	8/1/2015	9/1/2016	5	284	
3	Paving	Paving	9/2/2016	12/30/2016	5	86	
4	Architectural Coating	Architectural Coating	9/2/2016	12/31/2016	5	86	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 20.2

Acres of Paving: 0

Residential Indoor: 269,730; Residential Outdoor: 89,910; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Grading	Excavators	2	8.00	162	0.38
Grading	Graders	1	8.00	174	0.41
Grading	Rubber Tired Dozers	1	8.00	255	0.40
Grading	Scrapers	2	8.00	361	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	226	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	Pavers	1	8.00	125	0.42
Paving	Paving Equipment	1	8.00	130	0.36
Paving	Rollers	1	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Grading	8	20.00	0.00	65.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	27.00	8.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	3	8.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	5.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Grading - 2015

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					0.1462	0.0000	0.1462	0.0756	0.0000	0.0756	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1524	1.7786	1.1439	1.3900e-003		0.0856	0.0856		0.0787	0.0787	0.0000	132.3950	132.3950	0.0395	0.0000	133.2250
Total	**0.1524**	**1.7786**	**1.1439**	**1.3900e-003**	**0.1462**	**0.0856**	**0.2318**	**0.0756**	**0.0787**	**0.1544**	**0.0000**	**132.3950**	**132.3950**	**0.0395**	**0.0000**	**133.2250**

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	5.7000e-004	0.0103	6.5400e-003	2.0000e-005	5.6000e-004	1.9000e-004	7.5000e-004	1.5000e-004	1.8000e-004	3.3000e-004	0.0000	2.1399	2.1399	2.0000e-005	0.0000	2.1402
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.7300e-003	2.5300e-003	0.0254	6.0000e-005	4.9500e-003	3.0000e-005	4.9800e-003	1.3100e-003	3.0000e-005	1.3400e-003	0.0000	4.3549	4.3549	2.1000e-004	0.0000	4.3594
Total	**2.3000e-003**	**0.0129**	**0.0320**	**8.0000e-005**	**5.5100e-003**	**2.2000e-004**	**5.7300e-003**	**1.4600e-003**	**2.1000e-004**	**1.6700e-003**	**0.0000**	**6.4948**	**6.4948**	**2.3000e-004**	**0.0000**	**6.4996**

3.2 Grading - 2015

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					0.0570	0.0000	0.0570	0.0295	0.0000	0.0295	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1524	1.7786	1.1439	1.3900e-003		0.0856	0.0856		0.0787	0.0787	0.0000	132.3948	132.3948	0.0395	0.0000	133.2249
Total	**0.1524**	**1.7786**	**1.1439**	**1.3900e-003**	**0.0570**	**0.0856**	**0.1426**	**0.0295**	**0.0787**	**0.1082**	**0.0000**	**132.3948**	**132.3948**	**0.0395**	**0.0000**	**133.2249**

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	5.7000e-004	0.0103	6.5400e-003	2.0000e-005	5.6000e-004	1.9000e-004	7.5000e-004	1.5000e-004	1.8000e-004	3.3000e-004	0.0000	2.1399	2.1399	2.0000e-005	0.0000	2.1402
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.7300e-003	2.5300e-003	0.0254	6.0000e-005	4.9500e-003	3.0000e-005	4.9800e-003	1.3100e-003	3.0000e-005	1.3400e-003	0.0000	4.3549	4.3549	2.1000e-004	0.0000	4.3594
Total	**2.3000e-003**	**0.0129**	**0.0320**	**8.0000e-005**	**5.5100e-003**	**2.2000e-004**	**5.7300e-003**	**1.4600e-003**	**2.1000e-004**	**1.6700e-003**	**0.0000**	**6.4948**	**6.4948**	**2.3000e-004**	**0.0000**	**6.4996**

3.3 Building Construction - 2015

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	0.1994	1.6366	1.0216	1.4600e-003		0.1154	0.1154		0.1085	0.1085	0.0000	132.9769	132.9769	0.0334	0.0000	133.6776
Total	**0.1994**	**1.6366**	**1.0216**	**1.4600e-003**		**0.1154**	**0.1154**		**0.1085**	**0.1085**	**0.0000**	**132.9769**	**132.9769**	**0.0334**	**0.0000**	**133.6776**

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	4.0400e-003	0.0435	0.0476	9.0000e-005	2.7000e-003	8.4000e-004	3.5500e-003	7.7000e-004	7.8000e-004	1.5500e-003	0.0000	8.4247	8.4247	6.0000e-005	0.0000	8.4260
Worker	5.6400e-003	8.2600e-003	0.0832	1.8000e-004	0.0162	1.1000e-004	0.0163	4.2900e-003	1.0000e-004	4.3900e-003	0.0000	14.2405	14.2405	7.0000e-004	0.0000	14.2552
Total	**9.6800e-003**	**0.0518**	**0.1308**	**2.7000e-004**	**0.0189**	**9.5000e-004**	**0.0198**	**5.0600e-003**	**8.8000e-004**	**5.9400e-003**	**0.0000**	**22.6652**	**22.6652**	**7.6000e-004**	**0.0000**	**22.6812**

3.3 Building Construction - 2015

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	0.1994	1.6366	1.0216	1.4600e-003		0.1154	0.1154		0.1085	0.1085	0.0000	132.9768	132.9768	0.0334	0.0000	133.6774
Total	**0.1994**	**1.6366**	**1.0216**	**1.4600e-003**		**0.1154**	**0.1154**		**0.1085**	**0.1085**	**0.0000**	**132.9768**	**132.9768**	**0.0334**	**0.0000**	**133.6774**

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	4.0400e-003	0.0435	0.0476	9.0000e-005	2.7000e-003	8.4000e-004	3.5500e-003	7.7000e-004	7.8000e-004	1.5500e-003	0.0000	8.4247	8.4247	6.0000e-005	0.0000	8.4260
Worker	5.6400e-003	8.2600e-003	0.0832	1.8000e-004	0.0162	1.1000e-004	0.0163	4.2900e-003	1.0000e-004	4.3900e-003	0.0000	14.2405	14.2405	7.0000e-004	0.0000	14.2552
Total	**9.6800e-003**	**0.0518**	**0.1308**	**2.7000e-004**	**0.0189**	**9.5000e-004**	**0.0198**	**5.0600e-003**	**8.8000e-004**	**5.9400e-003**	**0.0000**	**22.6652**	**22.6652**	**7.6000e-004**	**0.0000**	**22.6812**

3.3 Building Construction - 2016

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	0.2980	2.4943	1.6193	2.3500e-003		0.1722	0.1722		0.1617	0.1617	0.0000	211.8844	211.8844	0.0526	0.0000	212.9880
Total	**0.2980**	**2.4943**	**1.6193**	**2.3500e-003**		**0.1722**	**0.1722**		**0.1617**	**0.1617**	**0.0000**	**211.8844**	**211.8844**	**0.0526**	**0.0000**	**212.9880**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.7400e-003	0.0614	0.0719	1.5000e-004	4.3400e-003	1.1400e-003	5.4900e-003	1.2400e-003	1.0500e-003	2.3000e-003	0.0000	13.3681	13.3681	9.0000e-005	0.0000	13.3700
Worker	8.1200e-003	0.0119	0.1197	2.9000e-004	0.0260	1.7000e-004	0.0261	6.9000e-003	1.5000e-004	7.0500e-003	0.0000	22.0283	22.0283	1.0300e-003	0.0000	22.0499
Total	**0.0139**	**0.0733**	**0.1915**	**4.4000e-004**	**0.0303**	**1.3100e-003**	**0.0316**	**8.1400e-003**	**1.2000e-003**	**9.3500e-003**	**0.0000**	**35.3965**	**35.3965**	**1.1200e-003**	**0.0000**	**35.4199**

3.3 Building Construction - 2016

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	0.2980	2.4943	1.6193	2.3500e-003		0.1722	0.1722		0.1617	0.1617	0.0000	211.8841	211.8841	0.0526	0.0000	212.9877
Total	**0.2980**	**2.4943**	**1.6193**	**2.3500e-003**		**0.1722**	**0.1722**		**0.1617**	**0.1617**	**0.0000**	**211.8841**	**211.8841**	**0.0526**	**0.0000**	**212.9877**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.7400e-003	0.0614	0.0719	1.5000e-004	4.3400e-003	1.1400e-003	5.4900e-003	1.2400e-003	1.0500e-003	2.3000e-003	0.0000	13.3681	13.3681	9.0000e-005	0.0000	13.3700
Worker	8.1200e-003	0.0119	0.1197	2.9000e-004	0.0260	1.7000e-004	0.0261	6.9000e-003	1.5000e-004	7.0500e-003	0.0000	22.0283	22.0283	1.0300e-003	0.0000	22.0499
Total	**0.0139**	**0.0733**	**0.1915**	**4.4000e-004**	**0.0303**	**1.3100e-003**	**0.0316**	**8.1400e-003**	**1.2000e-003**	**9.3500e-003**	**0.0000**	**35.3965**	**35.3965**	**1.1200e-003**	**0.0000**	**35.4199**

3.4 Paving - 2016

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	0.0449	0.4813	0.3186	4.8000e-004		0.0271	0.0271		0.0249	0.0249	0.0000	45.1797	45.1797	0.0136	0.0000	45.4659
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0449**	**0.4813**	**0.3186**	**4.8000e-004**		**0.0271**	**0.0271**		**0.0249**	**0.0249**	**0.0000**	**45.1797**	**45.1797**	**0.0136**	**0.0000**	**45.4659**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.1800e-003	1.7300e-003	0.0174	4.0000e-005	3.7800e-003	2.0000e-005	3.8100e-003	1.0000e-003	2.0000e-005	1.0300e-003	0.0000	3.2075	3.2075	1.5000e-004	0.0000	3.2107
Total	**1.1800e-003**	**1.7300e-003**	**0.0174**	**4.0000e-005**	**3.7800e-003**	**2.0000e-005**	**3.8100e-003**	**1.0000e-003**	**2.0000e-005**	**1.0300e-003**	**0.0000**	**3.2075**	**3.2075**	**1.5000e-004**	**0.0000**	**3.2107**

3.4 Paving - 2016

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	0.0449	0.4813	0.3186	4.8000e-004		0.0271	0.0271		0.0249	0.0249	0.0000	45.1797	45.1797	0.0136	0.0000	45.4658
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0449**	**0.4813**	**0.3186**	**4.8000e-004**		**0.0271**	**0.0271**		**0.0249**	**0.0249**	**0.0000**	**45.1797**	**45.1797**	**0.0136**	**0.0000**	**45.4658**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.1800e-003	1.7300e-003	0.0174	4.0000e-005	3.7800e-003	2.0000e-005	3.8100e-003	1.0000e-003	2.0000e-005	1.0300e-003	0.0000	3.2075	3.2075	1.5000e-004	0.0000	3.2107
Total	**1.1800e-003**	**1.7300e-003**	**0.0174**	**4.0000e-005**	**3.7800e-003**	**2.0000e-005**	**3.8100e-003**	**1.0000e-003**	**2.0000e-005**	**1.0300e-003**	**0.0000**	**3.2075**	**3.2075**	**1.5000e-004**	**0.0000**	**3.2107**

3.5 Architectural Coating - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.4167					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0158	0.1020	0.0810	1.3000e-004		8.4500e-003	8.4500e-003		8.4500e-003	8.4500e-003	0.0000	10.9790	10.9790	1.2900e-003	0.0000	11.0062
Total	**0.4326**	**0.1020**	**0.0810**	**1.3000e-004**		**8.4500e-003**	**8.4500e-003**		**8.4500e-003**	**8.4500e-003**	**0.0000**	**10.9790**	**10.9790**	**1.2900e-003**	**0.0000**	**11.0062**

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	7.4000e-004	1.0800e-003	0.0109	3.0000e-005	2.3600e-003	2.0000e-005	2.3800e-003	6.3000e-004	1.0000e-005	6.4000e-004	0.0000	2.0047	2.0047	9.0000e-005	0.0000	2.0067
Total	**7.4000e-004**	**1.0800e-003**	**0.0109**	**3.0000e-005**	**2.3600e-003**	**2.0000e-005**	**2.3800e-003**	**6.3000e-004**	**1.0000e-005**	**6.4000e-004**	**0.0000**	**2.0047**	**2.0047**	**9.0000e-005**	**0.0000**	**2.0067**

3.5 Architectural Coating - 2016

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.4167					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0158	0.1020	0.0810	1.3000e-004		8.4500e-003	8.4500e-003		8.4500e-003	8.4500e-003	0.0000	10.9790	10.9790	1.2900e-003	0.0000	11.0062
Total	**0.4326**	**0.1020**	**0.0810**	**1.3000e-004**		**8.4500e-003**	**8.4500e-003**		**8.4500e-003**	**8.4500e-003**	**0.0000**	**10.9790**	**10.9790**	**1.2900e-003**	**0.0000**	**11.0062**

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	7.4000e-004	1.0800e-003	0.0109	3.0000e-005	2.3600e-003	2.0000e-005	2.3800e-003	6.3000e-004	1.0000e-005	6.4000e-004	0.0000	2.0047	2.0047	9.0000e-005	0.0000	2.0067
Total	**7.4000e-004**	**1.0800e-003**	**0.0109**	**3.0000e-005**	**2.3600e-003**	**2.0000e-005**	**2.3800e-003**	**6.3000e-004**	**1.0000e-005**	**6.4000e-004**	**0.0000**	**2.0047**	**2.0047**	**9.0000e-005**	**0.0000**	**2.0067**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Increase Density

Improve Pedestrian Network

Implement School Bus Program

	ROG	NOx	CO	SO2	Fugitive 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	0.4609	1.6408	5.2912	0.0126	0.8951	0.0224	0.9174	0.2392	0.0206	0.2597	0.0000	1,004.6257	1,004.6257	0.0346	0.0000	1,005.3519
Unmitigated	0.4640	1.6695	5.3663	0.0129	0.9130	0.0228	0.9358	0.2440	0.0209	0.2649	0.0000	1,024.2030	1,024.2030	0.0352	0.0000	1,024.9423

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Single Family Housing	704.48	704.48	704.48	2,407,315	2,360,025
Total	704.48	704.48	704.48	2,407,315	2,360,025

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
Single Family Housing	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.462438	0.069856	0.176572	0.170752	0.045136	0.007399	0.012745	0.042494	0.000970	0.001060	0.006446	0.000893	0.003237

5.0 Energy Detail

4.4 Fleet Mix

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

Install Energy Efficient Appliances

	ROG	NOx	CO	SO2	Fugitive 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	151.4866	151.4866	6.9600e-003	1.4400e-003	152.0795
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	162.6267	162.6267	7.4800e-003	1.5500e-003	163.2632
NaturalGas Mitigated	0.0101	0.0867	0.0369	5.5000e-004		7.0100e-003	7.0100e-003		7.0100e-003	7.0100e-003	0.0000	100.3890	100.3890	1.9200e-003	1.8400e-003	101.0000
NaturalGas Unmitigated	0.0135	0.1151	0.0490	7.3000e-004		9.3100e-003	9.3100e-003		9.3100e-003	9.3100e-003	0.0000	133.3429	133.3429	2.5600e-003	2.4400e-003	134.1544

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					
Single Family Housing	2.49875e+006	0.0135	0.1151	0.0490	7.3000e-004		9.3100e-003	9.3100e-003		9.3100e-003	9.3100e-003	0.0000	133.3429	133.3429	2.5600e-003	2.4400e-003	134.1544
Total		**0.0135**	**0.1151**	**0.0490**	**7.3000e-004**		**9.3100e-003**	**9.3100e-003**		**9.3100e-003**	**9.3100e-003**	**0.0000**	**133.3429**	**133.3429**	**2.5600e-003**	**2.4400e-003**	**134.1544**

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					
Single Family Housing	1.88122e+006	0.0101	0.0867	0.0369	5.5000e-004		7.0100e-003	7.0100e-003		7.0100e-003	7.0100e-003	0.0000	100.3890	100.3890	1.9200e-003	1.8400e-003	101.0000
Total		**0.0101**	**0.0867**	**0.0369**	**5.5000e-004**		**7.0100e-003**	**7.0100e-003**		**7.0100e-003**	**7.0100e-003**	**0.0000**	**100.3890**	**100.3890**	**1.9200e-003**	**1.8400e-003**	**101.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Single Family Housing	568293	162.6267	7.4800e-003	1.5500e-003	163.2632
Total		**162.6267**	**7.4800e-003**	**1.5500e-003**	**163.2632**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Single Family Housing	529365	151.4866	6.9600e-003	1.4400e-003	152.0795
Total		**151.4866**	**6.9600e-003**	**1.4400e-003**	**152.0795**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Residential Exterior

Use only Natural Gas Hearths

	ROG	NOx	CO	SO2	Fugitive 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	0.5490	9.0500e-003	0.7739	4.0000e-005		5.2900e-003	5.2900e-003		5.2800e-003	5.2800e-003	0.0000	17.2397	17.2397	1.5800e-003	2.9000e-004	17.3637
Unmitigated	0.8002	0.0152	1.2387	7.8000e-004		0.0748	0.0748		0.0748	0.0748	7.8602	16.3512	24.2114	0.0247	5.3000e-004	24.8957

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	0.0521					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.4813					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.2424	6.1500e-003	0.4649	7.4000e-004		0.0707	0.0707		0.0707	0.0707	7.8602	15.1046	22.9648	0.0234	5.3000e-004	23.6225
Landscaping	0.0244	9.0500e-003	0.7738	4.0000e-005		4.1700e-003	4.1700e-003		4.1700e-003	4.1700e-003	0.0000	1.2466	1.2466	1.2700e-003	0.0000	1.2733
Total	**0.8002**	**0.0152**	**1.2387**	**7.8000e-004**		**0.0748**	**0.0748**		**0.0748**	**0.0748**	**7.8602**	**16.3512**	**24.2114**	**0.0247**	**5.3000e-004**	**24.8957**

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					
Consumer Products	0.4813					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	1.6200e-003	0.0000	9.0000e-005	0.0000		1.1200e-003	1.1200e-003		1.1000e-003	1.1000e-003	0.0000	15.9931	15.9931	3.1000e-004	2.9000e-004	16.0905
Landscaping	0.0244	9.0500e-003	0.7738	4.0000e-005		4.1700e-003	4.1700e-003		4.1700e-003	4.1700e-003	0.0000	1.2466	1.2466	1.2700e-003	0.0000	1.2733
Architectural Coating	0.0417					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.5490**	**9.0500e-003**	**0.7739**	**4.0000e-005**		**5.2900e-003**	**5.2900e-003**		**5.2700e-003**	**5.2700e-003**	**0.0000**	**17.2397**	**17.2397**	**1.5800e-003**	**2.9000e-004**	**17.3637**

7.0 Water Detail

7.1 Mitigation Measures Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

Use Water Efficient Irrigation System

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	24.6703	0.1267	3.1900e-003	28.3194
Unmitigated	29.1588	0.1584	3.9700e-003	33.7161

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Single Family Housing	4.8214 / 3.03958	29.1588	0.1584	3.9700e-003	33.7161
Total		**29.1588**	**0.1584**	**3.9700e-003**	**33.7161**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Single Family Housing	3.85712 / 2.85416	24.6703	0.1267	3.1900e-003	28.3194
Total		**24.6703**	**0.1267**	**3.1900e-003**	**28.3194**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	8.8220	0.5214	0.0000	19.7706
Unmitigated	17.6440	1.0427	0.0000	39.5413

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Single Family Housing	86.92	17.6440	1.0427	0.0000	39.5413
Total		**17.6440**	**1.0427**	**0.0000**	**39.5413**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Single Family Housing	43.46	8.8220	0.5214	0.0000	19.7706
Total		**8.8220**	**0.5214**	**0.0000**	**19.7706**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation

Category	Total CO2	CH4	N2O	CO2e
	MT			
Unmitigated	104.7840	0.0000	0.0000	104.7840

10.2 Net New Trees

Species Class

	Number of Trees	Total CO2	CH4	N2O	CO2e
		MT			
Miscellaneous	148	104.7840	0.0000	0.0000	104.7840
Total		**104.7840**	**0.0000**	**0.0000**	**104.7840**

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Appendix B
Preliminary Water Quality Management Plan

ESA

PRELIMINARY PROJECT SPECIFIC
WATER QUALITY MANAGEMENT PLAN
FOR
MEADOW RIDGE II AT CANYON HILLS
TENTATIVE TRACT MAP NO. 36682

Job Number 17039

December 30, 2013

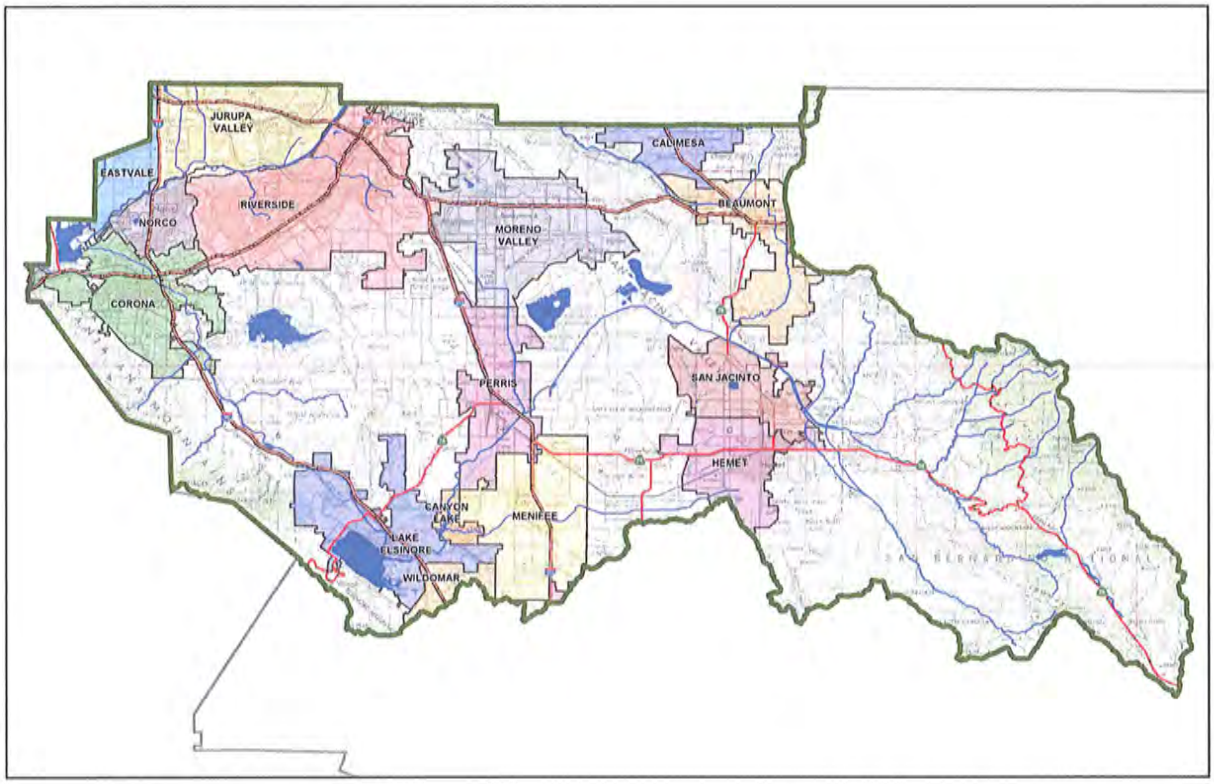
Project Specific Water Quality Management Plan

A Template for Projects located within the ***Santa Ana Watershed*** *Region of Riverside County*

Project Title: Meadow Ridge II at Canyon Hills

Development No: TTM 36682

Design Review/Case No: Residential Design Review No. 2013-___



☒ **Preliminary**
☐ **Final**

Original Date Prepared: December 30, 2013

Revision Date(s):

Prepared for Compliance with
Regional Board Order No. **R8-2010-0033**

Contact Information:

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Barry J. Cowan, P.E., Associate Principal
2 South Pointe Drive, Suite 275
Lake Forest, CA 92630
Telephone: (949) 588-0707

OWNER'S CERTIFICATION

This Project-Specific Water Quality Management Plan (WQMP) has been prepared for Pardee Homes by Rick Engineering Company for the Meadow Ridge II at Canyon Hills (TTM 36682) project.

This WQMP is intended to comply with the requirements of City of Lake Elsinore for Ordinance No. 2011-1296 which includes the requirement for the preparation and implementation of a Project-Specific WQMP.

The undersigned, while owning the property/project described in the preceding paragraph, shall be responsible for the implementation and funding of this WQMP and will ensure that this WQMP is amended as appropriate to reflect up-to-date conditions on the site. In addition, the property owner accepts responsibility for interim operation and maintenance of Stormwater BMPs until such time as this responsibility is formally transferred to a subsequent owner. This WQMP will be reviewed with the facility operator, facility supervisors, employees, tenants, maintenance and service contractors, or any other party (or parties) having responsibility for implementing portions of this WQMP. At least one copy of this WQMP will be maintained at the project site or project office in perpetuity. The undersigned is authorized to certify and to approve implementation of this WQMP. The undersigned is aware that implementation of this WQMP is enforceable under City of Lake Elsinore Water Quality Ordinance (Municipal Code Section14.08).

"I, the undersigned, certify under penalty of law that the provisions of this WQMP have been reviewed and accepted and that the WQMP will be transferred to future successors in interest."

______________________	______________________
Owner's Signature	Date
______________________	______________________
Owner's Printed Name	Owner's Title/Position

PREPARER'S CERTIFICATION

"The selection, sizing and design of stormwater treatment and other stormwater quality and quantity control measures in this plan meet the requirements of Regional Water Quality Control Board Order No. **R8-2010-0033** and any subsequent amendments thereto."

______________________	______________________
Preparer's Signature	Date
Barry J. Cowan	Associate Principle
Preparer's Printed Name	Preparer's Title/Position

Preparer's Licensure: RCE No. 46568

Table of Contents

List of Tables

List of Appendices

Section A: Project and Site Information

PROJECT INFORMATION	
Type of Project:	Residential
Planning Area:	32B
Community Name:	Canyon Hills
Development Name:	Meadow Ridge II
PROJECT LOCATION	
Latitude & Longitude (DMS): 33°40'09" / 117°13'04"	
Project Watershed and Sub-Watershed: Santa Ana / San Jacinto River, Reach-1 Lake Elsinore to Canyon Lake, Canyon Lake	
APN(s): 358-130-020-4	
Map Book and Page No.: TTM 36682	
PROJECT CHARACTERISTICS	
Proposed or Potential Land Use(s)	Single Family Residential
Proposed or Potential SIC Code(s)	N/A
Area of Impervious Project Footprint (SF)	0
Total Area of proposed Impervious Surfaces within the Project Limits (SF)/or Replacement	558,350
Does the project consist of offsite road improvements?	☒ Y ☐ N
Does the project propose to construct unpaved roads?	☐ Y ☒ N
Is the project part of a larger common plan of development (phased project)?	☒ Y ☐ N
EXISTING SITE CHARACTERISTICS	
Total area of existing Impervious Surfaces within the project limits (SF)	0
Is the project located within any MSHCP Criteria Cell?	☐ Y ☒ N
If so, identify the Cell number:	N/A
Are there any natural hydrologic features on the project site?	☐ Y ☒ N
Is a Geotechnical Report attached?	☐ Y ☒ N
If no Geotech. Report, list the NRCS soils type(s) present on the site (A, B, C and/or D)	D
What is the Water Quality Design Storm Depth for the project?	0.63 inches

A.1 Maps and Site Plans

When completing your Project-Specific WQMP, include a map of the local vicinity and existing site. In addition, include all grading, drainage, landscape/plant palette and other pertinent construction plans in Appendix 2. At a **minimum**, your WQMP Site Plan should include the following:

- Drainage Management Areas
- Proposed Structural BMPs
- Drainage Path
- Drainage Infrastructure, Inlets, Overflows
- Source Control BMPs
- Buildings, Roof Lines, Downspouts
- Impervious Surfaces
- Standard Labeling

Use your discretion on whether or not you may need to create multiple sheets or can appropriately accommodate these features on one or two sheets. Keep in mind that the Co-Permittee plan reviewer must be able to easily analyze your project utilizing this template and its associated site plans and maps.

A.2 Identify Receiving Waters

Using Table A.1 below, list in order of upstream to downstream, the receiving waters that the project site is tributary to. Continue to fill each row with the Receiving Water's 303(d) listed impairments (if any), designated beneficial uses, and proximity, if any, to a RARE beneficial use. Include a map of the receiving waters in Appendix 1.

Table A.1 Identification of Receiving Waters

Receiving Waters	EPA Approved 303(d) List Impairments	Designated Beneficial Uses	Proximity to RARE Beneficial Use
Salt Creek (802.12)	NONE	INTERMITTENT - REC1, REC2, WARM, WILD	N/A
Canyon Lake (802.11)	Nutrients, Bacteria & Viruses (Pathogens)	MUN, AGR, GWR, REC1, REC2, WARM, WILD	N/A
San Jacinto River, Reach 1- Lake Elsinore To Canyon Lake (802.32)	NONE	MUN, AGR, GWR, REC1, REC2, WARM, WILD	N/A
Lake Elsinore (802.31)	Nutrients, Organic Enrichment / Low Dissolved Oxygen, PCBs (Polychlorinated biphenyls), Sediment Toxicity, Unknown Toxicity	MUN, REC1, REC2, WARM, WILD	N/A

A.3 Additional Permits/Approvals required for the Project:

Table A.2 Other Applicable Permits

Agency	Permit Required	
State Department of Fish and Game, 1602 Streambed Alteration Agreement	☐ Y	☒ N
State Water Resources Control Board, Clean Water Act (CWA) Section 401 Water Quality Cert.	☐ Y	☒ N
US Army Corps of Engineers, CWA Section 404 Permit	☐ Y	☒ N
US Fish and Wildlife, Endangered Species Act Section 7 Biological Opinion	☐ Y	☒ N
Statewide Construction General Permit Coverage (WDID # 8-33C308189)	☒ Y	☐ N
Statewide Industrial General Permit Coverage	☐ Y	☒ N
Western Riverside MSHCP Consistency Approval (e.g., JPR, DBESP)	☐ Y	☒ N
Other *(please list in the space below as required)*	☐ Y	☐ N

If yes is answered to any of the questions above, the Co-Permittee may require proof of approval/coverage from those agencies as applicable including documentation of any associated requirements that may affect this Project-Specific WQMP.

Section B: Optimize Site Utilization (LID Principles)

Review of the information collected in Section 'A' will aid in identifying the principal constraints on site design and selection of LID BMPs as well as opportunities to reduce imperviousness and incorporate LID Principles into the site and landscape design. For example, **constraints** might include impermeable soils, high groundwater, groundwater pollution or contaminated soils, steep slopes, geotechnical instability, high-intensity land use, heavy pedestrian or vehicular traffic, utility locations or safety concerns. **Opportunities** might include existing natural areas, low areas, oddly configured or otherwise unbuildable parcels, easements and landscape amenities including open space and buffers (which can double as locations for bioretention BMPs), and differences in elevation (which can provide hydraulic head). Prepare a brief narrative for each of the site optimization strategies described below. This narrative will help you as you proceed with your LID design and explain your design decisions to others.

The 2010 Santa Ana MS4 Permit further requires that LID Retention BMPs (Infiltration Only or Harvest and Use) be used unless it can be shown that those BMPs are infeasible. Therefore, it is important that your narrative identify and justify if there are any constraints that would prevent the use of those categories of LID BMPs. Similarly, you should also note opportunities that exist which will be utilized during project design. Upon completion of identifying Constraints and Opportunities, include these on your WQMP Site plan in Appendix 1.

Site Optimization

The following questions are based upon Section 3.2 of the WQMP Guidance Document. Review of the WQMP Guidance Document will help you determine how best to optimize your site and subsequently identify opportunities and/or constraints, and document compliance.

Did you identify and preserve existing drainage patterns? If so, how? If not, why?

- **YES. An upstream watershed area of approximately 77 acres drains through the site and flows north over Holland Road into a natural drainage course. This offsite flow will be captured in a storm drain pipe, routed through the project, and discharged just north of Holland Road into the natural drainage course.**

Did you identify and protect existing vegetation? If so, how? If not, why?

- **NO. There are no existing areas with dense vegetation or mature trees within the project area**

Did you identify and preserve natural infiltration capacity? If so, how? If not, why?

- **NO. Infiltration is not used for the project site.**

Did you identify and minimize impervious area? If so, how? If not, why?

- **YES. Approximately 43% of the site will remain permeable. The project incorporates landscaping (permeable) areas throughout the entire site. Landscape design avoids the use of impervious surfaces such as decorative pavement. Sidewalks widths are reduced to minimum allowed. Garages are placed at minimum distances from street to minimize driveway areas.**

Did you identify and disperse runoff to adjacent pervious areas? If so, how? If not, why?

- **YES. Runoff from rooftops of the residential dwelling units will be discharged into adjacent landscape areas. The landscape areas will provide buffer areas prior to runoff entering an enclosed storm water conveyance facility.**

Section C: Delineate Drainage Management Areas (DMAs)

Utilizing the procedure in Section 3.3 of the WQMP Guidance Document which discusses the methods of delineating and mapping your project site into individual DMAs, complete Table C.1 below to appropriately categorize the types of classification (e.g., Type A, Type B, etc.) per DMA for your project site. Upon completion of this table, this information will then be used to populate and tabulate the corresponding tables for their respective DMA classifications.

Table C.1 DMA Classifications

DMA Name or ID	Surface Type(s)[1]	Area (Sq. Ft.)	DMA Type
A	Landscape, Roof, Pavement	862,950	D

[1]*Reference Table 2-1 in the WQMP Guidance Document to populate this column*

Table C.2 Type 'A', Self-Treating Areas

DMA Name or ID	Area (Sq. Ft.)	Stabilization Type	Irrigation Type (if any)
NONE			

Table C.3 Type 'B', Self-Retaining Areas

Self-Retaining Area				Type 'C' DMAs that are draining to the Self-Retaining Area		
DMA Name/ ID	Post-project surface type	Area (square feet) [A]	Storm Depth (inches) [B]	DMA Name / ID	[C] from Table C.4 = [C]	Required Retention Depth (inches) [D]
NONE						

$$[D] = [B] + \frac{[B] \cdot [C]}{[A]}$$

Table C.4 Type 'C', Areas that Drain to Self-Retaining Areas

DMA					Receiving Self-Retaining DMA		
DMA Name/ ID	Area (square feet)	Post-project surface type	Runoff factor	Product		Area (square feet)	Ratio
	[A]		[B]	[C] = [A] x [B]	DMA name /ID	[D]	[C]/[D]
NONE							

Table C.5 Type 'D', Areas Draining to BMPs

DMA Name or ID	BMP Name or ID
A	Proposed On-Site Basin

Note: More than one drainage management area can drain to a single LID BMP, however, one drainage management area may not drain to more than one BMP.

Section D: Implement LID BMPs

D.1 Infiltration Applicability

Is there an approved downstream 'Highest and Best Use' for stormwater runoff (see discussion in Chapter 2.4.4 of the WQMP Guidance Document for further details)? ☒ Y ☐ N

If yes has been checked, Infiltration BMPs shall not be used for the site. If no, continue working through this section to implement your LID BMPs. It is recommended that you contact your Co-Permittee to verify whether or not your project discharges to an approved downstream 'Highest and Best Use' feature.

Geotechnical Report

A Geotechnical Report or Phase I Environmental Site Assessment may be required by the Copermittee to confirm present and past site characteristics that may affect the use of Infiltration BMPs. In addition, the Co-Permittee, at their discretion, may not require a geotechnical report for small projects as described in Chapter 2 of the WQMP Guidance Document. If a geotechnical report has been prepared, include it in Appendix 3. In addition, if a Phase I Environmental Site Assessment has been prepared, include it in Appendix 4.

Is this project classified as a small project consistent with the requirements of Chapter 2 of the WQMP Guidance Document? ☐ Y ☐ N

Infiltration Feasibility

Table D.1 below is meant to provide a simple means of assessing which DMAs on your site support Infiltration BMPs and is discussed in the WQMP Guidance Document in Chapter 2.4.5. Check the appropriate box for each question and then list affected DMAs as applicable. If additional space is needed, add a row below the corresponding answer.

Table D.1 Infiltration Feasibility

Does the project site...	YES	NO
...have any DMAs with a seasonal high groundwater mark shallower than 10 feet?		
If Yes, list affected DMAs:		
...have any DMAs located within 100 feet of a water supply well?		
If Yes, list affected DMAs:		
...have any areas identified by the geotechnical report as posing a public safety risk where infiltration of stormwater could have a negative impact?		
If Yes, list affected DMAs:		
...have measured in-situ infiltration rates of less than 1.6 inches / hour?		
If Yes, list affected DMAs:		
...have significant cut and/or fill conditions that would preclude in-situ testing of infiltration rates at the final infiltration surface?		
If Yes, list affected DMAs:		
...geotechnical report identify other site-specific factors that would preclude effective and safe infiltration?		
Describe here:		

If you answered "Yes" to any of the questions above for any DMA, Infiltration BMPs should not be used for those DMAs and you should proceed to the assessment for Harvest and Use below.

D.2 Harvest and Use Assessment

Please check what applies:

- ☐ Reclaimed water will be used for the non-potable water demands for the project.
- ☐ Downstream water rights may be impacted by Harvest and Use as approved by the Regional Board (verify with the Copermittee).
- ☐ The Design Capture Volume will be addressed using Infiltration Only BMPs. In such a case, Harvest and Use BMPs are still encouraged, but it would not be required if the Design Capture Volume will be infiltrated or evapotranspired.

If any of the above boxes have been checked, Harvest and Use BMPs need not be assessed for the site. If neither of the above criteria applies, follow the steps below to assess the feasibility of irrigation use, toilet use and other non-potable uses (e.g., industrial use).

Irrigation Use Feasibility

Complete the following steps to determine the feasibility of harvesting stormwater runoff for Irrigation Use BMPs on your site:

Step 1: Identify the total area of irrigated landscape on the site, and the type of landscaping used.

Total Area of Irrigated Landscape: Insert Area (Acres)

Type of Landscaping (Conservation Design or Active Turf): List Landscaping Type

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for irrigation use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: Insert Area (Acres)

Step 3: Cross reference the Design Storm depth for the project site (see Exhibit A of the WQMP Guidance Document) with the left column of Table 2-3 in Chapter 2 to determine the minimum area of Effective Irrigated Area per Tributary Impervious Area (EIATIA).

Enter your EIATIA factor: EIATIA Factor

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum irrigated area that would be required.

Minimum required irrigated area: Insert Area (Acres)

Step 5: Determine if harvesting stormwater runoff for irrigation use is feasible for the project by comparing the total area of irrigated landscape (Step 1) to the minimum required irrigated area (Step 4).

Minimum required irrigated area (Step 4)	**Available Irrigated Landscape (Step 1)**
Insert Area (Acres)	Insert Area (Acres)

Toilet Use Feasibility

Complete the following steps to determine the feasibility of harvesting stormwater runoff for toilet flushing uses on your site:

Step 1: Identify the projected total number of daily toilet users during the wet season, and account for any periodic shut downs or other lapses in occupancy:

Projected Number of Daily Toilet Users: Number of daily Toilet Users

Project Type: Enter 'Residential', 'Commercial', 'Industrial' or 'Schools'

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for toilet use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: Insert Area (Acres)

Step 3: Enter the Design Storm depth for the project site (see Exhibit A) into the left column of Table 2-1 in Chapter 2 to determine the minimum number or toilet users per tributary impervious acre (TUTIA).

Enter your TUTIA factor: TUTIA Factor

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum number of toilet users that would be required.

Minimum number of toilet users: Required number of toilet users

Step 5: Determine if harvesting stormwater runoff for toilet flushing use is feasible for the project by comparing the Number of Daily Toilet Users (Step 1) to the minimum required number of toilet users (Step 4).

Minimum required Toilet Users (Step 4)	**Projected number of toilet users (Step 1)**
Insert Area (Acres)	Insert Area (Acres)

Other Non-Potable Use Feasibility

Are there other non-potable uses for stormwater runoff on the site (e.g. industrial use)? See Chapter 2 of the Guidance for further information. If yes, describe below. If no, write N/A.

Insert narrative description here.

Step 1: Identify the projected average daily non-potable demand, in gallons per day, during the wet season and accounting for any periodic shut downs or other lapses in occupancy or operation.

Average Daily Demand: Projected Average Daily Use (gpd)

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for the identified non-potable use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: Insert Area (Acres)

Step 3: Enter the Design Storm depth for the project site (see Exhibit A) into the left column of Table 2-3 in Chapter 2 to determine the minimum demand for non-potable uses per tributary impervious acre.

Enter the factor from Table 2-3: Enter Value

Step 4: Multiply the unit value obtained from Step 4 by the total of impervious areas from Step 3 to develop the minimum number of gallons per day of non-potable use that would be required.

Minimum required use: Minimum use required (gpd)

Step 5: Determine if harvesting stormwater runoff for other non-potable use is feasible for the project by comparing the Number of Daily Toilet Users (Step 1) to the minimum required number of toilet users (Step 4).

Minimum required non-potable use (Step 4)	Projected average daily use (Step 1)
Minimum use required (gpd)	Projected Average Daily Use (gpd)

If Irrigation, Toilet and Other Use feasibility anticipated demands are less than the applicable minimum values, Harvest and Use BMPs are not required and you should proceed to utilize LID Bioretention and Biotreatment, unless a site-specific analysis has been completed that demonstrates technical infeasibility as noted in D.3 below.

D.3 Bioretention and Biotreatment Assessment

Other LID Bioretention and Biotreatment BMPs as described in Chapter 2.4.7 of the WQMP Guidance Document are feasible on nearly all development sites with sufficient advance planning.

Select one of the following:

☒ LID Bioretention/Biotreatment BMPs will be used for some or all DMAs of the project as noted below in Section D.4 (note the requirements of Section 3.4.2 in the WQMP Guidance Document).

☐ A site-specific analysis demonstrating the technical infeasibility of all LID BMPs has been performed and is included in Appendix 5. If you plan to submit an analysis demonstrating the technical infeasibility of LID BMPs, request a pre-submittal meeting with the Copermittee to discuss this option. Proceed to Section E to document your alternative compliance measures.

D.4 Feasibility Assessment Summaries

From the Infiltration, Harvest and Use, Bioretention and Biotreatment Sections above, complete Table D.2 below to summarize which LID BMPs are technically feasible, and which are not, based upon the established hierarchy.

Table D.2 LID Prioritization Summary Matrix

DMA Name/ID	LID BMP Hierarchy				No LID (Alternative Compliance)
	1. Infiltration	2. Harvest and use	3. Bioretention	4. Biotreatment	
A	☐	☐	☒	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐

For those DMAs where LID BMPs are not feasible, provide a brief narrative below summarizing why they are not feasible, include your technical infeasibility criteria in Appendix 5, and proceed to Section E below to document Alternative Compliance measures for those DMAs. Recall that each proposed DMA must pass through the LID BMP hierarchy before alternative compliance measures may be considered.

Insert narrative description here.

D.5 LID BMP Sizing

Each LID BMP must be designed to ensure that the Design Capture Volume will be addressed by the selected BMPs. First, calculate the Design Capture Volume for each LID BMP using the V_{BMP} worksheet in Appendix F of the LID BMP Design Handbook. Second, design the LID BMP to meet the required V_{BMP} using a method approved by the Copermittee. Utilize the worksheets found in the LID BMP Design Handbook or consult with your Copermittee to assist you in correctly sizing your LID BMPs. Complete Table D.3 below to document the Design Capture Volume and the Proposed Volume for each LID BMP. Provide the completed design procedure sheets for each LID BMP in Appendix 6. You may add additional rows to the table below as needed.

Table D.3 DCV Calculations for LID BMPs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Enter BMP Name / Identifier Here*		
	[A]		[B]	[C]	[A] x [C]			
A	862,950	*Mixed*	*0.75*	*0.54*	*465,993*			
						Design Storm Depth (in)	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
	862,950				**465,993**	**0.63**	**24,464.6**	**45,000**

[B], [C] is obtained as described in Section 2.3.1 of the WQMP Guidance Document

[E] is obtained from Exhibit A in the WQMP Guidance Document

[G] is obtained from a design procedure sheet, such as in LID BMP Design Handbook and placed in Appendix 6

Section E: Alternative Compliance (LID Waiver Program)

LID BMPs are expected to be feasible on virtually all projects. Where LID BMPs have been demonstrated to be infeasible as documented in Section D, other Treatment Control BMPs must be used (subject to LID waiver approval by the Copermittee). Check one of the following Boxes:

☐ LID Principles and LID BMPs have been incorporated into the site design to fully address all Drainage Management Areas. No alternative compliance measures are required for this project and thus this Section is not required to be completed.

\- *Or*

☐ The following Drainage Management Areas are unable to be addressed using LID BMPs. A site-specific analysis demonstrating technical infeasibility of LID BMPs has been approved by the Co-Permittee and included in Appendix 5. Additionally, no downstream regional and/or sub-regional LID BMPs exist or are available for use by the project. The following alternative compliance measures on the following pages are being implemented to ensure that any pollutant loads expected to be discharged by not incorporating LID BMPs, are fully mitigated.

List DMAs here.

E.1 Identify Pollutants of Concern

Utilizing Table A.1 from Section A above which noted your project's receiving waters and their associated EPA approved 303(d) listed impairments, cross reference this information with that of your selected Priority Development Project Category in Table E.1 below. If the identified General Pollutant Categories are the same as those listed for your receiving waters, then these will be your Pollutants of Concern and the appropriate box or boxes will be checked on the last row. The purpose of this is to document compliance and to help you appropriately plan for mitigating your Pollutants of Concern in lieu of implementing LID BMPs.

Table E.1 Potential Pollutants by Land Use Type

Priority Development Project Categories and/or Project Features (check those that apply)	General Pollutant Categories							
	Bacterial Indicators	Metals	Nutrients	Pesticides	Toxic Organic Compounds	Sediments	Trash & Debris	Oil & Grease
☒ Detached Residential Development	P	N	P	P	N	P	P	P
☐ Attached Residential Development	P	N	P	P	N	P	P	P(2)
☐ Commercial/Industrial Development	P(3)	P	P(1)	P(1)	P(5)	P(1)	P	P
☐ Automotive Repair Shops	N	P	N	N	P(4, 5)	N	P	P
☐ Restaurants (>5,000 ft^2)	P	N	N	N	N	N	P	P
☐ Hillside Development (>5,000 ft^2)	P	N	P	P	N	P	P	P
☐ Parking Lots (>5,000 ft^2)	P(6)	P	P(1)	P(1)	P(4)	P(1)	P	P
☐ Retail Gasoline Outlets	N	P	N	N	P	N	P	P
Project Priority Pollutant(s) of Concern	☐	☐	☒	☐	☐	☐	☐	☐

P = Potential

N = Not Potential

(1) A potential Pollutant if non-native landscaping exists or is proposed onsite; otherwise not expected

(2) A potential Pollutant if the project includes uncovered parking areas; otherwise not expected

(3) A potential Pollutant is land use involving animal waste

(4) Specifically petroleum hydrocarbons

(5) Specifically solvents

(6) Bacterial indicators are routinely detected in pavement runoff

E.2 Stormwater Credits

Projects that cannot implement LID BMPs but nevertheless implement smart growth principles are potentially eligible for Stormwater Credits. Utilize Table 3-8 within the WQMP Guidance Document to identify your Project Category and its associated Water Quality Credit. If not applicable, write N/A.

Not Applicable. Section E.2 intentionally left blank.

Table E.2 Water Quality Credits

Qualifying Project Categories	Credit Percentage[2]
Total Credit Percentage[1]	

[1]*Cannot Exceed 50%*
[2]*Obtain corresponding data from Table 3-8 in the WQMP Guidance Document*

E.3 Sizing Criteria

After you appropriately considered Stormwater Credits for your project, utilize Table E.3 below to appropriately size them to the DCV, or Design Flow Rate, as applicable. Please reference Chapter 3.5.2 of the WQMP Guidance Document for further information.

Not Applicable. Section E.3 intentionally left blank.

Table E.3 Treatment Control BMP Sizing

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor		*Enter BMP Name / Identifier Here*		
	[A]		[B]	[C]	[A] x [C]				
						Design Storm Depth (in)	*Minimum Design Capture Volume or Design Flow Rate (cubic feet or cfs)*	*Total Storm Water Credit % Reduction*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
	A_T = Σ[A]				Σ= [D]	[E]	$[F] = \frac{[D]x[E]}{[G]}$	[F] X (1-[H])	[I]

[B], [C] is obtained as described in Section 2.3.1 from the WQMP Guidance Document
[E] is obtained from Exhibit A in the WQMP Guidance Document
[G] is for Flow-Based Treatment Control BMPs [G] = 43,560, for Volume-Based Control Treatment BMPs, [G] = 12
[H] is from the Total Credit Percentage as Calculated from Table E.2 above
[I] as obtained from a design procedure sheet from the BMP manufacturer and should be included in Appendix 6

E.4 Treatment Control BMP Selection

Treatment Control BMPs typically provide proprietary treatment mechanisms to treat potential pollutants in runoff, but do not sustain significant biological processes. Treatment Control BMPs must have a removal efficiency of a medium or high effectiveness as quantified below:

- **High**: equal to or greater than 80% removal efficiency
- **Medium**: between 40% and 80% removal efficiency

Such removal efficiency documentation (e.g., studies, reports, etc.) as further discussed in Chapter 3.5.2 of the WQMP Guidance Document, must be included in Appendix 6. In addition, ensure that proposed Treatment Control BMPs are properly identified on the WQMP Site Plan in Appendix 1.

Table E.4 Treatment Control BMP Selection

Selected Treatment Control BMP Name or ID[1]	Priority Pollutant(s) of Concern to Mitigate[2]	Removal Efficiency Percentage[3]
Onsite Basin	Bacterial Indicators	High
Onsite Basin	Nutrients	Medium
Onsite Basin	Pesticides	High
Onsite Basin	Sediments	High
Onsite Basin	Trash & Debris	High
Onsite Basin	Oil & Grease	High

[1] *Treatment Control BMPs must not be constructed within Receiving Waters. In addition, a proposed Treatment Control BMP may be listed more than once if they possess more than one qualifying pollutant removal efficiency.*
[2] *Cross Reference Table E.1 above to populate this column.*
[3] *As documented in a Co-Permittee Approved Study and provided in Appendix 6.*

Section F: Hydromodification

F.1 Hydrologic Conditions of Concern (HCOC) Analysis

Once you have determined that the LID design is adequate to address water quality requirements, you will need to assess if the proposed LID Design may still create a HCOC. Review Chapters 2 and 3 (including Figure 3-7) of the WQMP Guidance Document to determine if your project must mitigate for Hydromodification impacts. If your project meets one of the following criteria which will be indicated by the check boxes below, you do not need to address Hydromodification at this time. However, if the project does not qualify for Exemptions 1, 2 or 3, then additional measures must be added to the design to comply with HCOC criteria. This is discussed in further detail below in Section F.2.

HCOC EXEMPTION 1: The Priority Development Project disturbs less than one acre. The Copermittee has the discretion to require a Project-Specific WQMP to address HCOCs on projects less than one acre on a case by case basis. The disturbed area calculation should include all disturbances associated with larger common plans of development.

Does the project qualify for this HCOC Exemption? ☐ Y ☒ N

If Yes, HCOC criteria do not apply.

HCOC EXEMPTION 2: The volume and time of concentration[1] of storm water runoff for the post-development condition is not significantly different from the pre-development condition for a 2-year return frequency storm (a difference of 5% or less is considered insignificant) using one of the following methods to calculate:

- Riverside County Hydrology Manual
- Technical Release 55 (TR-55): Urban Hydrology for Small Watersheds (NRCS 1986), or derivatives thereof, such as the Santa Barbara Urban Hydrograph Method
- Other methods acceptable to the Co-Permittee

Does the project qualify for this HCOC Exemption? ☐ Y ☒ N

If Yes, report results in Table F.1 below and provide your substantiated hydrologic analysis in Appendix 7.

Table F.1 Hydrologic Conditions of Concern Summary

	2 year – 24 hour		
	Pre-condition	**Post-condition**	**% Difference**
Time of Concentration	N/A	N/A	N/A
Volume (Cubic Feet)	N/A	N/A	N/A

[1] Time of concentration is defined as the time after the beginning of the rainfall when all portions of the drainage basin are contributing to flow at the outlet.

HCOC EXEMPTION 3: All downstream conveyance channels to an adequate sump (for example, Prado Dam, Lake Elsinore, Canyon Lake, Santa Ana River, or other lake, reservoir or naturally erosion resistant feature) that will receive runoff from the project are engineered and regularly maintained to ensure design flow capacity; no sensitive stream habitat areas will be adversely affected; or are not identified on the Co-Permittees Hydromodification Sensitivity Maps.

Does the project qualify for this HCOC Exemption? ☒ Y ☐ N

If Yes, HCOC criteria do not apply and note below which adequate sump applies to this HCOC qualifier:

Canyon Lake

HCOC Mitigation

If none of the above HCOC Exemption Criteria are applicable, HCOC criteria is considered mitigated if they meet one of the following conditions:

a. Additional LID BMPS are implemented onsite or offsite to mitigate potential erosion or habitat impacts as a result of HCOCs. This can be conducted by an evaluation of site-specific conditions utilizing accepted professional methodologies published by entities such as the California Stormwater Quality Association (CASQA), the Southern California Coastal Water Research Project (SCCRWP), or other Co-Permittee approved methodologies for site-specific HCOC analysis.
b. The project is developed consistent with an approved Watershed Action Plan that addresses HCOC in Receiving Waters.
c. Mimicking the pre-development hydrograph with the post-development hydrograph, for a 2-year return frequency storm. Generally, the hydrologic conditions of concern are not significant, if the post-development hydrograph is no more than 10% greater than pre-development hydrograph. In cases where excess volume cannot be infiltrated or captured and reused, discharge from the site must be limited to a flow rate no greater than 110% of the pre-development 2-year peak flow.

Be sure to include all pertinent documentation used in your analysis of the items a, b or c in Appendix 7.

Section G: Source Control BMPs

Source control BMPs include permanent, structural features that may be required in your project plans — such as roofs over and berms around trash and recycling areas — and Operational BMPs, such as regular sweeping and "housekeeping", that must be implemented by the site's occupant or user. The MEP standard typically requires both types of BMPs. In general, Operational BMPs cannot be substituted for a feasible and effective permanent BMP. Using the Pollutant Sources/Source Control Checklist in Appendix 8, review the following procedure to specify Source Control BMPs for your site:

1. ***Identify Pollutant Sources***: Review Column 1 in the Pollutant Sources/Source Control Checklist. Check off the potential sources of Pollutants that apply to your site.

2. ***Note Locations on Project-Specific WQMP Exhibit***: Note the corresponding requirements listed in Column 2 of the Pollutant Sources/Source Control Checklist. Show the location of each Pollutant source and each permanent Source Control BMP in your Project-Specific WQMP Exhibit located in Appendix 1.

3. ***Prepare a Table and Narrative***: Check off the corresponding requirements listed in Column 3 in the Pollutant Sources/Source Control Checklist. In the left column of Table G.1 below, list each potential source of runoff Pollutants on your site (from those that you checked in the Pollutant Sources/Source Control Checklist). In the middle column, list the corresponding permanent, Structural Source Control BMPs (from Columns 2 and 3 of the Pollutant Sources/Source Control Checklist) used to prevent Pollutants from entering runoff. **Add additional narrative** in this column that explains any special features, materials or methods of construction that will be used to implement these permanent, Structural Source Control BMPs.

4. ***Identify Operational Source Control BMPs:*** To complete your table, refer once again to the Pollutant Sources/Source Control Checklist. List in the right column of your table the Operational BMPs that should be implemented as long as the anticipated activities continue at the site. Copermittee stormwater ordinances require that applicable Source Control BMPs be implemented; the same BMPs may also be required as a condition of a use permit or other revocable Discretionary Approval for use of the site.

Table G.1 Permanent and Operational Source Control Measures

Potential Sources of Runoff pollutants	Permanent Structural Source Control BMPs	Operational Source Control BMPs
☐ On-site storm drain inlets	☐ Mark all inlets with the words "Only Rain Down the Storm Drain" or similar. Catch Basin Markers may be available from the Riverside County Flood Control and Water Conservation District, call 951.955.1200 to verify.	☐ Maintain and periodically repaint or replace inlet markings. ☐ Provide stormwater pollution prevention information to new site owners, lessees, or operators. ☐ See applicable operational BMPs in Fact Sheet SC-44, "Drainage System Maintenance," in the CASQA

		Stormwater Quality Handbooks at www.cabmphandbooks.com □ Include the following in lease agreements: "Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains."
□ Landscape / Outdoor Pesticide Use	□ Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution. □ Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions. □ Consider using pest-resistant plants, especially adjacent to hardscape. □ To insure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interaction.	□ Maintain landscaping using minimum or no pesticide. □ See applicable operational BMPs in "What you should know for …Landscape and Gardening" at http://rcflood.org/stormwater/ □ Provide IPM information to new owners, lessees and operators.
□ Plazas, sidewalks, and parking lots		□ Sweep plazas, sidewalks, and parking lots regularly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into the storm drain system. Collect wash water containing any cleaning agent or degreaser and discharge to the sanitary not to a storm drain.

Section H: Construction Plan Checklist

Populate Table H.1 below to assist the plan checker in an expeditious review of your project. The first two columns will contain information that was prepared in previous steps, while the last column will be populated with the corresponding plan sheets. This table is to be completed with the submittal of your final Project-Specific WQMP.

To be completed with the Final WQMP.

Table H.1 Construction Plan Cross-reference

BMP No. or ID	BMP Identifier and Description	Corresponding Plan Sheet(s)

Note that the updated table — or Construction Plan WQMP Checklist — is **only a reference tool** to facilitate an easy comparison of the construction plans to your Project-Specific WQMP. Co-Permittee staff can advise you regarding the process required to propose changes to the approved Project-Specific WQMP.

Section I: Operation, Maintenance and Funding

The Copermittee will periodically verify that Stormwater BMPs on your site are maintained and continue to operate as designed. To make this possible, your Copermittee will require that you include in Appendix 9 of this Project-Specific WQMP:

1. A means to finance and implement facility maintenance in perpetuity, including replacement cost.
2. Acceptance of responsibility for maintenance from the time the BMPs are constructed until responsibility for operation and maintenance is legally transferred. A warranty covering a period following construction may also be required.
3. An outline of general maintenance requirements for the Stormwater BMPs you have selected.
4. Figures delineating and designating pervious and impervious areas, location, and type of Stormwater BMP, and tables of pervious and impervious areas served by each facility. Geo-locating the BMPs using a coordinate system of latitude and longitude is recommended to help facilitate a future statewide database system.
5. A separate list and location of self-retaining areas or areas addressed by LID Principles that do not require specialized O&M or inspections but will require typical landscape maintenance as noted in Chapter 5, pages 85-86, in the WQMP Guidance. Include a brief description of typical landscape maintenance for these areas.

Your local Co-Permittee will also require that you prepare and submit a detailed Stormwater BMP Operation and Maintenance Plan that sets forth a maintenance schedule for each of the Stormwater BMPs built on your site. An agreement assigning responsibility for maintenance and providing for inspections and certification may also be required.

Details of these requirements and instructions for preparing a Stormwater BMP Operation and Maintenance Plan are in Chapter 5 of the WQMP Guidance Document.

Maintenance Mechanism: **Homeowners' Association CC&Rs.**

Will the proposed BMPs be maintained by a Home Owners' Association (HOA) or Property Owners Association (POA)?

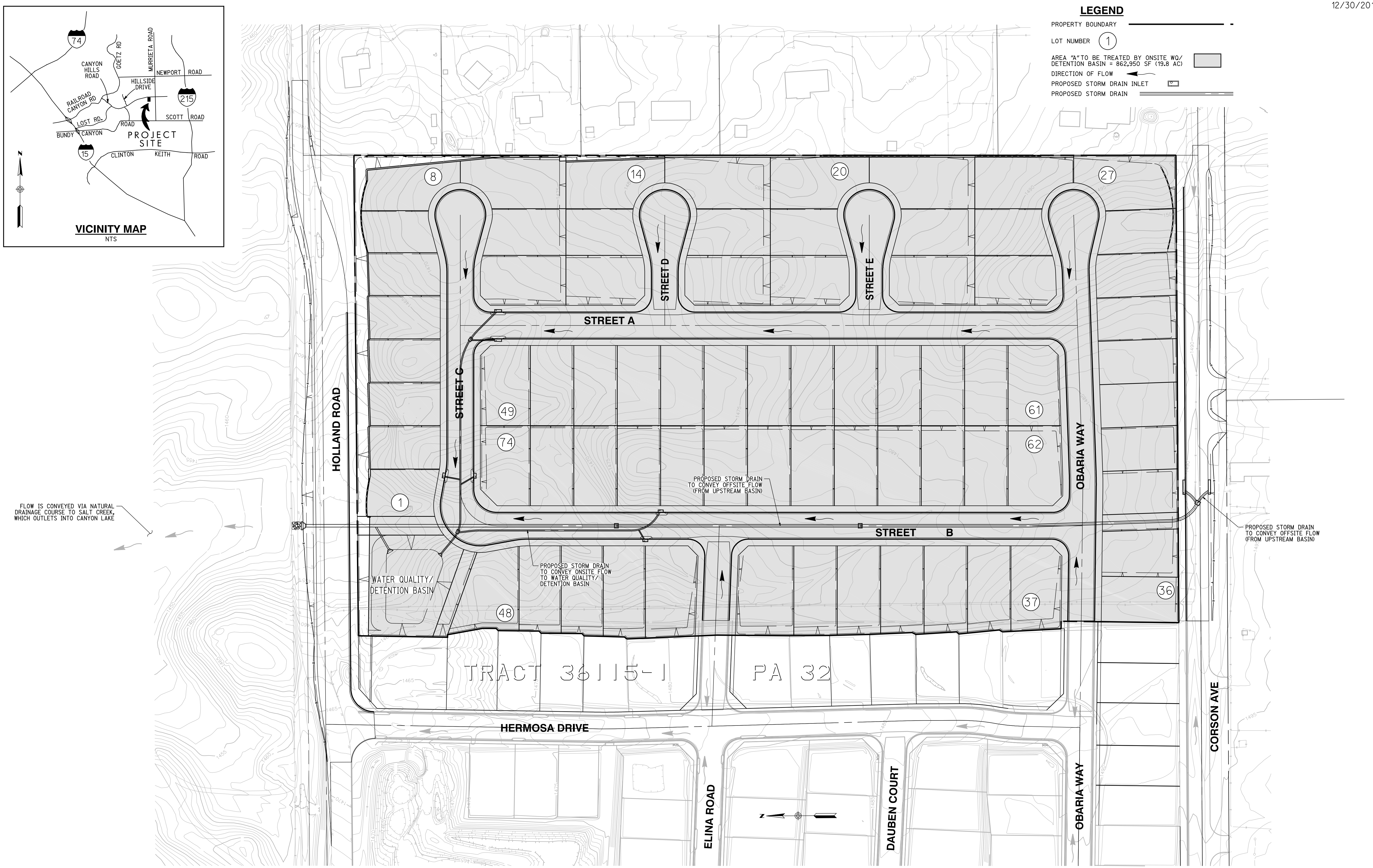
☒ Y ☐ N

Include your Operation and Maintenance Plan and Maintenance Mechanism in Appendix 9. Additionally, include all pertinent forms of educational materials for those personnel that will be maintaining the proposed BMPs within this Project-Specific WQMP in Appendix 10.

Appendix 1: Maps and Site Plans

Location Map, WQMP Site Plan and Receiving Waters Map

12/30/2013



J-17039

60 30 0 60 120 180
GRAPHIC SCALE 1" = 60'

WQMP Exhibit & Vicinity Map

RICK ENGINEERING COMPANY
Orange
2 SOUTH POINTE DRIVE - SUITE 275
LAKE FOREST, CA 92630
949.588.0707
(FAX)949.588.0709
rickengineering.com
San Diego - Riverside - San Luis Obispo - Bakersfield - Sacramento - Phoenix - Tucson

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27-DEC-2013 10:45

Appendix 2: Construction Plans

Grading and Drainage Plans

(To be included upon final design of this project)

Appendix 3: Soils Information

Geotechnical Study and Other Infiltration Testing Data

(To be included upon final design of this project)

Appendix 4: Historical Site Conditions

Phase I Environmental Site Assessment or Other Information on Past Site Use

(To be included upon final design of this project)

Appendix 5: LID Infeasibility

LID Technical Infeasibility Analysis

(Not Applicable)

Appendix 6: BMP Design Details

BMP Sizing, Design Details and other Supporting Documentation

Design Considerations

- Soil for Infiltration
- Tributary Area
- Slope
- Aesthetics
- Environmental Side-effects

Description

The bioretention best management practice (BMP) functions as a soil and plant-based filtration device that removes pollutants through a variety of physical, biological, and chemical treatment processes. These facilities normally consist of a grass buffer strip, sand bed, ponding area, organic layer or mulch layer, planting soil, and plants. The runoff's velocity is reduced by passing over or through buffer strip and subsequently distributed evenly along a ponding area. Exfiltration of the stored water in the bioretention area planting soil into the underlying soils occurs over a period of days.

Targeted Constituents

☑	Sediment	■
☑	Nutrients	▲
☑	Trash	■
☑	Metals	■
☑	Bacteria	■
☑	Oil and Grease	■
☑	Organics	■

Legend ***(Removal Effectiveness)***

● Low ■ High

▲ Medium

California Experience

None documented. Bioretention has been used as a stormwater BMP since 1992. In addition to Prince George's County, MD and Alexandria, VA, bioretention has been used successfully at urban and suburban areas in Montgomery County, MD; Baltimore County, MD; Chesterfield County, VA; Prince William County, VA; Smith Mountain Lake State Park, VA; and Cary, NC.

Advantages

- Bioretention provides stormwater treatment that enhances the quality of downstream water bodies by temporarily storing runoff in the BMP and releasing it over a period of four days to the receiving water (EPA, 1999).

- The vegetation provides shade and wind breaks, absorbs noise, and improves an area's landscape.

Limitations

- The bioretention BMP is not recommended for areas with slopes greater than 20% or where mature tree removal would be required since clogging may result, particularly if the BMP receives runoff with high sediment loads (EPA, 1999).

- Bioretention is not a suitable BMP at locations where the water table is within 6 feet of the ground surface and where the surrounding soil stratum is unstable.
- By design, bioretention BMPs have the potential to create very attractive habitats for mosquitoes and other vectors because of highly organic, often heavily vegetated areas mixed with shallow water.
- In cold climates the soil may freeze, preventing runoff from infiltrating into the planting soil.

Design and Sizing Guidelines

- The bioretention area should be sized to capture the design storm runoff.
- In areas where the native soil permeability is less than 0.5 in/hr an underdrain should be provided.
- Recommended minimum dimensions are 15 feet by 40 feet, although the preferred width is 25 feet. Excavated depth should be 4 feet.
- Area should drain completely within 72 hours.
- Approximately 1 tree or shrub per 50 ft^2 of bioretention area should be included.
- Cover area with about 3 inches of mulch.

Construction/Inspection Considerations

Bioretention area should not be established until contributing watershed is stabilized.

Performance

Bioretention removes stormwater pollutants through physical and biological processes, including adsorption, filtration, plant uptake, microbial activity, decomposition, sedimentation and volatilization (EPA, 1999). Adsorption is the process whereby particulate pollutants attach to soil (e.g., clay) or vegetation surfaces. Adequate contact time between the surface and pollutant must be provided for in the design of the system for this removal process to occur. Thus, the infiltration rate of the soils must not exceed those specified in the design criteria or pollutant removal may decrease. Pollutants removed by adsorption include metals, phosphorus, and hydrocarbons. Filtration occurs as runoff passes through the bioretention area media, such as the sand bed, ground cover, and planting soil.

Common particulates removed from stormwater include particulate organic matter, phosphorus, and suspended solids. Biological processes that occur in wetlands result in pollutant uptake by plants and microorganisms in the soil. Plant growth is sustained by the uptake of nutrients from the soils, with woody plants locking up these nutrients through the seasons. Microbial activity within the soil also contributes to the removal of nitrogen and organic matter. Nitrogen is removed by nitrifying and denitrifying bacteria, while aerobic bacteria are responsible for the decomposition of the organic matter. Microbial processes require oxygen and can result in depleted oxygen levels if the bioretention area is not adequately aerated. Sedimentation occurs in the swale or ponding area as the velocity slows and solids fall out of suspension.

The removal effectiveness of bioretention has been studied during field and laboratory studies conducted by the University of Maryland (Davis et al, 1998). During these experiments, synthetic stormwater runoff was pumped through several laboratory and field bioretention areas to simulate typical storm events in Prince George's County, MD. Removal rates for heavy metals and nutrients are shown in Table 1.

Table 1 Laboratory and Estimated Bioretention Davis et al. (1998); PGDER (1993)

Pollutant	Removal Rate
Total Phosphorus	70-83%
Metals (Cu, Zn, Pb)	93-98%
TKN	68-80%
Total Suspended Solids	90%
Organics	90%
Bacteria	90%

Results for both the laboratory and field experiments were similar for each of the pollutants analyzed. Doubling or halving the influent pollutant levels had little effect on the effluent pollutants concentrations (Davis et al, 1998).

The microbial activity and plant uptake occurring in the bioretention area will likely result in higher removal rates than those determined for infiltration BMPs.

Siting Criteria

Bioretention BMPs are generally used to treat stormwater from impervious surfaces at commercial, residential, and industrial areas (EPA, 1999). Implementation of bioretention for stormwater management is ideal for median strips, parking lot islands, and swales. Moreover, the runoff in these areas can be designed to either divert directly into the bioretention area or convey into the bioretention area by a curb and gutter collection system.

The best location for bioretention areas is upland from inlets that receive sheet flow from graded areas and at areas that will be excavated (EPA, 1999). In order to maximize treatment effectiveness, the site must be graded in such a way that minimizes erosive conditions as sheet flow is conveyed to the treatment area. Locations where a bioretention area can be readily incorporated into the site plan without further environmental damage are preferred. Furthermore, to effectively minimize sediment loading in the treatment area, bioretention only should be used in stabilized drainage areas.

Additional Design Guidelines

The layout of the bioretention area is determined after site constraints such as location of utilities, underlying soils, existing vegetation, and drainage are considered (EPA, 1999). Sites with loamy sand soils are especially appropriate for bioretention because the excavated soil can be backfilled and used as the planting soil, thus eliminating the cost of importing planting soil.

The use of bioretention may not be feasible given an unstable surrounding soil stratum, soils with clay content greater than 25 percent, a site with slopes greater than 20 percent, and/or a site with mature trees that would be removed during construction of the BMP.

Bioretention can be designed to be off-line or on-line of the existing drainage system (EPA, 1999). The drainage area for a bioretention area should be between 0.1 and 0.4 hectares (0.25 and 1.0 acres). Larger drainage areas may require multiple bioretention areas. Furthermore, the maximum drainage area for a bioretention area is determined by the expected rainfall intensity and runoff rate. Stabilized areas may erode when velocities are greater than 5 feet per second (1.5 meter per second). The designer should determine the potential for erosive conditions at the site.

The size of the bioretention area, which is a function of the drainage area and the runoff generated from the area is sized to capture the water quality volume.

The recommended minimum dimensions of the bioretention area are 15 feet (4.6 meters) wide by 40 feet (12.2 meters) long, where the minimum width allows enough space for a dense, randomly-distributed area of trees and shrubs to become established. Thus replicating a natural forest and creating a microclimate, thereby enabling the bioretention area to tolerate the effects of heat stress, acid rain, runoff pollutants, and insect and disease infestations which landscaped areas in urban settings typically are unable to tolerate. The preferred width is 25 feet (7.6 meters), with a length of twice the width. Essentially, any facilities wider than 20 feet (6.1 meters) should be twice as long as they are wide, which promotes the distribution of flow and decreases the chances of concentrated flow.

In order to provide adequate storage and prevent water from standing for excessive periods of time the ponding depth of the bioretention area should not exceed 6 inches (15 centimeters). Water should not be left to stand for more than 72 hours. A restriction on the type of plants that can be used may be necessary due to some plants' water intolerance. Furthermore, if water is left standing for longer than 72 hours mosquitoes and other insects may start to breed.

The appropriate planting soil should be backfilled into the excavated bioretention area. Planting soils should be sandy loam, loamy sand, or loam texture with a clay content ranging from 10 to 25 percent.

Generally the soil should have infiltration rates greater than 0.5 inches (1.25 centimeters) per hour, which is typical of sandy loams, loamy sands, or loams. The pH of the soil should range between 5.5 and 6.5, where pollutants such as organic nitrogen and phosphorus can be adsorbed by the soil and microbial activity can flourish. Additional requirements for the planting soil include a 1.5 to 3 percent organic content and a maximum 500 ppm concentration of soluble salts.

Soil tests should be performed for every 500 cubic yards (382 cubic meters) of planting soil, with the exception of pH and organic content tests, which are required only once per bioretention area (EPA, 1999). Planting soil should be 4 inches (10.1 centimeters) deeper than the bottom of the largest root ball and 4 feet (1.2 meters) altogether. This depth will provide adequate soil for the plants' root systems to become established, prevent plant damage due to severe wind, and provide adequate moisture capacity. Most sites will require excavation in order to obtain the recommended depth.

Planting soil depths of greater than 4 feet (1.2 meters) may require additional construction practices such as shoring measures (EPA, 1999). Planting soil should be placed in 18 inches or greater lifts and lightly compacted until the desired depth is reached. Since high canopy trees may be destroyed during maintenance the bioretention area should be vegetated to resemble a terrestrial forest community ecosystem that is dominated by understory trees. Three species each of both trees and shrubs are recommended to be planted at a rate of 2500 trees and shrubs per hectare (1000 per acre). For instance, a 15 foot (4.6 meter) by 40 foot (12.2 meter) bioretention area (600 square feet or 55.75 square meters) would require 14 trees and shrubs. The shrub-to-tree ratio should be 2:1 to 3:1.

Trees and shrubs should be planted when conditions are favorable. Vegetation should be watered at the end of each day for fourteen days following its planting. Plant species tolerant of pollutant loads and varying wet and dry conditions should be used in the bioretention area.

The designer should assess aesthetics, site layout, and maintenance requirements when selecting plant species. Adjacent non-native invasive species should be identified and the designer should take measures, such as providing a soil breach to eliminate the threat of these species invading the bioretention area. Regional landscaping manuals should be consulted to ensure that the planting of the bioretention area meets the landscaping requirements established by the local authorities. The designers should evaluate the best placement of vegetation within the bioretention area. Plants should be placed at irregular intervals to replicate a natural forest. Trees should be placed on the perimeter of the area to provide shade and shelter from the wind. Trees and shrubs can be sheltered from damaging flows if they are placed away from the path of the incoming runoff. In cold climates, species that are more tolerant to cold winds, such as evergreens, should be placed in windier areas of the site.

Following placement of the trees and shrubs, the ground cover and/or mulch should be established. Ground cover such as grasses or legumes can be planted at the beginning of the growing season. Mulch should be placed immediately after trees and shrubs are planted. Two to 3 inches (5 to 7.6 cm) of commercially-available fine shredded hardwood mulch or shredded hardwood chips should be applied to the bioretention area to protect from erosion.

Maintenance

The primary maintenance requirement for bioretention areas is that of inspection and repair or replacement of the treatment area's components. Generally, this involves nothing more than the routine periodic maintenance that is required of any landscaped area. Plants that are appropriate for the site, climatic, and watering conditions should be selected for use in the bioretention cell. Appropriately selected plants will aide in reducing fertilizer, pesticide, water, and overall maintenance requirements. Bioretention system components should blend over time through plant and root growth, organic decomposition, and the development of a natural soil horizon. These biologic and physical processes over time will lengthen the facility's life span and reduce the need for extensive maintenance.

Routine maintenance should include a biannual health evaluation of the trees and shrubs and subsequent removal of any dead or diseased vegetation (EPA, 1999). Diseased vegetation should be treated as needed using preventative and low-toxic measures to the extent possible. BMPs have the potential to create very attractive habitats for mosquitoes and other vectors because of highly organic, often heavily vegetated areas mixed with shallow water. Routine inspections for areas of standing water within the BMP and corrective measures to restore proper infiltration rates are necessary to prevent creating mosquito and other vector habitat. In addition, bioretention BMPs are susceptible to invasion by aggressive plant species such as cattails, which increase the chances of water standing and subsequent vector production if not routinely maintained.

In order to maintain the treatment area's appearance it may be necessary to prune and weed. Furthermore, mulch replacement is suggested when erosion is evident or when the site begins to look unattractive. Specifically, the entire area may require mulch replacement every two to three years, although spot mulching may be sufficient when there are random void areas. Mulch replacement should be done prior to the start of the wet season.

New Jersey's Department of Environmental Protection states in their bioretention systems standards that accumulated sediment and debris removal (especially at the inflow point) will normally be the primary maintenance function. Other potential tasks include replacement of dead vegetation, soil pH regulation, erosion repair at inflow points, mulch replenishment, unclogging the underdrain, and repairing overflow structures. There is also the possibility that the cation exchange capacity of the soils in the cell will be significantly reduced over time. Depending on pollutant loads, soils may need to be replaced within 5-10 years of construction (LID, 2000).

Cost

Construction Cost

Construction cost estimates for a bioretention area are slightly greater than those for the required landscaping for a new development (EPA, 1999). A general rule of thumb (Coffman, 1999) is that residential bioretention areas average about $3 to $4 per square foot, depending on soil conditions and the density and types of plants used. Commercial, industrial and institutional site costs can range between $10 to $40 per square foot, based on the need for control structures, curbing, storm drains and underdrains.

Retrofitting a site typically costs more, averaging $6,500 per bioretention area. The higher costs are attributed to the demolition of existing concrete, asphalt, and existing structures and the replacement of fill material with planting soil. The costs of retrofitting a commercial site in Maryland, Kettering Development, with 15 bioretention areas were estimated at $111,600.

In any bioretention area design, the cost of plants varies substantially and can account for a significant portion of the expenditures. While these cost estimates are slightly greater than those of typical landscaping treatment (due to the increased number of plantings, additional soil excavation, backfill material, use of underdrains etc.), those landscaping expenses that would be required regardless of the bioretention installation should be subtracted when determining the net cost.

Perhaps of most importance, however, the cost savings compared to the use of traditional structural stormwater conveyance systems makes bioretention areas quite attractive financially. For example, the use of bioretention can decrease the cost required for constructing stormwater conveyance systems at a site. A medical office building in Maryland was able to reduce the amount of storm drain pipe that was needed from 800 to 230 feet - a cost savings of $24,000 (PGDER, 1993). And a new residential development spent a total of approximately $100,000 using bioretention cells on each lot instead of nearly $400,000 for the traditional stormwater ponds that were originally planned (Rappahanock,). Also, in residential areas, stormwater management controls become a part of each property owner's landscape, reducing the public burden to maintain large centralized facilities.

Maintenance Cost

The operation and maintenance costs for a bioretention facility will be comparable to those of typical landscaping required for a site. Costs beyond the normal landscaping fees will include the cost for testing the soils and may include costs for a sand bed and planting soil.

References and Sources of Additional Information

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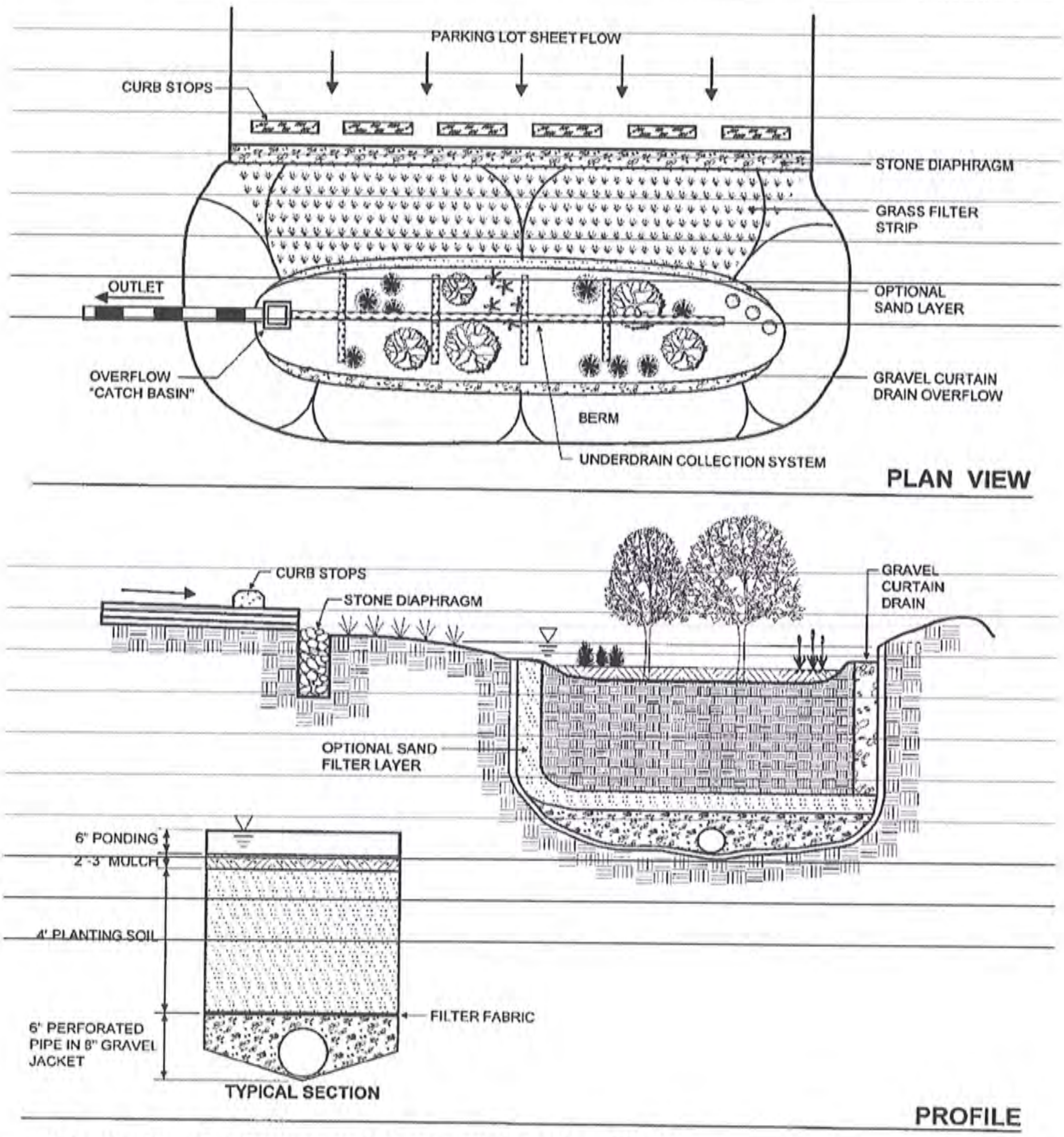

Schematic of a Bioretention Facility (MDE, 2000)

Appendix 7: Hydromodification

Supporting Detail Relating to Hydrologic Conditions of Concern

(Not Applicable)

Appendix 8: Source Control

Pollutant Sources/Source Control Checklist

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

How to use this worksheet (also see instructions in Section G of the WQMP Template):

1. Review Column 1 and identify which of these potential sources of stormwater pollutants apply to your site. Check each box that applies.
2. Review Column 2 and incorporate all of the corresponding applicable BMPs in your WQMP Exhibit.
3. Review Columns 3 and 4 and incorporate all of the corresponding applicable permanent controls and operational BMPs in your WQMP. Use the format shown in Table G.1on page 23 of this WQMP Template. Describe your specific BMPs in an accompanying narrative, and explain any special conditions or situations that required omitting BMPs or substituting alternative BMPs for those shown here.

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☒ A. **On-site storm drain inlets**	❑ **Locations of inlets.**	❑ **Mark all inlets with the words "Only Rain Down the Storm Drain" or similar. Catch Basin Markers may be available from the Riverside County Flood Control and Water Conservation District, call 951.955.1200 to verify.**	❑ **Maintain and periodically repaint or replace inlet markings.** ❑ **Provide stormwater pollution prevention information to new site owners, lessees, or operators.** ❑ **See applicable operational BMPs in Fact Sheet SC-44, "Drainage System Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com** ❑ **Include the following in lease agreements: "Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains."**
❑ B. **Interior floor drains and elevator shaft sump pumps**		❑ **State that interior floor drains and elevator shaft sump pumps will be plumbed to sanitary sewer.**	❑ **Inspect and maintain drains to prevent blockages and overflow.**
❑ C. **Interior parking garages**		❑ **State that parking garage floor drains will be plumbed to the sanitary sewer.**	❑ **Inspect and maintain drains to prevent blockages and overflow.**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ D1. **Need for future indoor & structural pest control**		❑ **Note building design features that discourage entry of pests.**	❑ **Provide Integrated Pest Management information to owners, lessees, and operators.**
☒ D2. **Landscape/ Outdoor Pesticide Use**	❑ **Show locations of native trees or areas of shrubs and ground cover to be undisturbed and retained.** ❑ **Show self-retaining landscape areas, if any.** ❑ **Show stormwater treatment and hydrograph modification management BMPs. (See instructions in Chapter 3, Step 5 and guidance in Chapter 5.)**	**State that final landscape plans will accomplish all of the following.** ❑ **Preserve existing native trees, shrubs, and ground cover to the maximum extent possible.** ❑ **Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution.** ❑ **Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions.** ❑ **Consider using pest-resistant plants, especially adjacent to hardscape.** ❑ **To insure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.**	❑ **Maintain landscaping using minimum or no pesticides.** ❑ **See applicable operational BMPs in "What you should know for…..Landscape and Gardening"** at http://rcflood.org/stormwater/**Error! Hyperlink reference not valid.** ❑ **Provide IPM information to new owners, lessees and operators.**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ E. **Pools, spas, ponds, decorative fountains, and other water features.**	❑ **Show location of water feature and a sanitary sewer cleanout in an accessible area within 10 feet. (Exception: Public pools must be plumbed according to County Department of Environmental Health Guidelines.)**	**If the Co-Permittee requires pools to be plumbed to the sanitary sewer, place a note on the plans and state in the narrative that this connection will be made according to local requirements.**	❑ **See applicable operational BMPs in** "Guidelines for Maintaining Your Swimming Pool, Jacuzzi and Garden Fountain" at http://rcflood.org/stormwater/
❑ F. **Food service**	❑ **For restaurants, grocery stores, and other food service operations, show location (indoors or in a covered area outdoors) of a floor sink or other area for cleaning floor mats, containers, and equipment.** ❑ **On the drawing, show a note that this drain will be connected to a grease interceptor before discharging to the sanitary sewer.**	❑ **Describe the location and features of the designated cleaning area.** ❑ **Describe the items to be cleaned in this facility and how it has been sized to insure that the largest items can be accommodated.**	❑ **See the brochure, "**The Food Service Industry Best Management Practices for: Restaurants, Grocery Stores, Delicatessens and Bakeries" at http://rcflood.org/stormwater/ **Provide this brochure to new site owners, lessees, and operators.**
❑ G. **Refuse areas**	❑ **Show where site refuse and recycled materials will be handled and stored for pickup. See local municipal requirements for sizes and other details of refuse areas.** ❑ **If dumpsters or other receptacles are outdoors, show how the designated area will be covered, graded, and paved to prevent run-on and show locations of berms to prevent runoff from the area.** ❑ **Any drains from dumpsters, compactors, and tallow bin areas shall be connected to a grease removal device before discharge to sanitary sewer.**	❑ **State how site refuse will be handled and provide supporting detail to what is shown on plans.** ❑ **State that signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar.**	❑ **State how the following will be implemented:** **Provide adequate number of receptacles. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. Prohibit/prevent dumping of liquid or hazardous wastes. Post "no hazardous materials" signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available on-site. See Fact Sheet SC-34, "Waste Handling and Disposal" in the CASQA Stormwater Quality Handbooks at** **www.cabmphandbooks.com**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ H. **Industrial processes.**	❑ **Show process area.**	❑ **If industrial processes are to be located on site, state: "All process activities to be performed indoors. No processes to drain to exterior or to storm drain system."**	❑ **See Fact Sheet SC-10, "Non-Stormwater Discharges" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com** See the brochure "Industrial & Commercial Facilities Best Management Practices for: Industrial, Commercial Facilities" at http://rcflood.org/stormwater/

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ I. **Outdoor storage of equipment or materials. (See rows J and K for source control measures for vehicle cleaning, repair, and maintenance.)**	❑ **Show any outdoor storage areas, including how materials will be covered. Show how areas will be graded and bermed to prevent run-on or run-off from area.** ❑ **Storage of non-hazardous liquids shall be covered by a roof and/or drain to the sanitary sewer system, and be contained by berms, dikes, liners, or vaults.** ❑ **Storage of hazardous materials and wastes must be in compliance with the local hazardous materials ordinance and a Hazardous Materials Management Plan for the site.**	**Include a detailed description of materials to be stored, storage areas, and structural features to prevent pollutants from entering storm drains.** **Where appropriate, reference documentation of compliance with the requirements of Hazardous Materials Programs for:** ▪ **Hazardous Waste Generation** ▪ **Hazardous Materials Release Response and Inventory** ▪ **California Accidental Release (CalARP)** ▪ **Aboveground Storage Tank** ▪ **Uniform Fire Code Article 80 Section 103(b) & (c) 1991** ▪ **Underground Storage Tank** **www.cchealth.org/groups/hazmat/**	❑ **See the Fact Sheets SC-31, "Outdoor Liquid Container Storage" and SC-33, "Outdoor Storage of Raw Materials" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

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1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ J. **Vehicle and Equipment Cleaning**	❑ **Show on drawings as appropriate:** **(1) Commercial/industrial facilities having vehicle/equipment cleaning needs shall either provide a covered, bermed area for washing activities or discourage vehicle/equipment washing by removing hose bibs and installing signs prohibiting such uses.** **(2) Multi-dwelling complexes shall have a paved, bermed, and covered car wash area (unless car washing is prohibited on-site and hoses are provided with an automatic shut-off to discourage such use).** **(3) Washing areas for cars, vehicles, and equipment shall be paved, designed to prevent run-on to or runoff from the area, and plumbed to drain to the sanitary sewer.** **(4) Commercial car wash facilities shall be designed such that no runoff from the facility is discharged to the storm drain system. Wastewater from the facility shall discharge to the sanitary sewer, or a wastewater reclamation system shall be installed.**	❑ **If a car wash area is not provided, describe any measures taken to discourage on-site car washing and explain how these will be enforced.**	**Describe operational measures to implement the following (if applicable):** ❑ **Washwater from vehicle and equipment washing operations shall not be discharged to the storm drain system.** Refer to "Outdoor Cleaning Activities and Professional Mobile Service Providers" for many of the Potential Sources of Runoff Pollutants categories below. Brochure can be found at http://rcflood.org/stormwater/ ❑**Car dealerships and similar may rinse cars with water only.**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ K. **Vehicle/Equipment Repair and Maintenance**	❑ **Accommodate all vehicle equipment repair and maintenance indoors. Or designate an outdoor work area and design the area to prevent run-on and runoff of stormwater.** ❑ **Show secondary containment for exterior work areas where motor oil, brake fluid, gasoline, diesel fuel, radiator fluid, acid-containing batteries or other hazardous materials or hazardous wastes are used or stored. Drains shall not be installed within the secondary containment areas.** ❑ **Add a note on the plans that states either (1) there are no floor drains, or (2) floor drains are connected to wastewater pretreatment systems prior to discharge to the sanitary sewer and an industrial waste discharge permit will be obtained.**	❑ **State that no vehicle repair or maintenance will be done outdoors, or else describe the required features of the outdoor work area.** ❑ **State that there are no floor drains or if there are floor drains, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.** ❑ **State that there are no tanks, containers or sinks to be used for parts cleaning or rinsing or, if there are, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.**	**In the Stormwater Control Plan, note that all of the following restrictions apply to use the site:** ❑ **No person shall dispose of, nor permit the disposal, directly or indirectly of vehicle fluids, hazardous materials, or rinsewater from parts cleaning into storm drains.** ❑ **No vehicle fluid removal shall be performed outside a building, nor on asphalt or ground surfaces, whether inside or outside a building, except in such a manner as to ensure that any spilled fluid will be in an area of secondary containment. Leaking vehicle fluids shall be contained or drained from the vehicle immediately.** ❑ **No person shall leave unattended drip parts or other open containers containing vehicle fluid, unless such containers are in use or in an area of secondary containment.** Refer to "Automotive Maintenance & Car Care Best Management Practices for Auto Body Shops, Auto Repair Shops, Car Dealerships, Gas Stations and Fleet Service Operations". Brochure can be found at http://rcflood.org/stormwater/ Refer to Outdoor Cleaning Activities and Professional Mobile Service Providers for many of the Potential Sources of Runoff Pollutants categories below. Brochure can be found at http://rcflood.org/stormwater/

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
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❑ L. **Fuel Dispensing Areas**	❑ **Fueling areas[6] shall have impermeable floors (i.e., portland cement concrete or equivalent smooth impervious surface) that are: a) graded at the minimum slope necessary to prevent ponding; and b) separated from the rest of the site by a grade break that prevents run-on of stormwater to the maximum extent practicable.** ❑ **Fueling areas shall be covered by a canopy that extends a minimum of ten feet in each direction from each pump. [Alternative: The fueling area must be covered and the cover's minimum dimensions must be equal to or greater than the area within the grade break or fuel dispensing area[1].] The canopy [or cover] shall not drain onto the fueling area.**		❑ **The property owner shall dry sweep the fueling area routinely.** ❑ **See the Fact Sheet SD-30 , "Fueling Areas" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

[6] The fueling area shall be defined as the area extending a minimum of 6.5 feet from the corner of each fuel dispenser or the length at which the hose and nozzle assembly may be operated plus a minimum of one foot, whichever is greater.

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ M. **Loading Docks**	❑ **Show a preliminary design for the loading dock area, including roofing and drainage. Loading docks shall be covered and/or graded to minimize run-on to and runoff from the loading area. Roof downspouts shall be positioned to direct stormwater away from the loading area. Water from loading dock areas shall be drained to the sanitary sewer, or diverted and collected for ultimate discharge to the sanitary sewer.** ❑ **Loading dock areas draining directly to the sanitary sewer shall be equipped with a spill control valve or equivalent device, which shall be kept closed during periods of operation.** ❑ **Provide a roof overhang over the loading area or install door skirts (cowling) at each bay that enclose the end of the trailer.**		❑ **Move loaded and unloaded items indoors as soon as possible.** ❑ **See Fact Sheet SC-30, "Outdoor Loading and Unloading," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ N. **Fire Sprinkler Test Water**		❑ **Provide a means to drain fire sprinkler test water to the sanitary sewer.**	❑ **See the note in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**
O. **Miscellaneous Drain or Wash Water or Other Sources** ❑ **Boiler drain lines** ❑ **Condensate drain lines** ❑ **Rooftop equipment** ❑ **Drainage sumps** ❑ **Roofing, gutters, and trim.** ❑ **Other sources**		❑ **Boiler drain lines shall be directly or indirectly connected to the sanitary sewer system and may not discharge to the storm drain system.** ❑ **Condensate drain lines may discharge to landscaped areas if the flow is small enough that runoff will not occur. Condensate drain lines may not discharge to the storm drain system.** ❑ **Rooftop equipment with potential to produce pollutants shall be roofed and/or have secondary containment.** ❑ **Any drainage sumps on-site shall feature a sediment sump to reduce the quantity of sediment in pumped water.** ❑ **Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff.** **Include controls for other sources as specified by local reviewer.**	

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☒ P. **Plazas, sidewalks, and parking lots.**			❑ **Sweep plazas, sidewalks, and parking lots regularly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into the storm drain system. Collect washwater containing any cleaning agent or degreaser and discharge to the sanitary sewer not to a storm drain.**

Appendix 9: O&M

Operation and Maintenance Plan and Documentation of Finance, Maintenance and Recording Mechanisms

(To be included upon final design of this project)

Appendix 10: Educational Materials

BMP Fact Sheets, Maintenance Guidelines and Other End-User BMP Information

Landscaping and garden maintenance activities can be major contributors to water pollution. Soils, yard wastes, over-watering and garden chemicals become part of the urban runoff mix that winds its way through streets, gutters and storm drains before entering lakes, rivers, streams, etc. Urban runoff pollution contaminates water and harms aquatic life!

In Riverside County, report illegal discharges into the storm drain, call
1-800-506-2555
"Only Rain Down the Storm Drain"

Important Links:

Riverside County Household Hazardous Waste Collection Information
1-800-304-2226 or www.rivcowm.org

Riverside County Backyard Composting Program
1-800-366-SAVE

Integrated Pest Management (IPM) Solutions
www.ipm.ucdavis.edu

California Master Gardener Programs
www.mastergardeners.org
www.camastergardeners.ucdavis.edu

California Native Plant Society
www.cnps.org

The Riverside County "Only Rain Down the Storm Drain" Pollution Prevention Program gratefully acknowledges Orange County's Storm Water Program for their contribution to this brochure.

...Only Rain Down ...the Storm Drain

What you should know for... Landscape and Gardening

Best Management tips for:

- Professionals
- Novices
- Landscapers
- Gardeners
- Cultivators

Tips for Landscape & Gardening

This brochure will help you to get the most of your lawn and gardening efforts and keep our waterways clean. Clean waterways provide recreation, establish thriving fish habitats, secure safe sanctuaries for wildlife, and add beauty to our communities. NEVER allow gardening products or waste water to enter the street, gutter or storm drain.

General Landscaping Tips

- Protect stockpiles and materials from wind and rain by storing them under tarps or secured plastic sheeting.

- Prevent erosion of slopes by planting fast-growing, dense ground covering plants. These will shield and bind the soil.
- Plant native vegetation to reduce the amount of water, fertilizers and pesticides applied to the landscape.
- Never apply pesticides or fertilizers when rain is predicted within the next 48 hours.

Garden & Lawn Maintenance

- Do not overwater. Use irrigation practices such as drip irrigation, soaker hoses or micro-spray systems. Periodically inspect and fix leaks and misdirected sprinklers.
- Do not rake or blow leaves, clippings or pruning waste into the street, gutter or storm drain. Instead, dispose of green waste by composting, hauling it to a permitted landfill, or recycling it through your city's program.

- Consider recycling your green waste and adding "nature's own fertilizer" to your lawn or garden.
- Read labels and use only as directed. Do not over-apply pesticides or fertilizers. Apply to spots as needed, rather than blanketing an entire area.
- Store pesticides, fertilizers and other chemicals in a dry covered area to prevent exposure that may result in the deterioration of containers and packaging.
- Rinse empty pesticide containers and re-use rinse water as you would use the product. Do not dump rinse water down storm drains or sewers. Dispose of empty containers in the trash.
- When available, use non-toxic alternatives to traditional pesticides, and use pesticides specifically designed to control the pest you are targeting.
- Try natural long-term common sense solutions first. Integrated Pest Management (IPM) can provide landscaping guidance and solutions, such as:
  - **Physical Controls** - Try hand picking, barriers, traps or caulking holes to control weeds and pests.
  - **Biological Controls** - Use predatory insects to control harmful pests.
  - **Chemical Controls** - Check out www.ipm.ucdavis.edu before using chemicals. Remember, all chemicals should be used cautiously and in moderation.
- If fertilizer is spilled, sweep up the spill before irrigating. If the spill is liquid, apply an absorbent material such as cat litter, and then sweep it up and dispose of it in the trash.
- Take unwanted pesticides to a Household Waste Collection Center to be recycled.
- *Dumping toxics into the street, gutter or storm drain is illegal!*

www.bewaterwise.com Great water conservation tips and drought tolerant garden designs.

www.ourwaterourworld.com Learn how to safely manage home and garden pests.

Additional information can also be found on the back of this brochure.

After the Storm

A Citizen's Guide to Understanding Stormwater

EPA United States Environmental Protection Agency

EPA 833-B-03-002
January 2003

Internet Address (URL) • HTTP://www.epa.gov
Recycled/Recyclable • Printed With Vegetable Oil Based Inks on 100% Postconsumer, Process Chlorine Free Recycled Paper

THE YEAR OF CLEAN WATER

WHEN IT RAINS IT DRAINS

For more information contact:

or visit
www.epa.gov/npdes/stormwater
www.epa.gov/nps

What is stormwater runoff?

Stormwater runoff occurs when precipitation from rain or snowmelt flows over the ground. Impervious surfaces like driveways, sidewalks, and streets prevent stormwater from naturally soaking into the ground.

Why is stormwater runoff a problem?

Stormwater can pick up debris, chemicals, dirt, and other pollutants and flow into a storm sewer system or directly to a lake, stream, river, wetland, or coastal water. Anything that enters a storm sewer system is discharged untreated into the waterbodies we use for swimming, fishing, and providing drinking water.

The effects of pollution

Polluted stormwater runoff can have many adverse effects on plants, fish, animals, and people.

- Sediment can cloud the water and make it difficult or impossible for aquatic plants to grow. Sediment also can destroy aquatic habitats.
- Excess nutrients can cause algae blooms. When algae die, they sink to the bottom and decompose in a process that removes oxygen from the water. Fish and other aquatic organisms can't exist in water with low dissolved oxygen levels.

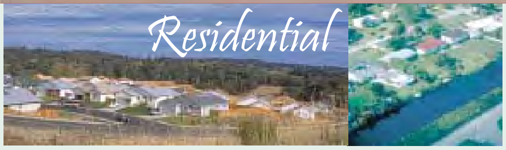
- Bacteria and other pathogens can wash into swimming areas and create health hazards, often making beach closures necessary.
- Debris—plastic bags, six-pack rings, bottles, and cigarette butts—washed into waterbodies can choke, suffocate, or disable aquatic life like ducks, fish, turtles, and birds.
- Household hazardous wastes like insecticides, pesticides, paint, solvents, used motor oil, and other auto fluids can poison aquatic life. Land animals and people can become sick or die from eating diseased fish and shellfish or ingesting polluted water.

- Polluted stormwater often affects drinking water sources. This, in turn, can affect human health and increase drinking water treatment costs.

Stormwater Pollution Solutions

Education is essential to changing people's behavior. Signs and markers near storm drains warn residents that pollutants entering the drains will be carried untreated into a local waterbody.

Residential



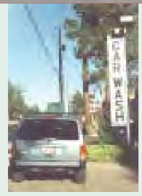
Recycle or properly dispose of household products that contain chemicals, such as insecticides, pesticides, paint, solvents, and used motor oil and other auto fluids. Don't pour them onto the ground or into storm drains.

Lawn care

Excess fertilizers and pesticides applied to lawns and gardens wash off and pollute streams. In addition, yard clippings and leaves can wash into storm drains and contribute nutrients and organic matter to streams.

- Don't overwater your lawn. Consider using a soaker hose instead of a sprinkler.
- Use pesticides and fertilizers sparingly. When use is necessary, use these chemicals in the recommended amounts. Use organic mulch or safer pest control methods whenever possible.
- Compost or mulch yard waste. Don't leave it in the street or sweep it into storm drains or streams.
- Cover piles of dirt or mulch being used in landscaping projects.

Auto care



Washing your car and degreasing auto parts at home can send detergents and other contaminants through the storm sewer system. Dumping automotive fluids into storm drains has the same result as dumping the materials directly into a waterbody.

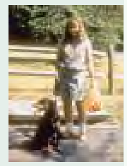
- Use a commercial car wash that treats or recycles its wastewater, or wash your car on your yard so the water infiltrates into the ground.
- Repair leaks and dispose of used auto fluids and batteries at designated drop-off or recycling locations.

Septic systems

Leaking and poorly maintained septic systems release nutrients and pathogens (bacteria and viruses) that can be picked up by stormwater and discharged into nearby waterbodies. Pathogens can cause public health problems and environmental concerns.

- Inspect your system every 3 years and pump your tank as necessary (every 3 to 5 years).
- Don't dispose of household hazardous waste in sinks or toilets.

Pet waste



Pet waste can be a major source of bacteria and excess nutrients in local waters.

- When walking your pet, remember to pick up the waste and dispose of it properly. Flushing pet waste is the best disposal method. Leaving pet waste on the ground increases public health risks by allowing harmful bacteria and nutrients to wash into the storm drain and eventually into local waterbodies.

Residential landscaping

Permeable Pavement—Traditional concrete and asphalt don't allow water to soak into the ground. Instead these surfaces rely on storm drains to divert unwanted water. Permeable pavement systems allow rain and snowmelt to soak through, decreasing stormwater runoff.

Rain Barrels—You can collect rainwater from rooftops in mosquito-proof containers. The water can be used later on lawn or garden areas.

Rain Gardens and Grassy Swales—Specially designed areas planted with native plants can provide natural places for rainwater to collect and soak into the ground. Rain from rooftop areas or paved areas can be diverted into these areas rather than into storm drains.

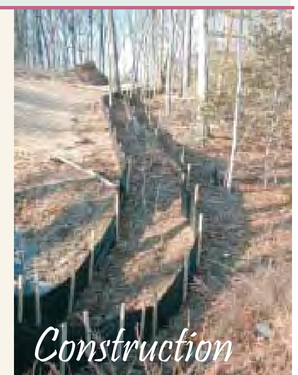
Vegetated Filter Strips—Filter strips are areas of native grass or plants created along roadways or streams. They trap the pollutants stormwater picks up as it flows across driveways and streets.

Commercial

Dirt, oil, and debris that collect in parking lots and paved areas can be washed into the storm sewer system and eventually enter local waterbodies.

- Sweep up litter and debris from sidewalks, driveways and parking lots, especially around storm drains.
- Cover grease storage and dumpsters and keep them clean to avoid leaks.
- Report any chemical spill to the local hazardous waste cleanup team. They'll know the best way to keep spills from harming the environment.

Construction



Erosion controls that aren't maintained can cause excessive amounts of sediment and debris to be carried into the stormwater system. Construction vehicles can leak fuel, oil, and other harmful fluids that can be picked up by stormwater and deposited into local waterbodies.

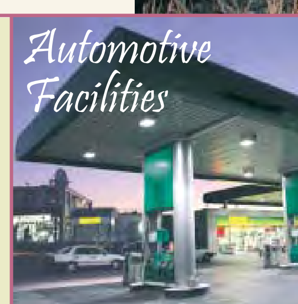
- Divert stormwater away from disturbed or exposed areas of the construction site.
- Install silt fences, vehicle mud removal areas, vegetative cover, and other sediment and erosion controls and properly maintain them, especially after rainstorms.
- Prevent soil erosion by minimizing disturbed areas during construction projects, and seed and mulch bare areas as soon as possible.

Agriculture

Lack of vegetation on streambanks can lead to erosion. Overgrazed pastures can also contribute excessive amounts of sediment to local waterbodies. Excess fertilizers and pesticides can poison aquatic animals and lead to destructive algae blooms. Livestock in streams can contaminate waterways with bacteria, making them unsafe for human contact.

- Keep livestock away from streambanks and provide them a water source away from waterbodies.
- Store and apply manure away from waterbodies and in accordance with a nutrient management plan.
- Vegetate riparian areas along waterways.
- Rotate animal grazing to prevent soil erosion in fields.
- Apply fertilizers and pesticides according to label instructions to save money and minimize pollution.

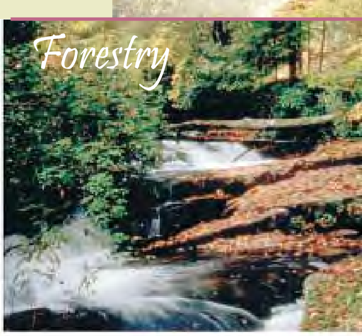
Automotive Facilities



Uncovered fueling stations allow spills to be washed into storm drains. Cars waiting to be repaired can leak fuel, oil, and other harmful fluids that can be picked up by stormwater.

- Clean up spills immediately and properly dispose of cleanup materials.
- Provide cover over fueling stations and design or retrofit facilities for spill containment.
- Properly maintain fleet vehicles to prevent oil, gas, and other discharges from being washed into local waterbodies.
- Install and maintain oil/water separators.

Forestry



Improperly managed logging operations can result in erosion and sedimentation.

- Conduct preharvest planning to prevent erosion and lower costs.
- Use logging methods and equipment that minimize soil disturbance.
- Plan and design skid trails, yard areas, and truck access roads to minimize stream crossings and avoid disturbing the forest floor.
- Construct stream crossings so that they minimize erosion and physical changes to streams.
- Expedite revegetation of cleared areas.

For Information:

For information on “closed-loop” suppliers and recycling/disposal vendors, contact:
County of Riverside
Health Services Agency
Department of Environmental Health
at (909) 358-5055.

SPILL RESPONSE AGENCY:
HAZ-MAT: (909) 358-5055
AFTER 5:00 P.M.: (909) 358-5245 OR 911

RECYCLING AND HAZARDOUS WASTE DISPOSAL: (909) 358-5055

TO REPORT ILLEGAL DUMPING OR A CLOGGED STORM DRAIN: 1-800-506-2555

To order additional brochures or to obtain information on other pollution prevention activities, call: (909) 955-1111.

The Cities and County of Riverside
StormWater/CleanWater Protection Program
1-800-506-2555

StormWater CleanWater PROTECTION PROGRAM

Riverside County gratefully acknowledges the Santa Clara Valley Nonpoint Source Pollution Control Program and the City of Los Angeles Stormwater Management Division for information provided in this brochure.

StormWater Pollution

What you should know for...

AUTOMOTIVE MAINTENANCE & CAR CARE

Best Management Practices (BMPS) for:

- Auto Body Shops
- Auto Repair Shops
- Car Dealerships
- Gas Stations
- Fleet Service Operations

StormWater Pollution . . . What You Should Know

Riverside County has two drainage systems - sanitary sewers and storm drains. The storm drain system is designed to help prevent flooding by carrying excess rainwater away from streets. Since the storm drain system does not provide for water treatment, it also serves the *unintended* function of transporting pollutants directly to our waterways.

Unlike sanitary sewers, storm drains are not connected to a treatment plant - they flow directly to our local streams, rivers and lakes.

Rain and water runoff from automotive shops and businesses can carry pollutant material into storm drains. Examples of pollutants include oil and grease from cars, copper and asbestos from worn brake linings, zinc from tires, and toxics from spilled fluids.

Stormwater pollution causes as much as 60% of our water pollution problem. It jeopardizes the quality of our waterways and poses a threat to groundwater resources if pollutants percolate through soil.

The Cities and County of Riverside StormWater/CleanWater Protection Program

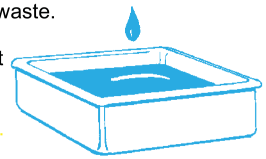
Since preventing pollution is much easier, and less costly, than cleaning up “after the fact,” the Cities and County of Riverside StormWater/CleanWater Protection Program informs residents and businesses on pollution prevention activities such as the Best Management Practices (BMPs) described in this pamphlet.

The Cities and County of Riverside have adopted ordinances for stormwater management and discharge control. In accordance with state and federal law, these local stormwater ordinances **prohibit** the discharge of wastes into the storm drain system or local surface waters. This includes discharges containing oil, antifreeze, gasoline and other waste materials.

PLEASE NOTE: A common stormwater pollution problem associated with automotive shops and businesses is the hosing down of service bays, parking and other areas. Often, this activity flushes pollutants into the storm drain system. The discharges of pollutants is ***strictly prohibited*** by local ordinances and state and federal regulations.

Keep your shop in tune. Follow these Practices to help prevent stormwater pollution . . .

1. Changing Automotive Fluids
- Designate an area away from storm or sanitary drains to change automotive fluids.
- Collect, separate, and recycle motor oil, antifreeze, transmission fluid, and gear oil.
- Drain brake fluid and other non-recyclables into a proper container and handle as a hazardous waste.
- Use a radiator flushing fluid that can be recycled, and add it to the waste antifreeze.



2. Working on Transmissions, Engines, and Miscellaneous Repairs
- Keep a drip pan or a wide low-rimmed container under vehicles to catch fluids whenever you unclip hoses, unscrew filters, or change parts, to contain unexpected leaks.

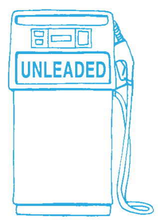
3. Preventing Leaks and Spills
- Avoid spills by emptying and wiping drip pans when you move them to another vehicle or when they are half-full.
- Routinely check equipment to wipe up spills and repair leaks.
- Place large pans or an inflatable portable berm under wrecked cars.
- Drain all fluids from wrecked vehicles or "parts" cars you keep on site.

4. Cleaning up Spills
- Clean up small spills immediately using shop rags.

- Keep dry absorbent materials and/or a wet/dry vacuum cleaner on hand for mid-sized spills.
- Contain large spills immediately; block or shut off floor and parking lot drains and notify the authorities.
- Train employees to be familiar with hazardous spill response plans and emergency procedures.

5. Identify and Control Wastewater Discharges
- Ensure that shop sinks and floor drains are connected to the sanitary sewer. Check with the local sewer authority regarding permitting or other requirements.
- Post signs to prevent disposal of liquid wastes into sanitary drains.

6. Fueling Vehicles
- Clean-up minor spills, with a dry absorbent, rather than allowing them to evaporate. Dispose of the absorbent as a dry hazardous waste.
- Use a damp cloth and a damp mop to keep the area clean rather than a hose or a wet mop.



7. Removing and Storing Batteries
- Store batteries indoors, on an open rack.
- Return used batteries to a battery vendor.
- Contain cracked batteries to prevent hazardous spills.

8. Cleaning Parts
- Clean parts in a self-contained unit, solvent sink, or parts washer to prevent solvents and grease from entering a sewer or storm drain connection.

9. Metal Grinding and Finishing
- Catch metal filings in an enclosed unit or on a tarpaulin.
- Sweep filing area to prevent washing metals into floor drains.

10. Storing and Disposing of Waste
- Store recyclable and non-recyclable waste separately.
- Place liquid waste (hazardous or otherwise) within a bermed or secondary containment area.
- Cover outdoor storage areas to prevent contact with rain water.
- Collect used parts for delivery to a scrap metal dealer.

11. Selecting and Controlling Inventory
- Purchase recyclable or non-toxic materials.
- Select "closed-loop" suppliers and purchase supplies in bulk.

12. Outdoor Parking and Auto Maintenance
- Treat outdoor areas as an extension of your service bays or avoid using altogether.
- Sweep-up trash and dirt from outdoor parking and maintenance areas. Do not hose down areas. All non-storm water discharges are prohibited.
- Drain work areas to a sanitary drain rather than a storm drain. Contact the local sewer authority to determine if pretreatment is required.

13. Washing Vehicles, Cleaning Engines, and Other Steam Cleaning
- For occasional car exterior cleaning, minimize the water used and divert runoff to landscaped areas, keeping it out of the storm drain.
- Wash vehicles with biodegradable, phosphate-free detergent.
- Make sure no wastewater from engine or parts cleaning or steam cleaning is discharged where it may flow to a street, gutter, or storm drain.

14. Cleaning Work Areas
- Sweep or vacuum the shop floor frequently.
- Damp mop work areas - do not hose down work areas into the street or gutter.
- Do not pour mop water into the parking lot, street, gutter or storm drain.
- Use non-toxic cleaning products whenever possible.

Please remember:

Helpful telephone numbers and links:

RIVERSIDE COUNTY WATER AGENCIES

City of Banning	(951) 922-3130
City of Beaumont/Cherry Valley	(951) 845-9581
City of Blythe	(760) 922-6161
City of Coachella	(760) 398-3502
City of Corona	(951) 736-2263
City of Hemet	(951) 765-3710
City of Norco	(951) 270 5607
City of Riverside Public Works	(951) 351-6140
City of San Jacinto	(951) 654-4041
Coachella Valley Water District	(760) 398-2651
Desert Water Agency (Palm Springs)	(760) 323-4971
Eastern Municipal Water District	(951) 928-3777
Elsinore Valley Municipal Water District	(951) 674 3146
Elsinore Water District	(951) 674-2168
Farm Mutual Water Company	(951) 244-4198
Idyllwild Water District	(951) 659-2143
Indio Water Authority	(760) 391-4129
Jurupa Community Services District	(951) 685-7434
Lee Lake Water	(951) 658-3241
Mission Springs Water	(760) 329-6448
Rancho California Water District	(951) 296-6900
Ripley, CSA #62	(760) 922-4951
Riverside Co. Service Area #51	(760) 227-3203
Rubidoux Community Services District	(951) 684-7580
Valley Sanitary District	(760) 347-2356
Western Municipal Water District	(951) 789-5000
Yucaipa Valley Water District	(909) 797-5117

REPORT ILLEGAL STORM DRAIN DISPOSAL
1-800-506-2555 or e-mail us at
fcnpdes@rcflood.org

- Riverside County Flood Control and Water Conservation District
  www.rcflood.org

Online resources include:

- California Storm Water Quality Association
  www.casqa.org
- State Water Resources Control Board
  www.waterboards.ca.gov
- Power Washers of North America
  www.thepwna.org

Stormwater Pollution

What you should know for...

Outdoor Cleaning Activities and Professional Mobile Service Providers

Storm drain pollution prevention information for:

- Car Washing / Mobile Detailers
- Window and Carpet Cleaners
- Power Washers
- Waterproofers / Street Sweepers
- Equipment cleaners or degreasers and all mobile service providers

Do you know where street flows actually go?

Storm drains are NOT connected to sanitary sewer systems and treatment plants!

The primary purpose of storm drains is to carry rain water away from developed areas to prevent flooding. Pollutants discharged to storm drains are transported directly into rivers, lakes and streams. Soaps, degreasers, automotive fluids, litter and a host of materials are washed off buildings, sidewalks, plazas and parking areas. Vehicles and equipment must be properly managed to prevent the pollution of local waterways.

Unintentional spills by mobile service operators can flow into storm drains and pollute our waterways. **Avoid mishaps.** *Always* have a **Spill Response Kit** on hand to clean up unintentional spills. Only emergency **Mechanical** repairs should be done in City streets, using drip pans for spills. **Plumbing** should be done on private property. Always store chemicals in a leak-proof container and keep covered when not in use. **Window/Power Washing** waste water shouldn't be released into the streets, but should be disposed of in a sanitary sewer, landscaped area or in the soil. Soiled **Carpet Cleaning** wash water should be filtered before being discharged into the sanitary sewer. Dispose of all filter debris properly. **Car Washing/Detailing** operators should wash cars on private property and use a regulated hose nozzle for water flow control and runoff prevention. Capture and dispose of waste water and chemicals properly. Remember, storm drains are for receiving rain water runoff only.

REPORT ILLEGAL STORM DRAIN DISPOSAL 1-800-506-2555

Help Protect Our Waterways!

Use these guidelines for Outdoor Cleaning Activities and Wash Water Disposal

Did you know that disposing of pollutants into the street, gutter, storm drain or body of water is *PROHIBITED* by law and can result in stiff penalties?

Best Management Practices

Waste wash water from Mechanics, Plumbers, Window/Power Washers, Carpet Cleaners, Car Washing and Mobile Detailing activities may contain significant quantities of motor oil, grease, chemicals, dirt, detergents, brake pad dust, litter and other materials.

Best Management Practices, or BMPs as they are known, are guides to prevent pollutants from entering the storm drains. *Each of us* can do our part to keep storm water clean by using the suggested BMPs below:

Simple solutions for both light and heavy duty jobs:

Do...consider dry cleaning methods first such as a mop, broom, rag or wire brush. Always keep a spill response kit on site.

Do...prepare the work area before power cleaning by using sand bags, rubber mats, vacuum booms, containment pads or temporary berms to keep wash water <u>away</u> from the gutters and storm drains.

Do...use vacuums or other machines to remove and collect loose debris or litter before applying water.

Do...obtain the property owner's permission to dispose of ***small amounts*** of power washing waste water on to landscaped, gravel or unpaved surfaces.

Do...check your local sanitary sewer agency's policies on wash water disposal regulations before disposing wash water to the sewer. (See list on reverse side)

Do...be aware that if discharging to landscape areas, soapy wash water may damage landscaping. Residual wash water may remain on paved surfaces to evaporate. Sweep up solid residuals and dispose of properly. Vacuum booms are another option for capturing and collecting wash water.

Do...check to see if local ordinances prevent certain activities.

Do not let...wash or waste water from sidewalk, plaza or building cleaning go into a street or storm drain.

...ONLY RAIN... DOWN THE STORM DRAIN

Report illegal storm drain disposal,
Call Toll Free
1-800-506-2555

Using Cleaning Agents

Try using biodegradable/phosphate-free products. They are easier on the environment, but don't confuse them for being toxic free. Soapy water entering the storm drain system <u>can</u> impact the delicate aquatic environment.

When cleaning surfaces with a ***high-pressure washer*** or ***steam cleaner***, additional precautions should be taken to prevent the discharge of pollutants into the storm drain system. These two methods of surface cleaning can loosen additional material that can contaminate local waterways.

Think Water Conservation

Minimize water use by using high pressure, low volume nozzles. Be sure to check all hoses for leaks. Water is a precious resource, don't let it flow freely and be sure to shut it off in between uses.

Screening Wash Water

Conduct thorough dry cleanup before washing exterior surfaces, such as buildings and decks ***with loose paint***, sidewalks or plaza areas. Keep debris from entering the storm drain after cleaning by first passing the wash water through a "20 mesh" or finer screen to catch the solid materials, then dispose of the mesh in a refuse container. Do not let the remaining wash water enter a street, gutter or storm drain.

Drain Inlet Protection & Collection of Wash Water

- Prior to any washing, block all storm drains with an impervious barrier such as sandbags or berms, or seal the storm drain with plugs or other appropriate materials.
- Create a containment area with berms and traps or take advantage of a low spot to keep wash water contained.
- Wash vehicles and equipment on grassy or gravel areas so that the wash water can seep into the ground.
- Pump or vacuum up all wash water in the contained area.

Concrete/Coring/Saw Cutting and Drilling Projects

Protect any down-gradient inlet by using dry activity techniques whenever possible. If water is used, minimize the amount of water used during the coring/drilling or saw cutting process. Place a barrier of sandbags and/or absorbent berms to protect the storm drain inlet or watercourse. Use a shovel or wet vacuum to remove the residue from the pavement. Do not wash residue or particulate matter into a storm drain inlet or watercourse.

RIVERSIDE COUNTY
ANIMAL SERVICES LOCATIONS:

www.rcdas.org

BLYTHE
16450 West Hobson Way
Blythe, CA 92225
760-921-7857

COACHELLA VALLEY ANIMAL CAMPUS
72-050 Petland Place
Thousand Palms, CA 92276
760-343-3644

RIVERSIDE COUNTY ANIMAL SERVICES
6851 Van Buren Blvd.
Riverside, CA 92509
951-688-4340

OTHER ANIMAL SHELTERS:

ANIMAL CARE CENTER OF INDIO
45-355 Van Buren
Indio, CA 92201
760-391-4138

ANIMAL FRIENDS OF THE VALLEYS
29001 Bastron Avenue
Lake Elsinore, CA 92530
951-674-0618
(Serving incorporated Temecula, Wildomar, Lake Elsinore, Murrieta and Canyon Lake)

MARY S. ROBERTS PET ADOPTION CENTER
6185 Industrial Avenue
Riverside, CA 92504
951-688-4340

RAMONA HUMANE SOCIETY
690 Humane Way
San Jacinto 92586
951-654-8002
(Serving Sun City, Menifee, Romoland and Homeland)

Looking to adopt a pet?
This website is linked to many animal shelters.
www.petfinder.com

To report illegal storm drain disposal, call
1-800-506-2555

Or visit our website at www.rcflood.org

E-mail fcnpdes@rcflood.org

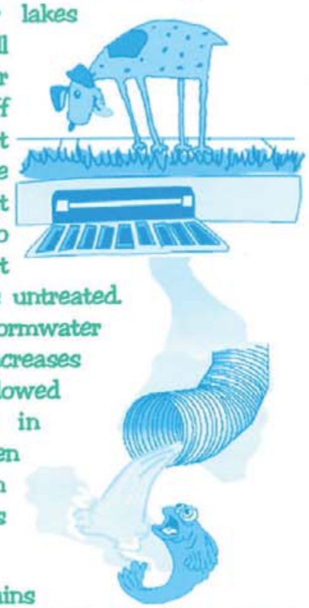
What's the Scoop?

TIPS FOR A HEALTHY PET AND A HEALTHIER ENVIRONMENT

CREATE A HEALTHY ENVIRONMENT in and around your home by following these simple pet practices. Your pet, family and neighbors will appreciate their clean comfortable surroundings.

HOUSEHOLD PETS

We all love our pets, but pet waste is a subject everyone likes to avoid. Pet waste left on trails, sidewalks, streets and grassy areas can be washed into the nearest waterway when it rains. Even if you can't see streams or lakes near you, rainfall (stormwater) or sprinkler runoff can wash pet waste into the storm drains that carry runoff to the nearest streams or lakes untreated. The risk of stormwater contamination increases if pet waste is allowed to accumulate in outdoor animal pen areas or left on sidewalks, streets or driveways.



Pet waste contains nutrients and bacteria. Nutrients can promote the growth of algae in streams and lakes. Algae can cause fish kills and other environmental damage if it is fed too many nutrients. Pet Waste also contains e. Coli and fecal bacteria, which can cause disease in other animals and humans that come in contact with it when swimming or splashing in streams and lakes. Dogs also carry salmonella and giardia, which can make people sick.

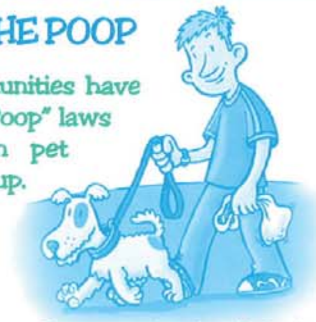
Pet waste that is not picked up and properly disposed can also increase vector problems. Flies and other insects are not only attracted to and feed on pet waste, but can also be infected with diseases and spread those diseases to humans and other animals.

WHAT CAN YOU DO?

- SCOOP up pet waste and flush it down the toilet or place in trash can.
- NEVER DUMP pet waste into a storm drain or catch basin.
- USE the complimentary bags or mutt mitts offered in dispensers at local parks.
- CARRY EXTRA BAGS when walking your dog and make them available to other pet owners who are without.
- TEACH CHILDREN how to properly clean up after a pet.
- TELL FRIENDS AND NEIGHBORS about the ill effects of animal waste on the environment. Encourage them to clean up after pets.

Call 1-800-506-2555 TOLL FREE to report illegal dumping to the storm drain, find the dates and times of local Household Hazardous Waste Collection Events, obtain additional information on stormwater problems and solutions, request presentations about stormwater pollution in your child's classroom, or learn about free grasscycling and composting workshops.

SCOOP THE POOP



Many communities have "Scoop the Poop" laws that govern pet waste cleanup. Some of these laws specifically require anyone who walks an animal off their property to carry a bag, shovel, or scooper. Any waste left by the animal must be cleaned up immediately. **CALL YOUR LOCAL CODE ENFORCEMENT OFFICE** to find out more about pet waste regulations.

OTHER WAYS TO PROTECT YOUR PETS AND THE ENVIRONMENT

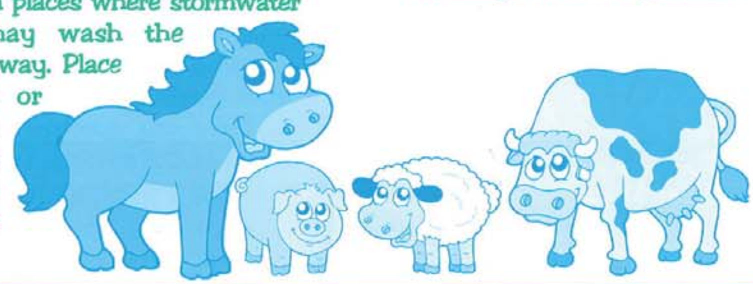
Pets are only one of many sources that contribute to water pollution. However, these other sources of water pollution cannot only harm the environment but also harm your pet. Improperly used or stored lawn fertilizers, pesticides, soaps, grease and vehicle fluids cannot only be washed into local streams and lakes, these chemicals can also harm your pet if they ingest or touch these chemicals. Call 1-800-506-2555 for information regarding how to properly dispose of household hazardous wastes such as these. You can also keep your pets and our environment healthy by properly maintaining your vehicles, and limiting use of pesticides and fertilizers to only the amount that is absolutely needed.

Make sure to not only protect your pets, but to also protect your neighbors pets. **NEVER HOSE VEHICLE FLUIDS** into the street or gutter. **USE ABSORBENT MATERIALS** such as cat litter to clean-up spills. **SWEEP UP** used absorbent materials and place it in the trash.

HORSES AND LIVESTOCK

Fortunate enough to own a horse or livestock? You, too, can play a part in protecting and cleaning up our water resources. The following are a few simple Best Management Practices (BMPs) specifically designed for horses and livestock.

- **STORE** your manure properly. Do not store unprotected piles of manure in places where stormwater runoff may wash the manure away. Place a cover or tarp over the pile to keep rainwater out.



- **BUILD** a manure storage facility to protect your pets, property and the environment. These structures usually consist of a concrete pad to protect groundwater and a short wall on one or two sides to make manure handling easier.
- **READ** the Only Rain Down the Storm Drain brochure titled "Tips for Horse Care" for additional guidance and recommendations. This brochure should be available from your local city office or for download at www.rcflood.org/stormwater.
- **KEEP** animals out of streams - Horses and livestock can deficate in streams causing stormwater pollution. Livestock and horses in streams can also disturb sensitive habitat and vegetation, causing additional environmental damage. Keep livestock and horses away from streams and use designated stream crossings whenever possible.
- **MATERIAL STORAGE SAFETY TIPS**
  Many of the chemicals found in barns require careful handling and proper disposal. When using these chemicals, be certain to follow these common sense guidelines:
  - Buy only what you need.
  - Treat spills of hoof oils like a fuel spill. Use kitty litter to soak up the oil and dispose of it in a tightly sealed plastic bag.
  - Store pesticides in a locked, dry, well-ventilated area.
  - Protect stored fertilizer and pesticides from rain and surface water.

RESOURCE CONSERVATION DISTRICTS CAN HELP

Call 1-800-506-2555 for assistance with locating a local conservation district that can help you properly manage your manure, re-establish healthy pastures, control weeds, or identify appropriate grasses for your soils.

Thank you for doing your part to protect your watershed, the environment, your pets and your community!

Saltwater Pools

- Salt water pools, although different from regular pools, are in fact, sanitized using chlorine. A salt-chlorine generator separates the chlorine and sodium molecules in salt and reintroduces them into the pool water. The same harmful effects of chlorine still apply.
- A salt water pool is still maintained with chemicals such as Muriatic acid, soda ash and sodium carbonate to help keep a proper pH, total Alkalinity, Calcium Hardness and Stabilizer levels.

- It may be illegal to discharge salt water to land. The salt may kill plants and the build-up of salt in soil puts animals, plants, and groundwater at risk. Consult your city representatives to determine local requirements regarding salt water drainage.

NEVER put unused chemicals into the trash, onto the ground or down a storm drain.

IMPORTANT: The discharge of pollutants into the street, gutter, storm drain system or waterways - without a permit or waiver - is strictly prohibited by local ordinances, state and federal law. Violations may result in monetary fines and enforcement actions.

Helpful telephone numbers and links

Riverside County Water Agencies:

City of Banning	(951) 922-3130
City of Beaumont/Cherry Valley	(951) 845-9581
City of Blythe	(760) 922-6161
City of Coachella	(760) 398-3502
City of Corona	(951) 736-2263
City of Hemet	(951) 765-3710
City of Norco	(951) 270 5607
City of Riverside Public Works	(951) 351-6140
City of San Jacinto	(951) 654-4041
Coachella Valley Water District	(760) 398-2651
Desert Water Agency (Palm Springs)	(760) 323-4971
Eastern Municipal Water District	(951) 928-3777
Elsinore Valley Municipal Water District	(951) 674 3146
Elsinore Water District	(951) 674-2168
Farm Mutual Water Company	(951) 244-4198
Idyllwild Water District	(951) 659-2143
Indio Water Authority	(760) 391-4129
Jurupa Community Services District	(951) 685-7434
Lee Lake Water	(951) 658-3241
Mission Springs Water	(760) 329-6448
Rancho California Water District	(951) 296-6900
Ripley, CSA #62	(760) 922-4951
Riverside Co. Service Area #51	(760) 227-3203
Rubidoux Community Services District	(951) 684-7580
Valley Sanitary District	(760) 347-2356
Western Municipal Water District	(951) 789-5000
Yucaipa Valley Water District	(909) 797-5117

CALL 1-800-506-2555 to:

- Report clogged storm drains or illegal storm drain disposal from residential, industrial, construction and commercial sites into public streets, storm drains and/or water bodies.
- Find out about our various storm drain pollution prevention materials.
- Locate the dates and times of Household Hazardous Waste (HHW) Collection Events.
- Request adult, neighborhood, or classroom presentations.
- Locate other County environmental services.
- Receive grasscycling information and composting workshop information.

Or visit our
Riverside County Flood Control and Water Conservation District
website at: www.rcflood.org

Other links to additional storm drain pollution information:
- County of Riverside Environmental Health: www.rivcoeh.org
- State Water Resources Control Board: www.waterboards.ca.gov
- California Stormwater Quality Association: www.casqa.org
- United States Environmental Protection Agency (EPA): www.epa.gov/compliance/assistance (compliance assistance information)

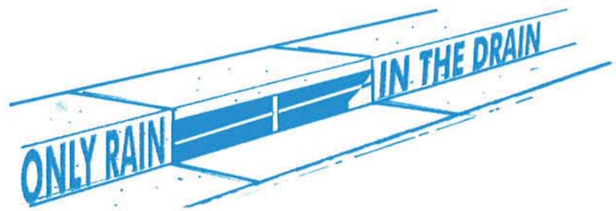
ONLY RAIN... DOWN THE STORM DRAIN

Riverside County's, "Only Rain Down the Storm Drain" Pollution Prevention Program gratefully acknowledges the Bay Area Stormwater Management Agencies Association and the Cleaning Equipment Trade Association for information provided in this brochure.

Guidelines for Maintaining your...

Swimming Pool, Jacuzzi and Garden Fountain

Where does the water go?



Pool, Jacuzzi and Fountain wastewater and rain water runoff (also called stormwater) that reach streets can enter the storm drain and be conveyed directly into local streams, rivers and lakes.

A storm drain's purpose is to prevent flooding by carrying rain water away from developed areas. Storm drains are not connected to sanitary sewers systems and treatment plants!

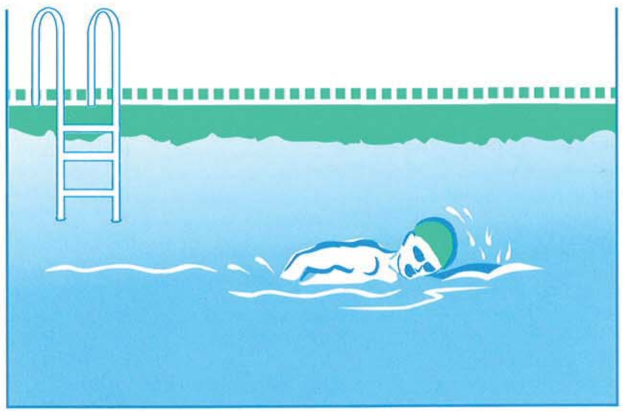
Wastewater, from residential swimming pools, Jacuzzis, fishponds and fountains, often contains chemicals used for sanitizing or cleansing purposes. Toxic chemicals (such as chlorine or copper-based algaecides) may pollute the environment when discharged into a storm drain system.

The Cities and County of Riverside have adopted ordinances that prohibit the discharge of wastewater to the street and storm drain system.

Discharge Regulations

Regulatory requirements for discharging wastewater from your pool may differ from city to city. Chlorinated water should not be discharged into the street, storm drain or surface waters. Check with your water agency to see if disposal to the sanitary sewer line is allowed for pool discharges (see reverse for Riverside County sewer agencies).

If allowed, a hose can be run from the pool Jacuzzi, or fountain to the private sewer cleanout, washing machine drain or a sink or bathtub.



If you cannot discharge to the sewer, you may drain your fountain, pool, or jacuzzi to your landscaping <u>by following these guidelines</u>:

First, reduce or eliminate solids (e.g. debris, leaves or dirt) in the pool water and <u>allow the chemicals in the pool water to dissipate before draining the pool</u> (this could take up to 7 days, verify using a home pool test kit).

Second, slowly drain to a landscaped area away from buildings or structures. Control the flow to prevent soil erosion; it may take more than one day to empty. Do not allow sediment to enter the street, gutter or storm drain.

Maintenance & Chemicals

Cleaning Filters

Filter rinse water and backwash must be discharged to the sanitary sewer, on-site septic tank and drain field system (if properly designed and adequately sized), or a seepage pit. Alternatively, rinse water or backwash may be diverted to landscaped or dirt areas. Filter media and other non-hazardous solids should be picked up and disposed of in the trash.

Algaecides

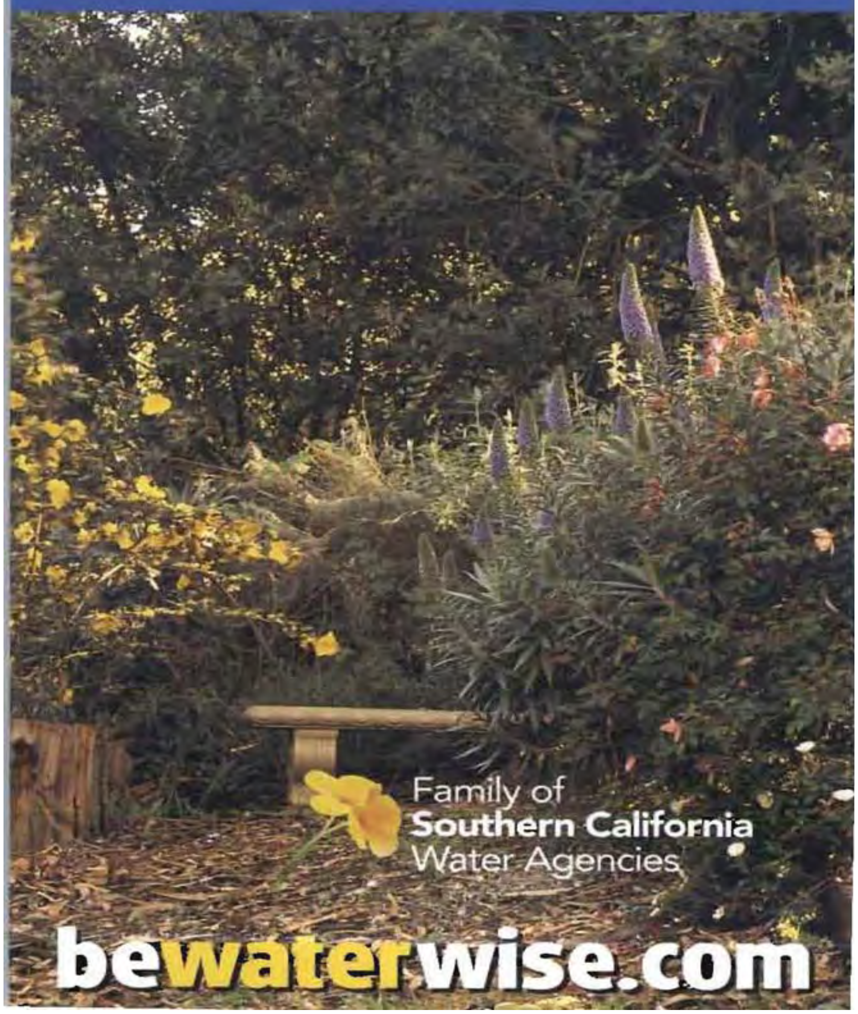
Avoid using copper-based algaecides unless absolutely necessary. Control algae with chlorine, organic polymers or other alternatives to copper-based pool chemicals. Copper is a heavy metal that can be toxic to aquatic life when you drain your pool.

Chemical Storage and Handling

- Use only the amount indicated on product labels
- Store chlorine and other chemicals in a covered area to prevent runoff. Keep out of reach of children and pets.
- Chlorine kits, available at retail swimming pool equipment and supply stores, should be used to monitor the chlorine and pH levels before draining your pool.
- Chlorine and other pool chemicals should never be allowed to flow into the gutter or storm drain system.

Take unwanted chemicals to a Household Hazardous Waste (HHW) Collection Event. There's no cost for taking HHW items to collection events – it's FREE! Call **1-800-506-2555** for a schedule of HHW events in your community.

10 Ways to Save Water Outdoors



TIP #1 The average homeowner uses twice the amount of water needed to keep plants healthy. Use the watering calculator and index at **bewaterwise.com** to know exactly how much water your plants need.

TIP #2 Check your sprinkler system for leaks, overspray and broken sprinkler heads. Update with drip or other more water-efficient sprinklers where appropriate.

TIP #3 This fall, plant a portion of your garden with beautiful native and California Friendly plants. Browse the plant database at **bewaterwise.com** to find just the right look for your outdoor spaces.

TIP #4 Reduce the amount of water-thirsty grass. Keep only what you need and replace the rest with less-thirsty plants or permeable paving.

TIP #5 For the grass you keep, set your lawnmower blade higher.

TIP #6 Adjust your sprinkler timer downward in September. Plants need less water when days are shorter.

TIP #7 Use a broom instead of the hose for cleaning sidewalks and patios.

TIP #8 Mulch! A layer of bark, gravel, compost, sawdust or low-growing groundcover evens out soil temperature and allows better water retention.

TIP #9 Check the list of invasive plants that hurt our environment at **caleppc.org** and remove any from your garden.

TIP #10 Share these tips with your gardener, neighbors and friends. Water conservation should be a part of every Southern Californian's lifestyle, but that doesn't mean we can't have lush and beautiful outdoor spaces.

bewaterwise.com

Design Objectives

- ☑ Maximize Infiltration
- ☑ Provide Retention
- ☑ Slow Runoff
- ☑ Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- Contain Pollutants
- Collect and Convey

Description

Each project site possesses unique topographic, hydrologic, and vegetative features, some of which are more suitable for development than others. Integrating and incorporating appropriate landscape planning methodologies into the project design is the most effective action that can be done to minimize surface and groundwater contamination from stormwater.

Approach

Landscape planning should couple consideration of land suitability for urban uses with consideration of community goals and projected growth. Project plan designs should conserve natural areas to the extent possible, maximize natural water storage and infiltration opportunities, and protect slopes and channels.

Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment.

Design Considerations

Design requirements for site design and landscapes planning should conform to applicable standards and specifications of agencies with jurisdiction and be consistent with applicable General Plan and Local Area Plan policies.

Designing New Installations

Begin the development of a plan for the landscape unit with attention to the following general principles:

- Formulate the plan on the basis of clearly articulated community goals. Carefully identify conflicts and choices between retaining and protecting desired resources and community growth.

- Map and assess land suitability for urban uses. Include the following landscape features in the assessment: wooded land, open unwooded land, steep slopes, erosion-prone soils, foundation suitability, soil suitability for waste disposal, aquifers, aquifer recharge areas, wetlands, floodplains, surface waters, agricultural lands, and various categories of urban land use. When appropriate, the assessment can highlight outstanding local or regional resources that the community determines should be protected (e.g., a scenic area, recreational area, threatened species habitat, farmland, fish run). Mapping and assessment should recognize not only these resources but also additional areas needed for their sustenance.

Project plan designs should conserve natural areas to the extent possible, maximize natural water storage and infiltration opportunities, and protect slopes and channels.

Conserve Natural Areas during Landscape Planning

If applicable, the following items are required and must be implemented in the site layout during the subdivision design and approval process, consistent with applicable General Plan and Local Area Plan policies:

- Cluster development on least-sensitive portions of a site while leaving the remaining land in a natural undisturbed condition.

- Limit clearing and grading of native vegetation at a site to the minimum amount needed to build lots, allow access, and provide fire protection.

- Maximize trees and other vegetation at each site by planting additional vegetation, clustering tree areas, and promoting the use of native and/or drought tolerant plants.

- Promote natural vegetation by using parking lot islands and other landscaped areas.

- Preserve riparian areas and wetlands.

Maximize Natural Water Storage and Infiltration Opportunities Within the Landscape Unit

- Promote the conservation of forest cover. Building on land that is already deforested affects basin hydrology to a lesser extent than converting forested land. Loss of forest cover reduces interception storage, detention in the organic forest floor layer, and water losses by evapotranspiration, resulting in large peak runoff increases and either their negative effects or the expense of countering them with structural solutions.

- Maintain natural storage reservoirs and drainage corridors, including depressions, areas of permeable soils, swales, and intermittent streams. Develop and implement policies and regulations to discourage the clearing, filling, and channelization of these features. Utilize them in drainage networks in preference to pipes, culverts, and engineered ditches.

- Evaluating infiltration opportunities by referring to the stormwater management manual for the jurisdiction and pay particular attention to the selection criteria for avoiding groundwater contamination, poor soils, and hydrogeological conditions that cause these facilities to fail. If necessary, locate developments with large amounts of impervious surfaces or a potential to produce relatively contaminated runoff away from groundwater recharge areas.

Protection of Slopes and Channels during Landscape Design

- Convey runoff safely from the tops of slopes.
- Avoid disturbing steep or unstable slopes.
- Avoid disturbing natural channels.
- Stabilize disturbed slopes as quickly as possible.
- Vegetate slopes with native or drought tolerant vegetation.
- Control and treat flows in landscaping and/or other controls prior to reaching existing natural drainage systems.
- Stabilize temporary and permanent channel crossings as quickly as possible, and ensure that increases in run-off velocity and frequency caused by the project do not erode the channel.
- Install energy dissipaters, such as riprap, at the outlets of new storm drains, culverts, conduits, or channels that enter unlined channels in accordance with applicable specifications to minimize erosion. Energy dissipaters shall be installed in such a way as to minimize impacts to receiving waters.
- Line on-site conveyance channels where appropriate, to reduce erosion caused by increased flow velocity due to increases in tributary impervious area. The first choice for linings should be grass or some other vegetative surface, since these materials not only reduce runoff velocities, but also provide water quality benefits from filtration and infiltration. If velocities in the channel are high enough to erode grass or other vegetative linings, riprap, concrete, soil cement, or geo-grid stabilization are other alternatives.
- Consider other design principles that are comparable and equally effective.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of " redevelopment" must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under "designing new installations" above should be followed.

Redevelopment may present significant opportunity to add features which had not previously been implemented. Examples include incorporation of depressions, areas of permeable soils, and swales in newly redeveloped areas. While some site constraints may exist due to the status of already existing infrastructure, opportunities should not be missed to maximize infiltration, slow runoff, reduce impervious areas, disconnect directly connected impervious areas.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Stormwater Management Manual for Western Washington, Washington State Department of Ecology, August 2001.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

Roof Runoff Controls SD-11

Rain Garden

Design Objectives

- ☑ Maximize Infiltration
- ☑ Provide Retention
- ☑ Slow Runoff
- Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- ☑ Contain Pollutants
- Collect and Convey

Description

Various roof runoff controls are available to address stormwater that drains off rooftops. The objective is to reduce the total volume and rate of runoff from individual lots, and retain the pollutants on site that may be picked up from roofing materials and atmospheric deposition. Roof runoff controls consist of directing the roof runoff away from paved areas and mitigating flow to the storm drain system through one of several general approaches: cisterns or rain barrels; dry wells or infiltration trenches; pop-up emitters, and foundation planting. The first three approaches require the roof runoff to be contained in a gutter and downspout system. Foundation planting provides a vegetated strip under the drip line of the roof.

Approach

Design of individual lots for single-family homes as well as lots for higher density residential and commercial structures should consider site design provisions for containing and infiltrating roof runoff or directing roof runoff to vegetative swales or buffer areas. Retained water can be reused for watering gardens, lawns, and trees. Benefits to the environment include reduced demand for potable water used for irrigation, improved stormwater quality, increased groundwater recharge, decreased runoff volume and peak flows, and decreased flooding potential.

Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment.

Design Considerations

Designing New Installations

Cisterns or Rain Barrels

One method of addressing roof runoff is to direct roof downspouts to cisterns or rain barrels. A cistern is an above ground storage vessel with either a manually operated valve or a permanently open outlet. Roof runoff is temporarily stored and then released for irrigation or infiltration between storms. The number of rain

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

barrels needed is a function of the rooftop area. Some low impact developers recommend that every house have at least 2 rain barrels, with a minimum storage capacity of 1000 liters. Roof barrels serve several purposes including mitigating the first flush from the roof which has a high volume, amount of contaminants, and thermal load. Several types of rain barrels are commercially available. Consideration must be given to selecting rain barrels that are vector proof and childproof. In addition, some barrels are designed with a bypass valve that filters out grit and other contaminants and routes overflow to a soak-away pit or rain garden.

If the cistern has an operable valve, the valve can be closed to store stormwater for irrigation or infiltration between storms. This system requires continual monitoring by the resident or grounds crews, but provides greater flexibility in water storage and metering. If a cistern is provided with an operable valve and water is stored inside for long periods, the cistern must be covered to prevent mosquitoes from breeding.

A cistern system with a permanently open outlet can also provide for metering stormwater runoff. If the cistern outlet is significantly smaller than the size of the downspout inlet (say ¼ to ½ inch diameter), runoff will build up inside the cistern during storms, and will empty out slowly after peak intensities subside. This is a feasible way to mitigate the peak flow increases caused by rooftop impervious land coverage, especially for the frequent, small storms.

Dry wells and Infiltration Trenches

Roof downspouts can be directed to dry wells or infiltration trenches. A dry well is constructed by excavating a hole in the ground and filling it with an open graded aggregate, and allowing the water to fill the dry well and infiltrate after the storm event. An underground connection from the downspout conveys water into the dry well, allowing it to be stored in the voids. To minimize sedimentation from lateral soil movement, the sides and top of the stone storage matrix can be wrapped in a permeable filter fabric, though the bottom may remain open. A perforated observation pipe can be inserted vertically into the dry well to allow for inspection and maintenance.

In practice, dry wells receiving runoff from single roof downspouts have been successful over long periods because they contain very little sediment. They must be sized according to the amount of rooftop runoff received, but are typically 4 to 5 feet square, and 2 to 3 feet deep, with a minimum of 1-foot soil cover over the top (maximum depth of 10 feet).

To protect the foundation, dry wells must be set away from the building at least 10 feet. They must be installed in solids that accommodate infiltration. In poorly drained soils, dry wells have very limited feasibility.

Infiltration trenches function in a similar manner and would be particularly effective for larger roof areas. An infiltration trench is a long, narrow, rock-filled trench with no outlet that receives stormwater runoff. These are described under Treatment Controls.

Pop-up Drainage Emitter

Roof downspouts can be directed to an underground pipe that daylights some distance from the building foundation, releasing the roof runoff through a pop-up emitter. Similar to a pop-up irrigation head, the emitter only opens when there is flow from the roof. The emitter remains flush to the ground during dry periods, for ease of lawn or landscape maintenance.

Foundation Planting

Landscape planting can be provided around the base to allow increased opportunities for stormwater infiltration and protect the soil from erosion caused by concentrated sheet flow coming off the roof. Foundation plantings can reduce the physical impact of water on the soil and provide a subsurface matrix of roots that encourage infiltration. These plantings must be sturdy enough to tolerate the heavy runoff sheet flows, and periodic soil saturation.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of " redevelopment" must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under "designing new installations" above should be followed.

Supplemental Information

Examples

- City of Ottawa's Water Links Surface –Water Quality Protection Program
- City of Toronto Downspout Disconnection Program
- City of Boston, MA, Rain Barrel Demonstration Program

Other Resources

Hager, Marty Catherine, Stormwater, "Low-Impact Development", January/February 2003. www.stormh2o.com

Low Impact Urban Design Tools, Low Impact Development Design Center, Beltsville, MD. www.lid-stormwater.net

Start at the Source, Bay Area Stormwater Management Agencies Association, 1999 Edition

Design Objectives

- ☑ Maximize Infiltration
- ☑ Provide Retention
- ☑ Slow Runoff
- Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- Contain Pollutants
- Collect and Convey

Description
Irrigation water provided to landscaped areas may result in excess irrigation water being conveyed into stormwater drainage systems.

Approach
Project plan designs for development and redevelopment should include application methods of irrigation water that minimize runoff of excess irrigation water into the stormwater conveyance system.

Suitable Applications
Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment. (Detached residential single-family homes are typically excluded from this requirement.)

Design Considerations
Designing New Installations
The following methods to reduce excessive irrigation runoff should be considered, and incorporated and implemented where determined applicable and feasible by the Permittee:

- Employ rain-triggered shutoff devices to prevent irrigation after precipitation.
- Design irrigation systems to each landscape area's specific water requirements.
- Include design featuring flow reducers or shutoff valves triggered by a pressure drop to control water loss in the event of broken sprinkler heads or lines.
- Implement landscape plans consistent with County or City water conservation resolutions, which may include provision of water sensors, programmable irrigation times (for short cycles), etc.

- Design timing and application methods of irrigation water to minimize the runoff of excess irrigation water into the storm water drainage system.

- Group plants with similar water requirements in order to reduce excess irrigation runoff and promote surface filtration. Choose plants with low irrigation requirements (for example, native or drought tolerant species). Consider design features such as:

  - Using mulches (such as wood chips or bar) in planter areas without ground cover to minimize sediment in runoff

  - Installing appropriate plant materials for the location, in accordance with amount of sunlight and climate, and use native plant materials where possible and/or as recommended by the landscape architect

  - Leaving a vegetative barrier along the property boundary and interior watercourses, to act as a pollutant filter, where appropriate and feasible

  - Choosing plants that minimize or eliminate the use of fertilizer or pesticides to sustain growth

- Employ other comparable, equally effective methods to reduce irrigation water runoff.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of " redevelopment" must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under "designing new installations" above should be followed.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

Design Objectives

- Maximize Infiltration
- Provide Retention
- Slow Runoff
- Minimize Impervious Land Coverage
- ☑ Prohibit Dumping of Improper Materials
- Contain Pollutants
- Collect and Convey

Description

Waste materials dumped into storm drain inlets can have severe impacts on receiving and ground waters. Posting notices regarding discharge prohibitions at storm drain inlets can prevent waste dumping. Storm drain signs and stencils are highly visible source controls that are typically placed directly adjacent to storm drain inlets.

Approach

The stencil or affixed sign contains a brief statement that prohibits dumping of improper materials into the urban runoff conveyance system. Storm drain messages have become a popular method of alerting the public about the effects of and the prohibitions against waste disposal.

Suitable Applications

Stencils and signs alert the public to the destination of pollutants discharged to the storm drain. Signs are appropriate in residential, commercial, and industrial areas, as well as any other area where contributions or dumping to storm drains is likely.

Design Considerations

Storm drain message markers or placards are recommended at all storm drain inlets within the boundary of a development project. The marker should be placed in clear sight facing toward anyone approaching the inlet from either side. All storm drain inlet locations should be identified on the development site map.

Designing New Installations

The following methods should be considered for inclusion in the project design and show on project plans:

- Provide stenciling or labeling of all storm drain inlets and catch basins, constructed or modified, within the project area with prohibitive language. Examples include "NO DUMPING

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

– DRAINS TO OCEAN" and/or other graphical icons to discourage illegal dumping.

- Post signs with prohibitive language and/or graphical icons, which prohibit illegal dumping at public access points along channels and creeks within the project area.

Note - Some local agencies have approved specific signage and/or storm drain message placards for use. Consult local agency stormwater staff to determine specific requirements for placard types and methods of application.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. If the project meets the definition of "redevelopment", then the requirements stated under " designing new installations" above should be included in all project design plans.

Additional Information

Maintenance Considerations

- Legibility of markers and signs should be maintained. If required by the agency with jurisdiction over the project, the owner/operator or homeowner's association should enter into a maintenance agreement with the agency or record a deed restriction upon the property title to maintain the legibility of placards or signs.

Placement

- Signage on top of curbs tends to weather and fade.

- Signage on face of curbs tends to be worn by contact with vehicle tires and sweeper brooms.

Supplemental Information

Examples

- Most MS4 programs have storm drain signage programs. Some MS4 programs will provide stencils, or arrange for volunteers to stencil storm drains as part of their outreach program.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

Appendix C
Jurisdictional Delineation Report

GLENN LUKOS ASSOCIATES
Regulatory Services

February 27, 2014

Ms. Amy Glad
Pardee Homes
2120 Park Place
Suite 100
El Segundo, California 90245

SUBJECT: Jurisdictional Delineation of the Christensen Property, a 21.35-Acre Property Located in the City of Lake Elsinore, Riverside County, California.

Dear Ms. Glad:

This report summarizes our findings of U.S. Army Corps of Engineers (Corps), Santa Ana Regional Water Quality Control Board (Regional Board), and California Department of Fish and Wildlife (CDFW) jurisdiction for the above-referenced property.[1]

The Christensen Property (Project) is located at latitude 33.668823° and longitude -117.217873º, within Section 8, Township 6 South, and Range 3 West [Exhibit 1]. The Project site is generally bounded by Canyon Hills Road and Holland Road to the north, Corson Avenue to the south, rural residential development along Anna Lane to the east, and the Canyon Hills Residential Development Project to the west. The Project site encompasses 21.35 acres and does not support a blue-line stream (as depicted on the U.S. Geological Survey (USGS) topographic map Romoland, California [dated 1953 and photorevised in 1979]) [Exhibit 2].

On February 20, 2014, regulatory specialists of Glenn Lukos Associates, Inc. (GLA) examined the Project site to determine the limits of (1) Corps jurisdiction pursuant to Section 404 of the Clean Water Act (CWA), (2) Regional Board jurisdiction pursuant to Section 401 of the CWA and Section 13260 of the California Water Code (CWC), and (3) CDFW jurisdiction pursuant to Division 2, Chapter 6, Sections 1600-1616 of the Fish and Game Code. An aerial photograph

[1] This report presents our best effort at estimating the subject jurisdictional boundaries using the most up-to-date regulations and written policy and guidance from the regulatory agencies.

depicting the Project site is attached as Exhibit 3. Site photographs are provided as Exhibit 4 and a soils map is attached as Exhibit 5.

There is no Corps, Regional Board, or CDFW jurisdiction associated with the Project site; therefore, there will be no impact to Corps, Regional Board, or CDFW jurisdiction associated with the Project and no permits/agreements from the Corps, Regional Board, or CDFW are necessary or required.

I. METHODOLOGY

Prior to beginning the field delineation a 200-scale color aerial photograph, a 200-scale topographic base map of the property, and the previously cited USGS topographic map were examined to determine the locations of potential areas of Corps, Regional Board, and CDFW jurisdiction. Suspected jurisdictional areas were field checked for the presence of definable channels and/or wetland vegetation, soils and hydrology. Suspected wetland habitats on the site were evaluated using the methodology set forth in the U.S. Army Corps of Engineers 1987 Wetland Delineation Manual[2] (Wetland Manual) and the 2008 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region Version 2.0[3] (Arid West Supplement). Lateral limits of non-wetland waters were identified using field indicators of an Ordinary High Water Mark (OHWM).[4] While in the field jurisdiction areas were recorded onto a 200-scale color aerial photograph using visible landmarks. Other data were recorded onto wetland data sheets.

The Soil Conservation Service (SCS)[5] has mapped the following soil types as occurring in the general vicinity of the Study Area:

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[2] Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1. Vicksburg, MS: U.S. Army Engineer Waterways Experimental Station.

[3] U.S. Army Corps of Engineers. 2008. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0). Ed. J.S. Wakeley, R.W. Lichevar, and C.V. Noble. ERDC/EL TR-08-28. Vicksburg, MS: U.S. Army Engineer Research and Development Center and Engineering Laboratory.

[4] U.S. Army Corps of Engineers. 2008. A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States. R. W. Lichvar and S. M. McColley. ERDC/CRREL TR-08-12. Hanover, NH: U.S. Army Engineer Cold Regions Research and Engineering Laboratory.

[5] SCS is now known as the National Resource Conservation Service or NRCS.

Cieneba Sandy Loam, 8 to 15 Percent Slopes, Eroded (ChD2)

The Cieneba series consists of somewhat excessively drained soils on uplands. These soils formed in coarse-grained igneous rock. Elevations range from 900 to 3,500 feet and the average annual rainfall ranges from 9 to 16 inches. Vegetation consists of annual grasses, chamise, and flat-top buckwheat. In a typical profile, the surface layer is brown sandy loam about 14 inches thick. The underlying soil is light yellowish-brown gravelly coarse sand, and to a depth of about 22 inches, slightly acid, weathered granodiorite. The available water holding capacity of this soil is 2 to 3 inches. Surface runoff is medium, and the erosion hazard is moderate. The root zone is 16 to 22 inches deep, and the natural fertility is low. This soil is mainly used for dryland grain, irrigated citrus, pasture, and range, and for home sites.

Hanford Coarse Sandy Loam, 2 to 8 Percent Slopes (HcC)

This gently to moderately sloping soil occurs on alluvial fans. The A horizon is neutral to slightly acid in reaction and pale brown to dark grayish brown in color. Elevations range from 700 to 2,500 feet and the annual rainfall ranges from 9 to 14 inches. The C1 horizon is generally slightly acid to neutral coarse sandy loam to mildly sandy loam. The C2 horizon and C3 horizons are slightly acid to mildly alkaline, light yellowish-brown to brown, stratified loamy sand and coarse sandy loam. Included with this soil in mapping are small areas of Tujunga loamy sand, Greenfield sandy loam, and Ramona sandy loam. Some included areas have a gravelly coarse sandy loam or fine sandy loam surface layer. Also included are some small areas of braided stream channels. This soil is well drained. Its permeability is moderately rapid. Runoff is slow to medium, and the hazard of erosion is slight to moderate. The available water holding capacity is 5.0 to 7.5 inches. The root zone is more than 60 inches deep. Natural fertility is moderate. Vegetation consists of annual grasses, forbs, and chamise. This soil is used for irrigated alfalfa, potatoes, and citrus, for dryland grain and pasture, and for home sites.

Monserate Sandy Loam, 5 to 8 Percent Slopes, Eroded (MmC2)

This moderately sloping soil occurs on terraces and fans. The A horizon is slightly acid to neutral in reaction and brown, grayish brown, or reddish brown to yellowish red in color. The Bt horizon is grayish brown to reddish brown in color and sandy clay loam to clay loam in texture. Runoff is medium and the hazard of erosion is moderate. Natural fertility is moderate. This soil is used for irrigated citrus, for dryland grain and pasture, and for nonfarm purposes.

Monserate Sandy Loam, Shallow, 5 to 15 Percent Slopes, Eroded (MnD2)

The profile of this soil is similar to that described for the Monserate series, but it has a reddish-brown surface layer and a sandy clay subsoil. Occasionally, the soil has may have a gravelly sandy loam surface layer. Runoff is rapid and the hazard of erosion is high. Natural fertility is moderately low. This soil is used for dryland pasture and grain, and for nonfarm purposes.

Placentia Fine Sandy Loam, 0 to 5 Percent Slopes, (PlB)

The Placentia series consists of moderately well drained, nearly level to gently sloping soils, occurring on terraces and alluvial fans. These soils developed in alluvium consisting mainly of granitic materials. Elevations range from 600 to 2,200 feet, and annual rainfall ranges from 10 to 14 inches. The A horizon is medium acid to slightly acid in reaction and brown to grayish brown, or pale brown in color, and sandy loam to loam in texture. The Bt horizon is neutral to moderately alkaline and contains lime splotches in the lower part. It is brown to reddish brown to dark red or yellowish brown in color and consists of heavy clay loam to sandy clay in texture. The C horizon is stratified sandy, gravelly, or cobbly granitic alluvium. The depth to the dense, very slowly permeable clay commonly ranges from 12 to 20 inches. Permeability of this soil is very slow, runoff is medium, and the hazard of erosion is moderate. This Placentia soil is used for permanent pasture, for dryland grain and pasture, and for nonfarm purposes.

Vista Rocky Coarse Sandy Loam, 2 to 35 Percent Slopes, Eroded (VtF2)

The Vista series contains soils that are well-drained soils of the uplands. These soils developed on weathered granite and granodiorite. Elevations range from 1,000 to 3,500 feet, and annual rainfall ranges from 10 to 15 inches. Typically, the surface layer is brown and grayish-brown coarse sandy loam about 15 inches thick. Runoff is medium on this soil, and the hazard of erosion is moderate. Natural fertility is moderately low. This soil is used for dryland pasture, homesites, and where it occurs in fields of more suitable soils, it is used for irrigated grain and citrus.

None of the soils within the project area are identified as hydric in the SCS's publication, Hydric Soils of the United States[6]; nor are any of these soils listed as hydric in the Soil Survey for Western Riverside County, California; however the Hydric Soils List for Western Riverside County does identify Placentia fine sandy loam, 0 to 5 percent slopes (PlD) as hydric when occurring in hydric depressions if the area is frequently ponded for long durations or very long durations during the growing season.

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[6] United States Department of Agriculture, Soil Conservation Service. 1991. Hydric Soils of the United States, 3rd Edition, Miscellaneous Publication Number 1491. (In cooperation with the National Technical Committee for Hydric Soils.)

It is important to note that under the Arid West Supplement, the presence of mapped hydric soils is no longer dispositive for the presence of hydric soils. Rather, the presence of hydric soils must now be confirmed in the field.

II. JURISDICTION

A. Army Corps of Engineers

Pursuant to Section 404 of the CWA, the Corps regulates the discharge of dredged and/or fill material into waters of the United States. The term "waters of the United States" is defined in Corps regulations at 33 CFR Part 328.3(a) as:

> *(1) All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters, which are subject to the ebb and flow of the tide;*
> *(2) All interstate waters including interstate wetlands;*
> *(3) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect foreign commerce including any such waters:*
>
> > *(i) Which are or could be used by interstate or foreign travelers for recreational or other purposes; or*
> > *(ii) From which fish or shell fish are or could be taken and sold in interstate or foreign commerce; or*
> > *(iii) Which are used or could be used for industrial purpose by industries in interstate commerce...*
>
> *(4) All impoundments of waters otherwise defined as waters of the United States under the definition;*
> *(5) Tributaries of waters identified in paragraphs (a) (1)-(4) of this section;*
> *(6) The territorial seas;*
> *(7) Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a) (1)-(6) of this section.*
>
> *Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA (other than cooling ponds as defined in 40 CFR 423.11(m) which also meet the criteria of this definition) are not waters of the United States.*

(8) Waters of the United States do not include prior converted cropland.[7] *Notwithstanding the determination of an area's status as prior converted cropland by any other federal agency, for the purposes of the CWA, the final authority regarding CWA jurisdiction remains with the U.S. Environmental Protection Agency (EPA).*

In the absence of wetlands, the limits of Corps jurisdiction in non-tidal waters, such as intermittent streams, extend to the OHWM which is defined at 33 CFR 328.3(e) as:

...that line on the shore established by the fluctuation of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.

1. Solid Waste Agency of Northern Cook County v. United States Army Corps of Engineers, et al.

Pursuant to Article I, Section 8 of the U.S. Constitution, federal regulatory authority extends only to activities that affect interstate commerce. In the early 1980s the Corps interpreted the interstate commerce requirement in a manner that restricted Corps jurisdiction on isolated (intrastate) waters. On September 12, 1985, EPA asserted that Corps jurisdiction extended to isolated waters that are used or could be used by migratory birds or endangered species, and the definition of "waters of the United States" in Corps regulations was modified as quoted above from 33 CFR 328.3(a).

On January 9, 2001, the Supreme Court of the United States issued a ruling on *Solid Waste Agency of Northern Cook County v. United States Army Corps of Engineers, et al.* (SWANCC). In this case the Court was asked whether use of an isolated, intrastate pond by migratory birds is a sufficient interstate commerce connection to bring the pond into federal jurisdiction of Section 404 of the CWA.

The written opinion notes that the court's previous support of the Corps' expansion of jurisdiction beyond navigable waters (*United States v. Riverside Bayview Homes, Inc*.) was for a wetland that <u>abutted</u> a navigable water and that the court did not express any opinion on the

[7] The term "prior converted cropland" is defined in the Corps' Regulatory Guidance Letter 90-7 (dated September 26, 1990) as "wetlands which were both manipulated (drained or otherwise physically altered to remove excess water from the land) and cropped before 23 December 1985, to the extent that they no longer exhibit important wetland values. Specifically, prior converted cropland is <u>inundated for no more than 14 consecutive days</u> during the growing season…." [Emphasis added.]

question of the authority of the Corps to regulate wetlands that are not adjacent to bodies of open water. The current opinion goes on to state:

> *In order to rule for the respondents here, we would have to hold that the jurisdiction of the Corps extends to ponds that are not adjacent to open water. We conclude that the text of the statute will not allow this.*

Therefore, we believe that the court's opinion goes beyond the migratory bird issue and says that no isolated, intrastate water is subject to the provisions of Section 404(a) of the CWA (regardless of any interstate commerce connection). However, the Corps and EPA have issued a joint memorandum, which states that they are interpreting the ruling to address only the migratory bird issue and leaving the other interstate commerce clause nexuses intact.

2. Rapanos v. United States and Carabell v. United States

On June 5, 2007, the EPA and Corps issued joint guidance that addresses the scope of jurisdiction pursuant to the Clean Water Act in light of the Supreme Court's decision in the consolidated cases *Rapanos v. United States* and *Carabell v. United States* ("Rapanos"). The chart below was provided in the joint EPA/Corps guidance.

For project sites that include waters other than Traditional Navigable Waters (TNWs) and/or their adjacent wetlands or Relatively Permanent Waters (RPWs) tributary to TNWs and/or their adjacent wetlands as set forth in the chart below, the Corps must apply the significant nexus standard, that includes the data set forth in the *Approved Jurisdictional Determination Form.*

For "isolated" waters or wetlands, the joint guidance also requires an evaluation by the Corps and EPA to determine whether other interstate commerce clause nexuses, not addressed in the SWANCC decision are associated with isolated features on project sites for which a jurisdictional determination is being sought from the Corps. The information pertaining to isolated waters is also included on the *Approved Jurisdictional Determination Form*.

The agencies will assert jurisdiction over the following waters:

- Traditional navigable waters
- Wetlands adjacent to traditional navigable waters
- Non-navigable tributaries of traditional navigable waters that are relatively permanent where the tributaries typically flow year-round or have continuous flow at least seasonally (e.g., typically three months)
- Wetlands that directly abut such tributaries

The agencies will decide jurisdiction over the following waters based on a fact-specific analysis to determine whether they have a significant nexus with a traditional navigable water:

- Non-navigable tributaries that are not relatively permanent
- Wetlands adjacent to non-navigable tributaries that are not relatively permanent
- Wetlands adjacent to but that do not directly abut a relatively permanent non-navigable tributary

The agencies generally will not assert jurisdiction over the following features:

- Swales or erosional features (e.g., gullies, small washes characterized by low volume, infrequent or short duration flow)
- Ditches (including roadside ditches) excavated wholly in and draining only uplands and that do not carry a relatively permanent flow of water

The agencies will apply the significant nexus standard as follows:

- A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by all wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical and biological integrity of downstream traditional navigable waters
- Significant nexus includes consideration of hydrologic and ecologic factors

3. Corps Preliminary Jurisdictional Determination

A *Corps Preliminary Jurisdictional Determination Form* may be used to concede Corps jurisdiction where all streambeds within the project area are considered Corps jurisdictional waters. The project would be able to move forward pursuant to Corps Regulatory Guidance Letter (RGL) 08-02, issued on June 26, 2008, which allows the Corps to issue preliminary jurisdictional determinations (Preliminary JD) for a project. A Preliminary JD allows a project to move forward by setting aside/voluntarily waiving questions regarding CWA jurisdiction over drainages on site in the interest of allowing expeditiously obtaining a Section 404 Permit.

As stated in RGL 08-02:

> *While a landowner, permit applicant, or other affected party can elect to request and obtain an approved JD, he or she can also decline to request an approved JD, and instead obtain a Corps individual or general permit authorization based on either a preliminary JD, or, in appropriate circumstances (such as authorizations by non-*

> *reporting nationwide general permits), no JD whatsoever. The Corps will determine what form of JD is appropriate for any particular circumstance based on all the relevant factors, to include, but not limited to, the applicant's preference, what kind of permit authorization is being used (individual permit versus general permit), and the nature of the proposed activity needing authorization.*

The Corps typically completes Preliminary JDs within 60 days of receipt of the request for such a determination. If the Corps project manager cannot complete the Preliminary JD within the 60-day timeframe, they must provide their supervisor, who would also provide the applicant, with a schedule to complete the determination (i.e., unlike the Rapanos significant nexus guidelines, there is a specific timeframe to complete the Preliminary JD and move forward with the jurisdictional determination, without uncertainty, and the EPA will not be involved with the Preliminary JD process as the Corps is not required to coordinate with the EPA to review Preliminary JDs).

4. Wetland Definition Pursuant to Section 404 of the Clean Water Act

The term “wetlands” (a subset of “waters of the United States”) is defined at 33 CFR 328.3(b) as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support...a prevalence of vegetation typically adapted for life in saturated soil conditions." In 1987 the Corps published a manual to guide its field personnel in determining jurisdictional wetland boundaries. The methodology set forth in the 1987 Wetland Delineation Manual and the Arid West Supplement generally require that, in order to be considered a wetland, the vegetation, soils, and hydrology of an area exhibit at least minimal hydric characteristics. While the manual and Supplement provide great detail in methodology and allow for varying special conditions, a wetland should normally meet each of the following three criteria:

- more than 50 percent of the dominant plant species at the site must be typical of wetlands (i.e., rated as facultative or wetter in the National List of Plant Species that Occur in Wetlands[8]);

[8] Reed, P.B., Jr. 1988. National List of Plant Species that Occur in Wetlands. U.S. Fish and Wildlife Service Biological Report 88(26.10). Robert W. Lichvar and John T. Kartesz. 2009. *North American Digital Flora: National Wetland Plant List*, version 2.4.0 (https://wetland_plants.usace.army.mil). U.S. Army Corps of Engineers, Engineer Research and Development Center, Cold Regions Research and Engineering Laboratory, Hanover, NH, and BONAP, Chapel Hill, NC. (Accessed May 14, 2012)

- soils must exhibit physical and/or chemical characteristics indicative of permanent or periodic saturation (e.g., a gleyed color, or mottles with a matrix of low chroma indicating a relatively consistent fluctuation between aerobic and anaerobic conditions); and

- Whereas the 1987 Manual requires that hydrologic characteristics indicate that the ground is saturated to within 12 inches of the surface for at least five percent of the growing season during a normal rainfall year, the Arid West Supplement does not include a quantitative criteria with the exception for areas with "problematic hydrophytic vegetation", which require a minimum of 14 days of ponding to be considered a wetland.

B. Regional Water Quality Control Board

Subsequent to the SWANCC decision, the Chief Counsel for the State Water Resources Control Board issued a memorandum that addressed the effects of the SWANCC decision on the Section 401 Water Quality Certification Program.[9] The memorandum states:

> *California's right and duty to evaluate certification requests under section 401 is pendant to (or dependent upon) a valid application for a section 404 permit from the Corps, or another application for a federal license or permit. Thus if the Corps determines that the water body in question is not subject to regulation under the COE's 404 program, for instance, no application for 401 certification will be required…*
>
> *The SWANCC decision does not affect the Porter Cologne authorities to regulate discharges to isolated, non-navigable waters of the states….*
>
> *Water Code section 13260 requires "any person discharging waste, or proposing to discharge waste, within any region that could affect the waters of the state to file a report of discharge (an application for waste discharge requirements)." (Water Code § 13260(a)(1) (emphasis added).) The term "waters of the state" is defined as "any surface water or groundwater, including saline waters, within the boundaries of the state." (Water Code § 13050(e).) The U.S. Supreme Court's ruling in SWANCC has no bearing on the Porter-Cologne definition. While all waters of the United States that are within the borders of California are also waters of the state, the converse is not true—waters of the United States is a subset of waters of the state. Thus, since Porter-Cologne was enacted California*

[9] Wilson, Craig M. January 25, 2001. Memorandum addressed to State Board Members and Regional Board Executive Officers.

> *always had and retains authority to regulate discharges of waste into any waters of the state, regardless of whether the COE has concurrent jurisdiction under section 404. The fact that often Regional Boards opted to regulate discharges to, e.g., vernal pools, through the 401 program in lieu of or in addition to issuing waste discharge requirements (or waivers thereof) does not preclude the regions from issuing WDRs (or waivers of WDRs) in the absence of a request for 401 certification….*

In this memorandum the SWRCB's Chief Counsel has made the clear assumption that fill material to be discharged into isolated waters of the United States is to be considered equivalent to "waste" and therefore subject to the authority of the Porter Cologne Water Quality Act. However, while providing a recounting of the Act's definition of waters of the United States, this memorandum fails to also reference the Act's own definition of waste:

> *"Waste" includes sewage and any and all other waste substances, liquid, solid, gaseous, or radioactive, associated with human habitation, or of human or animal origin, or from any producing, manufacturing, or processing operation, including waste placed within containers of whatever nature prior to, and for purposes of, disposal.*

The lack of inclusion of a reference to "fill material," "dirt," "earth" or other similar terms in the Act's definition of "waste," or elsewhere in the Act, suggests that no such association was intended. Thus, the Chief Counsel's memorandum signals that the SWRCB is attempting to retain jurisdiction over discharge of fill material into isolated waters of the United States by administratively expanding the definition of "waste" to include "fill material" without actually seeking amendment of the Act's definition of waste (an amendment would require action by the state legislature). Consequently, discharge of fill material into waters of the State not subject to the jurisdiction of the Corps pursuant to Section 404 of the Clean Water Act <u>may</u> require authorization pursuant to the Porter Cologne Act through application for waste discharge requirements (WDRs) or through waiver of WDRs, despite the lack of a clear regulatory imperative.

C. <u>California Department of Fish and Wildlife</u>

Pursuant to Division 2, Chapter 6, Section 1602 of the California Fish and Game Code, the CDFW regulates all diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake, which supports fish or wildlife.

CDFW defines a "stream" (including creeks and rivers) as "a body of water that flows at least periodically or intermittently through a bed or channel having banks and supports fish or other aquatic life. This includes watercourses having surface or subsurface flow that supports or has supported riparian vegetation." CDFW's definition of "lake" includes "natural lakes or man-made reservoirs."
CDFW jurisdiction within altered or artificial waterways is based upon the value of those waterways to fish and wildlife. The CDFW Legal Advisor has prepared the following opinion:

- Natural waterways that have been subsequently modified and which have the potential to contain fish, aquatic insects and riparian vegetation will be treated like natural waterways...

- Artificial waterways that have acquired the physical attributes of natural stream courses and which have been viewed by the community as natural stream courses, should be treated by [CDFW] as natural waterways...

- Artificial waterways without the attributes of natural waterways should generally not be subject to Fish and Game Code provisions...

Thus, CDFW jurisdictional limits closely mirror those of the Corps. Exceptions are CDFW's exclusion of isolated wetlands (those not associated with a river, stream, or lake), the addition of artificial stock ponds and irrigation ditches constructed on uplands, and the addition of riparian habitat supported by a river, stream, or lake regardless of the riparian area's federal wetland status.

III. RESULTS

A. Corps Jurisdiction

The Project site consists of an actively dry-farmed property, which has been recently disked and is generally unvegetated. Past historic aerial photography also indicates that the Project site was actively farmed but supported a few Eucalyptus trees (*Eucalyptus* sp.). Based upon a review of existing site conditions and past historic aerial photography, there are no drainage features within the Project site; therefore, there is no Corps jurisdiction present.

B. Regional Board Jurisdiction

The Project site consists of an actively dry-farmed property, which is generally disked and unvegetated. Past historic aerial photography also indicates that the Project site was actively farmed but supported a few Eucalyptus trees (*Eucalyptus* sp.). Based upon a review of existing site conditions and past historic aerial photography, there are no drainage features within the Project site; therefore, there is no Regional Board jurisdiction present.

C. California Department of Fish and Wildlife

The Project site consists of an actively dry-farmed property, which is generally disked and unvegetated. Past historic aerial photography also indicates that the Project site was actively farmed but supported a few Eucalyptus trees (*Eucalyptus* sp.). Based upon a review of existing site conditions and past historic aerial photography, there are no drainage features within the Project site; therefore, there is no CDFW jurisdiction present.

IV. IMPACT ANALYSIS

A. Impacts to Corps Jurisdiction

There is no Corps jurisdiction associated with the Project site; therefore, no permit from the Corps pursuant to Section 404 of the CWA is necessary.

B. Impacts to Regional Board Jurisdiction

There is no Regional Board jurisdiction associated with the Project site; therefore, no certification from the Regional Board pursuant to Section 401 of the CWA or waste discharge order pursuant to Section 13260 of the CWC is necessary.

C. Impacts to California Department of Fish and Wildlife Jurisdiction

There is no CDFW jurisdiction associated with the Project site; therefore, no agreement from the CDFW pursuant to Section 1602 of the Fish and Game Code is necessary.

If you have any questions regarding this report and impact analysis, please contact me at (949) 837-0404, Ext. 20 at the office or (714) 323-6221 on my cellular telephone. Thanks.

Sincerely,

GLENN LUKOS ASSOCIATES, INC.

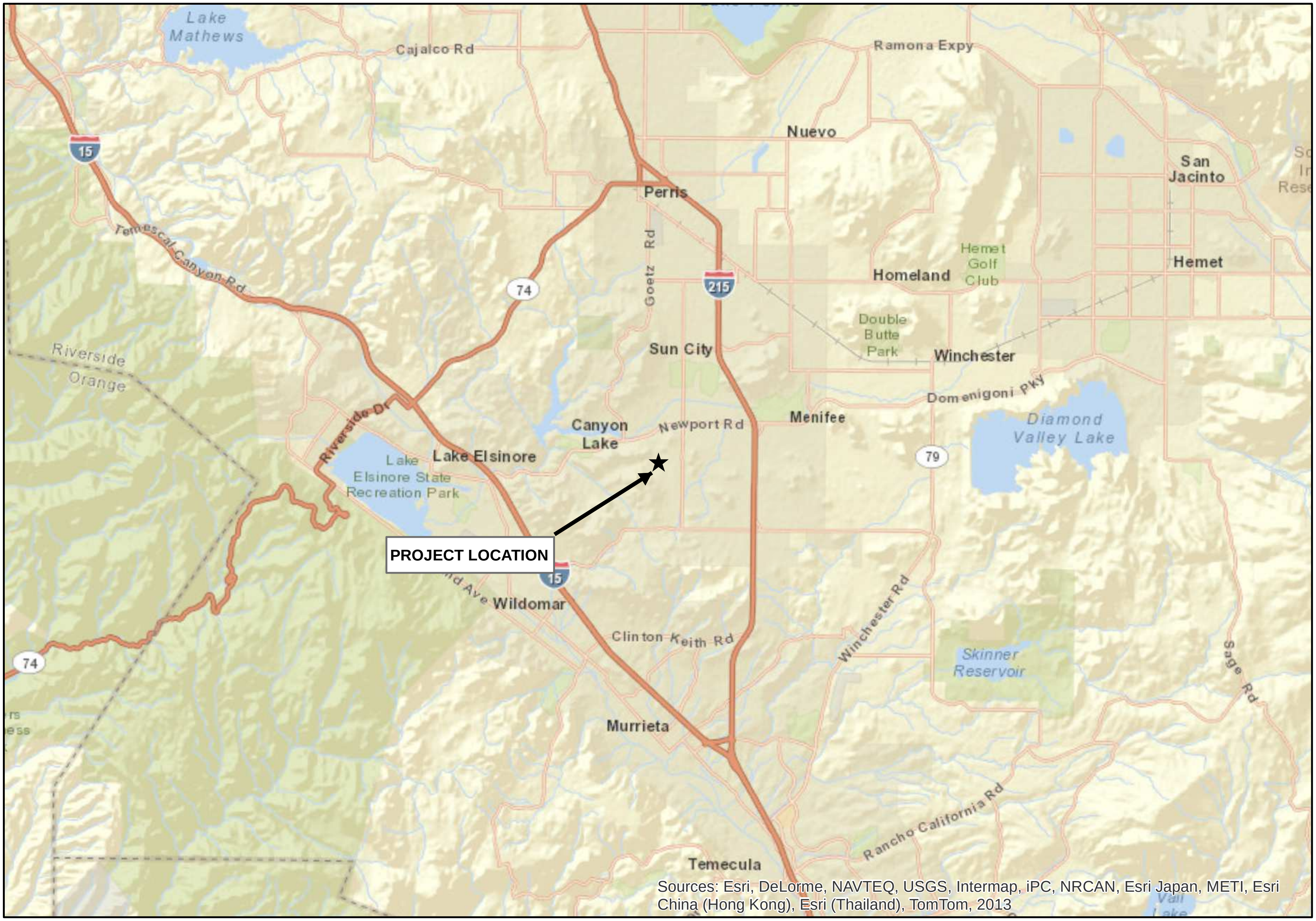
Martin A. Rasnick
Sr. Regulatory Specialist

s: 0163-140.jd.docx

Exhibit 1

Regional Map

Source: ESRI World Street Map



N

0 2 4 8 Miles

CHRISTENSEN PROPERTY

Regional Map

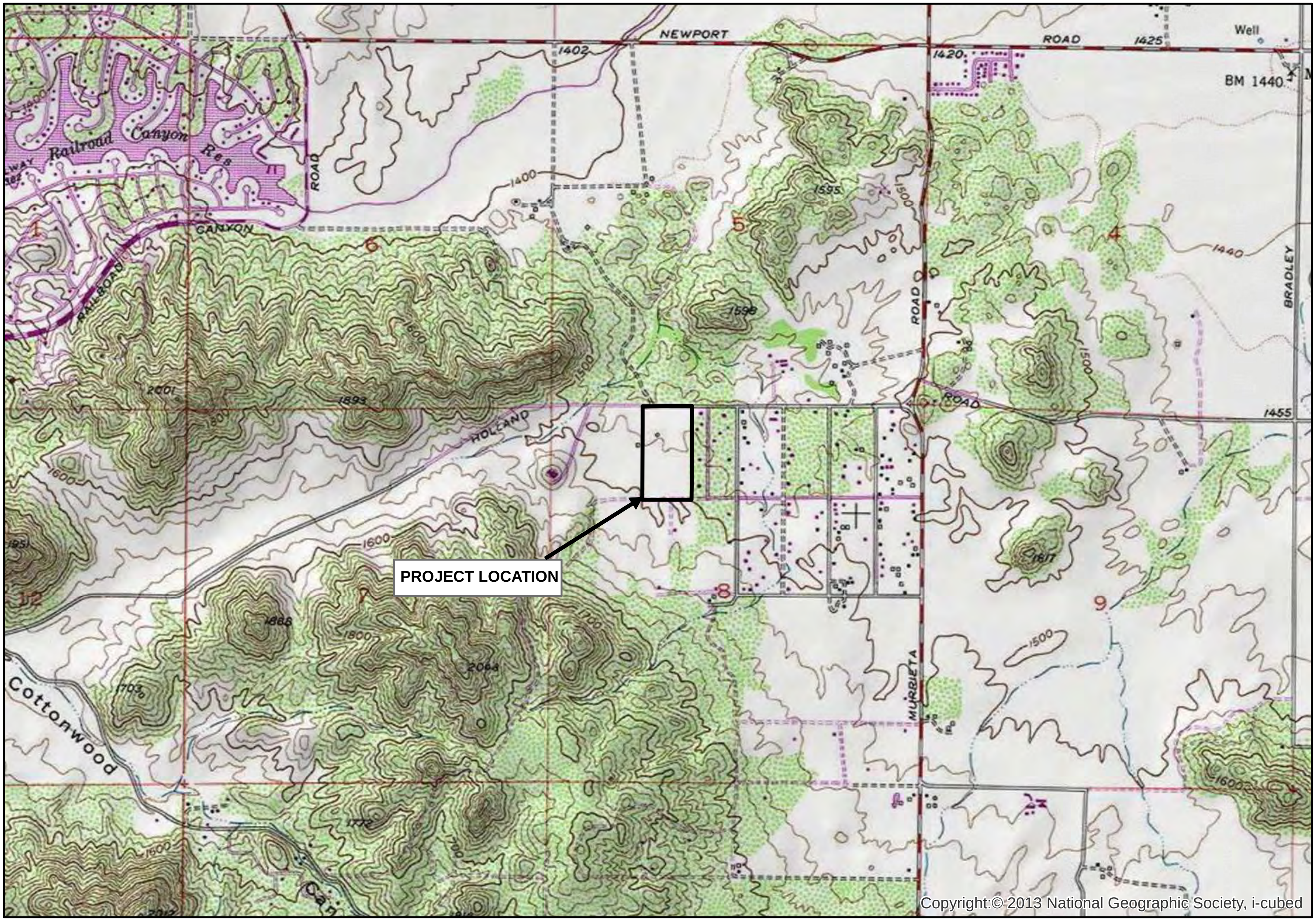
GLENN LUKOS ASSOCIATES

Exhibit 1

Exhibit 2

Vicinity/Location Map

Adapted from USGS Romoland, CA quadrangle



N

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2,000
4,000
Feet

CHRISTENSEN PROPERTY

Vicinity Map

GLENN LUKOS ASSOCIATES

Exhibit 2

Exhibit 3

Site Aerial Photograph

Legend

Project Boundary

N

0 62.5 125 250
Feet

CHRISTENSEN PROPERTY

Aerial Photo

GLENN LUKOS ASSOCIATES

Exhibit 3

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Exhibit 4

Site Photographs

Photograph 1: View depicting the Project site looking north.

Photograph 2: View depicting the Project site looking north.

GLENN LUKOS ASSOCIATES

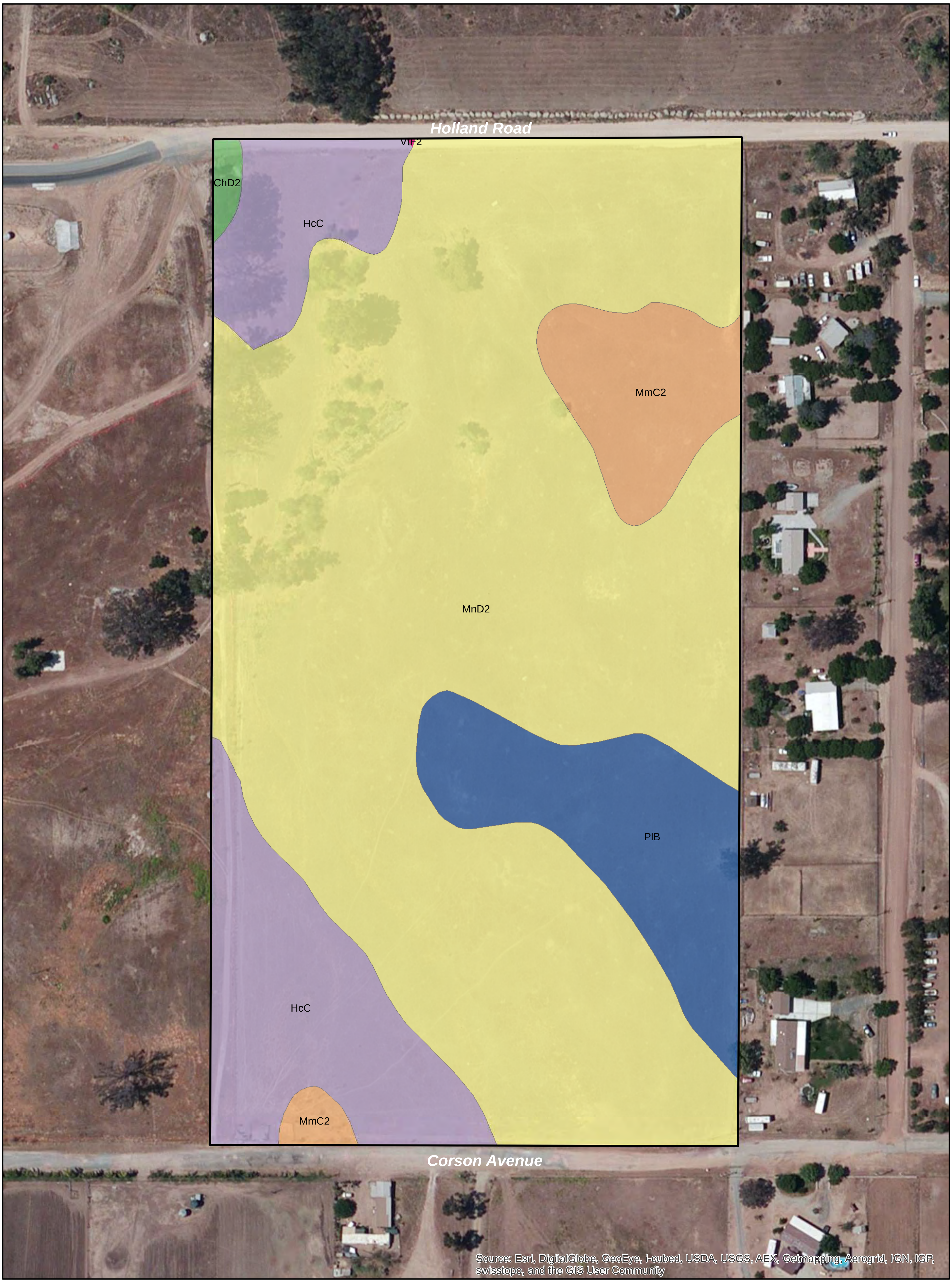
Exhibit 4

CHRISTENSEN PROPERTY

Site Photographs

Exhibit 5

Project Soils Map



Legend

- Project Boundary
- Cieneba sandy loam, 8 to 15 percent slopes, eroded, ChD2
- Hanford coarse sandy loam, 2 to 8 percent slopes, HcC
- Monserate sandy loam, 5 to 8 percent slopes, eroded, MmC2
- Monserate sandy loam, shallow, 5 to 15 percent slopes, eroded, MnD2
- Placentia fine sandy loam, 0 to 5 percent slopes, PlB
- Vista rocky coarse sandy loam, 2 to 35 percent slopes, eroded, VtF2

CHRISTENSEN PROPERTY

Soils Map

GLENN LUKOS ASSOCIATES

Exhibit 5

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Appendix D

Burrowing Owl
Passive Relocation Report

March 18, 2014

Mr. Hugh Hewitt
Hewitt Wolensky LLP
4041 MacArthur Boulevard – Suite 300
Newport Beach, CA 92660

Subject: 2014 Burrowing Owl Passive Relocation Report for the Christensen Site Located near the City of Lake Elsinore, Riverside County, California.

Summary: *Environmental Intelligence, LLC (EI) was retained by Pardee Homes to provide a burrowing owl habitat assessment and survey, passive relocation, and monitoring within the Christensen Site located near the City of Lake Elsinore, Riverside County, California. This report covers all survey and monitoring activities conducted by EI on the site between November 2013 and February 2014. Two active burrowing owl burrows and one burrowing owl were observed on the Site. The only burrowing owl observed during this period was passively relocated off-site to an area with suitable habitat. As of EI's last survey visit on February 5, 2014, no burrowing owls or burrowing owl sign were observed on-site.*

Dear Mr. Hewitt:

Environmental Intelligence, LLC (EI) was retained by Pardee Homes to provide a burrowing owl (*Athene cunicularia*) habitat assessment and survey, passive relocation, and monitoring on the Christensen Site (Site) located near the City of Lake Elsinore, Riverside County, California. Surveys and passive relocation followed methods recommended by the California Department of Fish and Wildlife (CDFW, 2012) and Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP, 2006). Two active burrowing owl burrows and one burrowing owl were observed on the Site during EI's surveys and relocation efforts. The burrowing owl was passively relocated successfully to suitable off-site habitat prior to the start of the burrowing owl breeding season. The following report describes all biological surveys, passive relocation, and monitoring conducted between November 26, 2013 and February 5, 2014.

Site Location and Description

The approximately 21-acre Christensen Site is located on the eastern border of the city of Lake Elsinore, Riverside County, California. The Site is located in the 7.5' U. S. Geological Survey (USGS) 'Romoland' Quadrangle. The Site abuts current land development to the west, Holland Road to the north, Corson Avenue to the south and rural single family homes to the east. Land use to the east and south of the site is rural ranch and equestrian properties. To the north and southeast of the site, undeveloped areas remain with native scrub and riparian communities present.

Methods and Results of Burrowing Owl Surveys, Passive Relocation, and Monitoring

Burrowing Owl Habitat Assessment and Survey

On November 26, 2013, an EI biologist conducted a burrowing owl habitat assessment to determine if the site contained suitable habitat. The site consisted of a gently sloping fallow agricultural field that showed signs of previous discing. The majority of the site contained bare ground and non-native annual grass and herb species. No shrubs or trees and very few native plant species were observed on the site. Numerous California ground squirrel (*Spermophilus beecheyi*) burrows were observed across the site providing suitable habitat for burrowing owl.

The site was surveyed with 100-foot (30-meter) linear transects providing 100 percent coverage of the site. Two burrows showing burrowing owl sign (white wash, pellets, feathers, or bone fragments) were recorded on-site. These burrows are considered active due to the presence of recent owl sign per the CDFW and MSHCP guidelines and passive relocation was determined to be necessary to remove any potential burrowing owl nesting sites. No burrowing owls were observed on the site during the November 26 visit. The two active burrows and approximately 240 potential refuge sites (i.e. California ground squirrels burrows) were marked with GPS units and all visible sign (scat, feathers, and bones) were removed after each site visit to facilitate monitoring of burrowing owl activity. Table I summarizes the survey, passive relocation efforts, and monitoring conducted between November 2013 and February 2014.

Passive Relocation

Passive relocation began on the Site on January 7, 2014. A 160-foot (50-meter) buffer was implemented around the two active burrowing owl burrows. Inactive burrows, containing no owl sign, of appropriate size within the buffer were manually closed by EI biologists. Any potential burrowing owl refuge sites outside the burrowing owl buffer were collapsed with the assistance of a skip loader equipped with ripping teeth. A biological monitor was present during all ripping activities on-site. Once all suitable refuge sites were removed one-way doors were placed over the two active burrowing owl burrow entrances and two adjacent burrows. These two adjacent burrows lacked burrowing owl sign, but were not collapsed due to the possibility of them being contiguous with the adjacent active burrows. The one-way doors were inspected daily to ensure they had not been tampered with and successfully prevented wildlife from re-entering the burrow. After at least two days, the one-way doors were removed and these burrows were visually inspected with a borescope (flexible fiber optic video camera) for signs of owls and other wildlife. When the burrows were confirmed to be unoccupied they were carefully collapsed and filled by hand.

A single burrowing owl was first observed on-site on January 7, 2014. Over the next two day period this owl was monitored and observed to be utilizing the two active burrows on-site, located within approximately 120 feet of one another. Surveys and monitoring conducted by EI biologists between January 7 and 10, confirmed the presence of a single burrowing owl. This owl was observed to be unpaired and was not nesting or feeding young.

Once passive relocation was completed on January 13, 2014 the Site was monitored weekly until the end of January for any new sign of burrowing owl occupation. No other burrowing owls or new burrowing owl sign were observed on the Site. On February 5, 2014, EI conducted a clearance survey to confirm burrowing owls were absent from the site.

Table 1. Christensen Site Visit Summary

Date	Biologist(s)*	Purpose
11/26/2013	SD	Habitat Assessment and Survey
1/7/2014	SD	Passive Relocation Preparation
1/8/2014	SD,	Passive Relocation
1/9/2014	SD, JG	Passive Relocation
1/10/2014	SD,JG	Passive Relocation
1/11/2014	JG	Passive Relocation
1/13/2014	JG	Passive Relocation
1/17/2014	SD, CD	Monitoring
1/23/2014	JG	Monitoring
1/30/2014	JG	Monitoring
2/5/2014	JG	Monitoring and Clearance Survey

*Biologists: SD = Scott Duff, JG = Jeremiah George, CD = Cherie Dugal

Conclusions

One burrowing owl was passively relocated off-site to suitable habitat during EI's passive relocation efforts. Passive relocation was completed prior to February 1, the start of the burrowing owl breeding season. As of the last site visit (February 5), no owls were present on the Christensen Site and the one passively relocated owl was observed residing 600-650 feet to the south of the Site.

If you have any questions or comments regarding this report please contact Eric Kline directly at 949-497-0931.

Sincerely,

ENVIRONMENTAL INTELLIGENCE, LLC

Eric Kline

Literature Cited

CDFG 2012. Staff Report on Burrowing Owl Mitigation. Dated March 7, 2012.

MSHCP 2006 (as amended). *Burrowing Owl Survey Instructions for the Western Riverside Multiple Species Habitat Conservation Plan Area.* Riverside, CA: the County. http://www.tlma.co.riverside.ca.us/epd/docu

Appendix E
CNDDB Database Search

Selected Elements by Scientific Name

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad is (Romoland (3311762))

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Aimophila ruficeps canescens southern California rufous-crowned sparrow	ABPBX91091	None	None	G5T3	S2S3	WL
Allium munzii Munz's onion	PMLIL022Z0	Endangered	Threatened	G1	S1	1B.1
Aquila chrysaetos golden eagle	ABNKC22010	None	None	G5	S3	FP
Artemisiospiza belli belli Bell's sage sparrow	ABPBX97021	None	None	G5T2T4	S2?	WL
Aspidoscelis hyperythra orangethroat whiptail	ARACJ02060	None	None	G5	S2	SSC
Aspidoscelis tigris stejnegeri coastal whiptail	ARACJ02143	None	None	G5T3T4	S2S3	
Athene cunicularia burrowing owl	ABNSB10010	None	None	G4	S2	SSC
Brodiaea filifolia thread-leaved brodiaea	PMLIL0C050	Threatened	Endangered	G1	S1	1B.1
Buteo regalis ferruginous hawk	ABNKC19120	None	None	G4	S3S4	WL
California macrophylla round-leaved filaree	PDGER01070	None	None	G2	S2	1B.1
Centromadia pungens ssp. laevis smooth tarplant	PDAST4R0R4	None	None	G3G4T2	S2	1B.1
Chaetodipus californicus femoralis Dulzura pocket mouse	AMAFD05021	None	None	G5T3	S2?	SSC
Chaetodipus fallax fallax northwestern San Diego pocket mouse	AMAFD05031	None	None	G5T3	S2S3	SSC
Chorizanthe parryi var. parryi Parry's spineflower	PDPGN040J2	None	None	G2T2	S2	1B.1
Chorizanthe polygonoides var. longispina long-spined spineflower	PDPGN040K1	None	None	G5T3	S3	1B.2
Crotalus ruber red-diamond rattlesnake	ARADE02090	None	None	G4	S2?	SSC
Dipodomys stephensi Stephens' kangaroo rat	AMAFD03100	Endangered	Threatened	G2	S2	
Eremophila alpestris actia California horned lark	ABPAT02011	None	None	G5T3Q	S3	WL
Eumops perotis californicus western mastiff bat	AMACD02011	None	None	G5T4	S3?	SSC
Euphydryas editha quino quino checkerspot butterfly	IILEPK405L	Endangered	None	G5T1T2	S1	

Selected Elements by Scientific Name

California Department of Fish and Wildlife

California Natural Diversity Database

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Harpagonella palmeri Palmer's grapplinghook	PDBOR0H010	None	None	G4	S3.2	4.2
Lanius ludovicianus loggerhead shrike	ABPBR01030	None	None	G4	S4	SSC
Lasiurus xanthinus western yellow bat	AMACC05070	None	None	G5	S3	SSC
Lasthenia glabrata ssp. coulteri Coulter's goldfields	PDAST5L0A1	None	None	G4T3	S2.1	1B.1
Lepidium virginicum var. robinsonii Robinson's pepper-grass	PDBRA1M114	None	None	G5T3	S3	4.3
Lepus californicus bennettii San Diego black-tailed jackrabbit	AMAEB03051	None	None	G5T3?	S3?	SSC
Navarretia fossalis spreading navarretia	PDPLM0C080	Threatened	None	G1	S1	1B.1
Onychomys torridus ramona southern grasshopper mouse	AMAFF06022	None	None	G5T3?	S3?	SSC
Orcuttia californica California Orcutt grass	PMPOA4G010	Endangered	Endangered	G1	S1	1B.1
Perognathus longimembris brevinasus Los Angeles pocket mouse	AMAFD01041	None	None	G5T1T2	S1S2	SSC
Phrynosoma blainvillii coast horned lizard	ARACF12100	None	None	G3G4	S3S4	SSC
Polioptila californica californica coastal California gnatcatcher	ABPBJ08081	Threatened	None	G3T2	S2	SSC
Southern Coast Live Oak Riparian Forest Southern Coast Live Oak Riparian Forest	CTT61310CA	None	None	G4	S4	
Southern Cottonwood Willow Riparian Forest Southern Cottonwood Willow Riparian Forest	CTT61330CA	None	None	G3	S3.2	
Spea hammondii western spadefoot	AAABF02020	None	None	G3	S3	SSC
Streptocephalus woottoni Riverside fairy shrimp	ICBRA07010	Endangered	None	G1	S1	

Record Count: 36

Selected Elements by Scientific Name

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad is (Steele Peak (3311773) or Perris (3311772) or Lakeview (3311771) or Winchester (3311761) or Romoland (3311762) or Lake Elsinore (3311763) or Wildomar (3311753) or Murrieta (3311752) or Bachelor Mtn. (3311751))

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Abronia villosa var. aurita chaparral sand-verbena	PDNYC010P1	None	None	G5T3T4	S2	1B.1
Accipiter cooperii Cooper's hawk	ABNKC12040	None	None	G5	S3	WL
Agelaius tricolor tricolored blackbird	ABPBXB0020	None	None	G2G3	S2	SSC
Aimophila ruficeps canescens southern California rufous-crowned sparrow	ABPBX91091	None	None	G5T3	S2S3	WL
Allium munzii Munz's onion	PMLIL022Z0	Endangered	Threatened	G1	S1	1B.1
Ambrosia pumila San Diego ambrosia	PDAST0C0M0	Endangered	None	G1	S1	1B.1
Ambystoma californiense California tiger salamander	AAAAA01180	Threatened	Threatened	G2G3	S2S3	SSC
Anaxyrus californicus arroyo toad	AAABB01230	Endangered	None	G2G3	S2S3	SSC
Aquila chrysaetos golden eagle	ABNKC22010	None	None	G5	S3	FP
Arctostaphylos rainbowensis Rainbow manzanita	PDERI042T0	None	None	G2	S2	1B.1
Artemisiospiza belli belli Bell's sage sparrow	ABPBX97021	None	None	G5T2T4	S2?	WL
Asio otus long-eared owl	ABNSB13010	None	None	G5	S3	SSC
Aspidoscelis hyperythra orangethroat whiptail	ARACJ02060	None	None	G5	S2	SSC
Aspidoscelis tigris stejnegeri coastal whiptail	ARACJ02143	None	None	G5T3T4	S2S3	
Astragalus pachypus var. jaegeri Jaeger's milk-vetch	PDFAB0F6G1	None	None	G4T1	S1	1B.1
Athene cunicularia burrowing owl	ABNSB10010	None	None	G4	S2	SSC
Atriplex coronata var. notatior San Jacinto Valley crownscale	PDCHE040C2	Endangered	None	G4T1	S1	1B.1
Atriplex parishii Parish's brittlescale	PDCHE041D0	None	None	G1G2	S1	1B.1
Atriplex serenana var. davidsonii Davidson's saltscale	PDCHE041T1	None	None	G5T1	S1	1B.2

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Ayenia compacta California ayenia	PDSTE01020	None	None	G4	S3?	2B.3
Branchinecta lynchi vernal pool fairy shrimp	ICBRA03030	Threatened	None	G3	S2S3	
Brodiaea filifolia thread-leaved brodiaea	PMLIL0C050	Threatened	Endangered	G1	S1	1B.1
Brodiaea santarosae Santa Rosa Basalt brodiaea	PMLIL0C0G0	None	None	G2	S2	1B.2
Buteo regalis ferruginous hawk	ABNKC19120	None	None	G4	S3S4	WL
Buteo swainsoni Swainson's hawk	ABNKC19070	None	Threatened	G5	S2	
California macrophylla round-leaved filaree	PDGER01070	None	None	G2	S2	1B.1
Calochortus plummerae Plummer's mariposa-lily	PMLIL0D150	None	None	G4	S4	4.2
Calochortus weedii var. intermedius intermediate mariposa-lily	PMLIL0D1J1	None	None	G3G4T2	S2	1B.2
Campylorhynchus brunneicapillus sandiegensis coastal cactus wren	ABPBG02095	None	None	G5T3Q	S3	SSC
Caulanthus simulans Payson's jewelflower	PDBRA0M0H0	None	None	G3	S3.2	4.2
Centromadia pungens ssp. laevis smooth tarplant	PDAST4R0R4	None	None	G3G4T2	S2	1B.1
Chaetodipus californicus femoralis Dulzura pocket mouse	AMAFD05021	None	None	G5T3	S2?	SSC
Chaetodipus fallax fallax northwestern San Diego pocket mouse	AMAFD05031	None	None	G5T3	S2S3	SSC
Charadrius alexandrinus nivosus western snowy plover	ABNNB03031	Threatened	None	G3T3	S2	SSC
Charina trivirgata rosy boa	ARADA01020	None	None	G4G5	S3S4	
Chorizanthe parryi var. parryi Parry's spineflower	PDPGN040J2	None	None	G2T2	S2	1B.1
Chorizanthe polygonoides var. longispina long-spined spineflower	PDPGN040K1	None	None	G5T3	S3	1B.2
Cicindela senilis frosti senile tiger beetle	IICOL02121	None	None	G2G3T1T3	S1	
Circus cyaneus northern harrier	ABNKC11010	None	None	G5	S3	SSC
Clinopodium chandleri San Miguel savory	PDLAM08030	None	None	G2	S2	1B.2

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Coleonyx variegatus abbotti San Diego banded gecko	ARACD01031	None	None	G5T3T4	S2S3	
Crotalus ruber red-diamond rattlesnake	ARADE02090	None	None	G4	S2?	SSC
Cryptantha wigginsii Wiggins' cryptantha	PDBOR0A400	None	None	G2	S1	1B.2
Diadophis punctatus modestus San Bernardino ringneck snake	ARADB10015	None	None	G5T2T3Q	S2?	
Dipodomys stephensi Stephens' kangaroo rat	AMAFD03100	Endangered	Threatened	G2	S2	
Dodecahema leptoceras slender-horned spineflower	PDPGN0V010	Endangered	Endangered	G1	S1	1B.1
Dudleya multicaulis many-stemmed dudleya	PDCRA040H0	None	None	G2	S2	1B.2
Elanus leucurus white-tailed kite	ABNKC06010	None	None	G5	S3	FP
Emys marmorata western pond turtle	ARAAD02030	None	None	G3G4	S3	SSC
Eremophila alpestris actia California horned lark	ABPAT02011	None	None	G5T3Q	S3	WL
Eryngium aristulatum var. parishii San Diego button-celery	PDAPI0Z042	Endangered	Endangered	G5T1	S1	1B.1
Eumops perotis californicus western mastiff bat	AMACD02011	None	None	G5T4	S3?	SSC
Euphydryas editha quino quino checkerspot butterfly	IILEPK405L	Endangered	None	G5T1T2	S1	
Geothallus tuberosus Campbell's liverwort	NBHEP1C010	None	None	G1	S1	1B.1
Gila orcuttii arroyo chub	AFCJB13120	None	None	G2	S2	SSC
Haliaeetus leucocephalus bald eagle	ABNKC10010	Delisted	Endangered	G5	S2	FP
Harpagonella palmeri Palmer's grapplinghook	PDBOR0H010	None	None	G4	S3.2	4.2
Hesperocyparis forbesii Tecate cypress	PGCUP040C0	None	None	G2	S2	1B.1
Horkelia cuneata var. puberula mesa horkelia	PDROS0W045	None	None	G4T2	S2.1	1B.1
Juncus luciensis Santa Lucia dwarf rush	PMJUN013J0	None	None	G2G3	S2S3	1B.2
Lanius ludovicianus loggerhead shrike	ABPBR01030	None	None	G4	S4	SSC

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Lasiurus xanthinus western yellow bat	AMACC05070	None	None	G5	S3	SSC
Lasthenia glabrata ssp. coulteri Coulter's goldfields	PDAST5L0A1	None	None	G4T3	S2.1	1B.1
Lepidium virginicum var. robinsonii Robinson's pepper-grass	PDBRA1M114	None	None	G5T3	S3	4.3
Lepus californicus bennettii San Diego black-tailed jackrabbit	AMAEB03051	None	None	G5T3?	S3?	SSC
Lilium parryi lemon lily	PMLIL1A0J0	None	None	G3	S3	1B.2
Limnanthes alba ssp. parishii Parish's meadowfoam	PDLIM02052	None	Endangered	G3T2T3	S2S3	1B.2
Linderiella santarosae Santa Rosa Plateau fairy shrimp	ICBRA06020	None	None	G1G2	S1	
Monardella hypoleuca ssp. intermedia intermediate monardella	PDLAM180A4	None	None	G4T2T3	S2S3	1B.3
Myosurus minimus ssp. apus little mousetail	PDRAN0H031	None	None	G5T2Q	S2.2	3.1
Nama stenocarpum mud nama	PDHYD0A0H0	None	None	G4G5	S1S2	2B.2
Navarretia fossalis spreading navarretia	PDPLM0C080	Threatened	None	G1	S1	1B.1
Navarretia prostrata prostrate vernal pool navarretia	PDPLM0C0Q0	None	None	G2	S2	1B.1
Neotoma lepida intermedia San Diego desert woodrat	AMAFF08041	None	None	G5T3?	S3?	SSC
Nyctinomops femorosaccus pocketed free-tailed bat	AMACD04010	None	None	G4	S2S3	SSC
Onychomys torridus ramona southern grasshopper mouse	AMAFF06022	None	None	G5T3?	S3?	SSC
Orcuttia californica California Orcutt grass	PMPOA4G010	Endangered	Endangered	G1	S1	1B.1
Perognathus longimembris brevinasus Los Angeles pocket mouse	AMAFD01041	None	None	G5T1T2	S1S2	SSC
Perognathus longimembris internationalis Jacumba pocket mouse	AMAFD01044	None	None	G5T2T3	S1S2	SSC
Phrynosoma blainvillii coast horned lizard	ARACF12100	None	None	G3G4	S3S4	SSC
Plegadis chihi white-faced ibis	ABNGE02020	None	None	G5	S1	WL
Polioptila californica californica coastal California gnatcatcher	ABPBJ08081	Threatened	None	G3T2	S2	SSC

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Pseudognaphalium leucocephalum white rabbit-tobacco	PDAST440C0	None	None	G4	S2S3.2	2B.2
Rana draytonii California red-legged frog	AAABH01022	Threatened	None	G2G3	S2S3	SSC
Salvadora hexalepis virgultea coast patch-nosed snake	ARADB30033	None	None	G5T4	S2S3	SSC
Scutellaria bolanderi ssp. austromontana southern mountains skullcap	PDLAM1U0A1	None	None	G4T2	S2	1B.2
Sibaropsis hammittii Hammitt's clay-cress	PDBRA32010	None	None	G2	S2.2	1B.2
Sidalcea neomexicana Salt Spring checkerbloom	PDMAL110J0	None	None	G4?	S2S3	2B.2
Socalchemmis icenoglei Icenogle's socalchemmis spider	ILARAU7020	None	None	G1	S1	
Southern Coast Live Oak Riparian Forest Southern Coast Live Oak Riparian Forest	CTT61310CA	None	None	G4	S4	
Southern Cottonwood Willow Riparian Forest Southern Cottonwood Willow Riparian Forest	CTT61330CA	None	None	G3	S3.2	
Southern Interior Basalt Flow Vernal Pool Southern Interior Basalt Flow Vernal Pool	CTT44310CA	None	None	G1	S1.2	
Southern Riparian Scrub Southern Riparian Scrub	CTT63300CA	None	None	G3	S3.2	
Southern Sycamore Alder Riparian Woodland Southern Sycamore Alder Riparian Woodland	CTT62400CA	None	None	G4	S4	
Spea hammondii western spadefoot	AAABF02020	None	None	G3	S3	SSC
Sphaerocarpos drewei bottle liverwort	NBHEP35030	None	None	G1	S1	1B.1
Streptocephalus woottoni Riverside fairy shrimp	ICBRA07010	Endangered	None	G1	S1	
Symphyotrichum defoliatum San Bernardino aster	PDASTE80C0	None	None	G2	S2	1B.2
Taricha torosa Coast Range newt	AAAAF02032	None	None	G4	S4	SSC
Taxidea taxus American badger	AMAJF04010	None	None	G5	S4	SSC
Texosporium sancti-jacobi woven-spored lichen	NLTEST7980	None	None	G3	S1	
Thamnophis hammondii two-striped garter snake	ARADB36160	None	None	G4	S2	SSC
Tortula californica California screw moss	NBMUS7L090	None	None	G2?	S2	1B.2

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Trichocoronis wrightii var. wrightii Wright's trichocoronis	PDAST9F031	None	None	G4T3	S1	2B.1
Valley Needlegrass Grassland Valley Needlegrass Grassland	CTT42110CA	None	None	G3	S3.1	
Vireo bellii pusillus least Bell's vireo	ABPBW01114	Endangered	Endangered	G5T2	S2	

Record Count: 106

Appendix F
Noise Impact Analysis

Kunzman Associates, Inc.

CANYON HILLS – CHRISTENSEN PROPERTY

NOISE IMPACT ANALYSIS

March 6, 2014

Traffic Engineering | Transportation Planning | Parking | Noise/Vibration | Expert Witness
Air Quality | Global Climate Change | Health Risk Assessment

KUNZMAN ASSOCIATES, INC.

CANYON HILLS – CHRISTENSEN PROPERTY

NOISE IMPACT ANALYSIS

March 6, 2014

Prepared by:

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I. Executive Summary

A. Canyon Hills Noise Study Summary

Kunzman Associates, Inc. prepared a noise study report for the Canyon Hills – Christensen Property located in the City of Lake Elsinore. The analysis was conducted for a 74 single-family detached residential dwelling unit development proposed on a 20 acre site located adjacent to and south of Holland Road, west of Anna Lane and north of Corson Avenue, in the City of Lake Elsinore.

B. Construction Noise and Vibration

The anticipated distances to the 60 and 75 dBA L_{max} project construction noise contours were calculated using RCNM. Without mitigation, sensitive receptors up to 150 feet from the property line could experience noise levels over 75 dBA L_{max}. Unmitigated noise levels could also reach 60 dBA L_{max} up to 890 feet from the property line. Construction noise levels at these receptors would exceed City of Lake Elsinore standards. If construction equipment is operated within 150 feet of a residential property line between the hours of 7:00 AM and 7:00 PM the daytime standard of 75 dBA L_{max} may be exceeded; and if construction equipment is operated within 890 feet of a reisidential property line between the hours of 7:00 PM and 7:00 AM the City's nighttime standard of 60 dBA L_{max} may be exceeded.

Due to the proximity of adjacent single-family detached residential dwelling units, project construction activities may result in ground borne vibration that is annoying but would only occur during site grading and preparation activities. Construction vibration will not result in any structural damage.

C. Construction Noise Mitigation Measures

In addition to adherence to the City of Lake Elsinore Municipal Code limiting construction hours of operation, the following measures will minimize noise and vibration related impacts during demolition and construction activities.

1. During all project site excavation and grading on-site, construction contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers, consistent with manufacturer standards. The contractor shall place all stationary construction equipment so that emitted noise is directed away from the noise sensitive receptors nearest the project site.

2. The contractor shall locate equipment staging in areas that will create the greatest distance between construction-related noise/vibration sources and sensitive receptors nearest the project site during all project construction.

3. The project proponent shall mandate that the construction contractor prohibit the use of music or sound amplification on the project site during construction.

4. The construction contractor shall limit haul truck deliveries to the same hours specified for construction equipment.

5. When feasible, avoid the use of pavement breakers and vibratory rollers and packers near sensitive receptors.

6. Temporary noise barriers that provide at least 10 dBA in attenuation must be installed when project construction occurs within 150 feet of an existing residential property line. Any such barriers should break the line of sight from noise generators to sensitive receptors located immediately east of the project site. They should also be constructed as close to the sensitive receptor as possible to achieve the greatest attenuation effect and have no gaps or openings.

7. Because the City nighttime standard of 60 dBA Ldn would be exceeded at sensitive receptors up to 250 feet to the east, even with installation of temporary noise barriers, no construction should be performed at night (7:00 PM to 7:00 AM) Mondays through Fridays, and not at all on weekends or holidays.

D. <u>Traffic Noise Impacts to the Proposed Project</u>

Unmitigated future exterior noise levels in the back yards of single-family detached residential dwelling units that are adjacent to Holland Road are expected to reach up to 72.4 dBA Ldn and unmitigated future exterior noise levels at the façade of the proposed single-family detached residential dwelling units are expected to reach 69.3 dBA Ldn at the first floor and 71.5 dBA Ldn at second story receptors.

Buildout traffic noise levels would exceed the City's 65 dBA Ldn threshold for exterior noise at sensitive receptors. Therefore, mitigation is required. Construction of a six-foot high barrier at the top of the slope would reduce noise these levels to below 65 dBA Ldn. The proposed barrier however, will not reduce exterior noise levels at the second story of single-family detached residential dwelling units adjacent to Holland Road to below 65 dBA Ldn and it is not aesthetically desirable or reasonable to construct a barrier high enough to do so. Therefore, enhanced building construction methods and materials must be employed to achieve acceptable interior noise levels. These methods are presented below.

E. <u>Traffic Noise Impacts to the Proposed Project Mitigation Measures</u>

1. Mitigation is required in order to achieve exterior noise levels of 65 dBA Ldn at several proposed sensitive receptors adjacent to Holland Road. This mitigation can be provided by constructing a six foot wall at the top of slope of the residential lots adjacent to Holland Road and at the northern and western top of slope of the northernmost lot along the western site boundary. Barriers shall wrap around to protect the side yards of lots.

2. As it is usually not aesthetically desirable to construct barriers high enough to reduce interior noise levels at second story sensitive receptors, enhanced building construction methods and materials must be employed. Single-family detached residential dwelling units adjacent to Holland Road will require approximately 25 dBA of exterior to interior noise reduction to achieve acceptable interior noise levels. Methods 1 through 8 should be implemented to achieve 25 dBA of exterior to interior noise reduction.

F. Off-Site Project Generated Traffic Noise Impacts

The FHWA Traffic Noise Prediction Model - FHWA-RD-77-108 was used to model Existing and Existing Plus Project noise levels were modeled for each roadway segment analyzed in the traffic study prepared for the proposed project. Project generated increases in ambient noise levels along affected road segments were then calculated. In no case would project generated vehicle noise contribute more than 1 dBA Ldn to the ambient noise levels along affected road segments. This increase would not be noticeable. No mitigation is required.

II. Introduction and Setting

A. Purpose and Objectives

This study was performed to address the possibility of significant impacts due to noise. The objectives of the study include:

- documentation of existing noise conditions
- discussion of noise modeling methodology and procedures
- analysis of noise and vibration generated by the construction of the project
- analysis of noise and vibration generated by the typical operation of the project
- analysis and discussion of potential traffic noise impacts to the proposed project
- analysis of noise affecting nearby sensitive receptors due to increased traffic produced by the project
- recommendations for mitigation measures

B. Project Location

The project is located adjacent to and south of Holland Road, west of Anna Lane and north of Corson Avenue, in the City of Lake Elsinore. A vicinity map showing the project location is provided on Figure 1.

C. Project Description

The proposed development consists of 74 single-family detached residential dwelling units on an approximately 20 acre site. The proposed site plan is shown on Figure 2.

Figure 1
Project Location Map

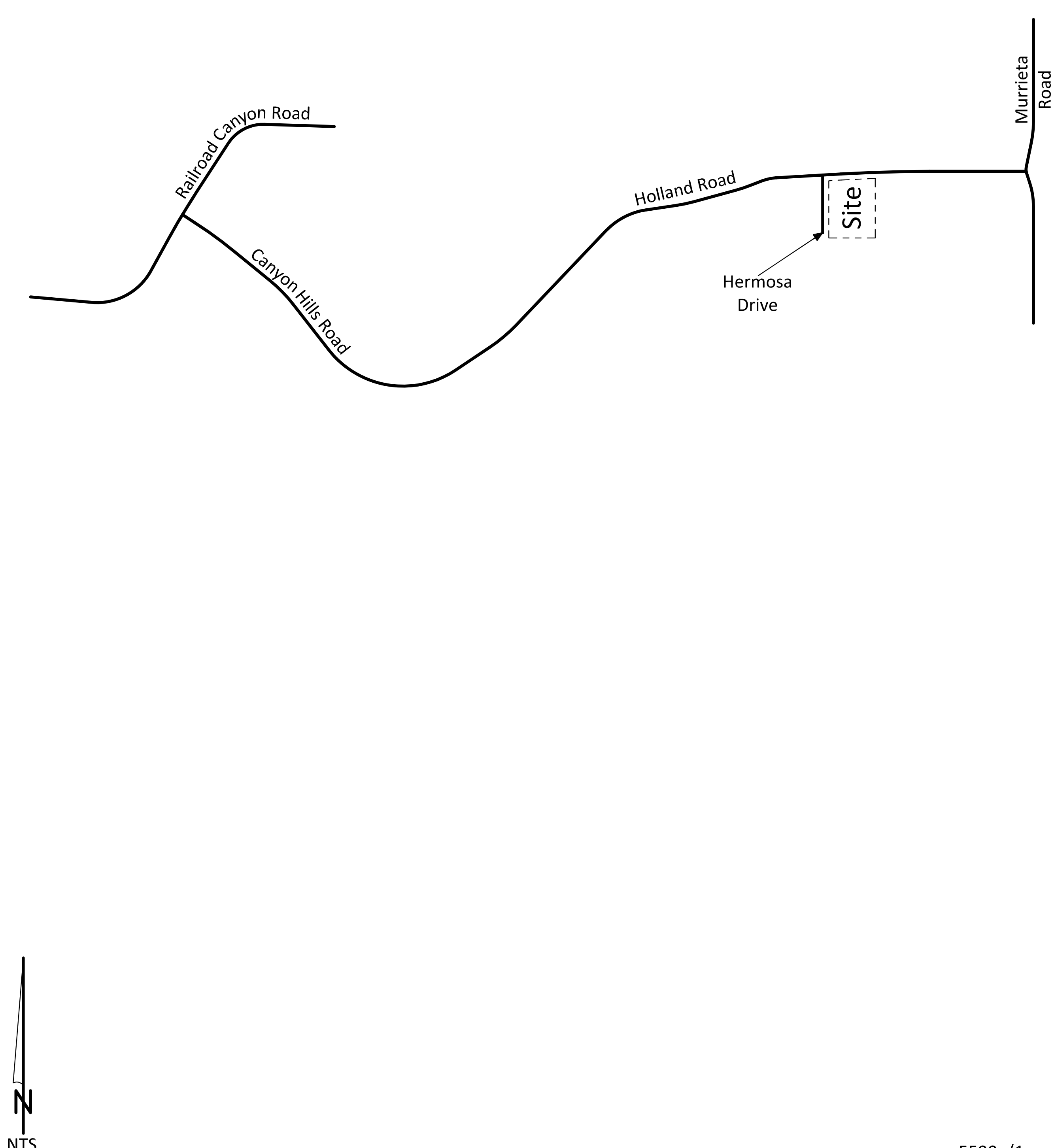

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Figure 2
Site Plan

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III. Definition of Terms

A. Noise/Sound Terminology

Sound is a pressure wave created by a moving or vibrating source that travels through an elastic medium such as air. Noise is defined as unwanted or objectionable sound. The effects of noise on people can include general annoyance, interference with speech communication, sleep disturbance, and in extreme circumstances, hearing impairment.

Commonly used noise terms are presented in Table 1. The unit of measurement used to describe a noise level is the decibel (dB). The human ear is not equally sensitive to all frequencies within the sound spectrum. Therefore, the "A-weighted" noise scale, which weights the frequencies to which humans are sensitive, is used for measurements. Noise levels using A-weighted measurements are written dBA or dBA.

Decibels are measured on a logarithmic scale, which quantifies sound intensity in a manner similar to the Richter scale used for earthquake magnitudes. Thus, a doubling of the energy of a noise source, such as a doubled traffic volume, would increase the noise levels by 3 dBA; halving of the energy would result in a 3 dBA decrease. Figure 3 shows the relationship of various noise levels to commonly experienced noise events.

Average noise levels over a period of minutes or hours are usually expressed as dBA $L_{eq,}$ or the equivalent noise level for that period of time. For example, $L_{eq(3)}$ would represent a 3-hour average. When no period is specified, a one-hour average is assumed.

Noise standards for land use compatibility are stated in terms of the Community Noise Equivalent Level (CNEL) and the Day-Night Average Noise Level (Ldn). CNEL is a 24-hour weighted average measure of community noise. CNEL is obtained by adding five decibels to sound levels in the evening (7:00 PM to 10:00 PM), and by adding ten decibels to sound levels at night (10:00 PM to 7:00 AM). This weighting accounts for the increased human sensitivity to noise during the evening and nighttime hours. Ldn is a very similar 24-hour average measure that weights only the nighttime hours.

It is widely accepted that the average healthy ear can barely perceive changes of 3 dBA; that a change of 5 dBA is readily perceptible, and that an increase (decrease) of 10 dBA sounds twice (half) as loud. This definition is recommended by the California Department of Transportation's Traffic Noise Analysis Protocol for New Highway and Reconstruction Projects.

The difference in sound (noise) levels from the exterior to the interior of a structure indicates the sound transmitted loss through the window, door, or wall. A Sound Transmission Class (STC) rating specifies the noise level reduction that windows, doors, wall construction materials, and insulation provide. For example, if the exterior of a structure is exposed to 75 dBA and 45 dBA is measured on the interior of the structure, then a reduction of 30 dBA is achieved. Typically, higher STC ratings indicate greater interior noise reductions.

B. <u>Vibration Terminology</u>

The rumbling sound caused by the vibration of room surfaces is called groundborne noise. The annoyance potential of groundborne noise is usually characterized with the A-weighted sound level. Groundborne vibration related to human annoyance is generally related to root mean square (rms) velocity levels expressed in VdB. In contrast to airborne noise, groundborne noise is not a phenomenon that most people experience every day. The background vibration velocity level in residential areas is usually 50 VdB or lower, well below the threshold of perception for humans which is around 65 VdB. Most perceptible indoor vibration is caused by sources within buildings such as operation of mechanical equipment, movement of people, or slamming of doors. Typical outdoor sources of perceptible groundborne vibration are construction equipment, steel-wheeled trains, and traffic on rough roads. If the roadway is smooth, the vibration from traffic is rarely perceptible.

The peak particle velocity (PPV) which is defined as the maximum instantaneous positive or negative peak of the vibration signal is the descriptor most utilized in the analysis of vibratory impacts to buildings. Table 2 shows the peak particle velocities of some common construction equipment.

Table 1

Definitions of Acoustical Terms[1]

Term	Definition
Decibel, dB	A logarithmic unit of noise level measurement that relates the energy of a noise source to that of a constant reference level; the number of decibels is 10 times the logarithm (to the base 10) of this ratio.
Frequency, Hertz	In a function periodic in time, the number of times that the quantity repeats itself in one second (i.e., the number of cycles per second).
A-Weighted Sound Level, dBA	The sound level obtained by use of A-weighting. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear.
Root Mean Square (RMS)	A measure of the magnitude of a varying noise source quantity. The name derives from the calculation of the square root of the mean of the squares of the values. It can be calculated from either a series of lone values or a continuous varying function.
Fast/Slow Meter Response	The fast and slow meter responses are different settings on a sound level meter. The fast response setting takes a measurement every 100 milliseconds, while a slow setting takes one every second.
L_{02}, L_{08}, L_{50}, L_{90}	The A-weighted noise levels that are equaled or exceeded by a fluctuating sound level, 2 percent, 8 percent, 50 percent, and 90 percent of a stated time period, respectively.
Equivalent Continuous Noise Level, L_{eq}	A level of steady state sound that in a stated time period, and a stated location, has the same A-weighted sound energy as the time-varying sound.
L_{max}, L_{min}	L_{max} is the RMS (root mean squared) maximum level of a noise source or environment measured on a sound level meter, during a designated time interval, using fast meter response. L_{min} is the minimum level.
Ambient Noise Level	The all-encompassing noise environment associated with a given environment, at a specified time, usually a composite of sound from many sources, at many directions, near and far, in which usually no particular sound is dominant.
Offensive/ Offending/ Intrusive Noise	The noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of sound depends on its amplitude, duration, frequency, and time of occurrence, and tonal information content as well as the prevailing ambient noise level.

[1] Adapted from: Cyril M. Harris; Handbook of Acoustical Measurement and Noise Control, 1991.

Table 2

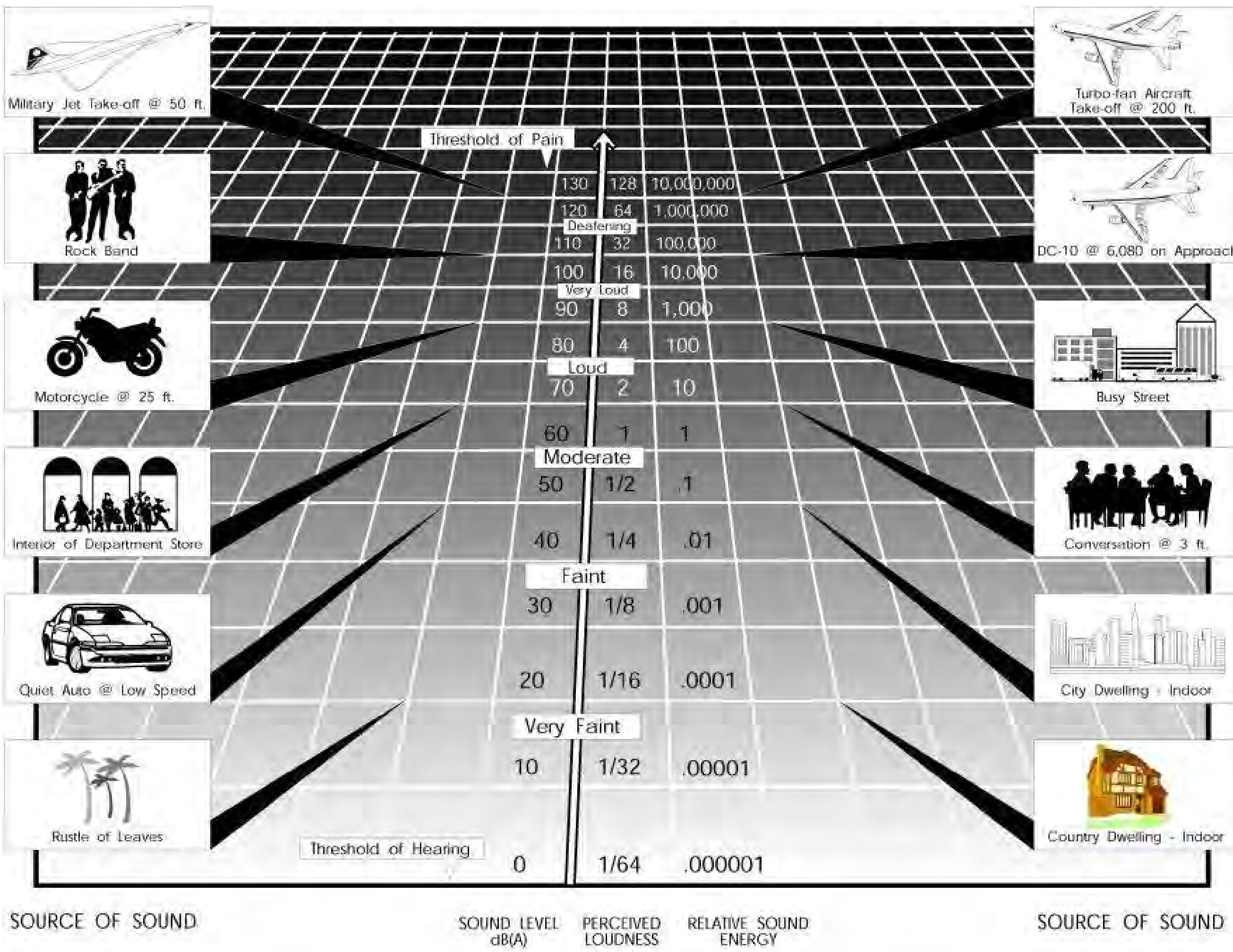
Construction Equipment Vibration Source Levels[1]

Equipment	Peak Partical Velocity in inches per second[2]		
	at 25 ft.	at 50 ft.	at 100 ft.
Clam Shovel Drop (slurry wall)	**0.202**	0.071	0.025
Vibratory Roller	**0.210**	0.074	0.026
Hoe Ram	**0.089**	0.031	0.011
Large Bulldozer	**0.089**	0.031	0.011
Caisson Drilling	**0.089**	0.031	0.011
Loaded Trucks	0.076	0.027	0.010
Jackhammer	0.035	0.012	0.004
Small Bulldozer	0.003	0.001	0.0004

[1] Source: Federal Transit Administration: Transit Noise and Vibration Impact Assessment, 2006.

[2] Bold values are considered annoying to people.

Figure 3
Common Noise Sources and Noise Levels



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IV. Existing Noise Environment

A. Sensitive Noise Receptors

The State of California defines sensitive receptors as those land uses that require serenity or are otherwise adversely affected by noise events or conditions. Schools, libraries, churches, hospitals, and residential uses make up the majority of these areas. The project site is adjacent to several existing single-family detached residential neighborhoods to the south and east.

B. Existing Noise Levels

An American National Standards Institute (ANSI Section SI4 1979, Type 1) Larson Davis model LxT sound level meter was used to document existing ambient noise levels on February 4, 2014. One 15-minute noise measurement was taken between 9:42 AM and 9:57 AM. The ambient Leq was measured at 39 dBA. The noise measurement location is shown on Figure 4. Correlating ambient noise levels are presented in Table 3 and measurement output data is included within Appendix A.

Measurement locations are shown on Figure 4. Ambient noise levels are presented in Table 3 and measurement output data is included within Appendix A.

Primary noise sources in the project area consist of vehicular traffic on adjacent roadways, birds chirping and dogs barking.

Table 3

Ambient Noise Levels[1]

Name	Time Period	Measurement Period	Description	Existing Ambient Noise Levels (dBA)					
				L_{eq}	L_{max}	L_2	L_8	L_{25}	L_{50}
M1	9:42 AM - 9:57 AM	15 min	Along southern property boundary	39.0	47.0	43.3	41.4	39.8	38.3

[1] Source: Site Visit, Kunzman Associates, Inc. (March 14, 2012).

Figure 4
Ambient Noise Measurement Locations

Legend

⊗ = Noise Measurement Location

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V. Analytical Methodology and Model Parameters

A. Noise Modeling and Input

1. Federal Highway Administration (FHWA) Traffic Noise Prediction Model

Existing and Existing Plus Project noise levels were modeled for affected nearby road segments utilizing the FHWA Traffic Noise Prediction Model - FHWA-RD-77-108 in order to quantify the proposed project’s contribution to increases in ambient noise levels.

The FHWA Traffic Noise Prediction Model arrives at a predicted noise level through a series of adjustments to the Reference Energy Mean Emission Level (REMEL). Adjustments are then made to the REMEL to account for: total average daily trips (ADT), roadway classification, width, speed and truck mix, roadway grade and site conditions (hard or soft ground surface). Surfaces adjacent to all modeled roadways were assumed to have a “hard site” to predict worst-case, conservative noise levels. A hard site, such as pavement, is highly reflective and does not attenuate noise as quickly as grass or other soft sites. Possible reductions in noise levels due to intervening topography and buildings were not accounted for in this analysis.

Existing and Existing Plus Project traffic volumes were obtained from the project's traffic study (Kunzman Associates, Inc. 2014). The City of Lake Elsinore does not have published vehicle/truck mixes or Day/Evening/Night (D/E/N) for use in acoustical studies. Vehicle/truck mixes and D/E/N splits for use in acoustical studies published by the Riverside County Department of Industrial Hygiene were utilized for noise modeling. Existing Plus Project vehicle mixes were calculated by adding the proposed project trips to existing conditions.

2. Road Construction Noise Model (RCNM)

A worst-case construction noise scenario was modeled using the Federal Highway Administration’s Roadway Construction Noise Model (RCNM). Modeling parameters and output are provided in Appendix B. RCNM utilizes standard noise emission levels for many different types of equipment and includes utilization percentage, impact, and shielding parameters.

3. SoundPLAN

SoundPLAN was utilized to model traffic noise associated with Holland Road. It is a three-dimensional noise modeling software that takes into account the shielding and reflective effects associated with intervening topography and nearby buildings. Roadway parameters utilized in the model include location, traffic volume, speed and vehicle mix (auto, medium truck and heavy truck). Because the City of Lake Elsinore does not have published mixes, day/evening/night mixes and truck mixes as recommended by the County of Riverside Department of Industrial Hygiene were utilized for modeling purposes.

VI. Applicable Standards

A. Federal Regulations

1. Federal Noise Control Act of 1972

The U.S. Environmental Protection Agency (EPA) Office of Noise Abatement and Control was originally established to coordinate federal noise control activities. After its inception, EPA's Office of Noise Abatement and Control issued the Federal Noise Control Act of 1972, establishing programs and guidelines to identify and address the effects of noise on public health, welfare, and the environment. In response, the EPA published Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety (Levels of Environmental Noise). The Levels of Environmental Noise recommended that the Ldn should not exceed 55 dBA outdoors or 45 dBA indoors to prevent significant activity interference and annoyance in noise-sensitive areas.

In addition, the Levels of Environmental Noise identified five dBA as an "adequate margin of safety" for a noise level increase relative to a baseline noise exposure level of 55 dBA Ldn (i.e., there would not be a noticeable increase in adverse community reaction with an increase of five dBA or less from this baseline level). The EPA did not promote these findings as universal standards or regulatory goals with mandatory applicability to all communities, but rather as advisory exposure levels below which there would be no risk to a community from any health or welfare effect of noise.

In 1981, EPA administrators determined that subjective issues such as noise would be better addressed at lower levels of government. Consequently, in 1982 responsibilities for regulating noise control policies were transferred to State and local governments. However, noise control guidelines and regulations contained in EPA rulings in prior years remain in place by designated Federal agencies, allowing more individualized control for specific issues by designated Federal, State, and local government agencies.

2. Federal Transit Administration

The Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual (2006) provides guidance for the analysis of noise and vibration associated with federally-funded transit projects. Section 7 of the manual discusses basic ground-borne vibration concepts including terminology, applicable descriptors, analysis procedures, thresholds and recommended mitigation for groundborne noise and vibration. Groundborne vibration thresholds included in this manual are frequently utilized for state and local projects where local thresholds for the analysis of groundborne noise and vibration have not been adopted. As shown in Table 4, the FTA's maximum acceptable vibration standard for human annoyance in residences where people normally sleep is 80 VdB (less than 70 vibration events per day).

B. State Regulations

1. State of California Building Standards Code

The State of California has adopted noise standards in areas of regulation not preempted by the Federal government. State standards regulate noise levels of motor vehicles, sound transmission through buildings, occupational noise control, and noise insulation. Title 24 of the California Code of Regulations, also known as the California Building Standards Code, establishes building standards applicable to all occupancies throughout the state. The code provides acoustical regulations for both exterior-to-interior sound insulation, as well as sound and impact isolation between adjacent spaces of various occupied units. Title 24 regulations state that interior noise levels generated by exterior noise sources shall not exceed 45 dBA Ldn/CNEL, with windows closed, in any habitable room for general residential uses.

Section 1208A, Sound Transmission, of the California Building Code requires acoustical evaluation and insulated building design and construction when exterior noise levels exceed 60 Ldn. New residential construction must be acoustically designed and constructed to reduce the intrusion of transportation noise and local fixed noise sources. The California Building Code requires a minimum Sound Transmission Class of 50 (STC50) and Impact Isolation Class 50 (IIC50) for multi-family attached residential dwelling units.

2. State of California General Plan Guidelines 2003

Though not adopted by law, the State of California General Plan Guidelines 2003, published by the California Governor's Office of Planning and Research (OPR) (OPR Guidelines), provides guidance for the compatibility of projects within areas of specific noise exposure. The OPR Guidelines identify the suitability of various types of construction relative to a range of outdoor noise levels and provide each local community some flexibility in setting local noise standards that allow for the variability in community preferences. Findings presented in the Levels of Environmental Noise Document (EPA 1974) influenced the recommendations of the OPR Guidelines, most importantly in the choice of noise exposure metrics (i.e., Ldn or CNEL) and in the upper limits for the normally acceptable outdoor exposure of noise-sensitive uses.

The OPR Guidelines include a Noise and Land Use Compatibility Matrix which identifies acceptable and unacceptable community noise exposure limits for various land use categories. Where the "normally acceptable" range is used, it is defined as the highest noise level that should be considered for the construction of the buildings which do not incorporate any special acoustical treatment or noise mitigation. The "conditionally acceptable" or "normally unacceptable" ranges include conditions calling for detailed acoustical study or construction mitigation to reduce interior exposure levels prior to the construction or operation of the building under the listed exposure levels.

3. California Environmental Quality Act

The California Environmental Quality Act Guidelines (Appendix G) establishes thresholds for noise impact analysis. Two of these standards apply to what is referred to as a "substantial increase" in ambient noise levels. Neither the California Environmental Quality Act nor the City of Lake Elsinore General Plan Noise Element recognizes an official numerical increase as a “substantial increase”. Industry-accepted standards for what is considered to be a “substantial increase” range from 3 dB to 12 dB. It should be noted that a change of 3 dB is considered to be “barely audible” to a trained ear and that a change of 5 dB is considered to be a readily audible change. Noise generated by transportation sources propagates differently than noise generated by point sources.

For purposes of this analysis, the following two thresholds were utilized to evaluate the project's potential to result in substantial increases in ambient noise levels.

Traffic Noise

Roadway noise impacts would be considered significant if the project increases noise levels at a noise sensitive land use by 3 dBA Ldn and if: (1) the existing noise levels already exceed the residential land use compatibility standard for "normally compatible" (65 dBA Ldn), or (2) the project increases noise levels from below the 65 dBA Ldn standard to above 65 dBA Ldn.

Stationary Noise

Project operations, including noise from loading and unloading activities, and parking lot noise etc., may produce an increase noise levels which disturbs the peace and quiet of adjacent residential areas or cause discomfort/annoyance to area residents. Caltrans considers a 5 dBA increase to be "readily audible", which seems to correlate most closely to "substantial increase." For the purposes of this report, a substantial permanent increase in ambient noise levels due to stationary noise sources shall be considered 5 dBA L_{eq}.

4. California Department of Transportation (Caltrans)

The Caltrans Transportation and Vibration Guidance Manual recommends a maximum vibration level standard of 0.2 in/sec PPV for the prevention of structural damage to typical residential buildings.

C. Local Regulations

1. General Plan Noise Element

The Public Safety and Welfare Element of the City of Lake Elsinore General includes the following goal regarding community noise:

- Maintain an environment for all City residents and visitors free of unhealthy, obtrusive, or otherwise excessive noise.

In order to implement this goal, the City of Lake Elsinore has adopted a slightly modified version of the Noise and Land Use Compatibility Guidelines from the State of California. As shown in Table 5, residential land uses are considered to be "Clearly Compatible" in areas with ambient noise levels of up to 60 dBA Ldn, (assuming that any buildings involved are of normal conventional construction) and "Normally Compatible[1]" up to 70 dBA Ldn. A 65 dBA Ldn exterior level is the threshold where noise begins to substantially interfere with enjoyment of any outdoor recreational amenity such as a yard, patio, spa/pool, etc. A level up to 65 dB Ldn exterior, and 45 dB Ldn interior would therefore be the appropriate noise standard for the proposed single-family detached residential dwelling units.

2. Municipal Code

Noises crossing boundaries between land uses are regulated by Section 17.176.060 of the Lake Elsinore Municipal Code. These noise standards are expressed in terms of a mean (50th percentile) noise level, which is the noise level allowed for up to 30 minutes. Some short-term noise levels may exceed the 50th percentile standard, up to a maximum of 20 dB above the allowable mean. This code is not intended to apply to construction activities but to neighbor to neighbor noise and will apply to each of the residential lots proposed by the project.

Section 17.176.080 of the City of Lake Elsinore Municipal Code prohibits the operation of any tools or equipment used in construction, drilling, repair, alteration, or demolition work between weekday hours of 7:00 PM and 7:00 AM, or at any time on weekends or holidays, such that the sound therefrom creates a noise disturbance across a residential or commercial real property line, except for emergency work of public service utilities or by variance issued by the City. Further, where technically and economically feasible, construction activities shall be conducted in such a manner that the maximum noise levels at affected properties will not exceed those listed in Table 5.

[1] "Normally Compatible" means that any new construction or development should be undertaken only after detailed analysis of the noise reduction requirements are made and needed nose insulation features in the design are determined. Conventional construction, with closed windows and fresh air supply systems or air conditioning, will normally suffice.

Table 4

Groundborne Vibration and Noise Impact Criteria[1]

Land Use Category	Groundborne Vibration Impact Levels (VdB)		Groundborne Noise Impact Levels (dBA)	
	Frequent Events[2]	Infrequent Events[3]	Frequent Events[2]	Infrequent Events[3]
Category 1: Buildings where low ambient vibration is essential for interior vibrations	65 VdB[4]	65 VdB[4]	NA[5]	NA[5]
Category 2: Residences and buildings where people normally sleep	72 VdB	80 VdB	35 dBA	43dBA
Category 3: institutional land uses with primarily daytime use	75 VdB	83 VdB	40 dBA	48 dBA

[1] Source: United States Department of Transportation, Federal Transit Administration, Transit Noise and Vibration Assessment, 1995.

[2] "Frequent Events" is defined as more than 70 vibration events per day.

[3] "Infrequent Events" is defined as fewer than 70 vibration events per day.

[4] This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes.

[5] NA – Not Applicable

Table 5

Noise and Land Use Compatibility Matrix[1]

Land Use Categories		Day-Night Noise Level (dBA L_{dn})						
Categories	Uses	< 55	60	65	70	75	80 >	
Residential	Single Family, Duplex, Multiple Family	A	A	B	B	C	D	D
	Mobile Homes	A	A	B	C	C	D	D
Commercial - Regional District	Hotels, Motels, Transient Lodging	A	A	B	B	C	C	D
Commercial - Regional Village - District Special	Commercial, Retail, Bank, Restaurant, Movie Theatre	A	A	A	A	B	B	C
Commercial Industrial Institutional	Office Building, Research and Development, Professional Offices, City Office Building	A	A	A	B	B	C	D
Commercial - Regional	Amphitheatre, Concert Hall	B	B	C	C	D	D	D
Institutional -Civic Center	Auditorium, Meeting Hall							
Commercial - Recreation	Children's Amusement Park, Miniature Golf Course, Go-cart Track, Equestrian Center, Sports Club	A	A	A	B	B	D	D
Commercial - General, Special Industrial Institutional	Automobile Service Station, Auto Dealership, Manufacturing, Warehousing, Wholesale, Utilities	A	A	A	A	B	B	B
Institutional General	Hospital, Church, Library, Schools, Classroom	A	A	B	C	C	D	D
Open Space	Parks	A	A	A	B	C	D	D
	Golf Course, Cemeteries, Nature Centers, Wildlife Reserves, Wildlife Habitat	A	A	A	A	B	C	C
Agriculture	Agriculture	A	A	A	A	A	A	A

Zone A **Clearly Compatible**	Specified land uses is satisfactory based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation or requirements.
Zone B **Normally Compatible**	New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice. Outdoor environment will seem noisy.
Zone C **Normally Incompatible**	New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of noise reduction requirements must be made and needed noise insulation features included in the design.
Zone D **Clearly Incompatible**	New construction or development should generally not be undertaken.

[1] Source: City of Lake Elsinore General Plan Public Safety and Welfare Element.

VII. Impact Analysis

A. Construction Noise Impacts

1. Project Generated Construction Noise Levels

Construction noise varies depending on the construction process, type of equipment involved, location of the construction site with respect to sensitive receptors, the schedule proposed to carry out each task (e.g., hours and days of the week) and the duration of the construction work. Typical noise sources and noise levels associated with construction activities are shown in Table 6.

The initial phase of construction would involve mass grading of the site, along with site development activities. This includes construction of internal roadways which involves fine grading, trenching, and paving activities. Following site preparation activities, the project would include construction of buildings. Construction of the buildings would require the following phases: site development, building construction, architectural coatings application, and paving associated with buildings. Mass site grading is expected to produce the highest construction noise levels and is estimated to require several graders, dozers, excavators, scrapers, and pickup trucks. The grading phase of construction is anticipated to last two to three months.

Noise levels were calculated utilizing the Road Construction Noise Model (RCNM) provided by the FHWA. Unmitigated noise levels could reach a maximum noise level of up to 81.0 L_{eq} and 85.0 dBA L_{max} at 50 feet, which is the closest to the nearest sensitive receptor the loudest piece of equipment (a grader) is likely to be working for any length of time. Noise levels will lower substantially as construction moves away from the property line. For example, a noise level that is 85 dBA at the source can be expected to drop to 79 dBA at a distance of 100 feet from the source and to 73 dBA at a distance of 200 feet from the source.

Project construction would generate trips from construction worker travel, the arrival and departure of trucks moving soil, delivering construction materials, and the removal of debris generated by on-site demolition activities resulting temporary increases in ambient noise levels. Although each haul truck would result in single noise events reaching up to 80 dBA at a distance of 50 feet (FHWA), fill material would be transported from the adjacent Planning Areas of 32, 28A, and 28B minimizing the need to utilize the roadway and thereby minimizing the potential to affected sensitive receptors along the roadway.

2. Consistency with Applicable Standards

City of Lake Elsinore General Plan

The City's General Plan does not contain any specific language pertaining to construction.

City of Lake Elsinore Municipal Code

Section 17.176.080 of the City of Lake Elsinore Municipal Code restricts construction which creates a noise disturbance across a residential or commercial real property line at night and on weekends or holidays. The code also sets a maximum allowed construction noise level of 75 dBA L_{max} in single-family residential areas between 7:00 AM and 7:00 PM. The code also sets a limit of 60 dBA L_{max} in those same areas to apply between the hours of 7:00 PM and 7:00 AM. The anticipated distances to the 60 and 75 dBA L_{max} project construction noise contours were calculated using RCNM. Without mitigation, sensitive receptors up to 150 feet from the property line could experience noise levels over 75 dBA L_{max}. Unmitigated noise levels could also reach 60 dBA L_{max} up to 890 feet from the property line. Construction noise levels at these receptors would exceed City of Lake Elsinore standards. If construction equipment is operated within 150 feet of a residential property line between the hours of 7:00 AM and 7:00 PM the daytime standard of 75 dBA L_{max} may be exceeded; and if construction equipment is operated within 890 feet of a residential property line between the hours of 7:00 PM and 7:00 AM the City's nighttime standard of 60 dBA L_{max} may be exceeded.

Project construction noise would be minimized with implementation of construction mitigation measures found in Section VII.

B. Traffic Noise Impacts to the Proposed Project

1. Traffic Noise Impacts to the Proposed Project

Buildout noise levels along Holland Road were modeled using SoundPLAN, which utilizes the algorithms found in the Federal Highway Administration's (FHWA) Traffic Noise Model. As shown on Figure 5, unmitigated future exterior noise levels in the back yards of single-family detached residential dwelling units that are adjacent to Holland Road are expected to reach up to 72.4 dBA Ldn and unmitigated future exterior noise levels at the façade of the proposed single-family detached residential dwelling units are expected to reach 69.3 dBA Ldn at the first floor and 71.5 dBA Ldn at second story receptors. Exterior noise levels at single-family detached residential dwelling units not adjacent to Holland Road would not exceed 65 dBA Ldn. Unmitigated buildout traffic noise levels for selected representative sensitive receptors along Holland Road are shown on Figures 5 and 6 and mitigated noise levels are shown on Figures 7 and 8.

2. Consistency with Applicable Standards

City of Lake Elsinore General Plan

Buildout traffic noise levels would exceed the City's 65 dBA Ldn threshold for exterior noise at sensitive receptors. Therefore, mitigation is required. Construction of a six-foot high barrier at the top of the slope as shown on Figures 7 and 8 would reduce noise these levels to below 65 dBA Ldn. The proposed barrier will not reduce exterior noise levels at the second story of single-family detached residential dwelling units adjacent to Holland Road to below 65 dBA Ldn and it is not aesthetically desirable or reasonable to construct a barrier high enough to do so. Therefore, enhanced building construction methods and materials must be employed to achieve acceptable interior noise levels. These methods are presented in Section VII of this report. Exterior noise levels with construction of a 6-foot barrier for selected representative sensitive receptors are shown on Figure 7 and noise level contours with construction of a barrier are shown on Figure 8.

C. Project Generated Traffic Noise Impacts to Sensitive Receptors

1. Off-Site Project Generated Traffic Noise Impacts

The FHWA Traffic Noise Prediction Model - FHWA-RD-77-108 was used to model Existing and Existing Plus Project noise levels were modeled for each roadway segment analyzed in the traffic study prepared for the proposed project (Kunzman Associates, Inc., 2014). Project generated increases in ambient noise levels along affected road segments were then calculated. Modeling output is included in this report as Appendix C.

The Existing traffic noise modeling resulted in noise levels ranging between 64.7 and 72.8 dBA Ldn at 50 feet from the centerline of the affected road segments; and the Existing Plus Project traffic noise model resulted in noise levels ranging from 66.6 to 72.9 dBA Ldn at 50 feet. The results of the Existing and Existing Plus Project noise models are shown in Table 7.

2. Consistency with Applicable Standards

California Environmental Quality Act - Substantial Increase

As can be seen in Table 7, in all cases, project generated vehicle noise would contribute less than 1 dBA Ldn to the ambient noise levels along affected road segments. This increase would not be noticeable. No mitigation is required.

D. Vibration Impacts

1. Project Generated Vibration

Table 2 shows the peak particle velocities of some common construction equipment and haul trucks (loaded trucks). The most vibration-causing piece of equipment that will likely be used on-site is the vibratory roller. This machine can cause vibration strong enough to annoy people over 100 feet away. Due to the proximity of adjacent single-family detached residential dwelling units, project construction activities may result in ground borne vibration that is annoying but would only occur during site grading and preparation activities. Construction vibration will not result in any structural damage.

Based on Caltrans data, haul trucks would not be anticipated to exceed 0.10 in/sec peak particle velocity (ppv) at 10 feet (Caltrans 2002). Predicted vibration levels at the nearest off-site structures, which are located in excess of 25 feet from the traveled roadway segments, would not be anticipated to exceed even the most conservative threshold of 0.2 inch/second ppv.

2. Consistency with Applicable Standards

The City of Lake Elsinore does not have standards or guidelines regarding ground-borne vibration. Vibration impacts will be reduced through implementation of construction mitigation measures provided in Section VII. Project construction will not result in any structural damage.

Table 6

Typical Construction Equipment Noise Levels[1]

Type of Equipment	Range of Maximum Sound Levels Measured (dBA at 50 ft.)	Suggested Maximum Sound Levels for Analysis (dBA at 50 ft.)
Rock Drills	83-99	96
Jack Hammers	75-85	82
Pneumatic Tools	78-88	85
Pumps	74-84	80
Dozers	77-90	85
Scrapers	83-91	87
Haul Trucks	83-94	88
Cranes	79-86	82
Portable Generators	71-87	80
Rollers	75-82	80
Tractors	77-82	80
Front-End Loaders	77-90	86
Hydraulic Backhoe	81-90	86
Hydraulic Excavators	81-90	86
Graders	79-89	86
Air Compressors	76-89	86
Trucks	81-87	86

[1] Source: Bolt, Beranek & Newman; Noise Control for Buildings and Manufacturing Plants, 1987.

Table 7

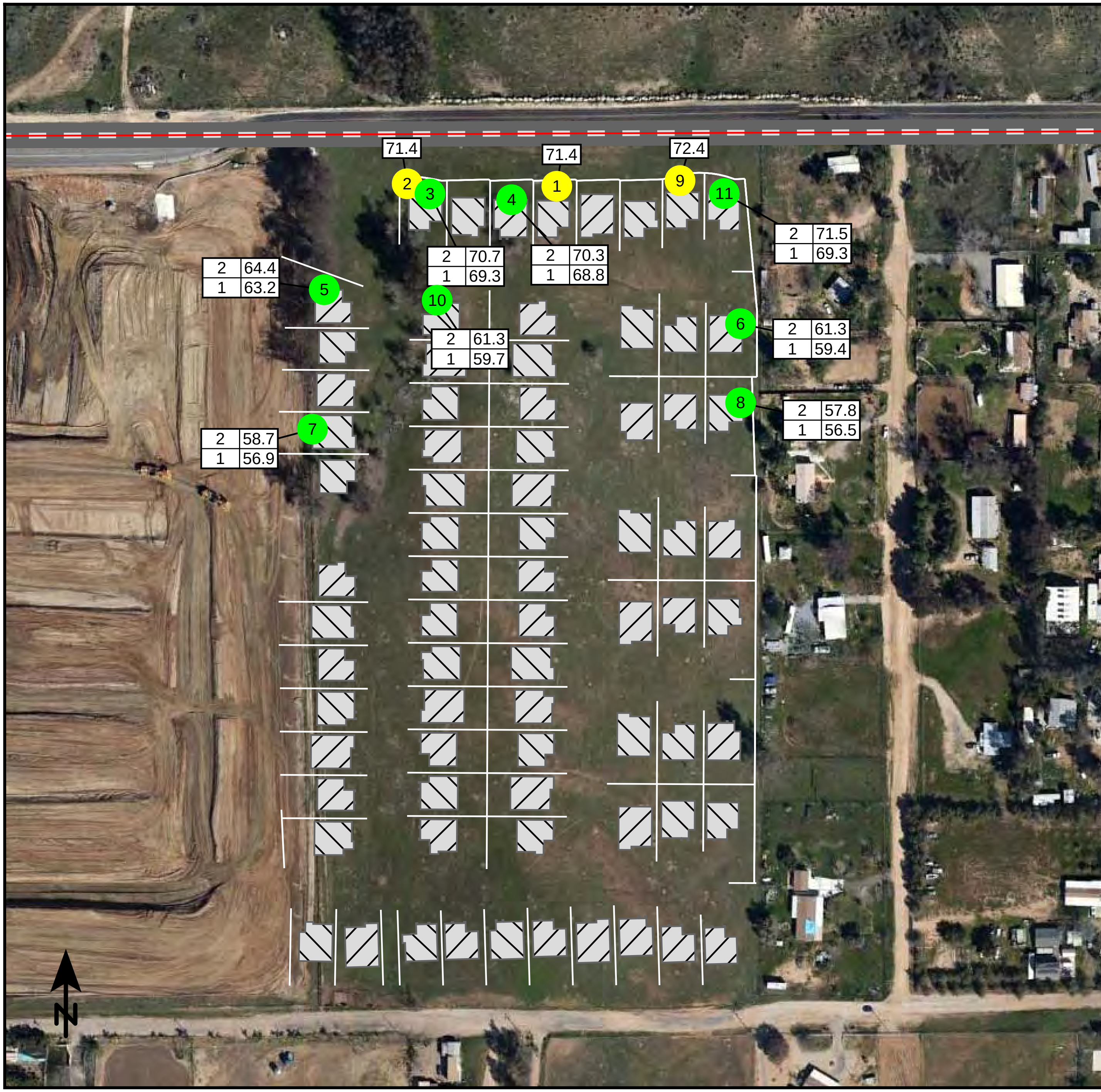
FHWA-RD-77-108 Traffic Noise Model Results[1]

Modeled Noise Levels (dBA CNEL)					
Roadway	Segment	Existing	Existing Plus Project	Increase	Substantial
Canyon Hills Road	Site to Murrieta Road	66.4	66.6	0.2	No
	Site to Railroad Canyon Road	64.7	64.9	0.2	No
Railroad Canyon Road	South of Canyon Hills Road	72.8	72.9	0.1	No
Murrieta Road	North of Canyon Hills Road	69.1	69.2	0.1	No
	South of Canyon Hills Road	67.9	67.9	0.0	No

[1] FHWA Spreadsheet Analysis (Summary of Appendix C)

Figure 5

Unmitigated Traffic Noise Levels (CNEL)



Signs and symbols

	Proposed Building
	Receiver
	Receiver at Building
	Roadway Emission Line
	Roadway Surface
3 59.3 51.8; 2 58.3 50.8; 1 57.3 49.8	CNEL by Floor

1 : 2667

0 12.5 25 50 75 100 m

Figure 6

Unmitigated Traffic Noise Level Contours (CNEL)

Signs and symbols

- Proposed Building
- Roadway Emission Line
- Roadway Surface

Levels in dB(A)

	<= 45
	45 - 50
	50 - 55
	55 - 60
	60 - 65
	65 - 70
	> 70

1 : 2667

0 12.5 25 50 75 100 m

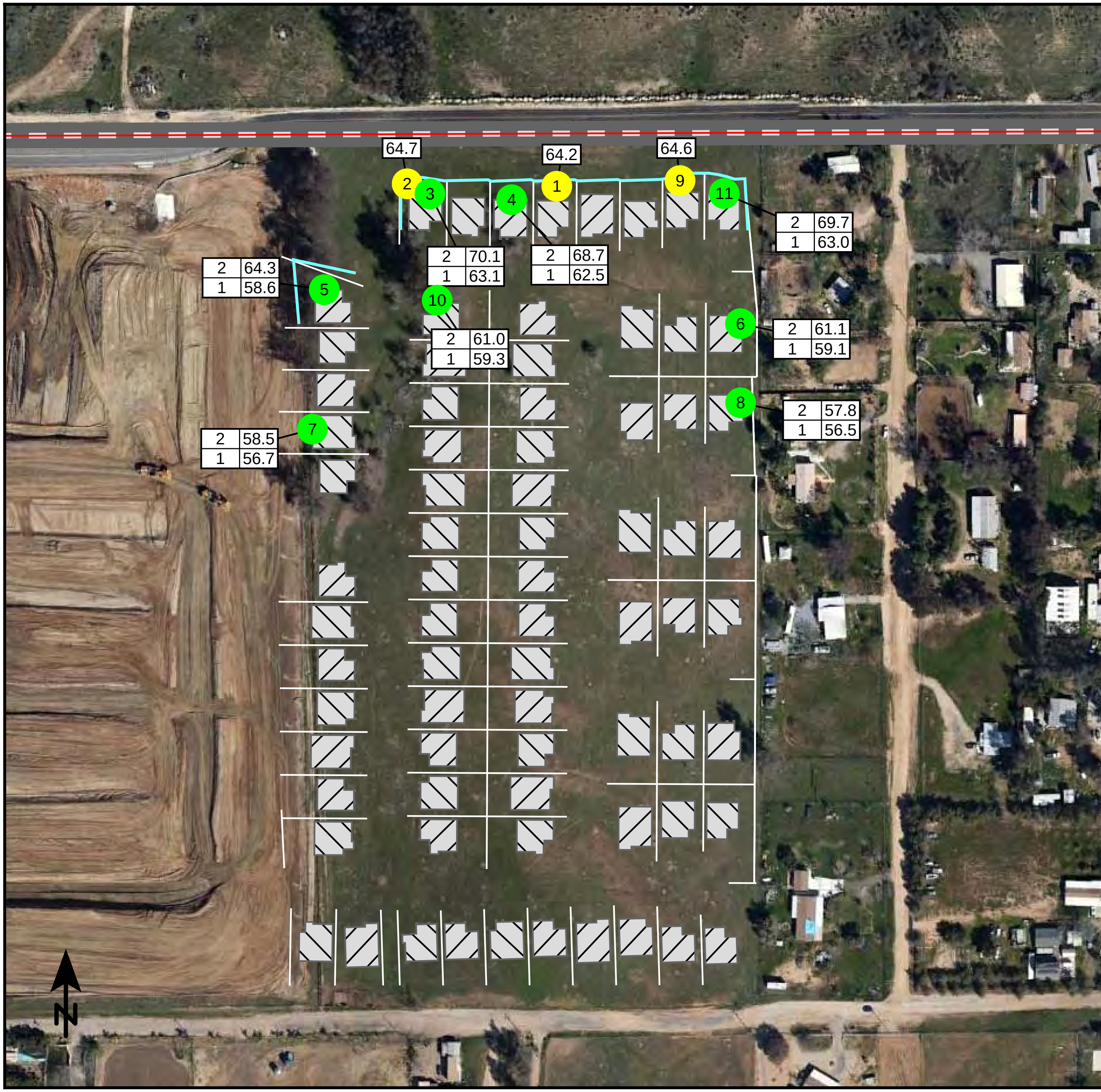


Figure 7

Mitigated Traffic Noise Levels (CNEL)

Signs and symbols

Proposed 6 ft Barrier

Proposed Building

Receiver

Receiver at Building

Roadway Emission Line

Roadway Surface

CNEL by Floor

1 : 2667

0 12.5 25 50 75 100 m

Note: The proposed barrier was modeled atop an approximately 6.5-9.5 foot high 2:1 slope, which acts as a berm to further shield noise levels.

Figure 8

Mitigated Traffic Noise Level Contours (CNEL)

Signs and symbols

- Proposed 6 ft Barrier
- Proposed Building
- Roadway Emission Line
- Roadway Surface

Levels in dB(A)

	<= 45
	45 - 50
	50 - 55
	55 - 60
	60 - 65
	65 - 70
	> 70

1 : 2667

0 12.5 25 50 75 100 m

Note: The proposed barrier was modeled atop an approximately 6.5-9.5 foot high 2:1 slope, which acts as a berm to further shield noise levels.

VIII. Mitigation Measures

A. Construction Measures

In addition to adherence to the City of Lake Elsinore Municipal Code limiting construction hours of operation, the following measures will minimize noise and vibration related impacts during demolition and construction activities.

8. During all project site excavation and grading on-site, construction contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers, consistent with manufacturer standards. The contractor shall place all stationary construction equipment so that emitted noise is directed away from the noise sensitive receptors nearest the project site.

9. The contractor shall locate equipment staging in areas that will create the greatest distance between construction-related noise/vibration sources and sensitive receptors nearest the project site during all project construction.

10. The project proponent shall mandate that the construction contractor prohibit the use of music or sound amplification on the project site during construction.

11. The construction contractor shall limit haul truck deliveries to the same hours specified for construction equipment.

12. When feasible, avoid the use of pavement breakers and vibratory rollers and packers near sensitive receptors.

13. Temporary noise barriers that provide at least 10 dBA in attenuation must be installed when project construction occurs within 150 feet of an existing residential property line. Any such barriers should break the line of sight from noise generators to sensitive receptors located immediately east of the project site. They should also be constructed as close to the sensitive receptor as possible to achieve the greatest attenuation effect and have no gaps or openings.

14. Because the City nighttime standard of 60 dBA Ldn would be exceeded at sensitive receptors up to 250 feet to the east, even with installation of temporary noise barriers, no construction should be performed at night (7:00 PM to 7:00 AM) Mondays through Fridays, and not at all on weekends or holidays.

B. Operational Noise Measures

3. Mitigation is required in order to achieve exterior noise levels of 65 dBA Ldn at several proposed sensitive receptors adjacent to Holland Road. This mitigation can be provided by constructing a six foot wall at the top of slope of the residential lots adjacent to Holland Road and at the northern and western top of slope of the northernmost lot

along the western site boundary. Barriers shall wrap around to protect the side yards of lots as shown on Figures 7 and 8.

4. As it is usually not aesthetically desirable to construct barriers high enough to reduce interior noise levels at second story sensitive receptors, enhanced building construction methods and materials must be employed. Single-family detached residential dwelling units adjacent to Holland Road will require approximately 25 dBA of exterior to interior noise reduction to achieve acceptable interior noise levels. The methods required to achieve this attenuation are shown as Mitigation Methods 1 through 6 in Table 8.

Table 8

Typical Noise Attenuation Methods to Insulate the Noise Receiver[1]

Noise Level Reduction	Typical Mitigation Methods
15-20 dBA	1. Air conditioning or mechanical ventilation. 2. Double-paned glass. 3. Solid core doors with weather stripping and seals.
20-25 dBA	*Mitigation 1, 2, and 3 plus* 4. Stucco or brick veneer exterior walls or wood siding w/one-half inch thick fiberboard underlayer. 5. Glass portions of windows/doors not to exceed 20 percent. 6. Exterior vents facing noise source shall be baffled.
25-30 dBA	*Mitigation 1 through 6 plus* 7. Interior sheetrock of exterior wall attached to studs by resilient channels or double walls. 8. Window assemblies, doors, wall construction materials, and insulation shall have a lab-tested STC rating of 30 or greater.

[1] Source: City of San Diego General Plan, March 2008

IX. References

Bolt, Baranek, and Newman

1971 Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances

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2003 Governor's Office of Planning and Research. State of California General Plan Guidelines, Appendix C, Guidelines for the Preparation and Content of the Noise Element of the General Plan. October.

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Harris, Cyril M.

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2014 Canyon Hills – Christensen Property Traffic Impact Analysis

Office of Planning and Research

2003 State of California General Plan Guidelines

Lake Elsinore, City of

2011 General Plan

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1994 Municipal Code – Chapter 17.176, Noise Control

Riverside, County of

2003 General Plan Circulation Element

2009 Requirements for determining and mitigating traffic noise impacts to residential structures. Department of Health – Office of Industrial Hygiene

Appendices

Appendix A –Noise Measurement Data Sheets

Appendix B – RCNM Noise Modeling Sheets

Appendix C – FHWA Traffic Noise Prediction Model - FHWA-RD-77-108 Output

APPENDIX A

Noise Measurement Data Sheets

Noise Measurement Data

Summary	Canyon Hills				
Filename	LxT_Data.141				
Serial Number	3099				
Model	SoundTrack LxT®				
Firmware Version	2.112				
User	Roma Stromberg				
Location	S of the site				
Start	02/04/2014 9:42:11				
Stop	02/04/2014 9:57:24				
Duration	0:15:13.8				
Run Time	0:15:08.0				
Pause	0:00:00.0				
Pre Calibration	02/04/2014 9:36:56				
Post Calibration	None				
Calibration Deviation	---				
Overall Settings					
RMS Weight	A Weighting				
Peak Weight	C Weighting				
Detector	Slow				
Preamp	PRMLxT1L				
Microphone Correction	Off				
Integration Method	Exponential				
Overload	0.0 dB				
Results					
LASeq	39.0 dB				
LASE	66.9 dB				
EAS	0.542 µPa²h				
EAS8	25.450 µPa²h				
EAS40	127.250 µPa²h				
LCpeak (max)	02/04/2014 9:55:50	92.9 dB			
LASmax	02/04/2014 9:52:34	47.0 dB			
LASmin	02/04/2014 9:54:41	33.6 dB			
SEA	-99.9 dB				
LCSeq	64.5 dB			**Statistics**	
LASeq	39.0 dB			**LAS1.67**	43.3 dB
LCSeq - LASeq	25.5 dB			**LAS8.33**	41.4 dB
LAIeq	42.1 dB			**LAS25.00**	39.8 dB
LAeq	39.0 dB			**LAS50.00**	38.3 dB
LAIeq - LAeq	3.1 dB			**LAS66.67**	37.5 dB
# Overloads	0			**LAS90.00**	35.9 dB
Overload Duration	0.0 s				

APPENDIX B

RCNM Noise Modeling Sheets

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 2/27/2014
Case Description: Canyon Hills Construction Noise

Receptor 1

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
50'	Residential	60	60	55

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Grader	No	40	85		50	0
Backhoe	No	40		77.6	100	0
Dozer	No	40		81.7	75	0
Excavator	No	40		80.7	125	0
Pickup Truck	No	40		75	50	0

Results

		Calculated (dBA)		
Equipment		*Lmax	Leq	Day Lmax
Grader		85	81	N/A
Backhoe		71.5	67.6	N/A
Dozer		78.1	74.2	N/A
Excavator		72.8	68.8	N/A
Pickup Truck		75	71	N/A
	Total	85	82.5	N/A

*Calculated Lmax is the Loudest value.

APPENDIX C

FHWA Traffic Noise Prediction Model
– FHWA-RD-77-108 Output

FHWA Sound32 Spreadsheet

Existing Traffic Noise

Project: **5590a**
Road: **Holland/Canyon Hills Road**
Segment: **Site to Railroad Canyon Road**

	DAYTIME			EVENING			NIGHTTIME				
	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	ADT	16300.00
										SPEED	40.00
										DISTANCE	45.00
INPUT PARAMETERS											
Vehicles per hour	499.87	6.11	2.38	92.37	0.27	0.27	69.41	6.11	2.38	% A	97.40
Speed in MPH	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00		
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00		
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	% MT	1.84
NOISE CALCULATIONS											
Reference levels	67.36	76.31	81.16	67.36	76.31	81.16	67.36	76.31	81.16	% HT	0.74
ADJUSTMENTS											
Flow	20.66	1.54	-2.57	13.33	-11.99	-11.99	12.09	1.54	-2.57		
Distance	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	LEFT	-90.00
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	RIGHT	90.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	CNEL	66.41
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	DAY LEQ	64.24
LEQ	63.41	53.24	53.98	56.08	39.71	44.56	54.84	53.24	53.98	Day hour	89.00
										Absorbtive?	no
	DAY LEQ	64.24		EVENING LEQ	56.46		NIGHT LEQ	58.84		Use hour?	no
										GRADE dB	0.00
	CNEL		66.41								

FHWA Sound32 Spreadsheet

Existing Plus Project Traffic Noise

Project: **5590a**
Road: **Holland/Canyon Hills Road**
Segment: **Site to Railroad Canyon Road**

	DAYTIME			EVENING			NIGHTTIME				
	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	ADT	16652.00
										SPEED	40.00
										DISTANCE	45.00
INPUT PARAMETERS											
Vehicles per hour	510.45	6.14	2.48	94.74	0.26	0.10	70.48	6.40	2.59	% A	97.39
Speed in MPH	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00		
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00		
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	% MT	1.84
NOISE CALCULATIONS											
Reference levels	67.36	76.31	81.16	67.36	76.31	81.16	67.36	76.31	81.16	% HT	0.75
ADJUSTMENTS											
Flow	20.75	1.55	-2.38	13.44	-12.25	-16.18	12.15	1.73	-2.20		
Distance	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	LEFT	-90.00
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	RIGHT	90.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	CNEL	66.56
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	DAY LEQ	64.33
LEQ	63.50	53.25	54.17	56.19	39.45	40.37	54.90	53.43	54.35	Day hour	89.00
										Absorbtive?	no
	DAY LEQ	64.33		EVENING LEQ	56.39		NIGHT LEQ	59.04		Use hour?	no
										GRADE dB	0.00
	CNEL		66.56								

FHWA Sound32 Spreadsheet

Existing Traffic Noise

Project: **5590a**
Road: **Holland/Canyon Hills Road**
Segment: **Site to Murrieta Road**

	DAYTIME			EVENING			NIGHTTIME				
	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	ADT	4300.00
										SPEED	40.00
										DISTANCE	45.00
INPUT PARAMETERS											
Vehicles per hour	124.52	2.58	4.30	23.11	0.11	0.18	17.20	2.69	4.48	% A	92.00
Speed in MPH	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00		
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00		
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	% MT	3.00
NOISE CALCULATIONS											
Reference levels	67.36	76.31	81.16	67.36	76.31	81.16	67.36	76.31	81.16	% HT	5.00
ADJUSTMENTS											
Flow	14.63	-2.21	0.01	7.31	-16.01	-13.79	6.03	-2.03	0.19		
Distance	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	LEFT	-90.00
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	RIGHT	90.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	CNEL	64.76
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	DAY LEQ	60.36
LEQ	57.37	49.49	56.56	50.06	35.69	42.75	48.78	49.67	56.73	Day hour	89.00
										Absorbtive?	no
	DAY LEQ	60.36		EVENING LEQ	50.93		NIGHT LEQ	58.06		Use hour?	no
										GRADE dB	0.00
	CNEL		64.76								

FHWA Sound32 Spreadsheet

Existing Plus Project Traffic Noise

Project: **5590a**
Road: **Holland/Canyon Hills Road**
Segment: **Site to Murrieta Road**

	DAYTIME			EVENING			NIGHTTIME				
	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	ADT	4652.00
										SPEED	40.00
										DISTANCE	45.00
INPUT PARAMETERS											
Vehicles per hour	135.26	2.72	4.37	25.10	0.11	0.18	18.68	2.83	4.55	% A	92.38
Speed in MPH	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00		
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00		
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	% MT	2.92
NOISE CALCULATIONS											
Reference levels	67.36	76.31	81.16	67.36	76.31	81.16	67.36	76.31	81.16	% HT	4.70
ADJUSTMENTS											
Flow	14.99	-1.98	0.08	7.67	-15.78	-13.72	6.39	-1.80	0.26		
Distance	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	LEFT	-90.00
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	RIGHT	90.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	CNEL	64.91
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	DAY LEQ	60.60
LEQ	57.73	49.72	56.63	50.42	35.92	42.82	49.13	49.90	56.80	Day hour	89.00
										Absorbtive?	no
	DAY LEQ	60.60		EVENING LEQ	51.24		NIGHT LEQ	58.19		Use hour?	no
										GRADE dB	0.00
	CNEL		64.91								

FHWA Sound32 Spreadsheet

Existing Traffic Noise

Project: **5590a**
Road: **Railroad Canyon Road**
Segment: **South of Canyon Hills Road**

	DAYTIME			EVENING			NIGHTTIME		
	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS
INPUT PARAMETERS									
Vehicles per hour	891.92	18.48	30.80	165.55	0.77	1.28	123.20	19.25	32.08
Speed in MPH	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
NOISE CALCULATIONS									
Reference levels	67.36	76.31	81.16	67.36	76.31	81.16	67.36	76.31	81.16
ADJUSTMENTS									
Flow	23.18	6.34	8.56	15.86	-7.46	-5.24	14.58	6.52	8.74
Distance	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00
LEQ	65.47	57.58	64.65	58.15	43.78	50.85	56.87	57.76	64.83

DAY LEQ	68.46	EVENING LEQ	59.03	NIGHT LEQ	66.15
CNEL	72.85				

ADT	30800.00
SPEED	40.00
DISTANCE	50.00
% A	92.00
% MT	3.00
% HT	5.00
LEFT	-90.00
RIGHT	90.00
CNEL	72.85
DAY LEQ	68.46
Day hour	89.00
Absorbtive?	no
Use hour?	no
GRADE dB	0.00

FHWA Sound32 Spreadsheet

Existing Plus Project Traffic Noise

Project: **5590a**
Road: **Railroad Canyon Road**
Segment: **South of Canyon Hills Road**

	DAYTIME			EVENING			NIGHTTIME				
	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	ADT	31152.00
										SPEED	40.00
										DISTANCE	50.00
INPUT PARAMETERS											
Vehicles per hour	902.62	18.62	30.87	167.52	0.78	1.29	124.63	19.40	32.16	% A	92.06
Speed in MPH	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00		
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00		
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	% MT	2.99
NOISE CALCULATIONS											
Reference levels	67.36	76.31	81.16	67.36	76.31	81.16	67.36	76.31	81.16	% HT	4.95
ADJUSTMENTS											
Flow	23.23	6.37	8.57	15.91	-7.43	-5.23	14.63	6.55	8.75		
Distance	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	LEFT	-90.00
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	RIGHT	90.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	CNEL	72.87
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	DAY LEQ	68.49
LEQ	65.52	57.62	64.66	58.20	43.81	50.86	56.92	57.79	64.84	Day hour	89.00
										Absorbtive?	no
	DAY LEQ	68.49		EVENING LEQ	59.07		NIGHT LEQ	66.17		Use hour?	no
										GRADE dB	0.00
	CNEL		72.87								

FHWA Sound32 Spreadsheet

Existing Traffic Noise

Project: **5590a**
Road: **Murrieta Road**
Segment: **North of Holand Road**

	DAYTIME			EVENING			NIGHTTIME				
	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	ADT	10400.00
										SPEED	40.00
										DISTANCE	40.00
INPUT PARAMETERS											
Vehicles per hour	301.17	6.24	10.40	55.90	0.26	0.43	41.60	6.50	10.83	% A	92.00
Speed in MPH	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00		
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00		
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	% MT	3.00
NOISE CALCULATIONS											
Reference levels	67.36	76.31	81.16	67.36	76.31	81.16	67.36	76.31	81.16	% HT	5.00
ADJUSTMENTS											
Flow	18.46	1.63	3.84	11.15	-12.18	-9.96	9.86	1.80	4.02		
Distance	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	LEFT	-90.00
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	RIGHT	90.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	CNEL	69.10
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	DAY LEQ	64.71
LEQ	61.72	53.84	60.90	54.41	40.04	47.10	53.12	54.01	61.08	Day hour	89.00
										Absorbtive?	no
	DAY LEQ	64.71		EVENING LEQ	55.28		NIGHT LEQ	62.40		Use hour?	no
										GRADE dB	0.00
	CNEL		69.10								

FHWA Sound32 Spreadsheet

Existing Plus Project Traffic Noise

Project: **5590a**
Road: **Murrieta Road**
Segment: **North of Holand Road**

	DAYTIME			EVENING			NIGHTTIME				
	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS		
										ADT	10646.00
										SPEED	40.00
										DISTANCE	40.00
INPUT PARAMETERS											
Vehicles per hour	308.66	6.34	10.45	57.29	0.26	0.44	42.62	6.60	10.88	% A	92.12
Speed in MPH	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00		
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00		
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	% MT	2.98
NOISE CALCULATIONS											
Reference levels	67.36	76.31	81.16	67.36	76.31	81.16	67.36	76.31	81.16	% HT	4.91
ADJUSTMENTS											
Flow	18.57	1.69	3.86	11.25	-12.11	-9.94	9.97	1.87	4.04		
Distance	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	LEFT	-90.00
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	RIGHT	90.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	CNEL	69.15
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	DAY LEQ	64.78
LEQ	61.83	53.91	60.92	54.51	40.10	47.12	53.23	54.08	61.10	Day hour	89.00
										Absorbtive?	no
	DAY LEQ	64.78		EVENING LEQ	55.37		NIGHT LEQ	62.44		Use hour?	no
										GRADE dB	0.00
	CNEL		69.15								

FHWA Sound32 Spreadsheet

Existing Traffic Noise

Project: **5590a**
Road: **Murrieta Road**
Segment: **South of Holand Road**

	DAYTIME AUTOS	DAYTIME M.TRUCKS	DAYTIME H.TRUCKS	EVENING AUTOS	EVENING M.TRUCKS	EVENING H.TRUCKS	NIGHTTIME AUTOS	NIGHTTIME M.TRUCKS	NIGHTTIME H.TRUCKS
INPUT PARAMETERS									
Vehicles per hour	225.88	4.68	7.80	41.93	0.20	0.33	31.20	4.88	8.13
Speed in MPH	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
NOISE CALCULATIONS									
Reference levels	67.36	76.31	81.16	67.36	76.31	81.16	67.36	76.31	81.16
ADJUSTMENTS									
Flow	17.21	0.38	2.59	9.90	-13.43	-11.21	8.62	0.55	2.77
Distance	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00
LEQ	60.47	52.59	59.65	53.16	38.79	45.85	51.87	52.77	59.83

DAY LEQ	63.46	EVENING LEQ	54.03
NIGHT LEQ	61.16		
CNEL	67.85		

ADT	7800.00
SPEED	40.00
DISTANCE	40.00
% A	92.00
% MT	3.00
% HT	5.00
LEFT	-90.00
RIGHT	90.00
CNEL	67.85
DAY LEQ	63.46
Day hour	89.00
Absorbtive?	no
Use hour?	no
GRADE dB	0.00

FHWA Sound32 Spreadsheet

Existing Plus Project Traffic Noise

Project: **5590a**
Road: **Murrieta Road**
Segment: **South of Holand Road**

	DAYTIME			EVENING			NIGHTTIME				
	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	ADT	7906.00
										SPEED	40.00
										DISTANCE	40.00
INPUT PARAMETERS											
Vehicles per hour	229.10	4.72	7.82	42.52	0.20	0.33	31.63	4.92	8.15	% A	92.07
Speed in MPH	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00		
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00		
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	% MT	2.99
NOISE CALCULATIONS											
Reference levels	67.36	76.31	81.16	67.36	76.31	81.16	67.36	76.31	81.16	% HT	4.95
ADJUSTMENTS											
Flow	17.27	0.42	2.61	9.96	-13.39	-11.20	8.67	0.59	2.78		
Distance	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	LEFT	-90.00
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	RIGHT	90.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	CNEL	67.88
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	DAY LEQ	63.50
LEQ	60.53	52.63	59.66	53.22	38.82	45.86	51.93	52.80	59.84	Day hour	89.00
										Absorbtive?	no
	DAY LEQ	63.50		EVENING LEQ	54.08		NIGHT LEQ	61.18		Use hour?	no
										GRADE dB	0.00
	CNEL		67.88								

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Appendix G
Traffic Impact Analysis

KUNZMAN ASSOCIATES, INC.

CANYON HILLS - CHRISTENSEN PROPERTY

TRAFFIC IMPACT ANALYSIS (REVISED)

February 2, 2015

Traffic Engineering | Transportation Planning | Parking | Noise/Vibration | Expert Witness
Air Quality | Global Climate Change | Health Risk Assessment

KUNZMAN ASSOCIATES, INC.

CANYON HILLS – CHRISTENSEN PROPERTY

TRAFFIC IMPACT ANALYSIS (REVISED)

February 2, 2015

Prepared by:

Perrie Ilercil, P.E.
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William Kunzman

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5590c

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I. Executive Summary

This section summarizes the existing traffic conditions, project traffic impacts, and the proposed mitigation measures. Although this is a technical report, every effort has been made to write the report clearly and concisely. To assist the reader with those terms unique to transportation engineering, a glossary of terms is provided in Appendix A.

A. Project Description

This report contains the traffic impact analysis for the proposed Canyon Hills – Christensen Property. The project site is located on the south side of Holland Road and east of Hermosa Drive which is approximately 2.8 miles east of Railroad Canyon Road in the City of Lake Elsinore. The project is proposed to be developed with 74 single-family detached residential dwelling units.

B. Definition of Deficiency and Significant Impact

The following definitions of deficiencies and significant impacts have been developed in accordance with the City of Lake Elsinore requirements:

The definition of an intersection deficiency has been obtained from the City of Lake Elsinore General Plan. The General Plan states that peak hour intersection operations of Level of Service D or better are generally acceptable. Therefore, any intersection operating at Level of Service E to F will be considered deficient

C. Existing Traffic Conditions

1. The project site is currently undeveloped and is not generating significant trips.

2. The existing roadway adjacent to the project is Holland Road.

3. The study area intersections currently operate at acceptable Levels of Service during the peak hours for existing traffic conditions, except for the following study area intersection that currently operates at an unacceptable Level of Service during the morning peak hour:

   Murrieta Road (NS) at:
   Holland Road (EW) - #3

4. A traffic signal appears to currently be warranted for existing traffic conditions at the following study area intersection in the City of Menifee (see Appendix E):

   Murrieta Road (NS) at:
   Holland Road (EW) - #3

The unsignalized intersection has been evaluated for a traffic signal using the California Department of Transportation Warrant 3 Peak Hour traffic signal warrant analysis, as specified in the California Manual of Uniform Traffic Control Devices (January 2012).

D. Traffic Impacts

1. The proposed development is projected to generate approximately 704 daily vehicle trips, 55 of which will occur during the morning peak hour and 74 of which will occur during the evening peak hour.

2. For Existing Plus Project traffic conditions, the study area intersections are projected to operate at acceptable Levels of Service during the peak hours, except for the following study area intersection that is projected to operate at an unacceptable Level of Service during the morning peak hour, without improvements:

   Murrieta Road (NS) at:
   Holland Road (EW) - #3

   The study area intersections are projected to operate within acceptable Levels of Service during the peak hours, with improvements.

3. Based upon discussions with Cities of Lake Elsinore and Menifee staff, the Canyon Hills, Audie Murphy Ranch, Calder Ranch, and Sycamore at Hidden Hills areas which are currently not built out were included as other development.

4. For Opening Year (2016) Without Project traffic conditions, the study area intersections are projected to operate at acceptable Levels of Service during the peak hours, except for the following study area intersection that is projected to operate at unacceptable Levels of Service during the peak hours, without improvements:

   Murrieta Road (NS) at:
   Holland Road (EW) - #3

5. For Opening Year (2016) With Project traffic conditions, the study area intersections are projected to operate at acceptable Levels of Service during the peak hours, except for the following study area intersection that is projected to operate at unacceptable Levels of Service during the peak hours, without improvements:

   Murrieta Road (NS) at:
   Holland Road (EW) - #3

   The study area intersections are projected to operate within acceptable Levels of Service during the peak hours, with improvements.

E. Roadway Improvements

The following measures are recommended to mitigate the impact of the project on traffic circulation:

On-Site

1. Site-specific circulation and access recommendations are depicted on Figure 31.

2. Construct Holland Road from the west project boundary to the east project boundary at its ultimate half-section width including landscaping and parkway improvements in conjunction with development, as necessary.

3. Construct Corson Avenue from the west project boundary to the east project boundary at its ultimate half-section width including landscaping and parkway improvements in conjunction with development, as necessary, or pay cash in lieu for improvements as approved by the City Engineer.

4. On-site traffic signing and striping should be implemented in conjunction with detailed construction plans for the project.

5. Sight distance at project accesses should be reviewed with respect to California Department of Transportation/City of Lake Elsinore standards in conjunction with the preparation of final grading, landscaping, and street improvement plans. The final grading, landscaping, and street improvement plans shall demonstrate that sight distance standards are met. Such plans must be reviewed by the City and approved as consistent with this measure prior to issue of grading permits.

Off-Site

1. The project does not contribute enough trips to the adjacent street to require it to be upgraded from the proposed local street classification. As shown on Figure 26, the average daily traffic volumes on Hermosa Drive with the project and other development contributions (see Figure 19) is 1,190 vehicles per day. This in below the 1,600 vehicle per day threshold for a local street classification.

2. As is the case for any roadway design, the City of Lake Elsinore should periodically review traffic operations in the vicinity of the project once the project is constructed to assure that the traffic operations are satisfactory.

3. The project should participate in the phased construction of the off-site intersection improvements and traffic signalization through payment of established City of Lake Elsinore fees, participation in the Western Riverside Transportation Uniform Mitigation Fees program, assessment district, community facilities district financing and/or appropriate fair share financing agreement, and construction of off-site facilities under appropriate fee credit agreements.

II. Congestion Management Program Methodology

This section discusses the Congestion Management Plan. The purpose, prescribed methodology, and definition of a significant traffic impact are discussed.

A. Congestion Management Plan

The Congestion Management Plan is a result of Proposition 111 which was a statewide initiative approved by the voters in June, 1990. The proposition allowed for a nine cent per gallon state gasoline tax increase over a five year period.

Proposition 111 explicitly stated that the new gas tax revenues were to be used to fix existing traffic problems and was not to be used to promote future development. For a City to get its share of the Proposition 111 gas tax, it has to follow certain procedures specified by the State Legislature. The legislation requires that a traffic impact analysis be prepared for new development. The traffic impact analysis is prepared to monitor and fix traffic problems caused by new development.

The Legislature requires that adjacent jurisdictions use a standard methodology for conducting a traffic impact analysis. To assure that adjacent jurisdictions use a standard methodology in preparing a traffic impact analysis, one common procedure is that all Cities within a County, and the County agency itself, adopt and use one standard methodology for conducting a traffic impact analysis.

Although each City has developed standards for preparing a traffic impact analysis, traffic impact analysis requirements do vary in detail from one City to another, but not in overall intent or concept. The general approach selected by each City for conducting a traffic impact analysis has common elements.

The general approach for conducting a traffic impact analysis is that existing peak hour traffic is counted and the percent of roadway capacity currently being used is determined. Then growth in traffic is accounted for and added to existing traffic and the percent of roadway capacity used is again determined. The project traffic is then added and the percent of roadway capacity used is again determined. If the new project adds traffic to an overcrowded facility, then the new project has to mitigate the traffic impact so that the facility operates at a level that is no worse than before the project traffic was added.

If the project size is below a certain minimum threshold level, then a project does not have to have a traffic impact analysis prepared, once it is shown or agreed that the project is below the minimum threshold.

If a project is bigger than the minimum threshold size, then a traffic impact analysis is required.

B. <u>Prescribed Methodology for a Traffic Impact Analysis</u>

The traffic impact analysis must include all monitored intersections to which the project adds traffic above a certain minimum amount.

In the City of Lake Elsinore, the minimum project added trips that is needed before an intersection has to be studied is 50 or more peak hour trips.

The City of Lake Elsinore allows Level of Service D to be used as a maximum acceptable threshold for the study area intersections.

The technique used to assess the capacity needs of an intersection is known as the Intersection Delay Method (see Appendix D) based on the <u>Highway Capacity Manual</u>. To calculate delay, the volume of traffic using the intersection is compared with the capacity of the intersection. Signalized intersections are considered deficient (Level of Service F) if the overall intersection critical volume to capacity ratio equals or exceeds 1.0, even if the level of service defined by the delay value is below the defined Level of Service standard. The Volume to Capacity ratio is defined as the critical volumes divided by the intersection capacity. A Volume to Capacity ratio greater than 1.0 implies an infinite queue.

The Level of Service analysis for signalized intersections has been performed using optimized signal timing. This analysis has included an assumed lost time of three seconds per phase. Signal timing optimization has considered pedestrian safety and signal coordination requirements. Appropriate time for pedestrian crossings has also been considered in the signalized intersection analysis.

Project trips are generated using rates and procedures contained in the Institute of Transportation Engineers, <u>Trip Generation</u>, 9th Edition, 2012.

This traffic analysis has been prepared in accordance with the traffic impact analysis requirements.

The project generated trips were added to the study area intersections, and a full intersection analysis was conducted, even when the project added trips failed to meet the minimum thresholds that require an intersection analysis.

C. <u>Mitigation Measures</u>

If a project is large enough to require that a traffic impact analysis be prepared, and if the project adds traffic to an intersection above a minimum threshold, and if the intersection is operating at above an acceptable level of operation, then the project must mitigate its traffic impact.

Traffic mitigation can be in many forms including adding lanes. Lanes can sometimes be obtained through restriping or elimination of parking, and sometimes require spot roadway widening.

III. Project Description

This section discusses the project's location and proposed development. Figure 1 shows the project location and Figure 2 illustrates the site plan.

A. Location

The project site is located on the south side of Holland Road and east of Hermosa Drive which is approximately 2.8 miles east of Railroad Canyon Road in the City of Lake Elsinore.

B. Proposed Development

The proposed land use for the project site consists of 74 single-family detached residential dwelling units. The proposed project will have access to Holland Road via Hermosa Drive, Elina Road and Obaria Way through the adjacent Canyon Hills Planning Area 32. Hermosa Drive, Elina Road and Obaria Way are proposed roadways to be utilized by the Canyon Hills Planning Area 32 project and are currently under construction.

C. Site Plan

Figure 2 illustrates the site plan.

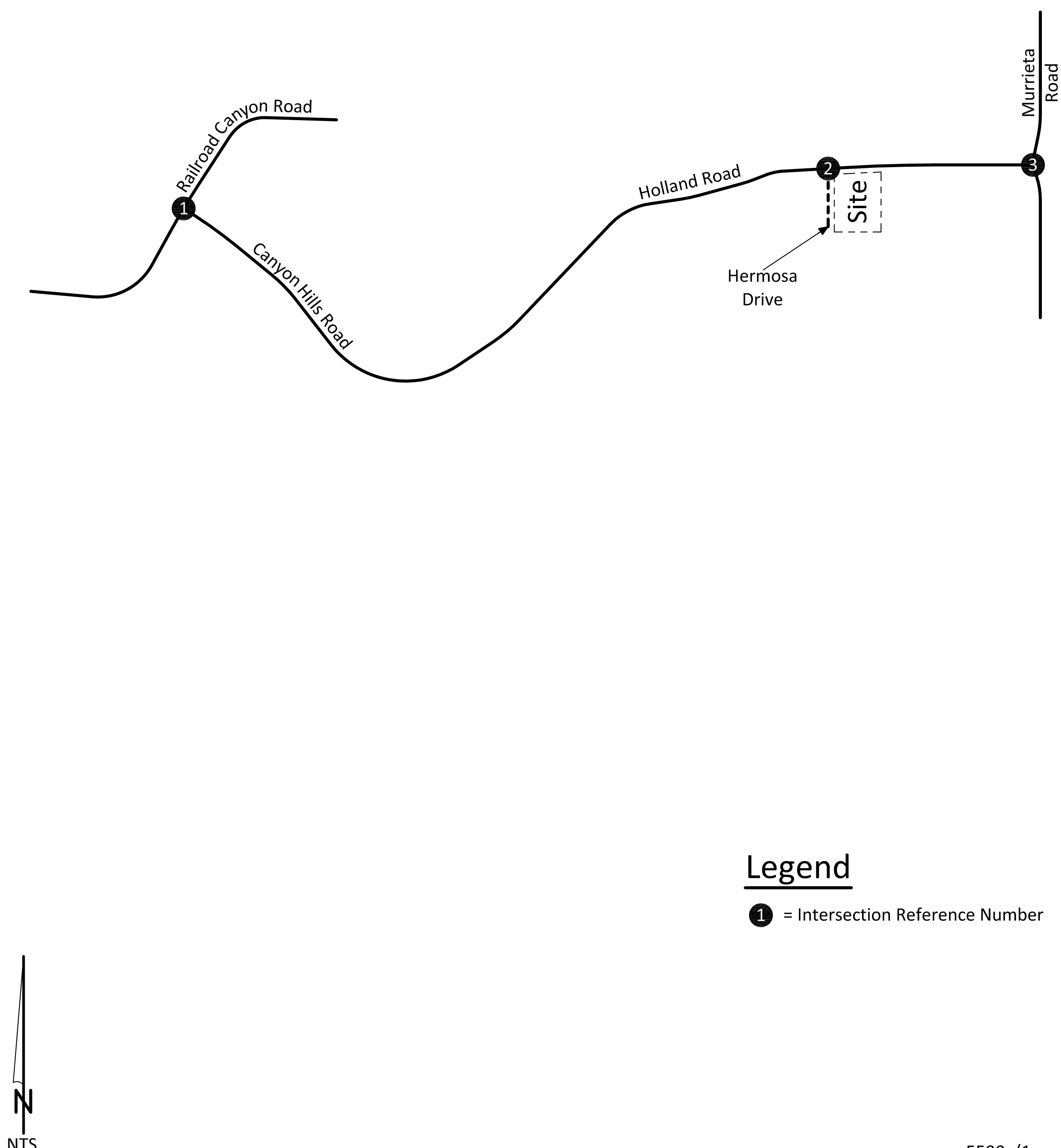
The following describes the proposed land use from a traffic engineering viewpoint:

Single-Family Detached Residential. The primary market for these units will be families with children. As a result, peak traffic volumes will occur during home-to-work and work-to-home trips. Child-related trips such as home-to-school or home-to-Little League are also a significant factor in the daily trip generation, but they have a smaller influence on peak hour volumes.

D. Phasing and Timing

The proposed project is anticipated for opening in Year 2016 and is proposed to be built in one phase. With completion of the adjacent developments, Hermosa Drive will provide access to Holland Road, approximately 2.8 miles east of Railroad Canyon Road by the project opening year. Project access to Hermosa Drive is dependent upon completion of the adjacent Canyon Hills Planning Area 32 to the west of the project site. This traffic impact analysis is based upon 2 years of background traffic growth (2014-2016).

Figure 1
Project Location Map



5590c/1

Figure 2
Site Plan

5590c/2

IV. Existing Traffic Conditions

Traffic conditions as they exist today are discussed below and illustrated on Figures 3 to 8.

A. Study Area

Appendix B includes the scoping agreement with City of Lake Elsinore staff. The study area includes the following intersections:

Railroad Canyon Road (NS) at:
Canyon Hills Road (EW) - #1

Hermosa Drive (NS) at:
Holland Road (EW) - #2

Murrieta Road (NS) at:
Holland Road (EW) - #3

B. Surrounding Street System

Existing roadways within the study area include Railroad Canyon Road, Murrieta Road, and Canyon Hills Road/Holland Road.

Railroad Canyon Road: This north-south six-lane divided roadway is classified as an Urban Arterial (120 foot right-of-way) on the City of Lake Elsinore General Plan Circulation Element. It currently carries approximately 28,000 to 30,800 vehicles per day in the study area.

Murrieta Road: This north-south two-lane undivided roadway is classified as an Arterial on the City of Menifee General Plan Circulation Element. It currently carries approximately 7,800 to 10,400 vehicles per day in the study area.

Canyon Hills Road/Holland Road: This east-west two-lane undivided to four-lane divided roadway is classified as a Major Roadway (100 foot right-of-way) on the City of Lake Elsinore General Plan Circulation Element. It currently carries approximately 4,300 to 16,300 vehicles per day in the study area.

C. Existing Travel Lanes and Intersection Controls

Figure 3 identifies the existing roadway conditions for study area roadways. The number of through lanes for existing roadways and the existing intersection controls are identified.

D. Existing Average Daily Traffic Volumes

Figure 4 depicts the existing average daily traffic volumes. The existing average daily traffic volumes have been factored from peak hour counts (see Appendix C) made for Kunzman Associates, Inc. in February 2014 using the following formula for each intersection leg:

PM Peak Hour (Approach Volume + Exit Volume) x 12 = Leg Volume.

This is a conservative estimate and may over estimate the average daily traffic volumes.

E. Existing Intersection Delay

The technique used to assess the capacity needs of an intersection is known as the Intersection Delay Method (see Appendix D). To calculate delay, the volume of traffic using the intersection is compared with the capacity of the intersection.

The existing delay and Level of Service for intersections in the vicinity of the project are shown in Table 1. Existing delay is based upon manual weekday morning and evening peak hour counts made for Kunzman Associates, Inc. in February 2014 (see Figures 5 and 6). Traffic count worksheets are provided in Appendix C.

There are two peak hours in a weekday. The morning peak hour is between 7 AM and 9 AM, and the evening peak hour is between 4 PM and 6 PM. The actual peak hour within the two hour interval is the four consecutive 15 minute periods with the highest total volume when all movements are added together. Explicit peak hour factors have been calculated using the data collected for this project

The study area intersections currently operate at acceptable Levels of Service during the peak hours for existing traffic conditions, except for the following study area intersection that is projected to operate at an unacceptable Level of Service during the morning peak hour, without improvements:

Murrieta Road (NS) at:
Holland Road (EW) - #3

Existing delay worksheets are provided in Appendix D.

It should be noted that the Murrieta Road and Holland Road intersection is in the City of Menifee. This intersection is listed as an "Enhanced Intersection location that may require additional lanes and/or right-of-way in order to satisfy the City of Menifee peak hour intersection LOS criteria" per the City of Menifee General Plan.

F. Existing Traffic Signal Warrant Analysis

A traffic signal appears to currently be warranted for existing traffic conditions at the following study area intersection in the City of Menifee (see Appendix E):

Murrieta Road (NS) at:
Holland Road (EW) - #3

The unsignalized intersection has been evaluated for a traffic signal using the California Department of Transportation Warrant 3 Peak Hour traffic signal warrant analysis, as specified in the California Manual of Uniform Traffic Control Devices (January 2012).

G. Existing City of Lake Elsinore Circulation Plan

Figure 7 shows the current City of Lake Elsinore General Plan Circulation Element. Both existing and future roadways are included in the Circulation Element of the General Plan and are graphically depicted on Figure 7. This figure shows the nature and extent of arterial highways that are needed to adequately serve the ultimate development depicted by the land use element of the General Plan. The City of Lake Elsinore General Plan roadway cross-sections are illustrated on Figure 8.

H. Transit Service

The study area is currently served by the Riverside Transit Agency Route 40 along Railroad Canyon Road.

Table 1

Existing Intersection Delay and Level of Service

Intersection	Jurisdiction	Traffic Control[3]	Intersection Approach Lanes[1]												Peak Hour Delay-LOS[2]	
			Northbound			Southbound			Eastbound			Westbound				
			L	T	R	L	T	R	L	T	R	L	T	R	Morning	Evening
Railroad Canyon Road (NS) at: Canyon Hills Road (EW) - #1	Lake Elsinore	TS	1	3	1 >	1	3	1	1	0.5	0.5	1.5	1	0.5	28.2-C	23.3-C
Murrieta Road (NS) at: Holland Road (EW) - #3	Menifee	CSS	0.5	0.5	0	0	0.5	0.5	0.5	0	0.5	0	0	0	99.9-F[4]	19.8-C

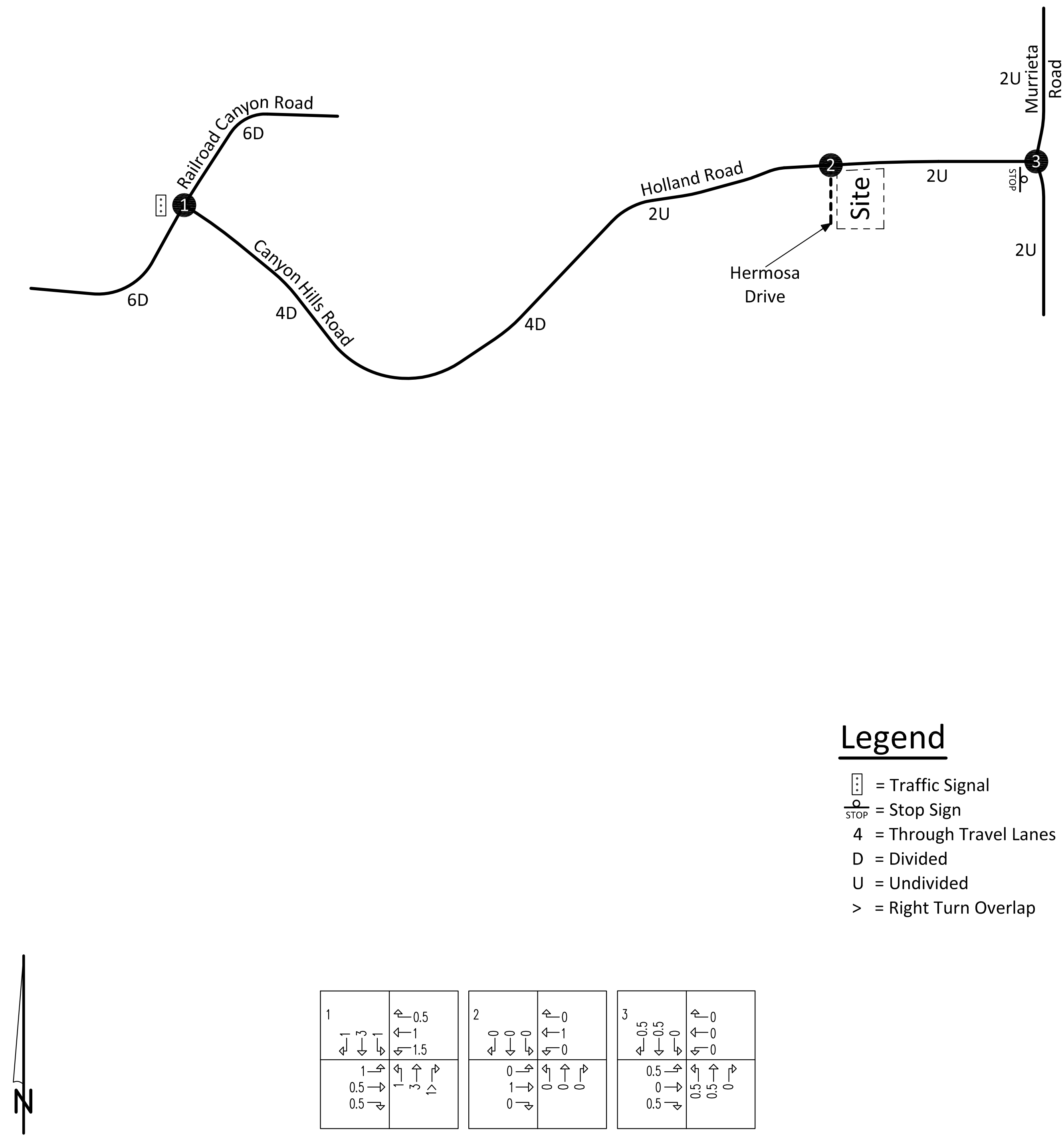
[1] When a right turn lane is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes. L = Left; T = Through; R = Right; > = Right Turn Overlap

[2] Delay and level of service has been calculated using the following analysis software: Traffix, Version 7.9.0215 (2008). Per the Highway Capacity Manual, overall average for intersection delay and level of service are shown for intersections with traffic signal or all way stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[3] TS = Traffic Signal; CSS = Cross Street Stop

[4] 99.9-F = Delay High, Intersection Unstable, Level of Service F.

Figure 3
Existing Through Travel Lanes and Intersection Controls

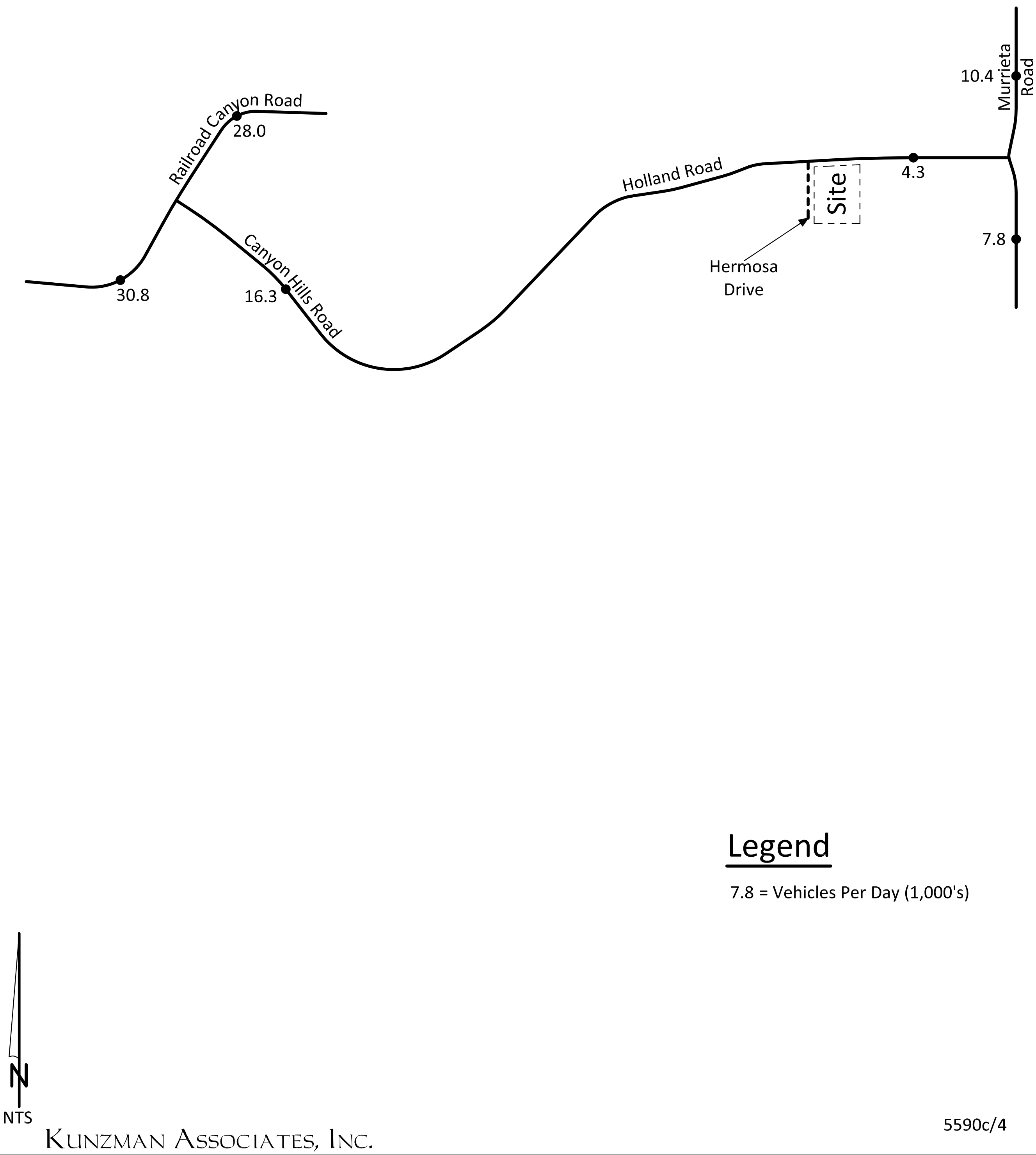


5590c/3

KUNZMAN ASSOCIATES, INC. Intersection reference numbers are in upper left corner of turning movement boxes.

OVER 35 YEARS OF EXCELLENT SERVICE

Figure 4
Existing Average Daily Traffic Volumes

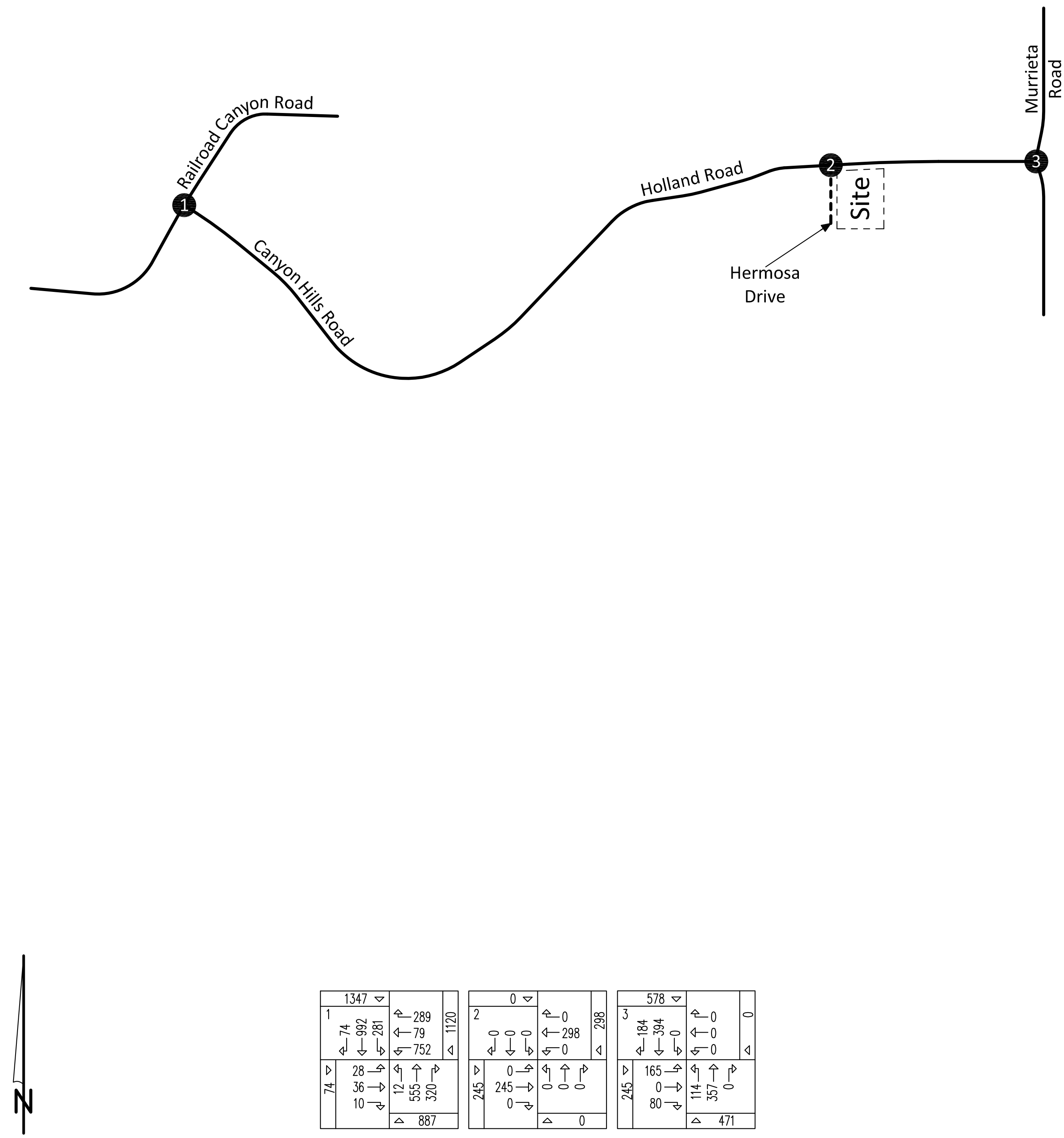


5590c/4

KUNZMAN ASSOCIATES, INC.

OVER 35 YEARS OF EXCELLENT SERVICE

Figure 5
Existing Morning Peak Hour Intersection Turning Movement Volumes

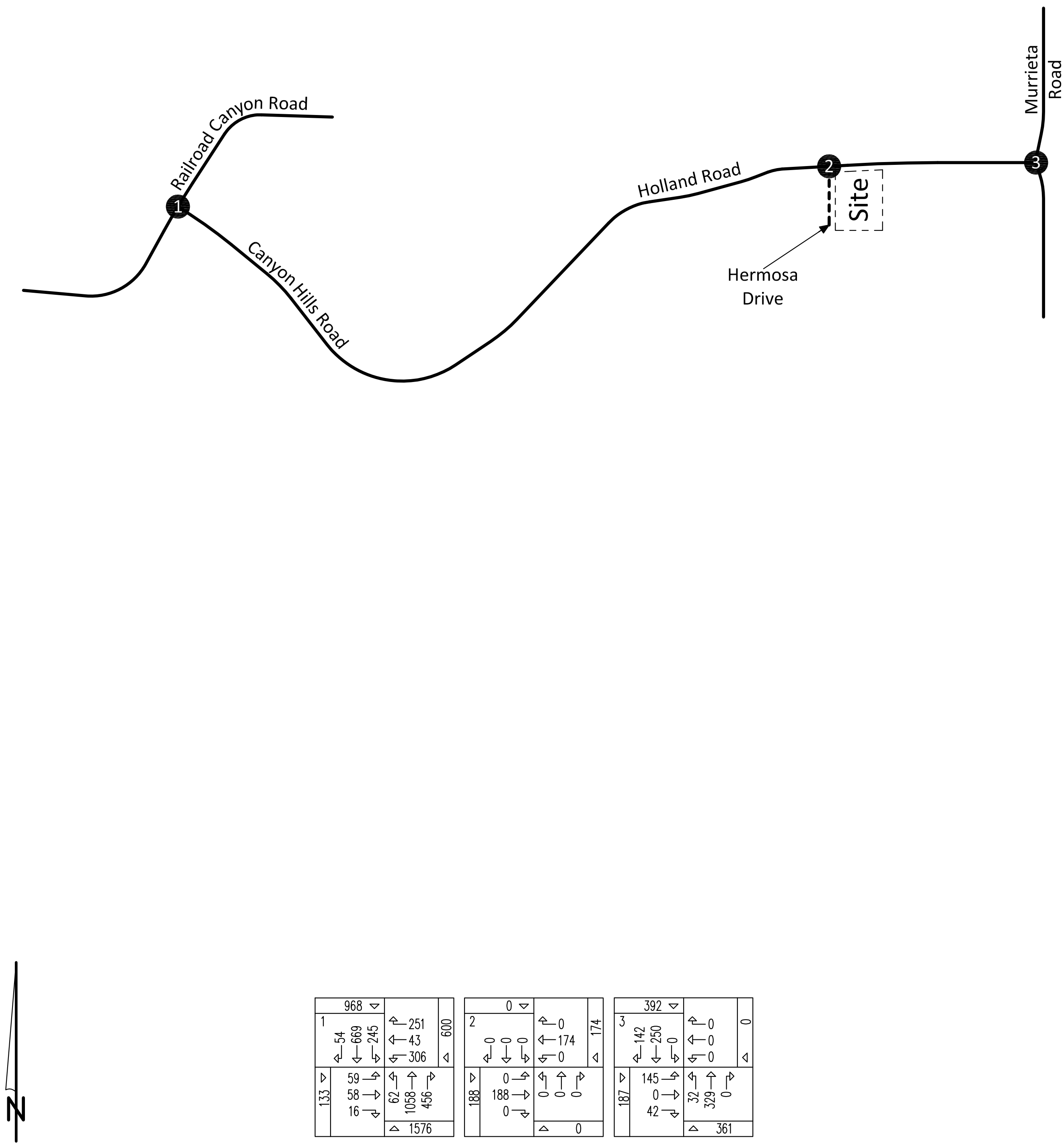


5590c/5

KUNZMAN ASSOCIATES, INC. Intersection reference numbers are in upper left corner of turning movement boxes.

OVER 35 YEARS OF EXCELLENT SERVICE

Figure 6
Existing Evening Peak Hour Intersection Turning Movement Volumes

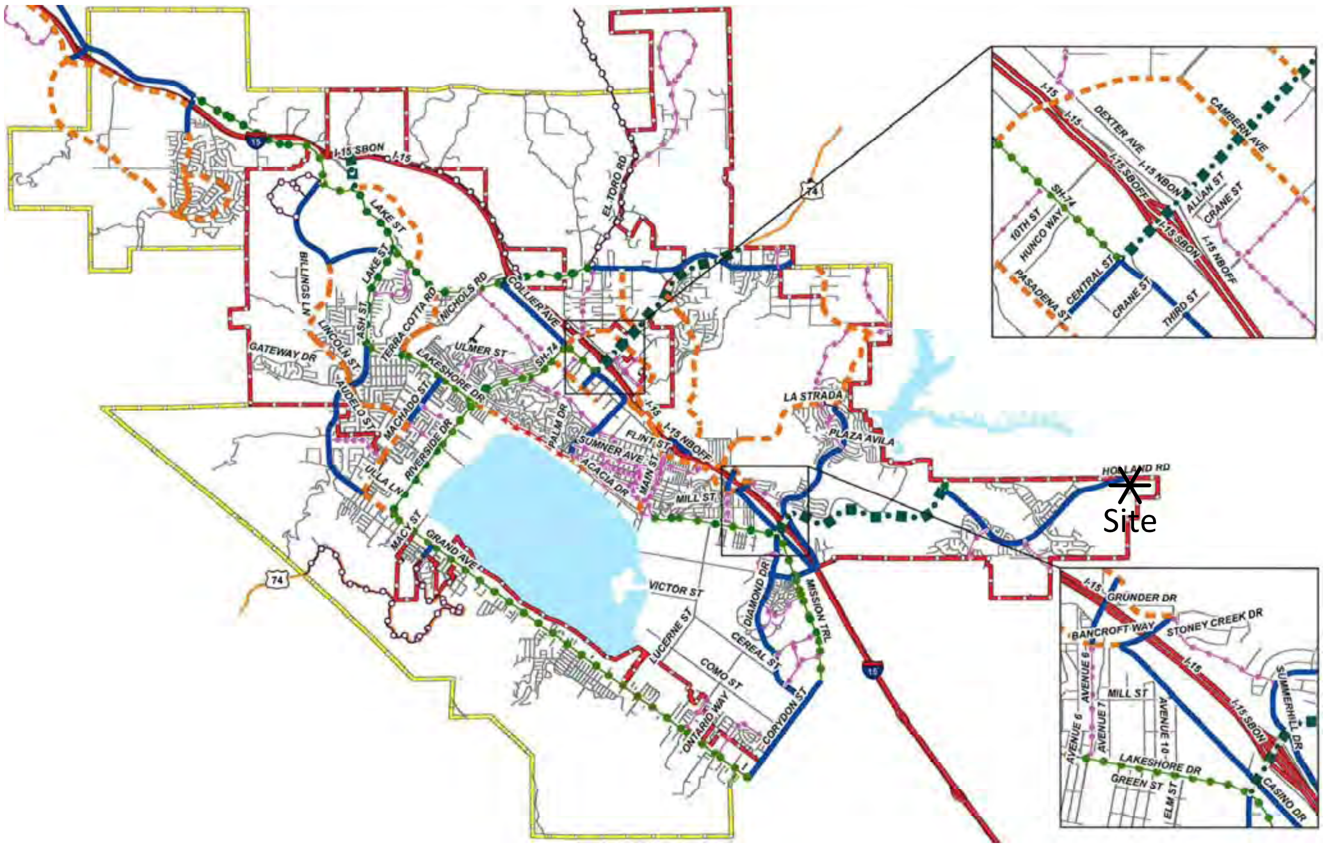


5590c/6

KUNZMAN ASSOCIATES, INC. Intersection reference numbers are in upper left corner of turning movement boxes.

OVER 35 YEARS OF EXCELLENT SERVICE

Figure 7
City of Lake Elsinore General Plan Circulation Element



Legend

- AUGMENTED URBAN ARTERIAL (8-LANES)
- URBAN ARTERIAL (6-LANES / 120' R.O.W.)
- MAJOR (4-LANES / 100' R.O.W.)
- SECONDARY (4-LANES / 90' R.O.W.)
- COLLECTOR (2-LANES / 68' R.O.W.)
- DIVIDED COLLECTOR (2-LANES WITH POTENTIAL AUGMENTED INTERSECTIONS
- NEW SPECIAL ROADWAY
- I-15
- SHWY-74
- SPHERE OF INFLUENCE
- CITY BOUNDARY

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Source: City of Lake Elsinore

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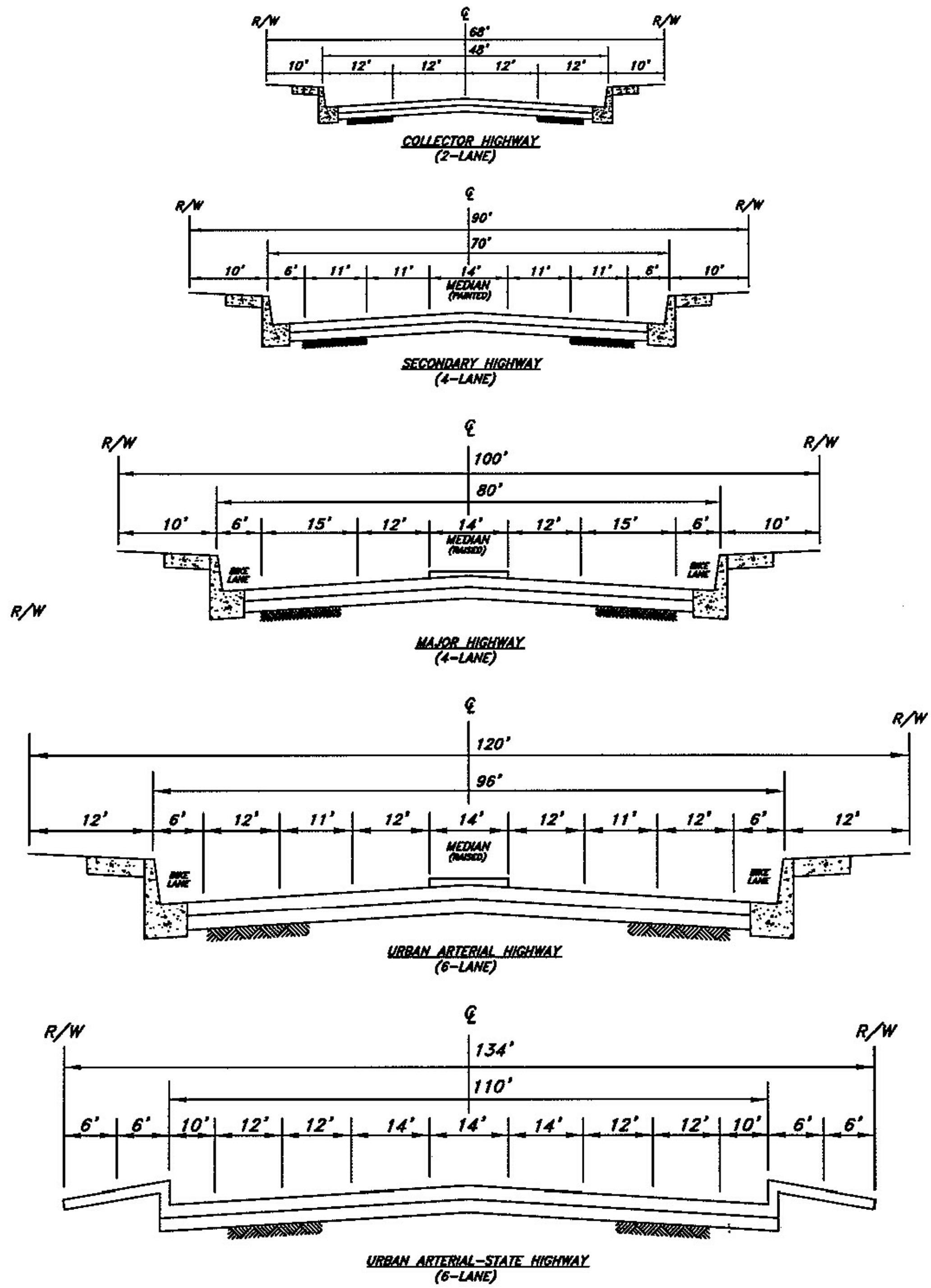
Figure 8
City of Lake Elsinore General Plan Roadway Cross-Sections



Source: City of Lake Elsinore

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V. Project Traffic

Traffic Conditions for the proposed project are discussed below and illustrated on Figures 9 to 12. The proposed land use for the project site consists of 74 single-family detached residential dwelling units. The proposed project will have access to Hermosa Drive (proposed) via Elina Road and Obaria Way through the adjacent Canyon Hills Planning Area 32 project which is currently under construction.

A. Trip Generation

The trips generated by the project are determined by multiplying an appropriate trip generation rate by the quantity of land use. Trip generation rates are predicated on the assumption that energy costs, the availability of roadway capacity, the availability of vehicles to drive, and life styles remain similar to what are known today. A major change in these variables may affect trip generation rates.

Trip generation rates were determined for daily traffic and morning peak hour inbound and outbound traffic, and evening peak hour inbound and outbound traffic for the proposed land use. By multiplying the trip generation rates by the land use quantity, the traffic volumes are determined. Table 2 shows the project trip generation based upon rates obtained from the Institute of Transportation Engineers, Trip Generation, 9th Edition, 2012.

As shown in Table 2, the proposed development is projected to generate approximately 704 daily vehicle trips, 55 of which will occur during the morning peak hour and 74 of which will occur during the evening peak hour.

B. Trip Distribution

Figure 9 displays the directional distribution of the project trips for the proposed land use.

To determine the trip distribution for the proposed project, peak hour traffic counts of the existing directional distribution of traffic for existing areas in the vicinity of the site, and other additional information on future development and traffic impacts in the area were reviewed.

C. Trip Assignment

Based on the identified trip generation and distribution, project average daily traffic volumes have been calculated and shown on Figure 10. Morning and evening peak hour intersection turning movement volumes expected from the project are shown on Figures 11 and 12.

D. Modal Split

The traffic reducing potential of public transit has not been considered in this report. Essentially the traffic projections are conservative in that public transit might be able to reduce the traffic volumes.

Table 2

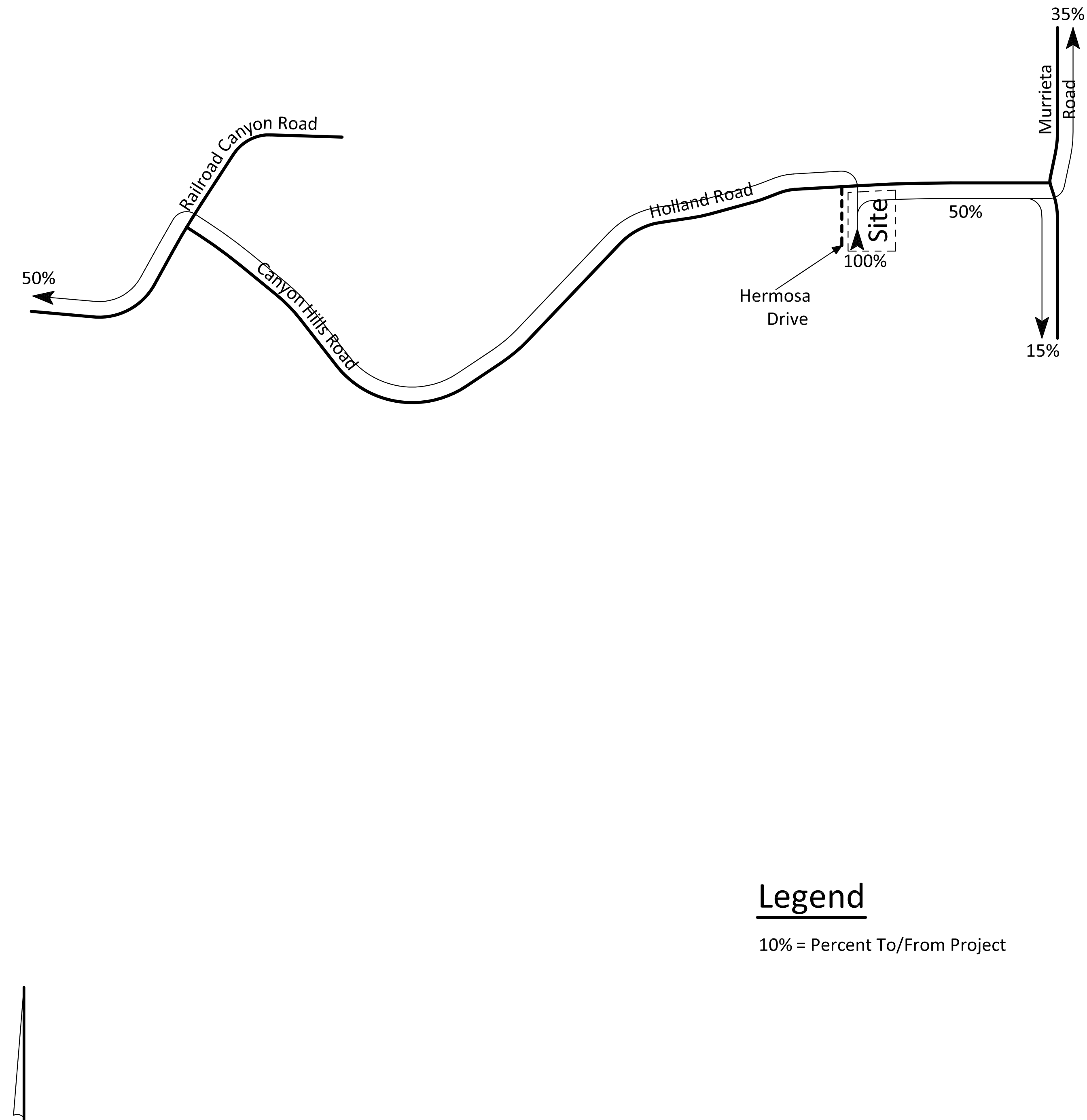
Project Trip Generation[1]

Land Use	Quantity	Units[2]	Peak Hour						Daily
			Morning			Evening			
			Inbound	Outbound	Total	Inbound	Outbound	Total	
Trip Generation Rate Single-Family Detached Residential		DU	0.19	0.56	0.75	0.63	0.37	1.00	9.52
Trips Generated Single-Family Detached Residential	74	DU	14	41	55	47	27	74	704

[1] Source: Institute of Transportation Engineers, Trip Generation, 9th Edition, 2012, Land Use Category 210.

[2] DU = Dwelling Unit

Figure 9
Project Trip Distribution



5590c/9

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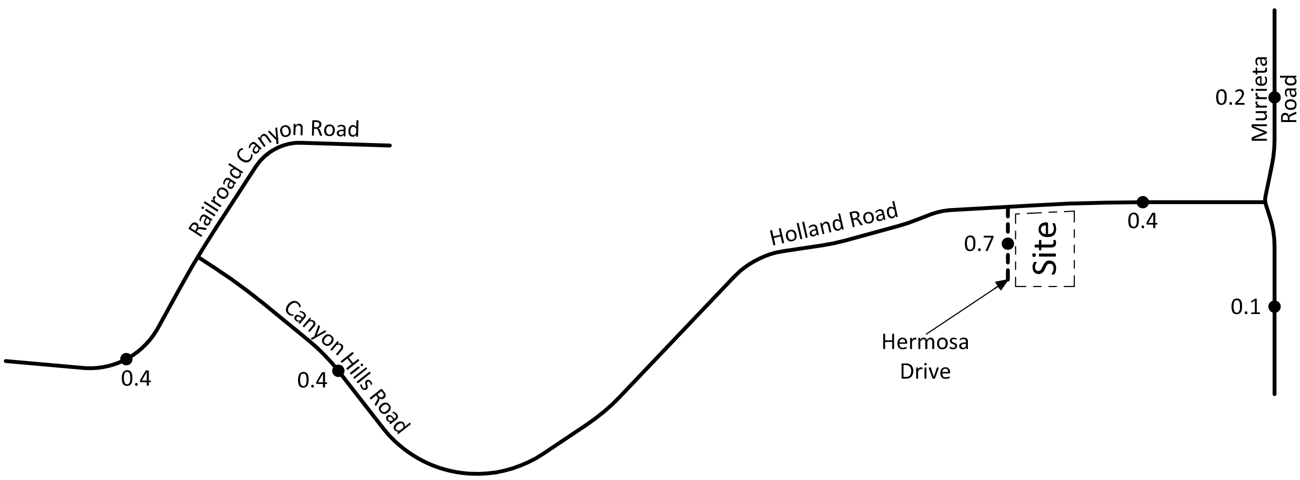
Figure 10
Project Average Daily Traffic Volumes



Legend

0.1 = Vehicles Per Day (1,000's)

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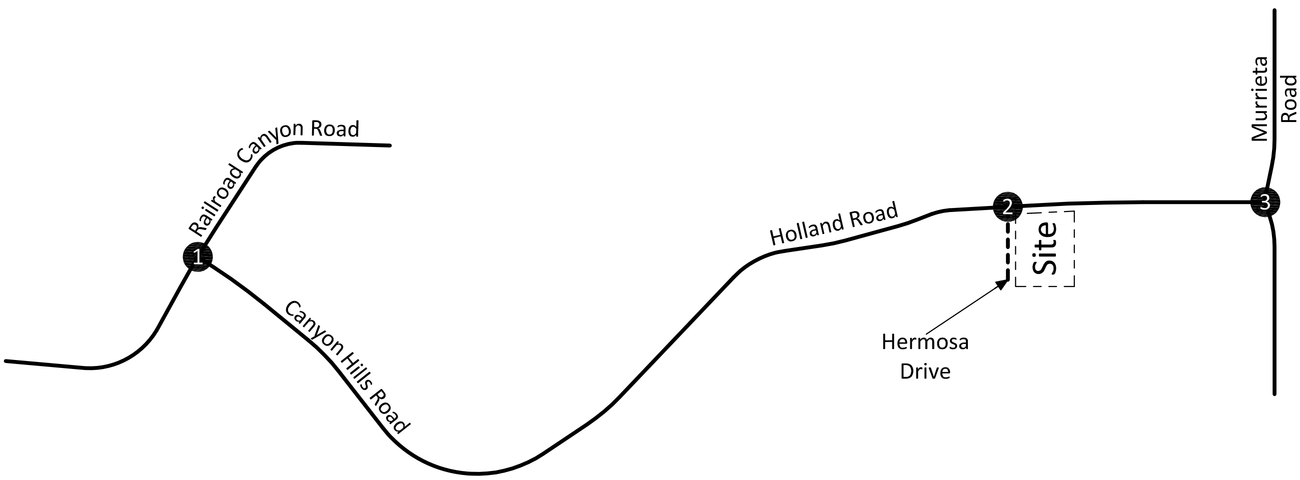
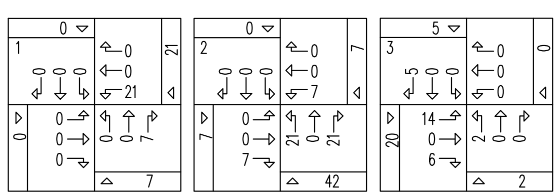
Figure 11
Project Morning Peak Hour Intersection Turning Movement Volumes





5590c/11

KUNZMAN ASSOCIATES, INC. Intersection reference numbers are in upper left corner of turning movement boxes.

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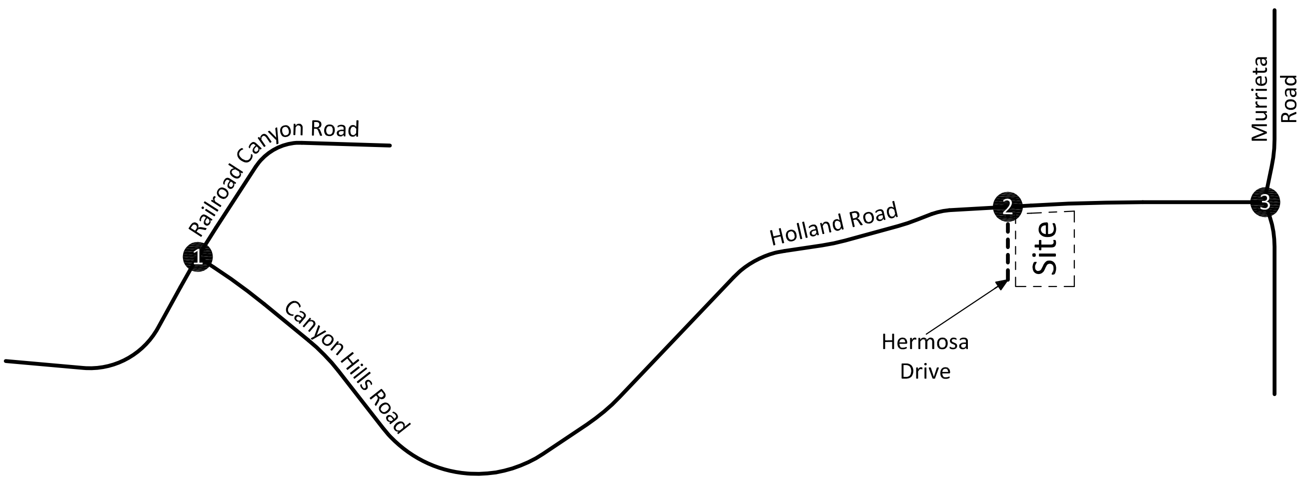
Figure 12
Project Evening Peak Hour Intersection Turning Movement Volumes



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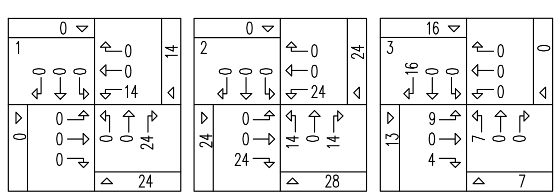

5590c/12

KUNZMAN ASSOCIATES, INC. Intersection reference numbers are in upper left corner of turning movement boxes.

VI. Existing Plus Project Traffic Conditions

Once the project-related trips are assigned to the existing street network and added to existing volumes, the traffic impact can be assessed. Figures 13 to 15 illustrate the Existing Plus Project traffic conditions.

A. Method of Projection

To assess Existing Plus Project traffic conditions, project traffic is combined with existing traffic.

B. Average Daily Traffic Volumes

Upon project completion and occupancy, the Existing Plus Project average daily traffic volumes are as illustrated on Figure 13.

C. Intersection Delay

The technique used to assess the capacity needs of an intersection is known as the Intersection Delay Method (see Appendix D). To calculate delay, the volume of traffic using the intersection is compared with the capacity of the intersection.

The delay and Level of Service for Existing Plus Project traffic conditions have been calculated and are shown in Table 3. Existing Plus Project morning and evening peak hour intersection turning movement volumes are shown on Figures 14 and 15, respectively.

For Existing Plus Project traffic conditions, the study area intersections are projected to operate at acceptable Levels of Service during the peak hours, except for the following study area intersection that is projected to operate at an unacceptable Level of Service during the morning peak hour, without improvements:

Murrieta Road (NS) at:
Holland Road (EW) - #3

The study area intersections are projected to operate within acceptable Levels of Service during the peak hours, with improvements. Existing Plus Project delay worksheets are provided in Appendix D.

It should be noted that the Murrieta Road and Holland Road intersection is in the City of Menifee. This intersection is listed as an "Enhanced Intersection location that may require additional lanes and/or right-of-way in order to satisfy the City of Menifee peak hour intersection LOS criteria" per the City of Menifee General Plan.

Table 3

Existing Plus Project Intersection Delay and Level of Service

Intersection	Jurisdiction	Traffic Control[3]	Northbound L	Northbound T	Northbound R	Southbound L	Southbound T	Southbound R	Eastbound L	Eastbound T	Eastbound R	Westbound L	Westbound T	Westbound R	Peak Hour Delay-LOS[2] Morning	Peak Hour Delay-LOS[2] Evening
Railroad Canyon Road (NS) at:																
Canyon Hills Road (EW) - #1	Lake Elsinore	TS	1	3	1	1	3	1	1	0.5	0.5	1.5	1	0.5	28.6-C	23.3-C
Hermosa Drive (NS) at:																
Holland Road (EW) - #2	Lake Elsinore	**CSS**	**1**	**0**	**d**	0	0	0	0	0.5	0.5	0.5	0.5	0	11.4-B	10.5-B
Murrieta Road (NS) at:																
Holland Road (EW) - #3	Menifee															
-Without Improvements		CSS	0.5	0.5	0	0	0.5	0.5	0.5	0	0.5	0	0	0	99.9-F[4]	21.4-C
-With Improvements		**TS**	0.5	0.5	0	0	0.5	0.5	0.5	0	0.5	0	0	0	23.9-C	9.0-A

`

[1] When a right turn lane is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes. L = Left; T = Through; R = Right; > = Right Turn Overlap; **CSS** = Improvements

[2] Delay and level of service has been calculated using the following analysis software: Traffix, Version 7.9.0215 (2008). Per the Highway Capacity Manual, overall average for intersection delay and level of service are shown for intersections with traffic signal or all way stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[3] TS = Traffic Signal; CSS = Cross Street Stop

[4] 99.9-F = Delay High, Intersection Unstable, Level of Service F.

Figure 13
Existing Plus Project Average Daily Traffic Volumes

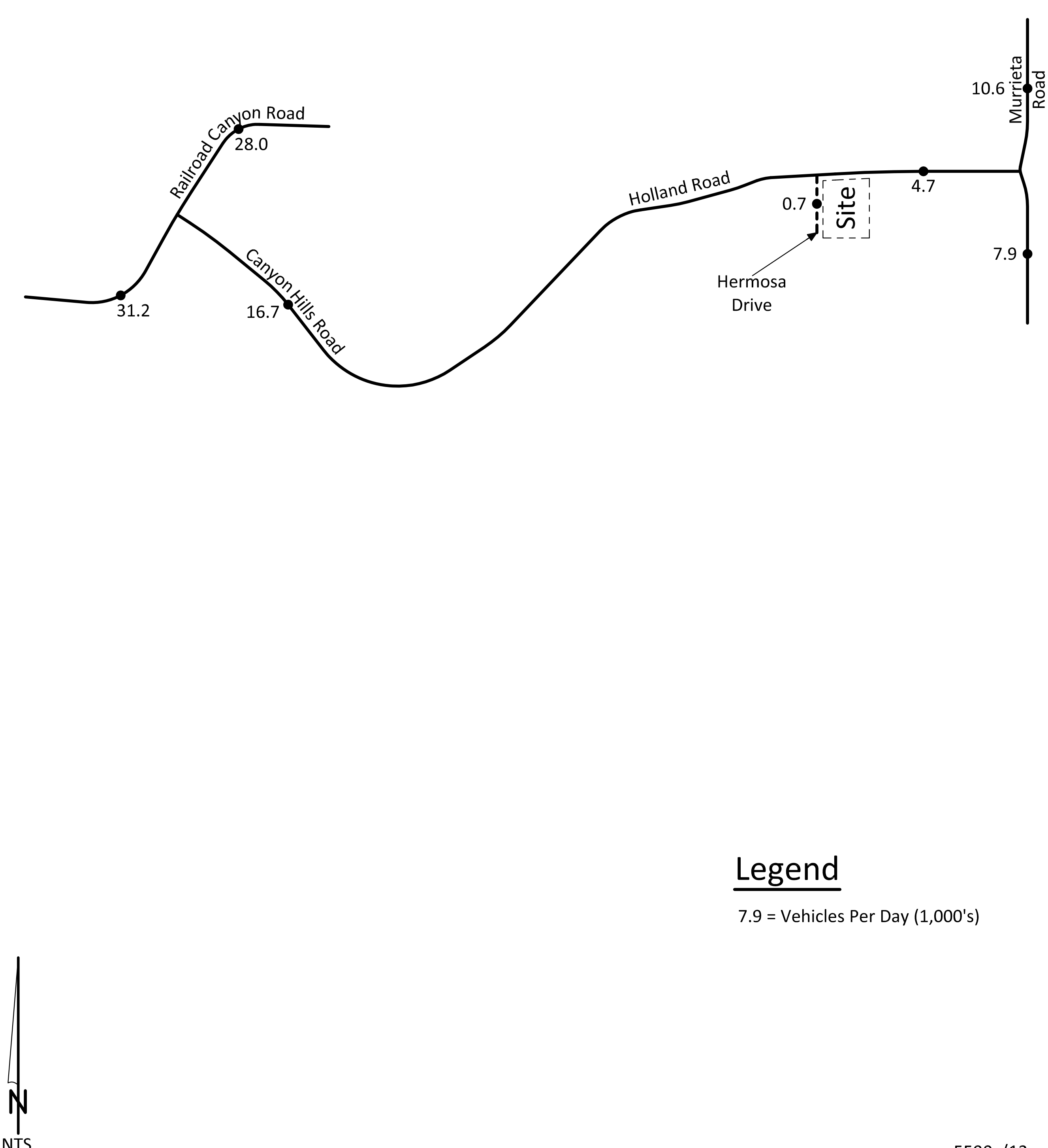

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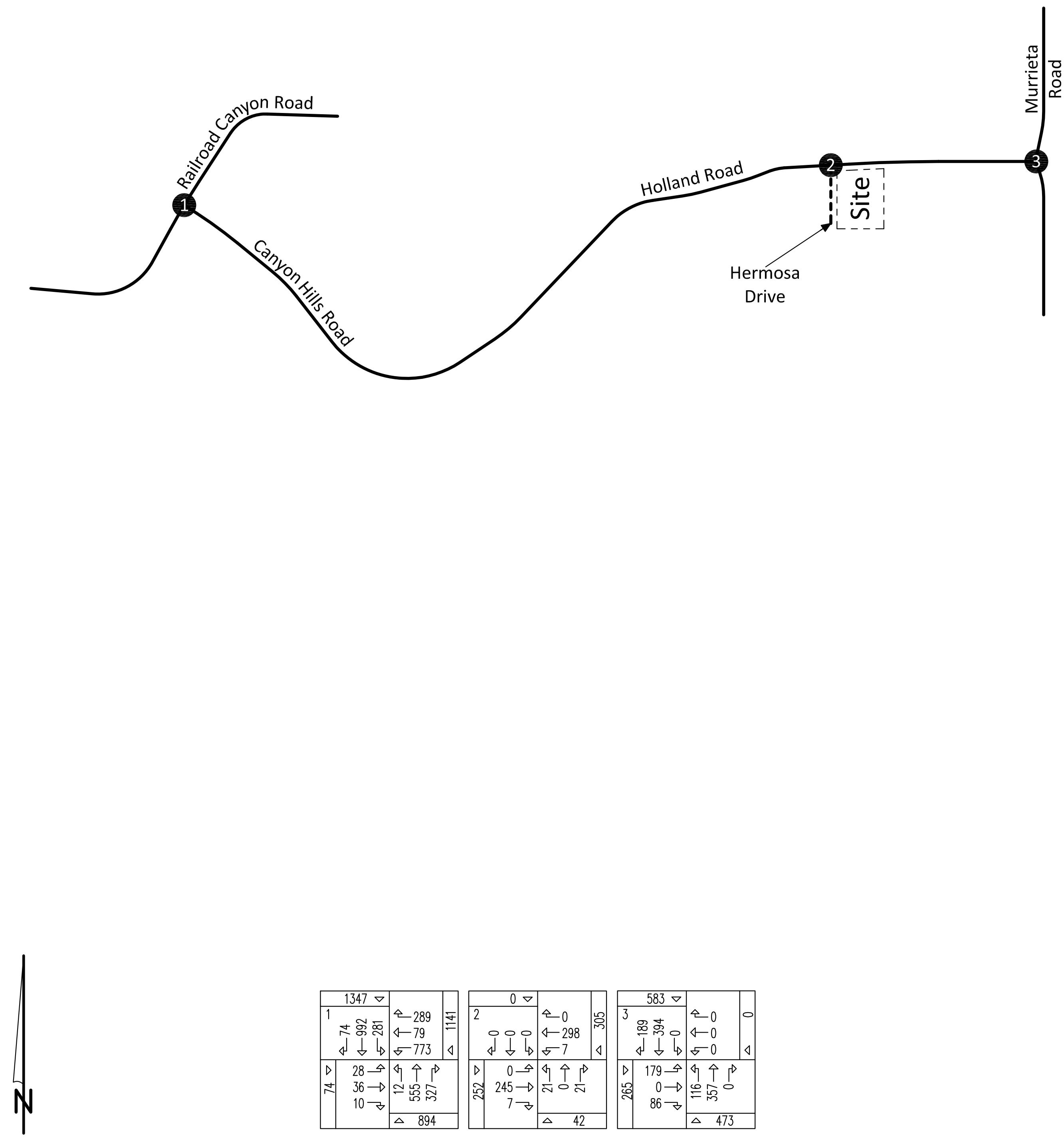
Figure 14
Existing Plus Project
Morning Peak Hour Intersection Turning Movement Volumes



5590c/14

Kunzman Associates, Inc. Intersection reference numbers are in upper left corner of turning movement boxes.

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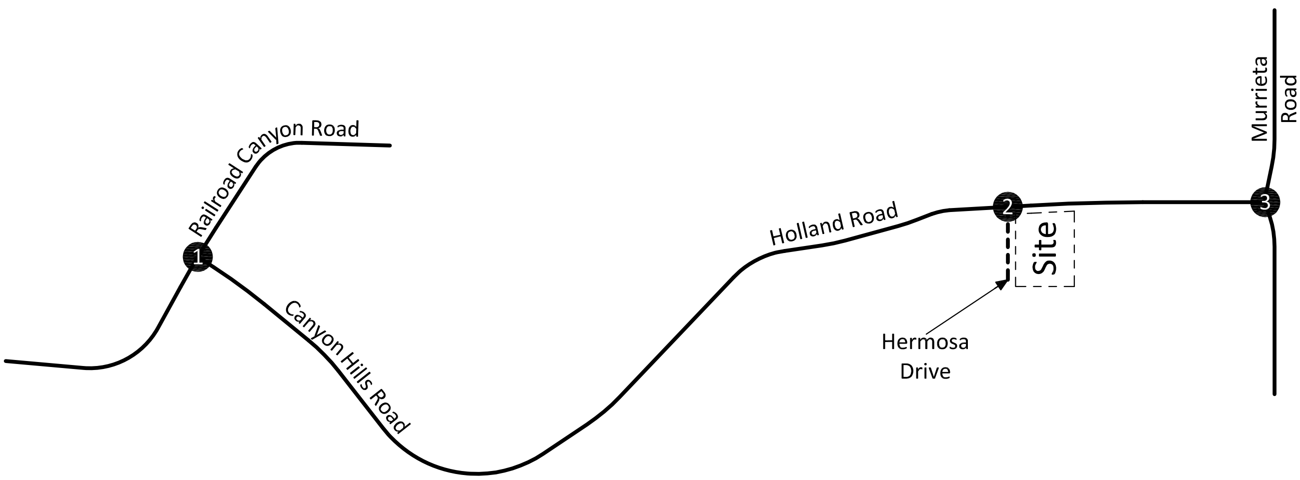
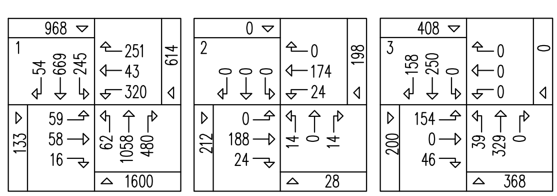
Figure 15
Existing Plus Project
Evening Peak Hour Intersection Turning Movement Volumes





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VII. Opening Year Traffic Conditions

Figures 16 to 30 illustrate the Opening Year traffic conditions.

A. Method of Projection

To assess Opening Year traffic conditions, existing traffic is combined with areawide growth. The Opening Year for analysis purposes in this report is 2016.

To account for areawide growth on roadways, traffic volumes have been calculated based on a "conservative" 2.0 percent annual growth rate of existing traffic volumes over the two (2) year period.

B. Other Development

Table 4 lists the proposed land use for the other development (see Figure 16). Table 4 shows the daily and peak hour vehicle trips generated by the other development in the study area. A list of other potential developments within the study area has been provided by the City of Lake Elsinore and City of Menifee planning departments. Potential developments within the study area are included in the analysis if they are not currently built, they are approved, their approval has not expired, and they would contribute traffic to the study area intersections. Figures 17 to 21 contain the directional distribution and trip assignment of the other development trips.

Figure 22 shows the average daily traffic volumes that can be expected for the other development traffic conditions. Other development morning and evening peak hour intersection turning movement volumes are shown on Figures 23 and 24, respectively.

C. Average Daily Traffic Volumes

The Opening Year (2016) Without Project average daily traffic volumes are as illustrated on Figure 25 and Opening Year (2016) With Project average daily traffic volumes are as illustrated on Figure 26.

D. Opening Year (2016) Intersection Delay

The technique used to assess the capacity needs of an intersection is known as the Intersection Delay Method (see Appendix D). To calculate delay, the volume of traffic using the intersection is compared with the capacity of the intersection.

The delay and Level of Service for Opening Year (2016) Without Project traffic conditions have been calculated and are shown in Table 5. Opening Year (2016) Without Project morning and evening peak hour intersection turning movement volumes are shown on Figures 27 and 28, respectively.

For Opening Year (2016) Without Project traffic conditions, the study area intersections are projected to operate at acceptable Levels of Service during the peak hours, except for the following study area intersection that is projected to operate at unacceptable Levels of Service during the peak hours, without improvements:

Murrieta Road (NS) at:
    Holland Road (EW) - #3

The delay and Level of Service for Opening Year (2016) With Project traffic conditions have been calculated and are shown in Table 6. Opening Year (2016) With Project morning and evening peak hour intersection turning movement volumes are shown on Figures 29 and 30, respectively.

For Opening Year (2016) With Project traffic conditions, the study area intersections are projected to operate at acceptable Levels of Service during the peak hours, except for the following study area intersection that is projected to operate at unacceptable Levels of Service during the peak hours, without improvements:

Murrieta Road (NS) at:
    Holland Road (EW) - #3

The study area intersections are projected to operate within acceptable Levels of Service during the peak hours, with improvements. Opening Year (2016) delay worksheets are provided in Appendix D.

It should be noted that the Murrieta Road and Holland Road intersection is in the City of Menifee. This intersection is listed as an "Enhanced Intersection location that may require additional lanes and/or right-of-way in order to satisfy the City of Menifee peak hour intersection LOS criteria" per the City of Menifee General Plan.

Table 4

Other Development Trip Generation[1]

Traffic Analysis Zone	Other Development	Quantity	Units[2]	Peak Hour						Daily
				Morning			Evening			
				Inbound	Outbound	Total	Inbound	Outbound	Total	
1	Canyon Hills Planning Area - 1A, 1B, 2A, 2C & 2D	130	DU	25	73	98	82	48	130	1,238
2	Canyon Hills Planning Area - 25, 28A, 28B, 31 & 32[3&4]	396	DU	75	222	297	249	147	396	3,770
3	Canyon Hills Planning Area -32[4]	49	DU	9	27	36	31	18	49	466
4	Audie Murphy Planning Area - 14-21, 23, 25, 27-28, 32-38[3]	340	DU	65	190	255	214	126	340	3,237
5	Calder Ranch & Sycamore at Hidden Hills[3]	247	DU	47	138	185	156	91	247	2,351
Total		1,162	DU	221	650	871	732	430	1,162	11,062

1 Source: Institute of Transportation Engineers, Trip Generation, 9th Edition, 2012, Land Use Category 210.

2 DU = Dwelling Unit

3 Dwelling units adjusted to reflect build out of specific planning areas or percent completion of subdivisions.

4 Canyon Hills Planning Area 32 split to reflect trip distribution on Hermosa Drive.

Table 5

Opening Year (2016) Without Project Intersection Delay and Level of Service

Intersection	Jurisdiction	Traffic Control[3]	Intersection Approach Lanes[1]												Peak Hour Delay-LOS[2]	
			Northbound			Southbound			Eastbound			Westbound				
			L	T	R	L	T	R	L	T	R	L	T	R	Morning	Evening
Railroad Canyon Road (NS) at:																
Canyon Hills Road (EW) - #1	Lake Elsinore	TS	1	3	1	1	3	1	1	0.5	0.5	1.5	1	0.5	34.6-C	25.0-C
Hermosa Drive (NS) at:																
Holland Road (EW) - #2	Lake Elsinore	**CSS**	**1**	**0**	**d**	0	0	0	0	0.5	0.5	0.5	0.5	0	12.9-B	11.7-B
Murrieta Road (NS) at:																
Holland Road (EW) - #3	Menifee															
-Without Improvements		CSS	0.5	0.5	0	0	0.5	0.5	0.5	0	0.5	0	0	0	99.9-F[4]	90.7-F
-With Improvements		**TS**	0.5	0.5	0	0	0.5	0.5	0.5	0	0.5	0	0	0	13.8-B	10.2-B

[1] When a right turn lane is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes. L = Left; T = Through; R = Right; > = Right Turn Overlap; **CSS** = Improvements

[2] Delay and level of service has been calculated using the following analysis software: Traffix, Version 7.9.0215 (2008). Per the Highway Capacity Manual, overall average for intersection delay and level of service are shown for intersections with traffic signal or all way stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[3] TS = Traffic Signal; CSS = Cross Street Stop

[4] 99.9-F = Delay High, Intersection Unstable, Level of Service F.

Table 6

Opening Year (2016) With Project Intersection Delay and Level of Service

Intersection	Jurisdiction	Traffic Control[3]	Intersection Approach Lanes[1]												Peak Hour Delay-LOS[2]	
			Northbound			Southbound			Eastbound			Westbound				
			L	T	R	L	T	R	L	T	R	L	T	R	Morning	Evening
Railroad Canyon Road (NS) at:																
Canyon Hills Road (EW) - #1	Lake Elsinore	TS	1	3	1	1	3	1	1	0.5	0.5	1.5	1	0.5	35.0-C	25.2-C
Hermosa Drive (NS) at:																
Holland Road (EW) - #2	Lake Elsinore	**CSS**	**1**	**0**	**d**	0	0	0	0	0.5	0.5	0.5	0.5	0	13.5-B	12.5-B
Murrieta Road (NS) at:																
Holland Road (EW) - #3	Menifee															
-Without Improvements		CSS	0.5	0.5	0	0	0.5	0.5	0.5	0	0.5	0	0	0	99.9-F[4]	99.9-F[4]
-With Improvements		**TS**	0.5	0.5	0	0	0.5	0.5	0.5	0	0.5	0	0	0	14.5-B	10.5-B

[1] When a right turn lane is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes. L = Left; T = Through; R = Right; > = Right Turn Overlap; **CSS** = Improvements

[2] Delay and level of service has been calculated using the following analysis software: Traffix, Version 7.9.0215 (2008). Per the Highway Capacity Manual, overall average for intersection delay and level of service are shown for intersections with traffic signal or all way stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[3] TS = Traffic Signal; CSS = Cross Street Stop

[4] 99.9-F = Delay High, Intersection Unstable, Level of Service F.

Figure 16
Other Development Traffic Analysis Zone Map

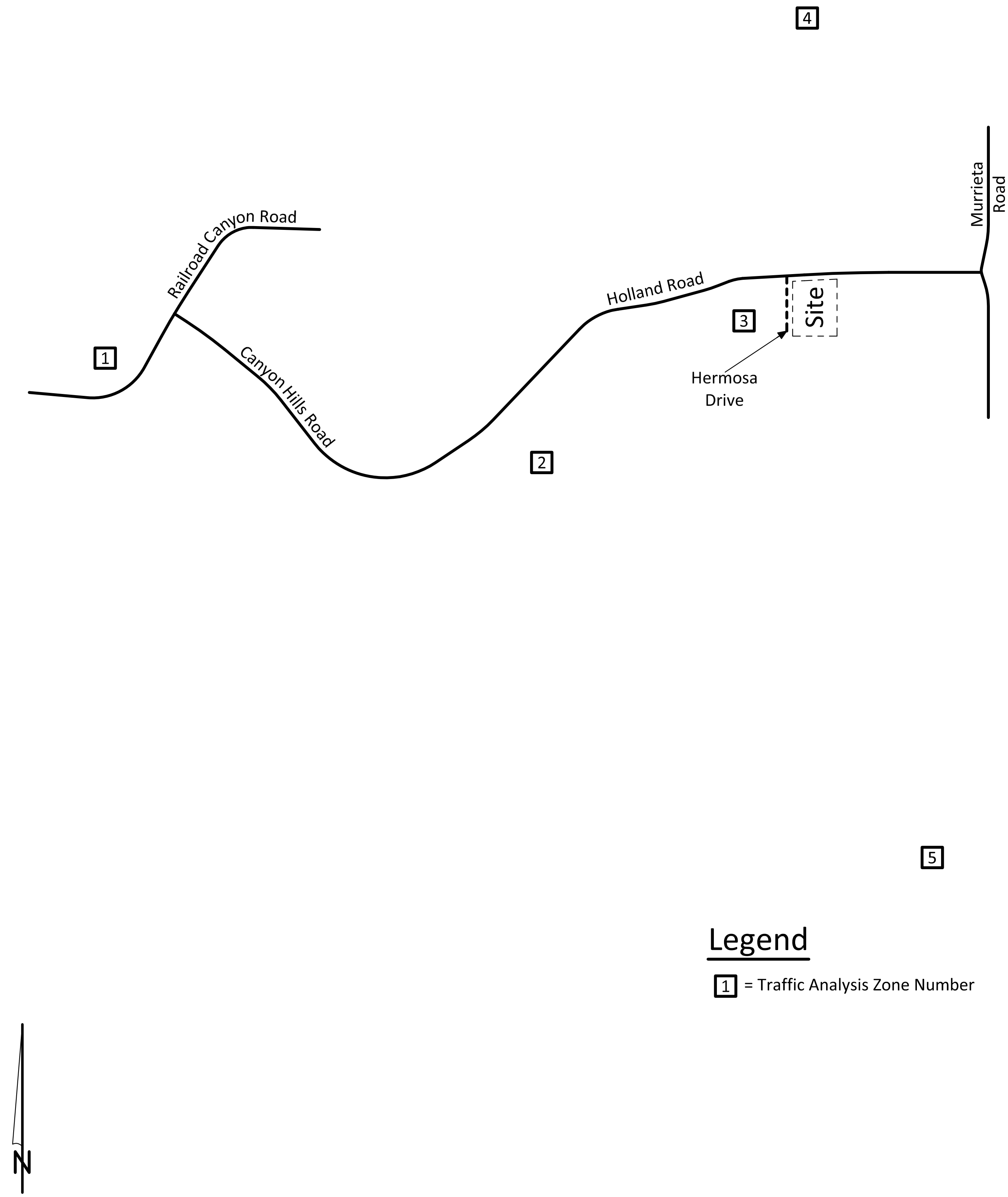
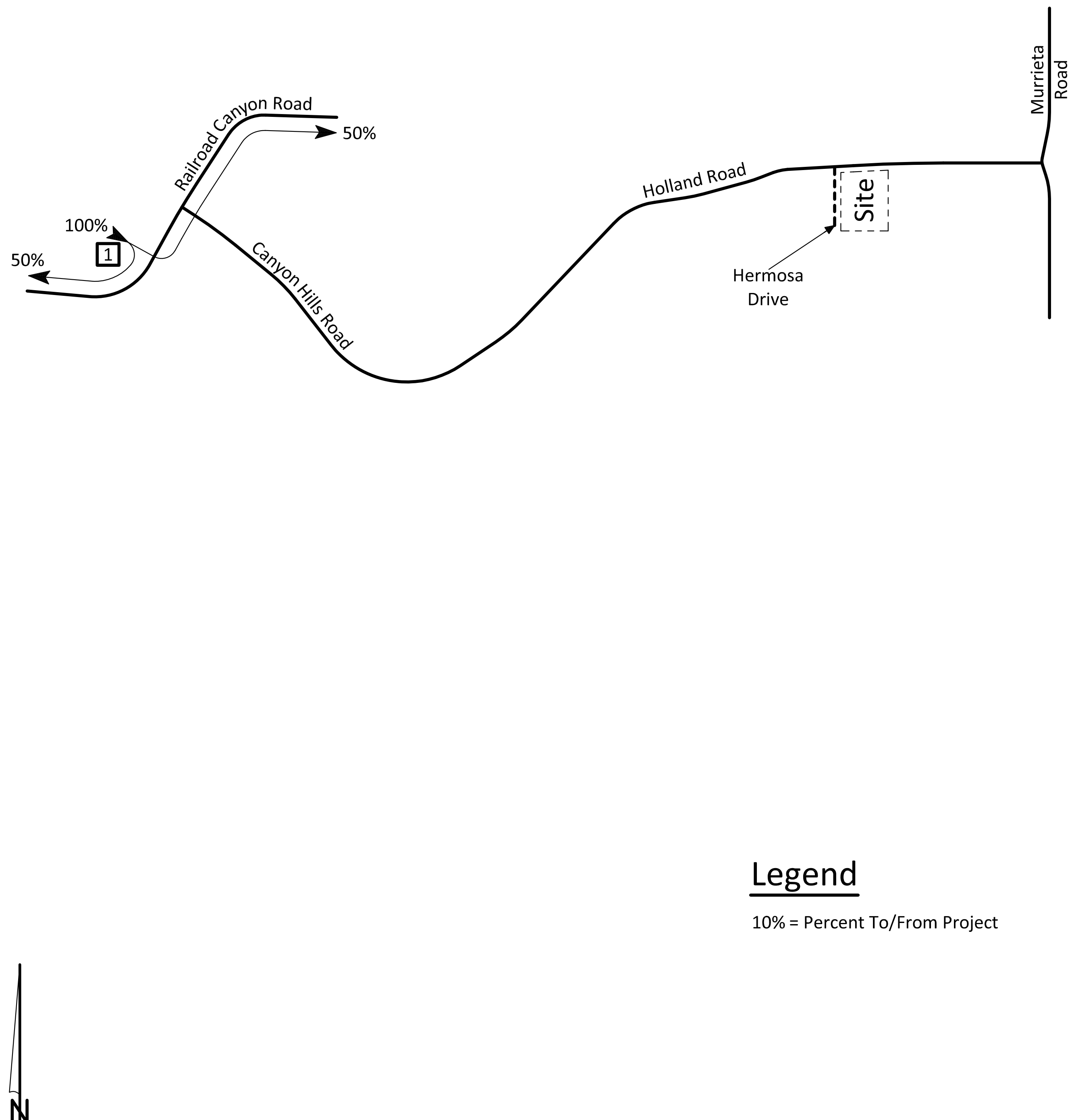


Figure 17
Other Development Trip Distribution - Traffic Analysis Zone 1



5590c/17

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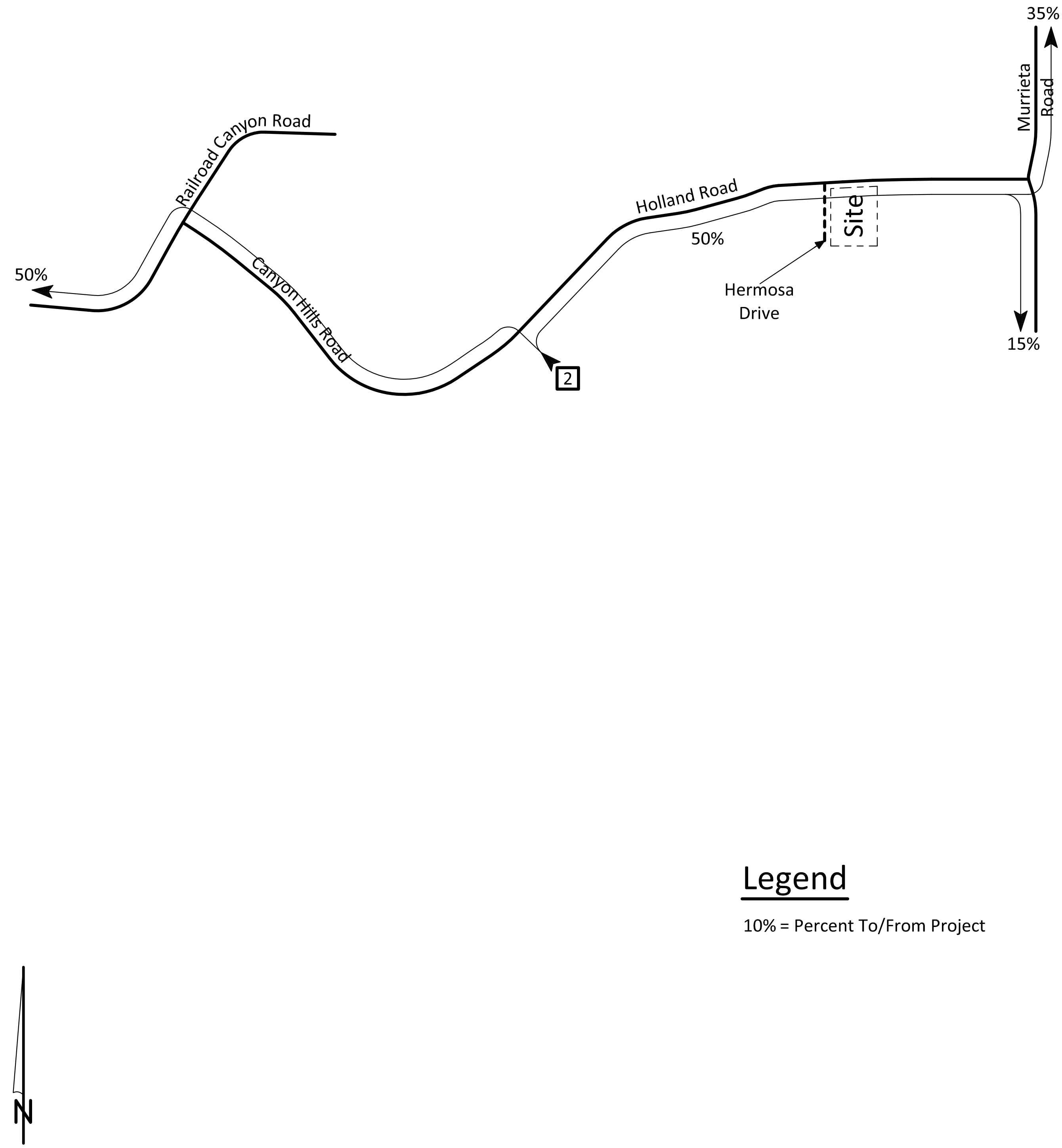
Figure 18
Other Development Trip Distribution - Traffic Analysis Zone 2



5590c/18

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Figure 19
Other Development Trip Distribution - Traffic Analysis Zone 3

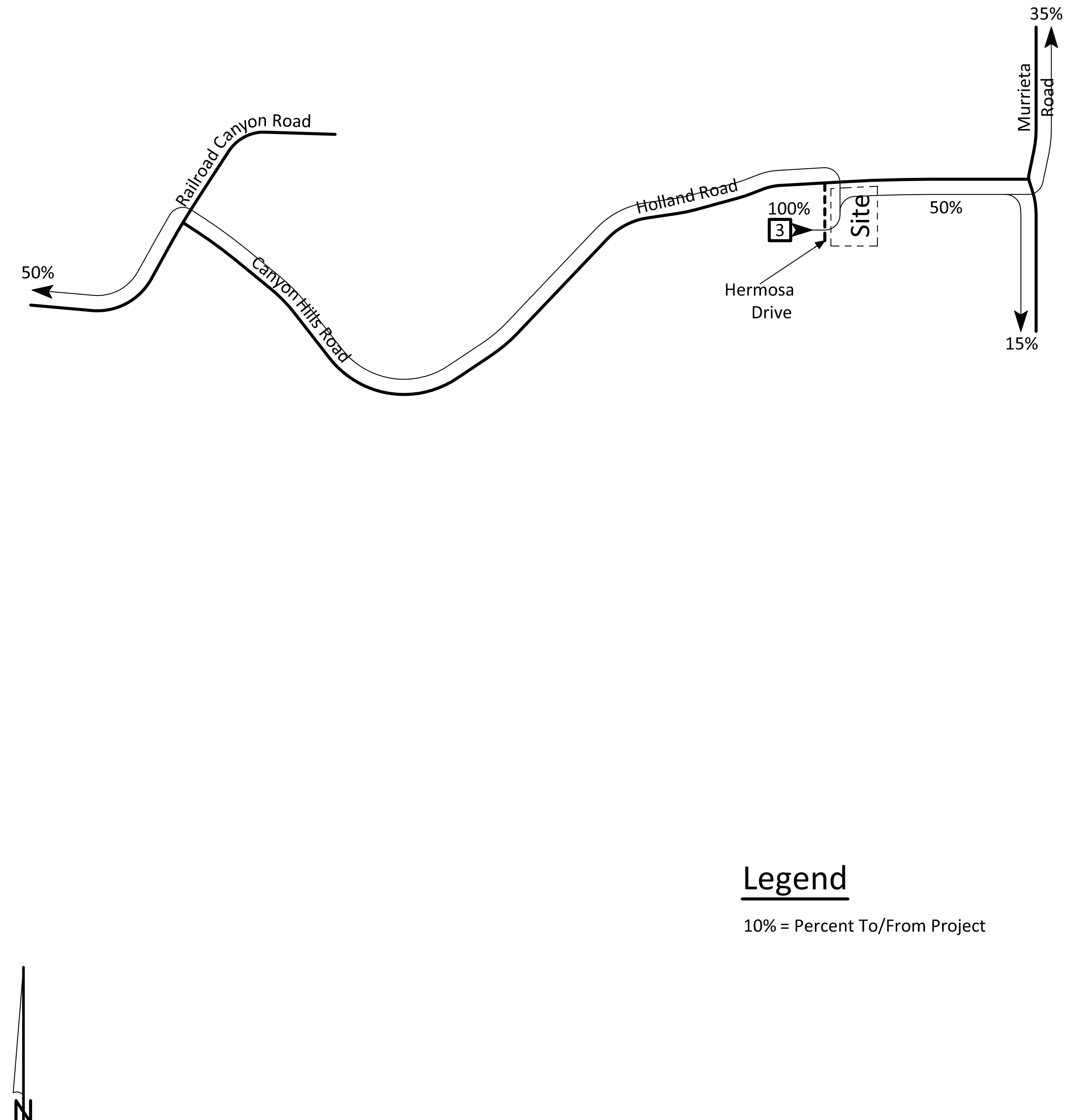

Figure 20
Other Development Trip Distribution - Traffic Analysis Zone 4

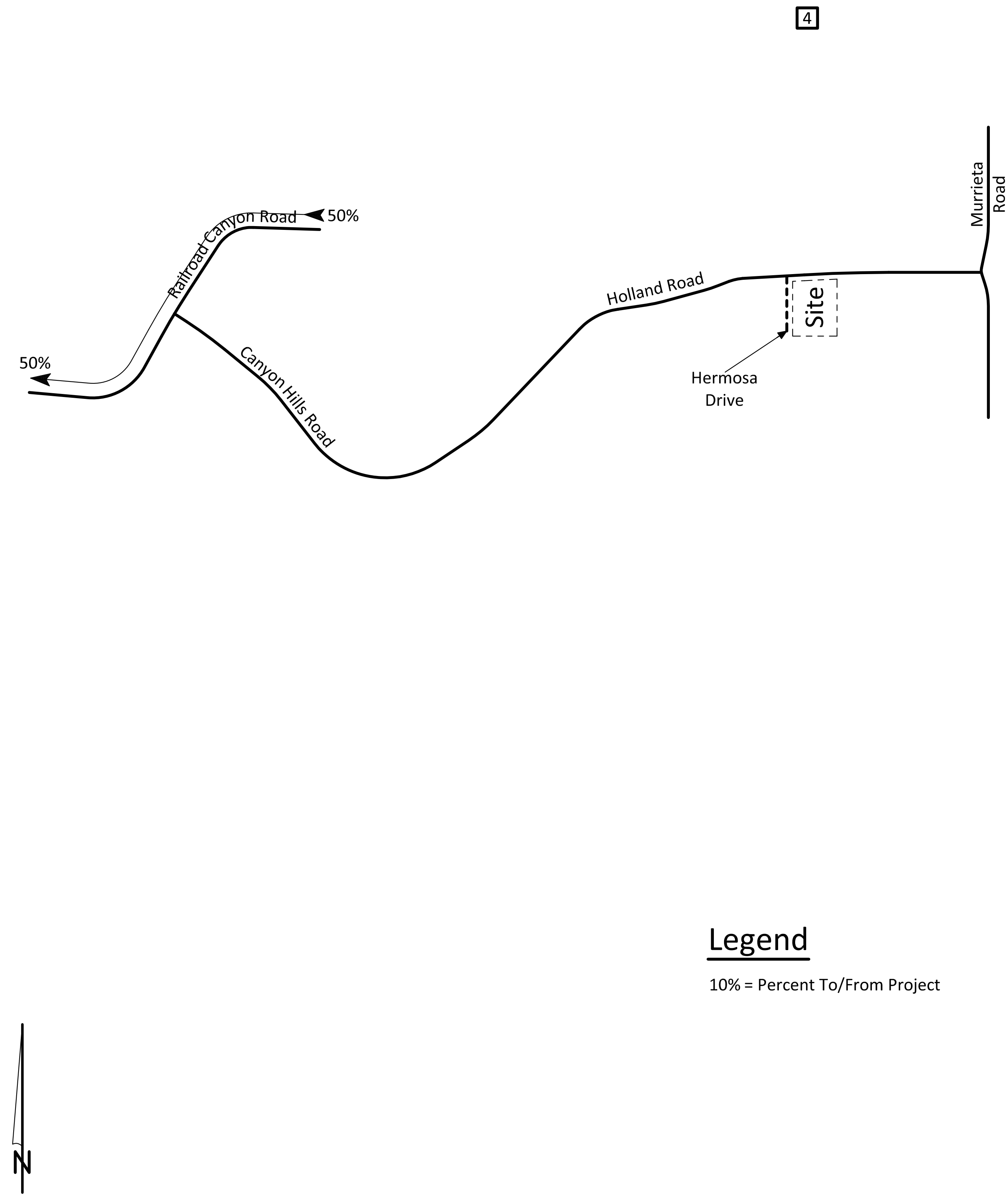

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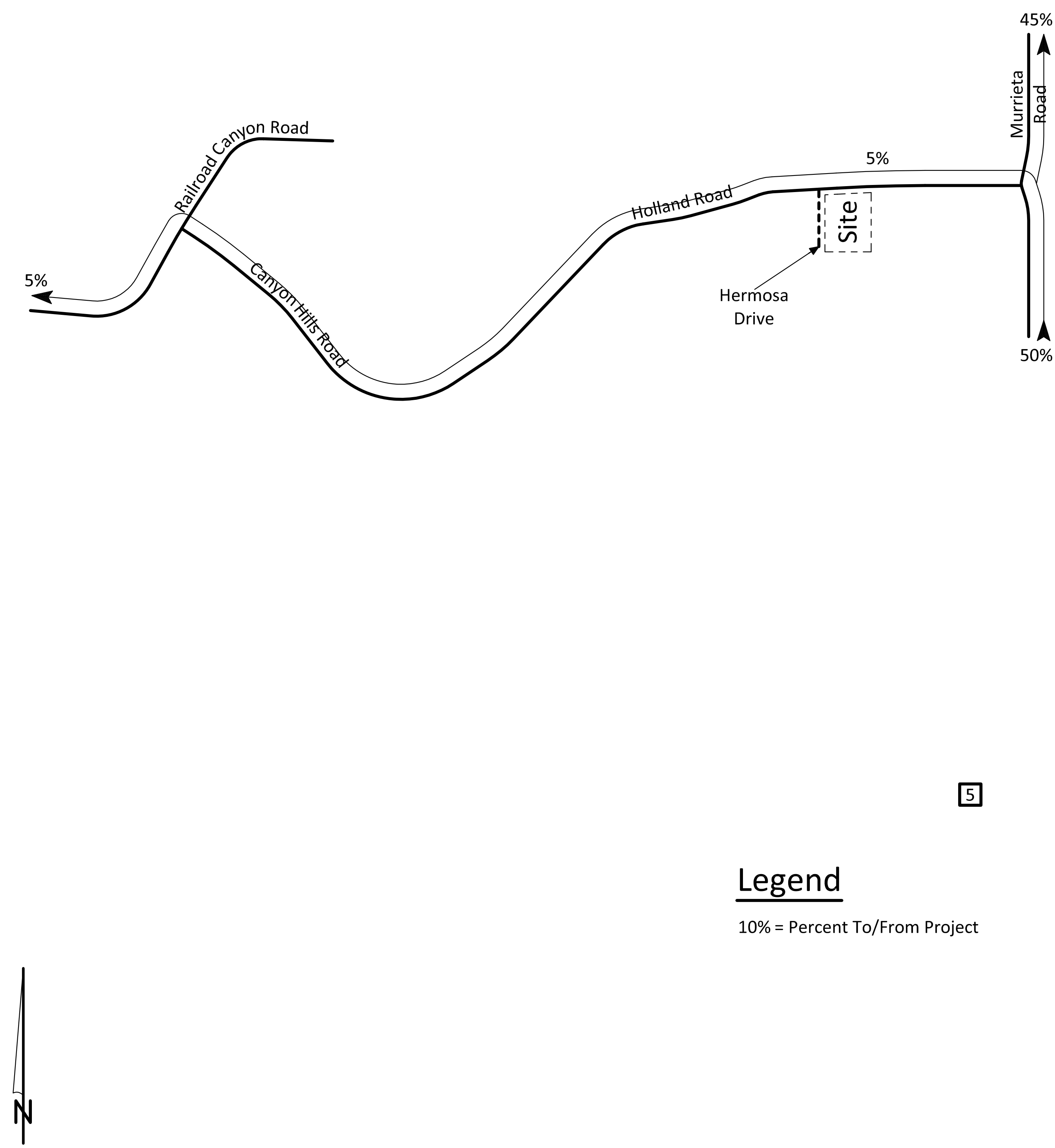
Figure 21
Other Development Trip Distribution - Traffic Analysis Zone 5



5590c/21

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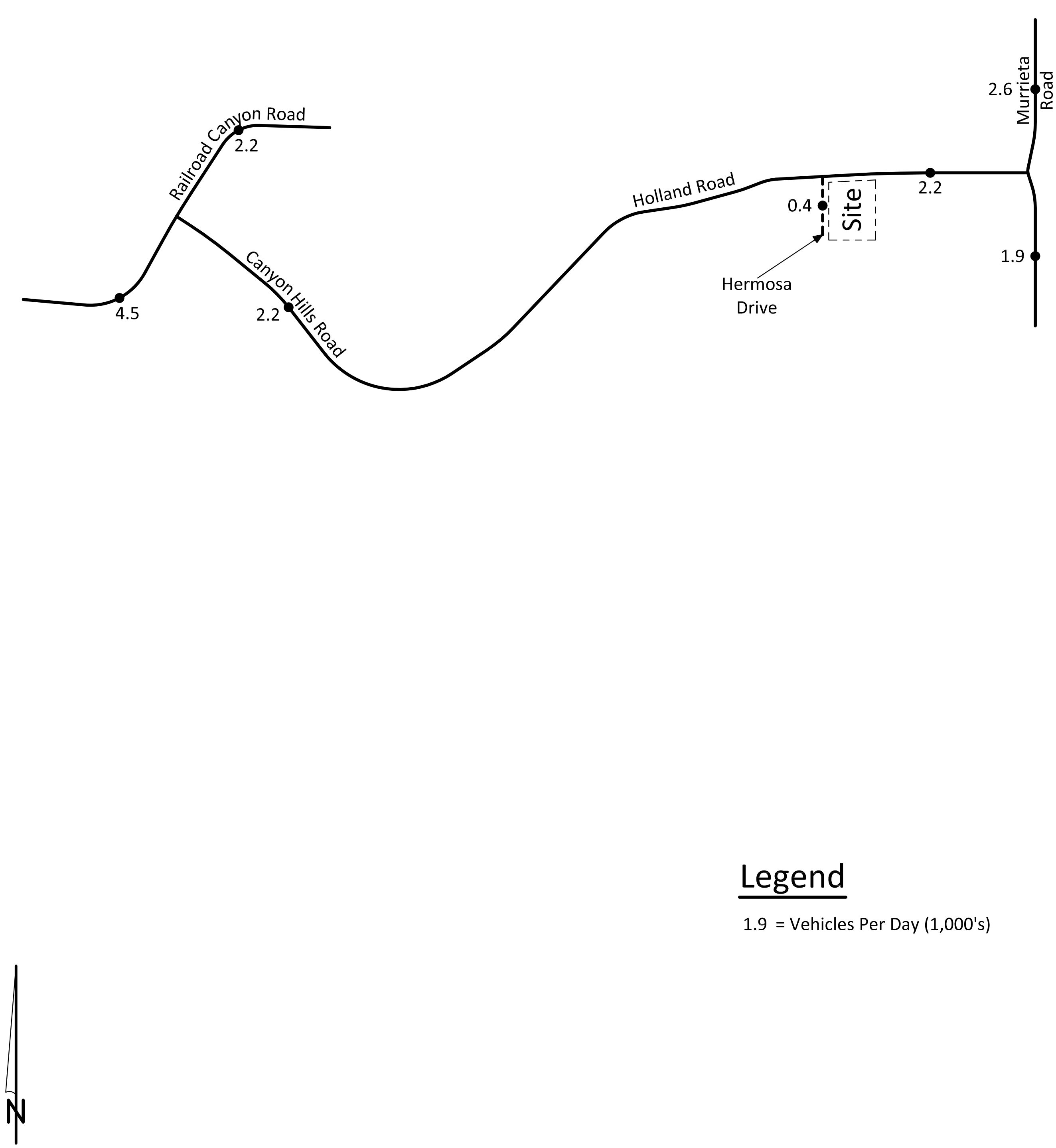
Figure 22
Other Development Average Daily Traffic Volumes



5590c/22

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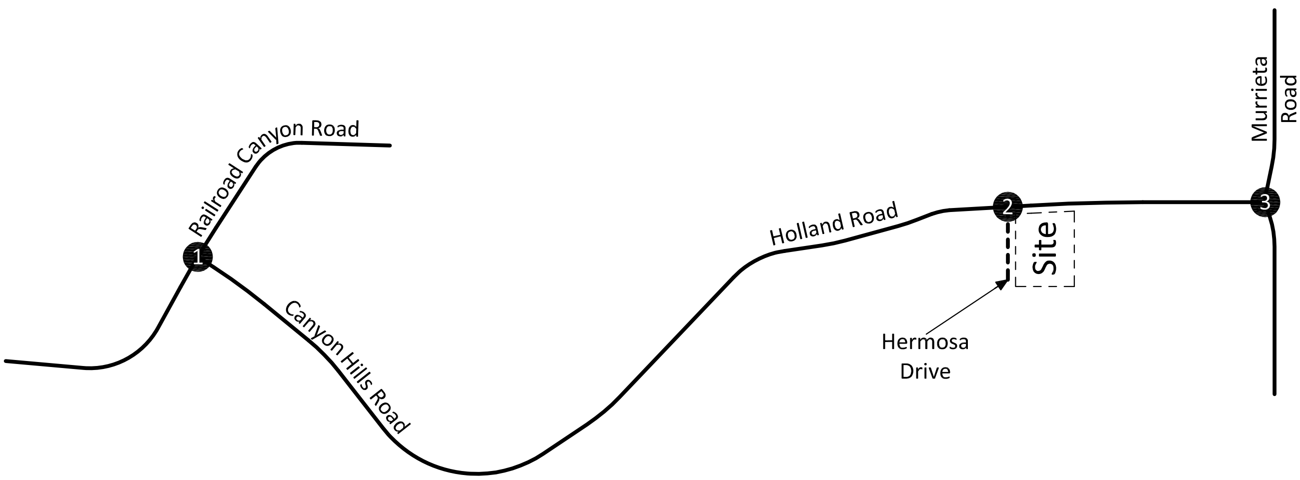
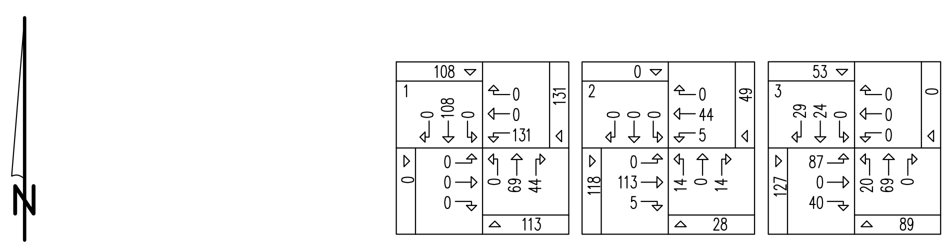
Figure 23
Other Development
Morning Peak Hour Intersection Turning Movement Volumes





5590c/23

KUNZMAN ASSOCIATES, INC. Intersection reference numbers are in upper left corner of turning movement boxes.

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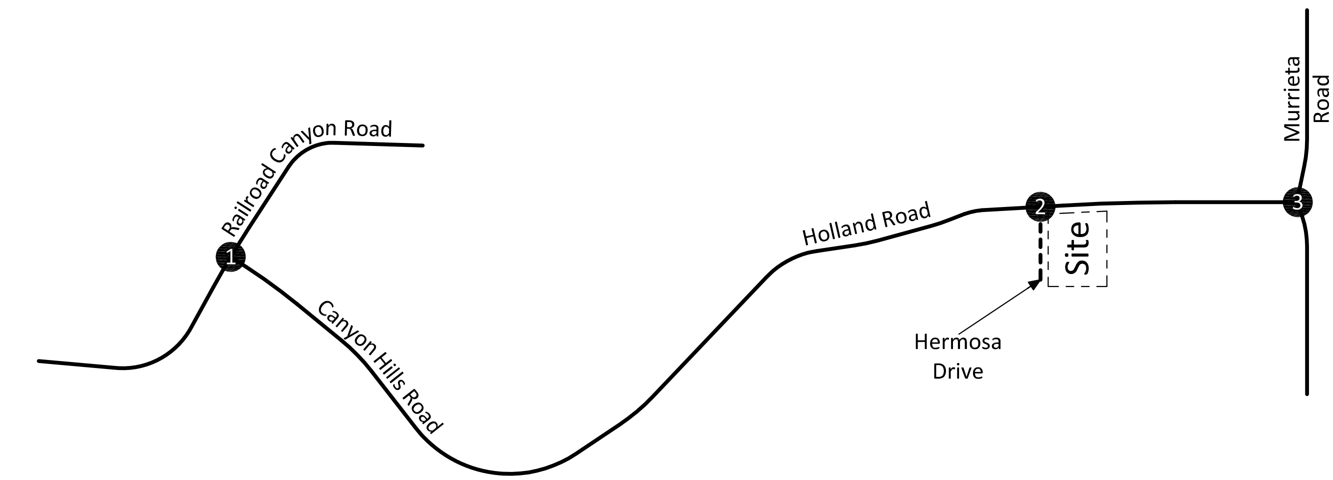
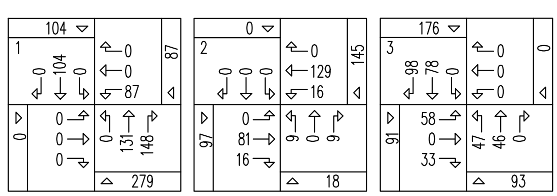
Figure 24
Other Development
Evening Peak Hour Intersection Turning Movement Volumes





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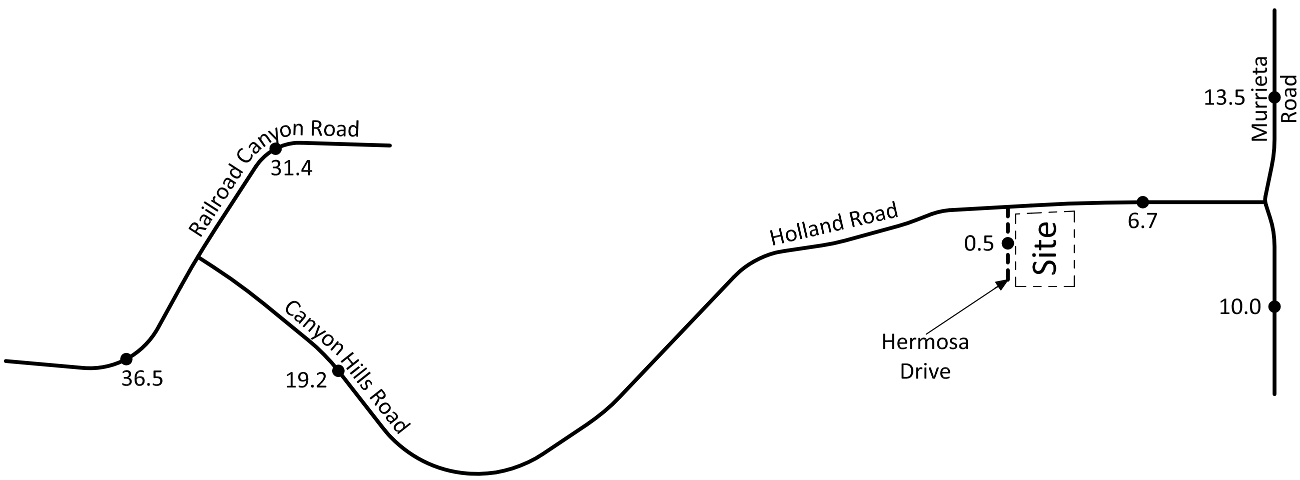
KUNZMAN ASSOCIATES, INC. Intersection reference numbers are in upper left corner of turning movement boxes.

OVER 35 YEARS OF EXCELLENT SERVICE

Figure 25
Opening Year (2016) Without Project Average Daily Traffic Volumes



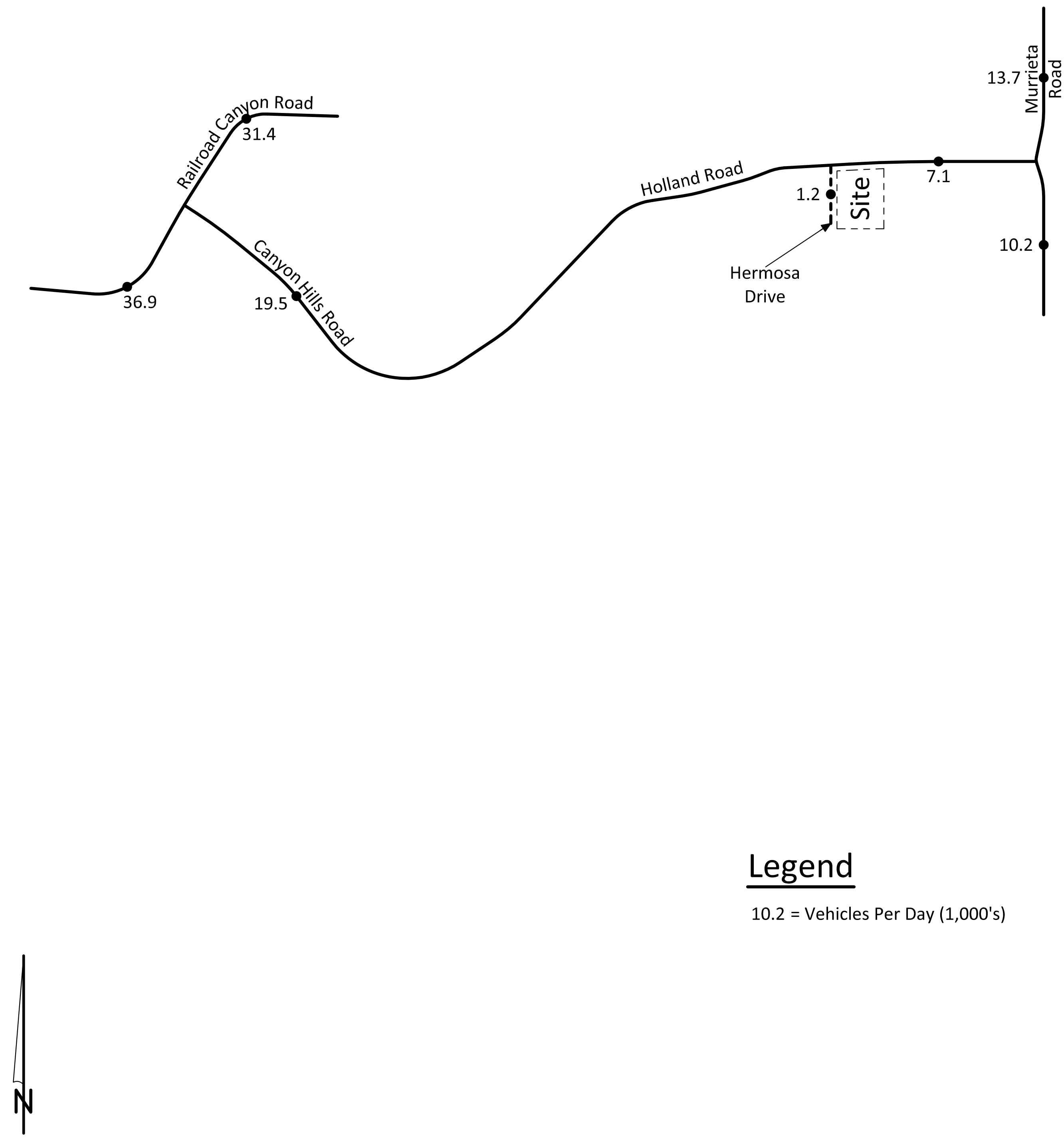
Legend

10.0 = Vehicles Per Day (1,000's)

NTS

5590c/25

Figure 26
Opening Year (2016) With Project Average Daily Traffic Volumes



5590c/26

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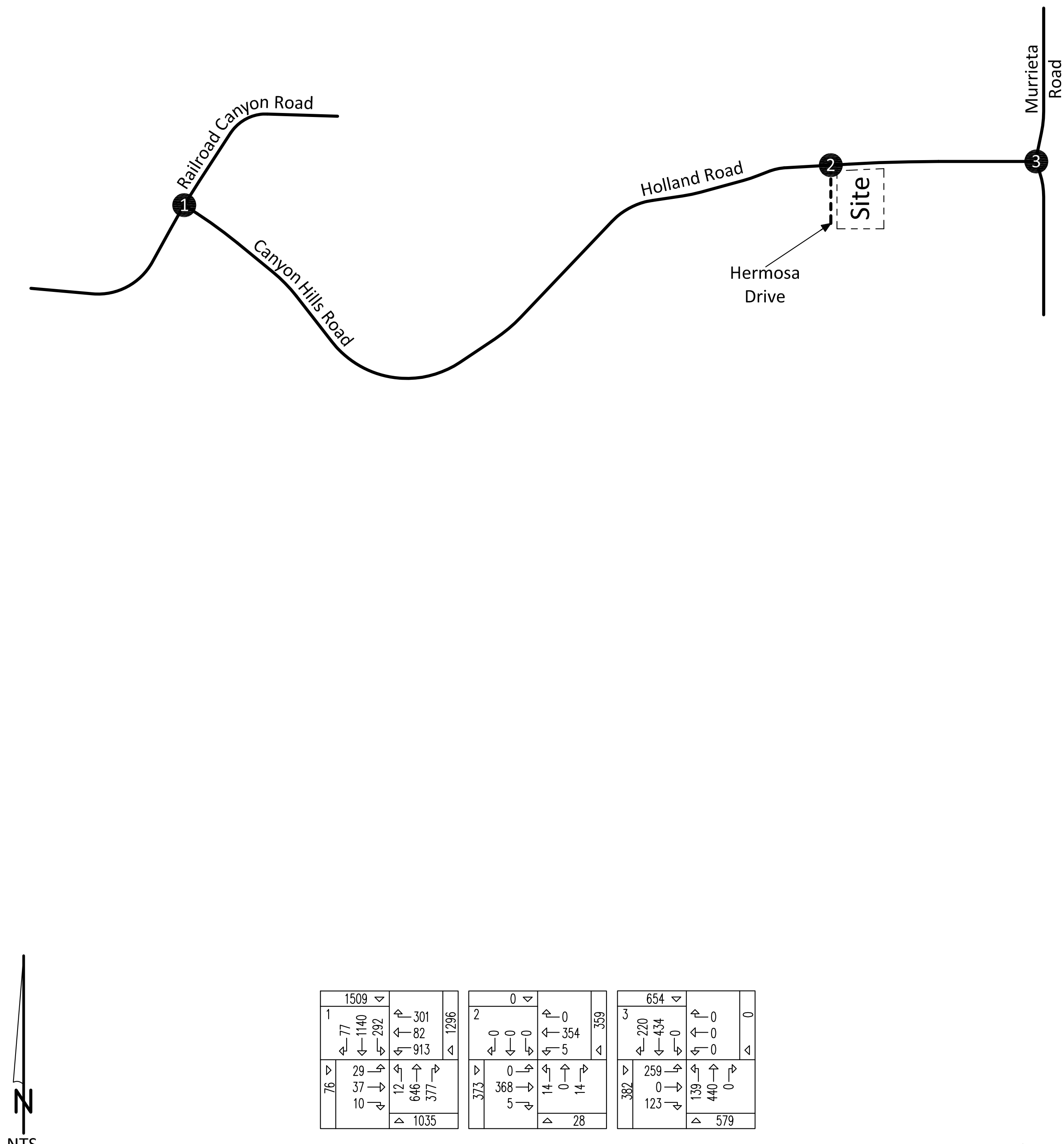
Figure 27
Opening Year (2016) Without Project
Morning Peak Hour Intersection Turning Movement Volumes



5590c/27

Kunzman Associates, Inc. Intersection reference numbers are in upper left corner of turning movement boxes.

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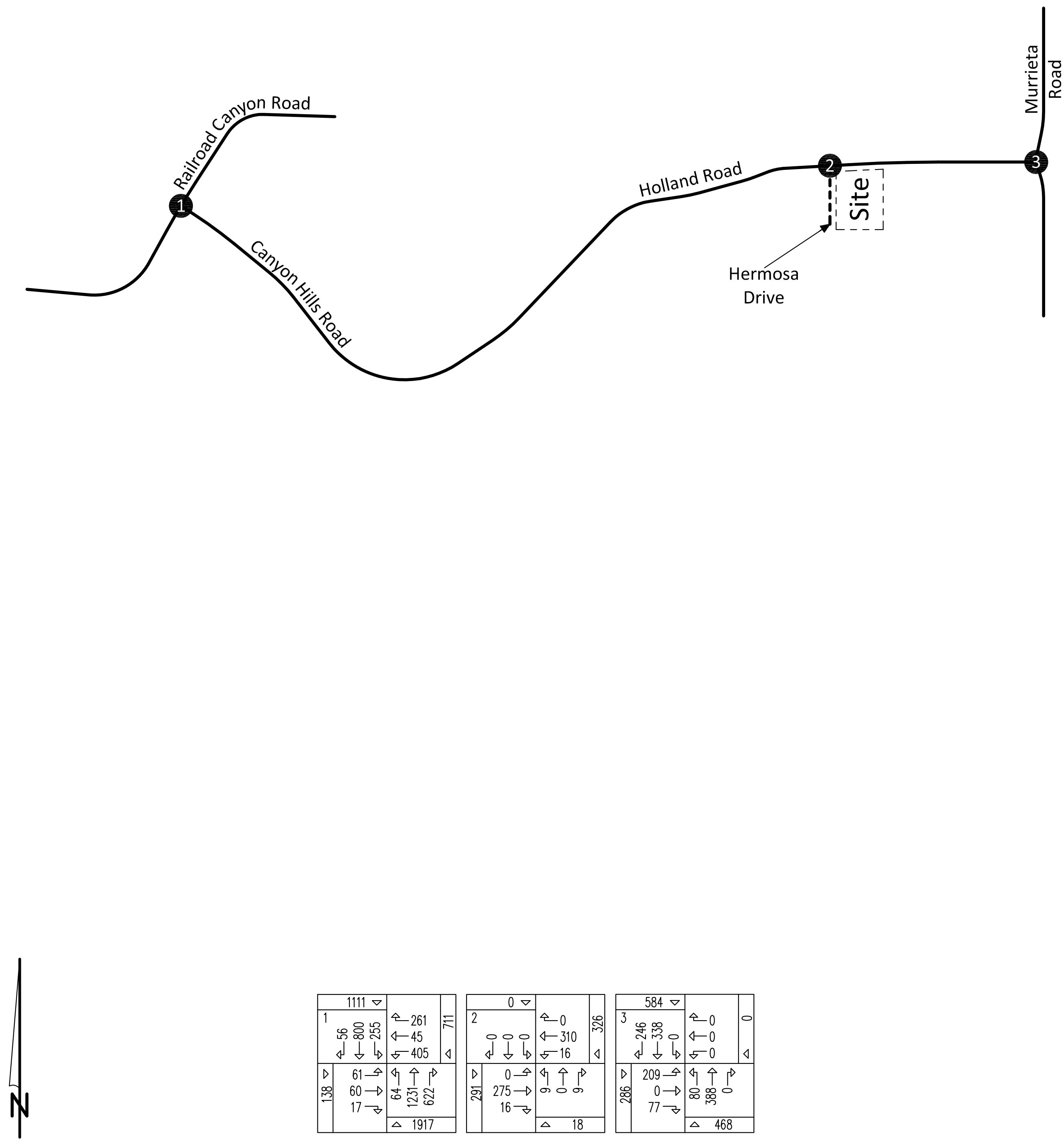
Figure 28
Opening Year (2016) Without Project
Evening Peak Hour Intersection Turning Movement Volumes



5590c/28

Kunzman Associates, Inc. Intersection reference numbers are in upper left corner of turning movement boxes.

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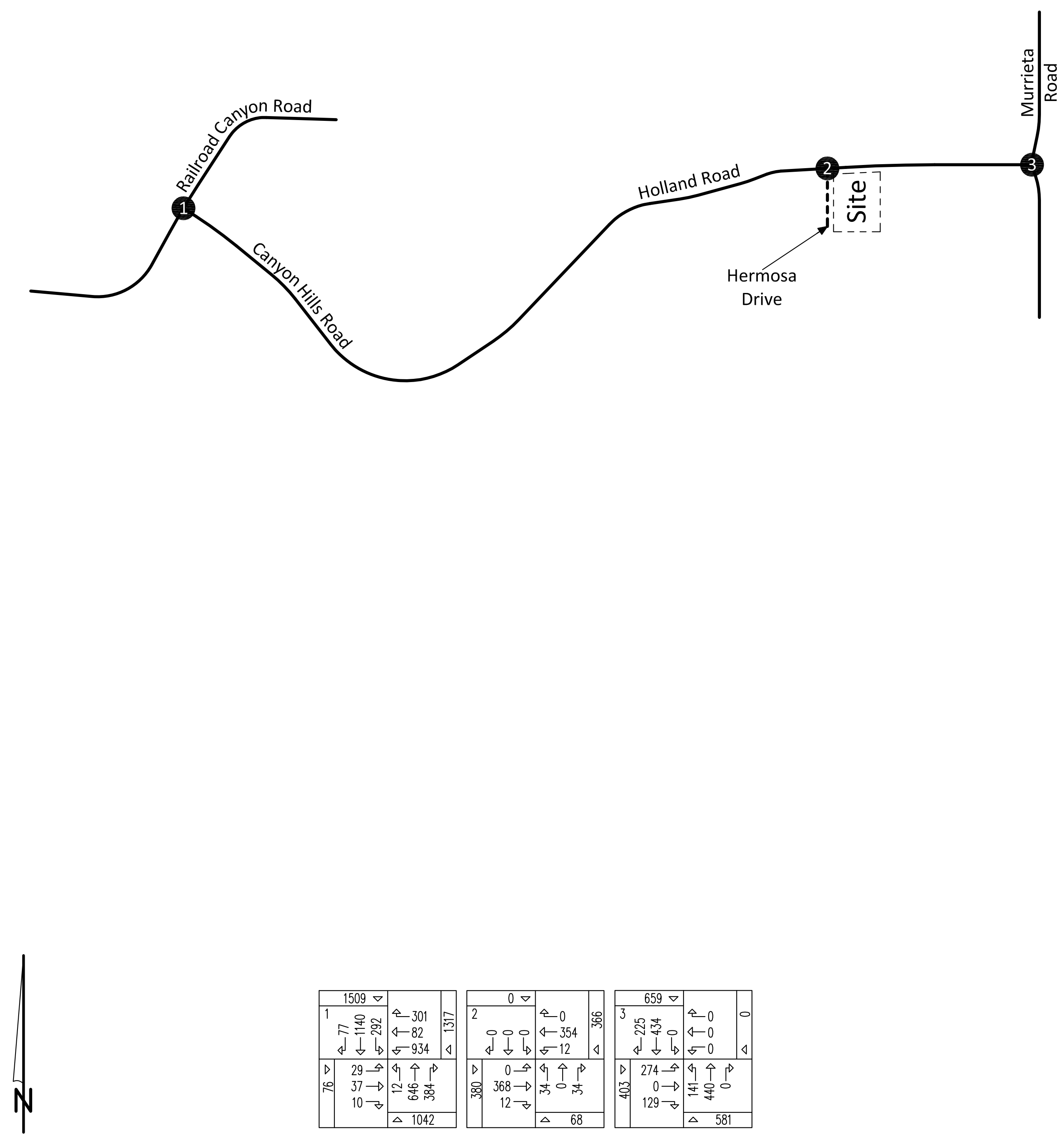
Figure 29
Opening Year (2016) With Project
Morning Peak Hour Intersection Turning Movement Volumes

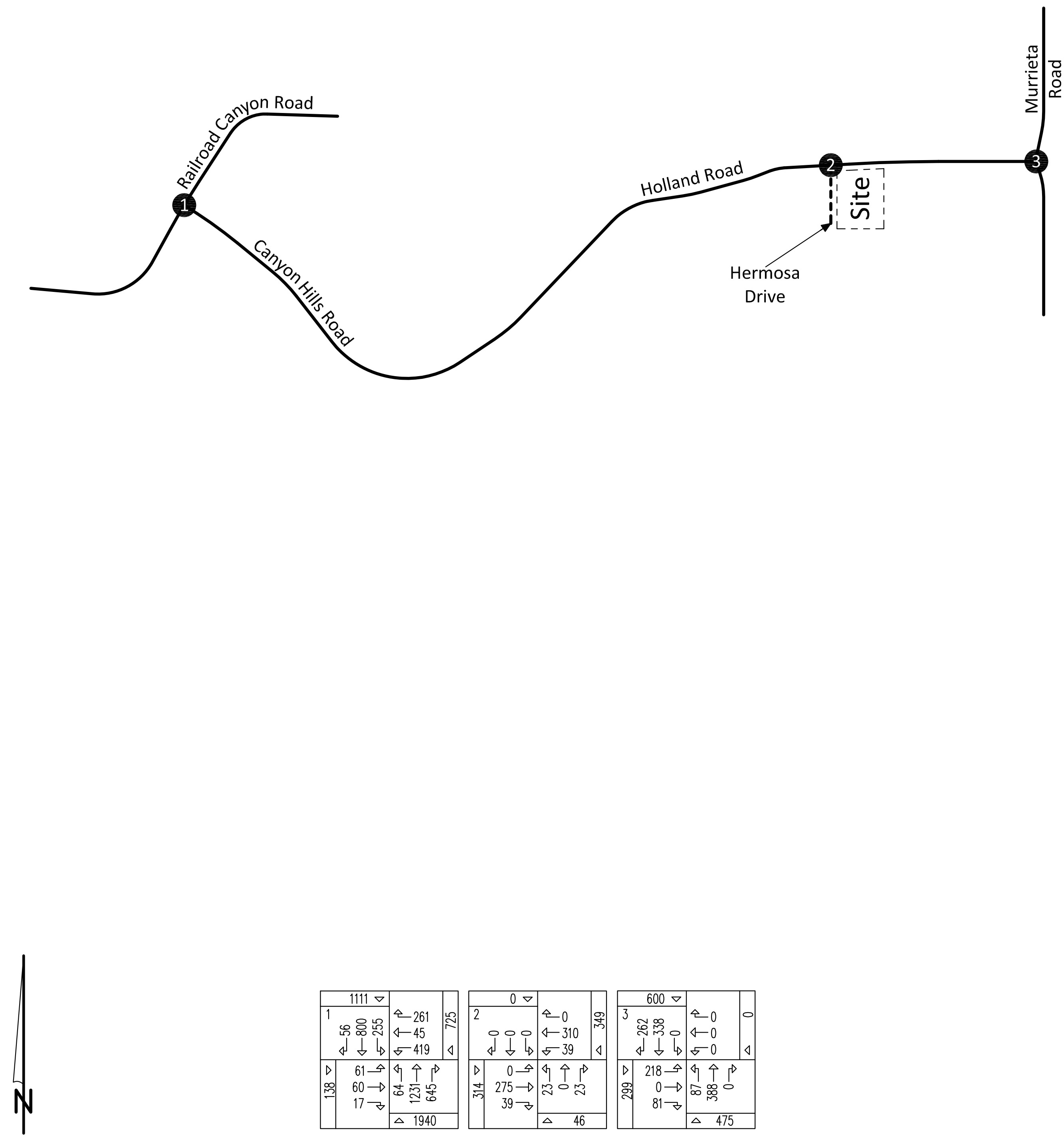


5590c/29

KUNZMAN ASSOCIATES, INC. Intersection reference numbers are in upper left corner of turning movement boxes.

OVER 35 YEARS OF EXCELLENT SERVICE

Figure 30
Opening Year (2016) With Project
Evening Peak Hour Intersection Turning Movement Volumes



5590c/30

KUNZMAN ASSOCIATES, INC. Intersection reference numbers are in upper left corner of turning movement boxes.

OVER 35 YEARS OF EXCELLENT SERVICE

VIII. Recommendations

A. Site Access

The proposed project will have access to Holland Road via Hermosa Drive, Elina Road and Obaria Way through the adjacent project of Canyon Hills Planning Area 32. Hermosa Drive, Elina Road and Obaria Way are proposed roadways to be utilized by Canyon Hills Planning Area 32 project and are currently under construction.

B. Roadway Improvements

1. On- Site

On-site improvements and improvements adjacent to the site will be required in conjunction with the proposed development to ensure adequate circulation within the project itself (see Figure 31).

Construct Holland Road from the west project boundary to the east project boundary at its ultimate half-section width including landscaping and parkway improvements in conjunction with development, as necessary.

Construct Corson Avenue from the west project boundary to the east project boundary at its ultimate half-section width including landscaping and parkway improvements in conjunction with development, as necessary, or pay cash in lieu for improvements as approved by the City Engineer.

Sight distance at project accesses should be reviewed with respect to California Department of Transportation/City of Lake Elsinore standards in conjunction with the preparation of final grading, landscaping, and street improvement plans. The final grading, landscaping, and street improvement plans shall demonstrate that sight distance standards are met. Such plans must be reviewed by the City and approved as consistent with this measure prior to issue of grading permits.

On-site traffic signing and striping should be implemented in conjunction with detailed construction plans for the project.

2. Off-Site

The project does not contribute enough trips to the adjacent street to require it to be upgraded from the proposed local street classification. As shown on Figure 26, the average daily traffic volumes on Hermosa Drive with the project and other development contributions (see Figure 19) is 1,190 vehicles per day. This in below the 1,600 vehicle per day threshold for a local street classification.

As is the case for any roadway design, the City of Lake Elsinore should periodically review traffic operations in the vicinity of the project once the project is constructed to assure that the traffic operations are satisfactory.

The project should participate in the phased construction of the off-site intersection improvements and traffic signalization through payment of established City of Lake Elsinore fees, participation in the Western Riverside Transportation Uniform Mitigation Fees program, assessment district, community facilities district financing and/or appropriate fair share financing agreement, and construction of off-site facilities under appropriate fee credit agreements.

C. Construction Traffic

Project construction would generate trips from construction worker travel, the arrival and departure of trucks delivering construction materials, and the removal of debris generated by on-site demolition activities   The site will be importing fill material from the adjacent Planning Areas of 32, 28A, and 28B. A portion of the grading of these four sections will be concurrent to balance the fill from one section to another. As these sections are adjoining the need to utilize the roadway is minimized. The grading is anticipated to be approximately two to three months in duration.

Compared to the project trip generation, construction of the proposed project is expected to generate significantly less trips. The traffic impacts of construction activity will be minor and temporary. To further lessen the impact of construction traffic, any temporary traffic controls used around the construction area should implement suitable measures (per the Southern California Chapter of the American Public Works Association, Work Area Traffic Control Handbook, 12th Edition, 2012, the California Department of Transportation Manual of Uniform Traffic Control Devices 2009 California Supplement, dated January 13, 2012) and City / County Standards to assure continued traffic flow along these roadway segments and construction activities should adhere to applicable local ordinances.

Table 7

Project Fair Share Intersection Traffic Contribution

Intersection	Jurisdiction	Improvement	Peak Hour	Existing Traffic	Year 2016 With Project Traffic	Project Traffic	Total New Traffic	Project % of New Traffic
Murrieta Road (NS) at: Holland Road (EW) - #3	Menifee	Traffic Signal[1]	Morning	1,294	1,797	27	503	N/A[2]
			Evening	976	1,569	36	593	N/A

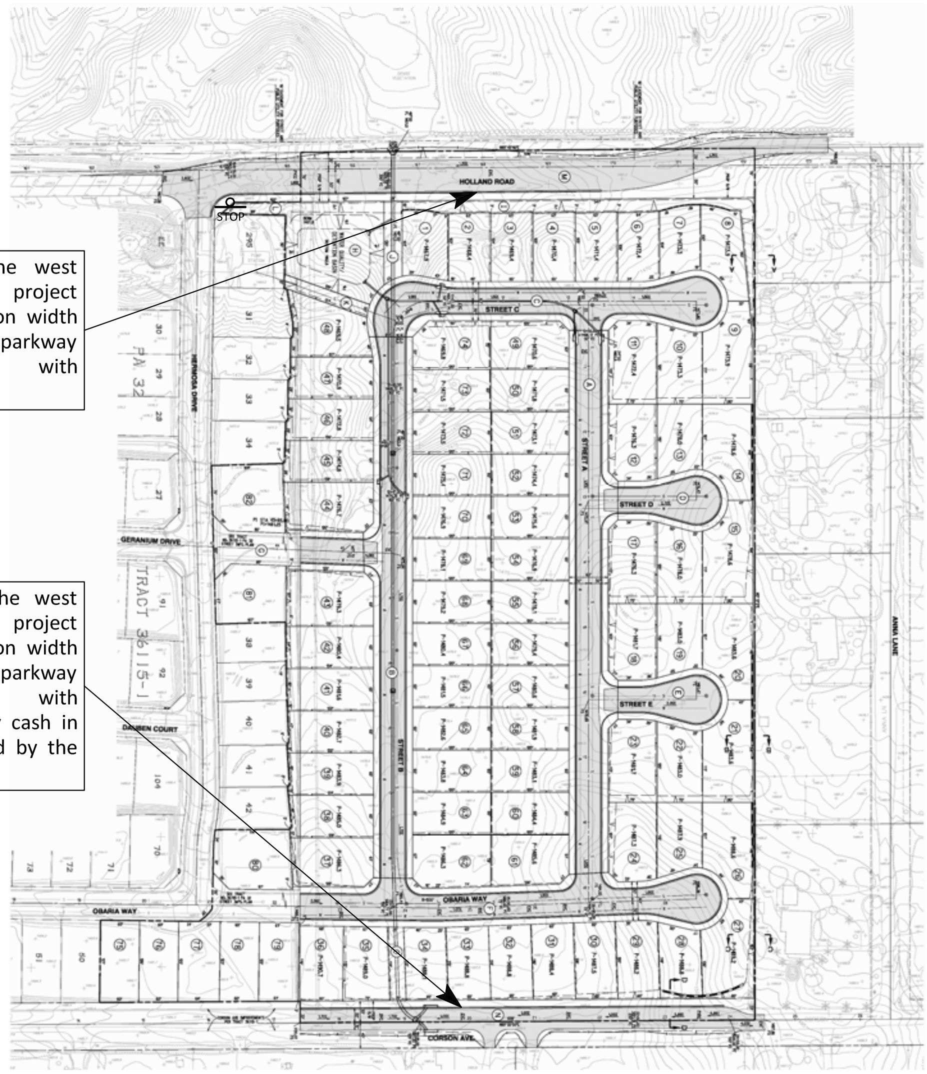
[1] Traffic signal appears to currently be warranted for this intersection for existing traffic conditions (see Appendix E).

[2] N/A = Not Applicable. It should be noted that this intersection does not meet the 50 peak hour trip criteria.

Figure 31
Circulation Recommendations

Construct Holland Road from the west project boundary to the east project boundary at its ultimate half-section width including landscaping and parkway improvements in conjunction with development, as necessary.

Construct Corson Avenue from the west project boundary to the east project boundary at its ultimate half-section width including landscaping and parkway improvements in conjunction with development, as necessary, or pay cash in lieu for improvements as approved by the City Engineer.



Legend

STOP = Stop Sign

Sight distance at project accesses should be reviewed with respect to California Department of Transportation/City of Lake Elsinore standards in conjunction with the preparation of final grading, landscaping, and street improvement plans. The final grading, landscaping, and street improvement plans shall demonstrate that sight distance standards are met. Such plans must be reviewed by the City and approved as consistent with this measure prior to issue of grading permits.

On-site traffic signing and striping should be implemented in conjunction with detailed construction plans for the project.

As is the case for any roadway design, the City of Lake Elsinore should periodically review traffic operations in the vicinity of the project once the project is constructed to assure that the traffic operations are satisfactory.

The project should participate in the phased construction of the off-site intersection improvements and traffic signalization through payment of established City of Lake Elsinore fees, participation in the Western Riverside Transportation Uniform Mitigation Fees program, assessment district, community facilities district financing and/or appropriate fair share financing agreement, and construction of off-site facilities under appropriate fee credit agreements.

N

NTS

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Appendices

Appendix A – Glossary of Transportation Terms

Appendix B – City of Lake Elsinore Scoping Agreement

Appendix C – Traffic Count Worksheets

Appendix D – Explanation and Calculation of Intersection Delay

Appendix E – Traffic Signal Warrant Worksheet

APPENDIX A

Glossary of Transportation Terms

GLOSSARY OF TRANSPORTATION TERMS

COMMON ABBREVIATIONS

AC:	Acres
ADT:	Average Daily Traffic
Caltrans:	California Department of Transportation
DU:	Dwelling Unit
ICU:	Intersection Capacity Utilization
LOS:	Level of Service
TSF:	Thousand Square Feet
V/C:	Volume/Capacity
VMT:	Vehicle Miles Traveled

TERMS

AVERAGE DAILY TRAFFIC: The total volume during a year divided by the number of days in a year. Usually only weekdays are included.

BANDWIDTH: The number of seconds of green time available for through traffic in a signal progression.

BOTTLENECK: A constriction along a travelway that limits the amount of traffic that can proceed downstream from its location.

CAPACITY: The maximum number of vehicles that can be reasonably expected to pass over a given section of a lane or a roadway in a given time period.

CHANNELIZATION: The separation or regulation of conflicting traffic movements into definite paths of travel by the use of pavement markings, raised islands, or other suitable means to facilitate the safe and orderly movements of both vehicles and pedestrians.

CLEARANCE INTERVAL: Nearly same as yellow time. If there is an all red interval after the end of a yellow, then that is also added into the clearance interval.

CORDON: An imaginary line around an area across which vehicles, persons, or other items are counted (in and out).

CYCLE LENGTH: The time period in seconds required for one complete signal cycle.

CUL-DE-SAC STREET: A local street open at one end only, and with special provisions for turning around.

DAILY CAPACITY: The daily volume of traffic that will result in a volume during the peak hour equal to the capacity of the roadway.

DELAY: The time consumed while traffic is impeded in its movement by some element over which it has no control, usually expressed in seconds per vehicle.

DEMAND RESPONSIVE SIGNAL: Same as traffic-actuated signal.

DENSITY: The number of vehicles occupying in a unit length of the through traffic lanes of a roadway at any given instant. Usually expressed in vehicles per mile.

DETECTOR: A device that responds to a physical stimulus and transmits a resulting impulse to the signal controller.

DESIGN SPEED: A speed selected for purposes of design. Features of a highway, such as curvature, superelevation, and sight distance (upon which the safe operation of vehicles is dependent) are correlated to design speed.

DIRECTIONAL SPLIT: The percent of traffic in the peak direction at any point in time.

DIVERSION: The rerouting of peak hour traffic to avoid congestion.

FORCED FLOW: Opposite of free flow.

FREE FLOW: Volumes are well below capacity. Vehicles can maneuver freely and travel is unimpeded by other traffic.

GAP: Time or distance between successive vehicles in a traffic stream, rear bumper to front bumper.

HEADWAY: Time or distance spacing between successive vehicles in a traffic stream, front bumper to front bumper.

INTERCONNECTED SIGNAL SYSTEM: A number of intersections that are connected to achieve signal progression.

LEVEL OF SERVICE: A qualitative measure of a number of factors, which include speed and travel time, traffic interruptions, freedom to maneuver, safety, driving comfort and convenience, and operating costs.

LOOP DETECTOR: A vehicle detector consisting of a loop of wire embedded in the roadway, energized by alternating current and producing an output circuit closure when passed over by a vehicle.

MINIMUM ACCEPTABLE GAP: Smallest time headway between successive vehicles in a traffic stream into which another vehicle is willing and able to cross or merge.

MULTI-MODAL: More than one mode; such as automobile, bus transit, rail rapid transit, and bicycle transportation modes.

OFFSET: The time interval in seconds between the beginning of green at one intersection and the beginning of green at an adjacent intersection.

PLATOON: A closely grouped component of traffic that is composed of several vehicles moving, or standing ready to move, with clear spaces ahead and behind.

ORIGIN-DESTINATION SURVEY: A survey to determine the point of origin and the point of destination for a given vehicle trip.

PASSENGER CAR EQUIVALENTS (PCE): One car is one Passenger Car Equivalent. A truck is equal to 2 or 3 Passenger Car Equivalents in that a truck requires longer to start, goes slower, and accelerates slower. Loaded trucks have a higher Passenger Car Equivalent than empty trucks.

PEAK HOUR: The 60 consecutive minutes with the highest number of vehicles.

PRETIMED SIGNAL: A type of traffic signal that directs traffic to stop and go on a predetermined time schedule without regard to traffic conditions. Also, fixed time signal.

PROGRESSION: A term used to describe the progressive movement of traffic through several signalized intersections.

SCREEN-LINE: An imaginary line or physical feature across which all trips are counted, normally to verify the validity of mathematical traffic models.

SIGNAL CYCLE: The time period in seconds required for one complete sequence of signal indications.

SIGNAL PHASE: The part of the signal cycle allocated to one or more traffic movements.

STARTING DELAY: The delay experienced in initiating the movement of queued traffic from a stop to an average running speed through a signalized intersection.

TRAFFIC-ACTUATED SIGNAL: A type of traffic signal that directs traffic to stop and go in accordance with the demands of traffic, as registered by the actuation of detectors.

TRIP: The movement of a person or vehicle from one location (origin) to another (destination). For example, from home to store to home are two trips, not one.

TRIP-END: One end of a trip at either the origin or destination; i.e. each trip has two trip-ends. A trip-end occurs when a person, object, or message is transferred to or from a vehicle.

TRIP GENERATION RATE: The quantity of trips produced and/or attracted by a specific land use stated in terms of units such as per dwelling, per acre, and per 1,000 square feet of floor space.

TRUCK: A vehicle having dual tires on one or more axles, or having more than two axles.

UNBALANCED FLOW: Heavier traffic flow in one direction than the other. On a daily basis, most facilities have balanced flow. During the peak hours, flow is seldom balanced in an urban area.

VEHICLE MILES OF TRAVEL: A measure of the amount of usage of a section of highway, obtained by multiplying the average daily traffic by length of facility in miles.

APPENDIX B

City of Lake Elsinore Scoping Agreement

SCOPING AGREEMENT FOR TRAFFIC IMPACT ANALYSIS

Project Name: **Canyon Hills PA 32B**
Project Address: **South of Holland Road and east of Hermosa Drive**
Project Description: **74 Single-Family Detached Residential Dwelling Units**

	Consultant	Developer
Name:	**KUNZMAN ASSOCIATES, INC.**	**PARDEE HOMES**
Address:	**1111 Town & Country Road, Suite 34**	**35050 Canyon Hills Road**
	Orange, CA 92868	**Lake Elsinore, CA 92532**
Telephone:	**(714) 973-8383**	**(951) 246-2218**

A. Trip Generation Source: **Institute of Transportation Engineers, Trip Generation, 9th Edition, 2012**

	Current Trip Generation In	Out	Total	Proposed Trip Generation In	Out	Total
AM				14	41	55
PM				47	27	74
Daily	–			–		704

Internal Trip Allowance Yes $\boxed{\text{No}}$ (___% Trip Discount)
Pass-By Trip Allowance Yes $\boxed{\text{No}}$ (___%Trip Discount)

B. Trip Geographic Distribution: N 35 % S 15 % E 0 % W 50 %

C. Background Traffic

Project Build-out Year 2015 Annual Ambient Growth Rate: 2 %
Phase Year(s) ________
Other area projects to be analyzed: **Please provide, thank you!**

Model/Forecast methodology ________

D. Study intersections:

1. Canyon Hills Road (NS) at Railroad Canyon Road (EW)
3. Hermosa Drive (NS) at Holland Road (EW)
5. Murrieta Road (NS) at Holland Road (EW)

E. Specific issues to be addressed:

Analyze Hermosa Drive roadway sizing
Review internal residential streets.

Recommended by:

Carl Ballard, Principal Associate — **January 30, 2014**
Consultant's Representative — Date

Revised on ________

Approved Scoping Agreement:

[signature] — 2/6/14
City of Lake Elsinore — Date
#5590

Table 1

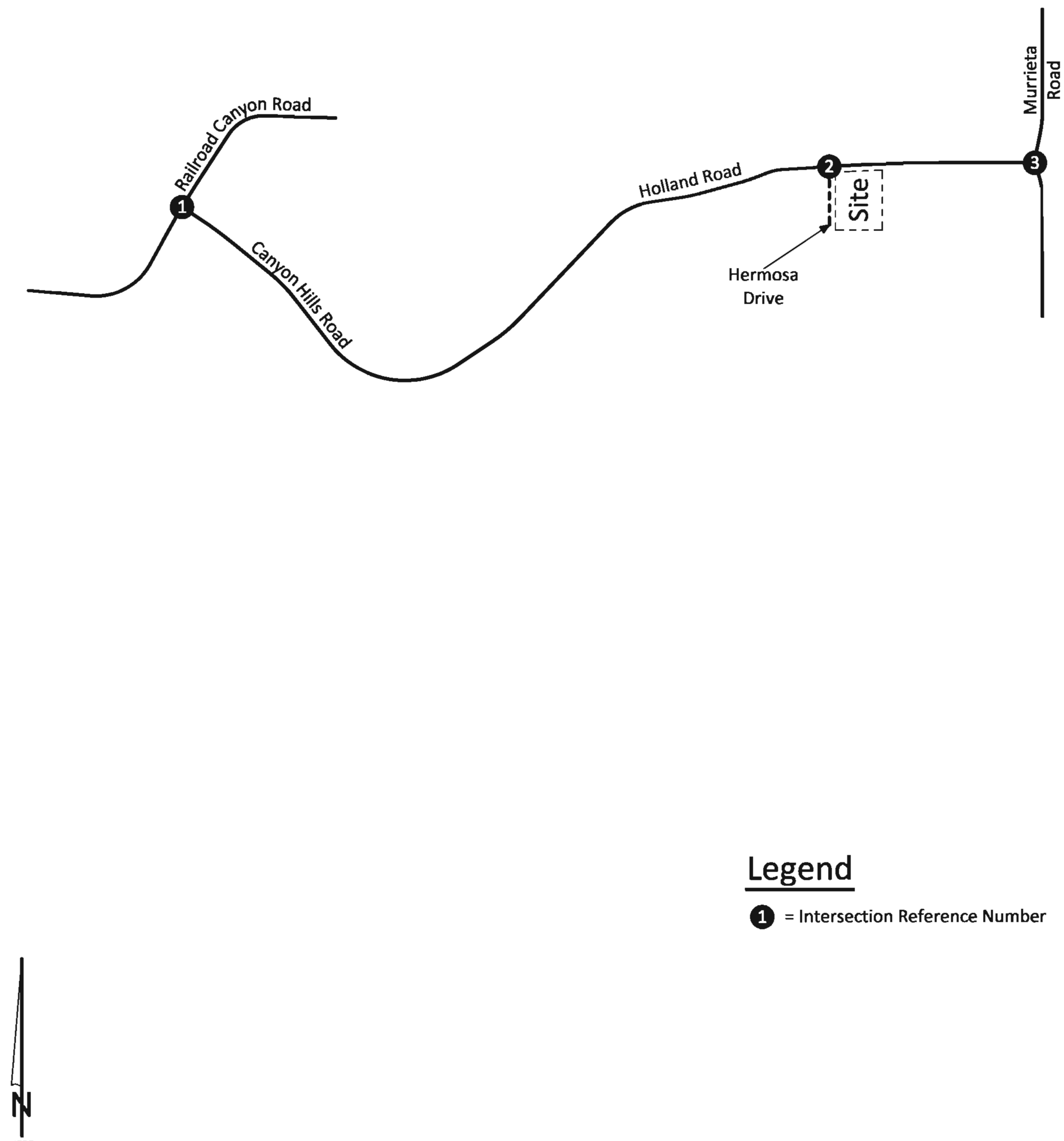
Project Trip Generation[1]

Land Use	Quantity	Units[2]	Peak Hour						Daily
			Morning			Evening			
			Inbound	Outbound	Total	Inbound	Outbound	Total	
Trip Generation Rates									
Single-Family Detached Residential		DU	0.19	0.56	0.75	0.63	0.37	1.00	9.52
Trips Generated									
Single-Family Detached Residential	74	DU	14	41	55	47	27	74	704

[1] Source: Institute of Transportation Engineers, Trip Generation, 9th Edition, 2012, Land Use Category 210.

[1] DU = Dwelling Units

Figure 1
Project Location Map



5590/1

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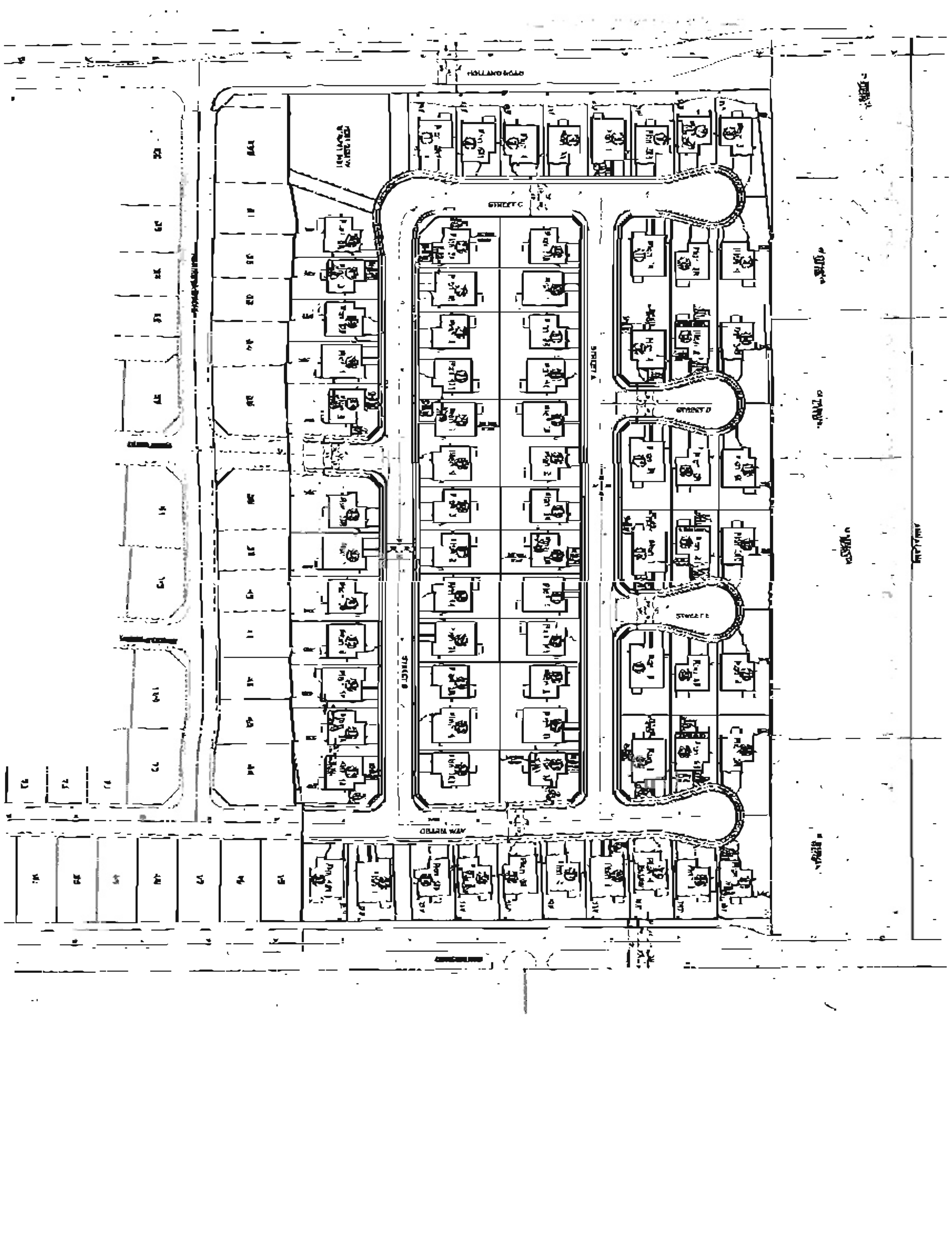
Figure 2
Site Plan



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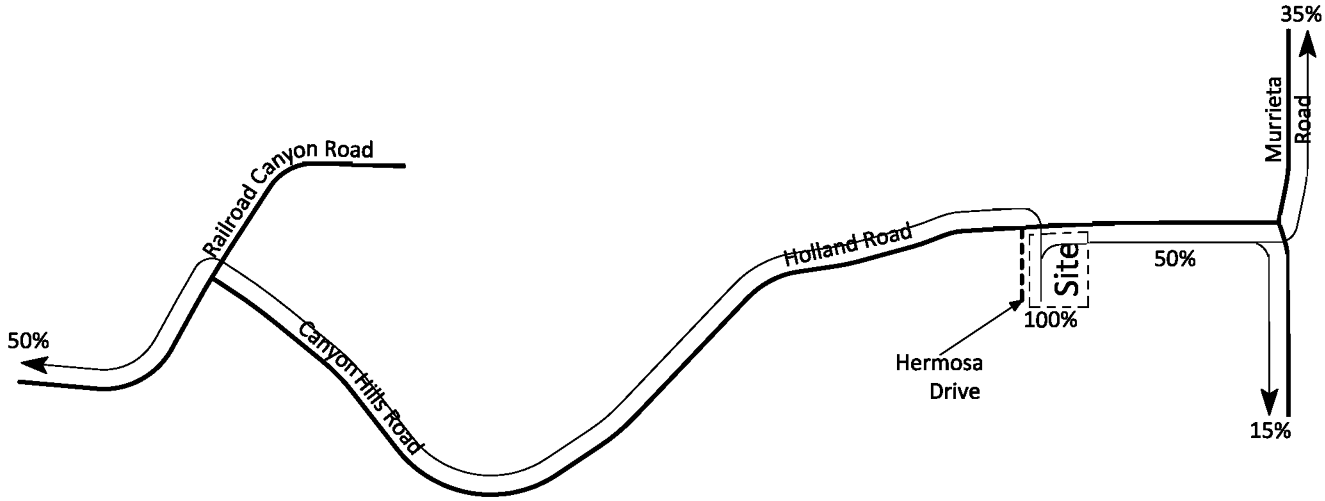
5590/2

Figure 3
Project Trip Distribution



Legend

10% = Percent To/From Project

5590/3

APPENDIX C

Traffic Count Worksheets

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 951 249 3226 pacific@aimtd.com

DATE:	LOCATION:	Lake Elsinore	PROJECT #:	SC0304
Tue, Feb 11, 14	NORTH & SOUTH:	Railroad Canyon	LOCATION #:	1
	EAST & WEST:	Canyon Hills	CONTROL:	SIGNAL

NOTES:

AM
PM
MD
OTHER
OTHER

▲ N
◄ W
E ►
S ▼

		NORTHBOUND Railroad Canyon			SOUTHBOUND Railroad Canyon			EASTBOUND Canyon Hills			WESTBOUND Canyon Hills			
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	LANES:	1	3	1	1	3	1	1	1	0	1.5	1	0.5	
AM	7:00 AM	5	69	85	48	211	22	2	7	3	147	9	31	639
	7:15 AM	2	94	109	103	225	16	3	10	1	228	25	37	853
	7:30 AM	3	138	113	87	306	23	5	5	5	219	25	103	1,032
	7:45 AM	4	147	53	60	252	23	10	12	1	168	17	98	845
	8:00 AM	3	176	45	31	209	12	10	9	3	137	12	51	698
	8:15 AM	2	122	45	38	269	12	2	6	2	85	13	33	629
	8:30 AM	3	133	36	23	259	16	5	1	1	80	11	38	606
	8:45 AM	4	163	32	26	215	16	5	6	3	110	9	34	623
	VOLUMES	26	1,042	518	416	1,946	140	42	56	19	1,174	121	425	5,947
	APPROACH %	2%	66%	33%	17%	78%	6%	36%	48%	16%	68%	7%	25%	
	APP/DEPART	1,589	/	1,528	2,521	/	3,142	117	/	990	1,720	/	287	0
	BEGIN PEAK HR		7:15 AM											
	VOLUMES	12	555	320	281	992	74	28	36	10	752	79	289	3,428
	APPROACH %	1%	63%	36%	21%	74%	5%	38%	49%	14%	67%	7%	26%	
	PEAK HR FACTOR		0.873			0.809			0.804			0.807		0.830
	APP/DEPART	887	/	872	1,347	/	1,754	74	/	637	1,120	/	165	0
PM	4:00 PM	9	249	90	48	136	9	8	10	2	92	10	67	730
	4:15 PM	11	271	101	54	156	11	10	9	0	75	11	66	775
	4:30 PM	4	272	90	57	148	14	13	7	0	83	14	60	762
	4:45 PM	7	264	92	53	172	12	11	14	4	77	12	64	782
	5:00 PM	19	264	89	70	185	16	10	13	4	74	9	54	807
	5:15 PM	22	250	107	57	165	10	23	12	1	72	11	61	791
	5:30 PM	8	274	124	52	154	11	10	17	4	80	11	68	813
	5:45 PM	13	270	136	66	165	17	16	16	7	80	12	68	866
	VOLUMES	93	2,114	829	457	1,281	100	101	98	22	633	90	508	6,370
	APPROACH %	3%	70%	27%	25%	70%	5%	46%	44%	10%	51%	7%	41%	
	APP/DEPART	3,041	/	2,761	1,876	/	1,941	221	/	1,385	1,232	/	283	0
	BEGIN PEAK HR		5:00 PM											
	VOLUMES	62	1,058	456	245	669	54	59	58	16	306	43	251	3,277
	APPROACH %	4%	67%	29%	25%	69%	6%	44%	44%	12%	51%	7%	42%	
	PEAK HR FACTOR		0.940			0.893			0.853			0.938		0.946
	APP/DEPART	1,576	/	1,368	968	/	991	133	/	759	600	/	159	0

Railroad Canyon

NORTH SIDE

Canyon Hills WEST SIDE

EAST SIDE **Canyon Hills**

SOUTH SIDE

Railroad Canyon

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 951 249 3226 pacific@aimtd.com

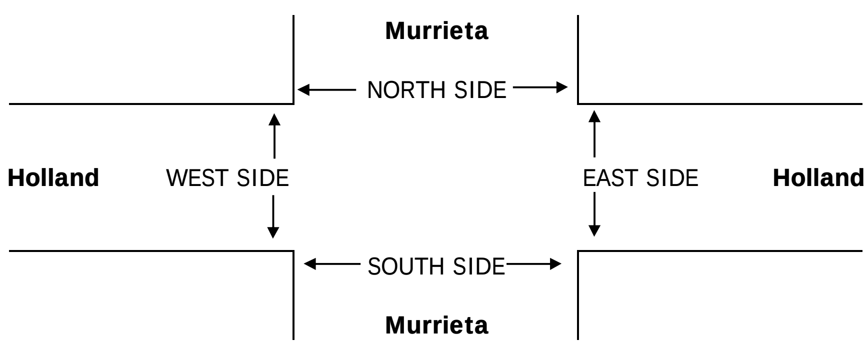
DATE: Tue, Feb 11, 14	LOCATION: Lake Elsinore	PROJECT #:	SC0304
	NORTH & SOUTH: Murrieta	LOCATION #:	2
	EAST & WEST: Holland	CONTROL:	Stop 1-way E

NOTES:

AM
PM
MD
OTHER
OTHER

▲ N
◄ W
E ►
S ▼

		NORTHBOUND Murrieta			SOUTHBOUND Murrieta			EASTBOUND Holland			WESTBOUND Holland			
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	LANES:	0	1	X	X	1	0	0	X	0	X	X	X	
AM	7:00 AM	20	65	0	0	61	46	36	0	21	0	0	0	249
AM	7:15 AM	54	88	0	0	96	87	23	0	14	0	0	0	362
AM	7:30 AM	31	105	0	1	111	40	43	0	25	0	0	0	356
AM	7:45 AM	24	92	0	0	86	32	49	0	26	0	0	0	309
AM	8:00 AM	5	72	0	0	101	25	50	0	15	0	0	0	268
AM	8:15 AM	18	88	0	0	126	18	24	0	20	0	0	0	294
AM	8:30 AM	22	101	0	0	69	16	27	0	21	0	0	0	256
AM	8:45 AM	8	58	0	0	27	20	20	0	7	0	0	0	140
AM	VOLUMES	182	669	0	1	677	284	272	0	149	0	0	0	2,234
AM	APPROACH %	21%	79%	0%	0%	70%	30%	65%	0%	35%	0%	0%	0%	
AM	APP/DEPART	851	/	941	962	/	826	421	/	1	0	/	466	0
AM	BEGIN PEAK HR		7:15 AM											
AM	VOLUMES	114	357	0	1	394	184	165	0	80	0	0	0	1,295
AM	APPROACH %	24%	76%	0%	0%	68%	32%	67%	0%	33%	0%	0%	0%	
AM	PEAK HR FACTOR		0.829			0.791			0.817			0.000		0.894
AM	APP/DEPART	471	/	522	579	/	474	245	/	1	0	/	298	0
PM	4:00 PM	10	80	0	0	56	30	29	0	9	0	0	0	214
PM	4:15 PM	6	83	0	0	55	35	34	0	13	0	0	0	226
PM	4:30 PM	9	89	0	0	49	38	28	0	6	0	0	0	219
PM	4:45 PM	10	81	0	0	59	37	39	0	11	0	0	0	237
PM	5:00 PM	8	77	0	0	64	35	42	0	11	0	0	0	237
PM	5:15 PM	9	86	0	0	68	33	33	1	9	0	0	0	239
PM	5:30 PM	5	85	0	0	59	37	31	0	11	0	0	0	228
PM	5:45 PM	9	85	0	0	43	37	32	0	12	0	0	0	218
PM	VOLUMES	66	666	0	0	453	282	268	1	82	0	0	0	1,818
PM	APPROACH %	9%	91%	0%	0%	62%	38%	76%	0%	23%	0%	0%	0%	
PM	APP/DEPART	732	/	934	735	/	535	351	/	1	0	/	348	0
PM	BEGIN PEAK HR		4:45 PM											
PM	VOLUMES	32	329	0	0	250	142	145	1	42	0	0	0	941
PM	APPROACH %	9%	91%	0%	0%	64%	36%	77%	1%	22%	0%	0%	0%	
PM	PEAK HR FACTOR		0.950			0.970			0.887			0.000		0.984
PM	APP/DEPART	361	/	474	392	/	292	188	/	1	0	/	174	0



APPENDIX D

Explanation and Calculation of Intersection Delay

EXPLANATION AND CALCULATION OF INTERSECTION LEVEL OF SERVICE USING DELAY METHODOLOGY

The levels of service at the unsignalized and signalized intersections are calculated using the delay methodology in the Highway Capacity Manual. This methodology views an intersection as consisting of several lane groups. A lane group is a set of lanes serving a movement. If there are two northbound left turn lanes, then the lane group serving the northbound left turn movement has two lanes. Similarly, there may be three lanes in the lane group serving the northbound through movement, one lane in the lane group serving the northbound right turn movement, and so forth. It is also possible for one lane to serve two lane groups. A shared lane might result in there being 1.5 lanes in the northbound left turn lane group and 2.5 lanes in the northbound through lane group.

For each lane group, there is a capacity. That capacity is calculated by multiplying the number of lanes in the lane group times a theoretical maximum lane capacity per lane times 12 adjustment factors.

Each of the 12 adjustment factors has a value of approximately 1.00. A value less than 1.00 is generally assigned when a less than desirable condition occurs.

The 12 adjustment factors are as follows:

1. Peak hour factor (to account for peaking within the peak hour)
2. Lane utilization factor (to account for not all lanes loading equally)
3. Lane width
4. Percent of heavy trucks
5. Approach grade
6. Parking
7. Bus stops at intersections
8. Area type (CBD or other)
9. Right turns
10. Left turns

11. Pedestrian activity

12. Signal progression

The maximum theoretical lane capacity and the 12 adjustment factors for it are all unknowns for which approximate estimates have been recommended in the Highway Capacity Manual. For the most part, the recommended values are not based on statistical analysis but rather on educated estimates. However, it is possible to use the delay method and get reasonable results as will be discussed below.

Once the lane group volume is known and the lane group capacity is known, a volume to capacity ratio can be calculated for the lane group.

With a volume to capacity ratio calculated, average delay per vehicle in a lane group can be estimated. The average delay per vehicle in a lane group is calculated using a complex formula provided by the Highway Capacity Manual, which can be simplified and described as follows:

Delay per vehicle in a lane group is a function of the following:

1. Cycle length

2. Amount of red time faced by a lane group

3. Amount of yellow time for that lane group

4. The volume to capacity ratio of the lane group

The average delay per vehicle for each lane group is calculated, and eventually an overall average delay for all vehicles entering the intersection is calculated. This average delay per vehicle is then used to judge Level of Service. The Level of Services are defined in the table that follows this discussion.

Experience has shown that when a maximum lane capacity of 1,900 vehicles per hour is used (as recommended in the Highway Capacity Manual), little or no yellow time penalty is used, and none of the 12 penalty factors are applied, calculated delay is realistic. The delay calculation for instance assumes that yellow time is totally unused. Yet experience shows that most of the yellow time is used.

An idiosyncrasy of the delay methodology is that it is possible to add traffic to an intersection and reduce the average total delay per vehicle. If the average total delay is 30 seconds per vehicle for all vehicles traveling through an intersection, and traffic is added to a movement that has an average total delay of 15 seconds per vehicle, then the overall average total delay is reduced.

The delay calculation for a lane group is based on a concept that the delay is a function of the amount of unused capacity available. As the volume approaches capacity and there is no more unused capacity available, then the delay rapidly increases. Delay is not proportional to volume, but rather increases rapidly as the unused capacity approaches zero.

Because delay is not linearly related to volumes, the delay does not reflect how close an intersection is to overloading. If an intersection is operating at Level of Service C and has an average total delay of 2 seconds per vehicle, you know very little as to what percent the traffic can increase before Level of Service E is reached.

LEVEL OF SERVICE DESCRIPTION[1]

Level of Service	Description	Average Total Delay Per Vehicle (Seconds)	
		Signalized	Unsignalized
A	Level of Service A occurs when progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.	0 to 10.00	0 to 10.00
B	Level of Service B generally occurs with good progression and/or short cycle lengths. More vehicles stop than for Level of Service A, causing higher levels of average total delay.	10.01 to 20.00	10.01 to 15.00
C	Level of Service C generally results when there is fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear in this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.	20.01 to 35.00	15.01 to 25.00
D	Level of Service D generally results in noticeable congestion. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volume to capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.	35.01 to 55.00	25.01 to 35.00
E	Level of Service E is considered to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high volume to capacity ratios. Individual cycle failures are frequent occurrences.	55.01 to 80.00	35.01 to 50.00
F	Level of Service F is considered to be unacceptable to most drivers. This condition often occurs with oversaturation, i.e., when arrival flow rates exceed the capacity of the intersection. It may also occur at high volume to capacity ratios below 1.00 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.	80.01 and up	50.01 and up

[1] Source: Highway Capacity Manual Special Report 209, Transportation Research Board, National Research Council, Washington, D.C., 2000.

Existing

Canyon Hills Residential PA-32B
Existing
Morning Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #1 Railroad Canyon Road (NS) at Canyon Hills Road(EW)

Cycle (sec):	75	Critical Vol./Cap.(X):	0.658
Loss Time (sec):	16 (Y+R=4.0 sec)	Average Delay (sec/veh):	28.2
Optimal Cycle:	OPTIMIZED	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Split Phase			Split Phase		
Rights:	Ovl			Include			Include			Include		
Min. Green:	7	7	7	7	7	7	7	7	7	7	7	7
Lanes:	1 0 3 0 1			1 0 3 0 1			1 0 0 1 0			1 1 0 1 0		
Volume Module:												
Base Vol:	12	555	320	281	992	74	28	36	10	752	79	289
Growth 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
Initial Bse:	12	555	320	281	992	74	28	36	10	752	79	289
User 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
PHF Adj:	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
PHF Volume:	14	668	385	338	1195	89	34	43	12	906	95	348
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	14	668	385	338	1195	89	34	43	12	906	95	348
PCE 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
MLF 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
FinalVolume:	14	668	385	338	1195	89	34	43	12	906	95	348
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	0.95	0.95	0.95
Lanes:	1.00	3.00	1.00	1.00	3.00	1.00	1.00	0.78	0.22	2.00	0.21	0.79
Final Sat.:	1900	5187	1900	1900	5187	1900	1900	1487	413	3610	387	1418
Capacity Analysis Module:												
Vol/Sat:	0.01	0.13	0.20	0.18	0.23	0.05	0.02	0.03	0.03	0.25	0.25	0.25
Crit Moves:	****				****			****		****		
Green/Cycle:	0.09	0.16	0.47	0.22	0.29	0.29	0.09	0.09	0.09	0.31	0.31	0.31
Volume/Cap:	0.08	0.81	0.43	0.81	0.80	0.16	0.19	0.31	0.31	0.80	0.78	0.78
Delay/Veh:	31.3	36.3	13.4	38.7	28.0	20.1	31.9	32.8	32.8	26.5	25.9	25.9
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	31.3	36.3	13.4	38.7	28.0	20.1	31.9	32.8	32.8	26.5	25.9	25.9
LOS by Move:	C	D	B	D	C	C	C	C	C	C	C	C
HCM2kAvgQ:	0	8	6	10	12	2	1	2	2	12	12	12

Note: Queue reported is the number of cars per lane.

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Canyon Hills Residential PA-32B
Existing
Evening Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #1 Railroad Canyon Road (NS) at Canyon Hills Road(EW)

Cycle (sec): 60 Critical Vol./Cap.(X): 0.736
Loss Time (sec): 16 (Y+R=4.0 sec) Average Delay (sec/veh): 23.3
Optimal Cycle: OPTIMIZED Level Of Service: C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Split Phase			Split Phase		
Rights:	Ovl			Include			Include			Include		
Min. Green:	7	7	7	7	7	7	7	7	7	7	7	7
Lanes:	1 0	3 0	1	1 0	3 0	1	1 0	0 1	0	1 1	0 1	0
Volume Module:												
Base Vol:	62	1058	456	245	669	54	59	58	16	306	43	251
Growth 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
Initial Bse:	62	1058	456	245	669	54	59	58	16	306	43	251
User 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
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	66	1118	482	259	707	57	62	61	17	323	45	265
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	66	1118	482	259	707	57	62	61	17	323	45	265
PCE 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
MLF 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
FinalVolume:	66	1118	482	259	707	57	62	61	17	323	45	265
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	0.95	0.95	0.95
Lanes:	1.00	3.00	1.00	1.00	3.00	1.00	1.00	0.78	0.22	1.75	0.25	1.00
Final Sat.:	1900	5187	1900	1900	5187	1900	1900	1489	411	3165	445	1805
Capacity Analysis Module:												
Vol/Sat:	0.03	0.22	0.25	0.14	0.14	0.03	0.03	0.04	0.04	0.10	0.10	0.15
Crit Moves:		****		****				****				****
Green/Cycle:	0.20	0.27	0.45	0.17	0.23	0.23	0.12	0.12	0.12	0.18	0.18	0.18
Volume/Cap:	0.17	0.81	0.57	0.81	0.58	0.13	0.28	0.35	0.35	0.56	0.56	0.81
Delay/Veh:	20.1	24.3	13.1	38.2	21.1	18.3	24.9	25.4	25.4	23.0	23.0	29.8
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	20.1	24.3	13.1	38.2	21.1	18.3	24.9	25.4	25.4	23.0	23.0	29.8
LOS by Move:	C	C	B	D	C	B	C	C	C	C	C	C
HCM2kAvgQ:	1	10	7	7	5	1	1	2	2	4	4	8

Note: Queue reported is the number of cars per lane.

```
-----------------------------------------------------------------------------
                      Canyon Hills Residential PA-32B
                                 Existing
                            Morning Peak Hour
-----------------------------------------------------------------------------

                     Level Of Service Computation Report
          2000 HCM Unsignalized Method (Base Volume Alternative)
*****************************************************************************
Intersection #3 Murrieta Road (NS) at Canyon Hills Road(EW)
*****************************************************************************
Average Delay (sec/veh):     30.2       Worst Case Level Of Service: F[155.1]
*****************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:        0  1  0  0  0    0  0  0  1  0    0  0  1! 0  0    0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     114  357    0      0  394  184    165    0   80      0    0    0
Growth 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
Initial Bse:  114  357    0      0  394  184    165    0   80      0    0    0
User 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
PHF Adj:     0.89 0.89  0.89  0.89 0.89  0.89  0.89 0.89  0.89  0.89 0.89  0.89
PHF Volume:   127  399    0      0  441  206    185    0   89      0    0    0
Reduct Vol:     0    0    0      0    0    0      0    0    0      0    0    0
FinalVolume:  127  399    0      0  441  206    185    0   89      0    0    0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.4  6.5   6.2 xxxxx xxxx xxxxx
FollowUpTim:  2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  646 xxxx xxxxx  xxxx xxxx xxxxx  1198 1198   543  xxxx xxxx xxxxx
Potent Cap.:  949 xxxx xxxxx  xxxx xxxx xxxxx   207  187   543  xxxx xxxx xxxxx
Move Cap.:    949 xxxx xxxxx  xxxx xxxx xxxxx   184  160   543  xxxx xxxx xxxxx
Volume/Cap:  0.13 xxxx  xxxx  xxxx xxxx  xxxx  1.00 0.00  0.16  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.5 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  9.4 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  235 xxxxx  xxxx xxxx xxxxx
SharedQueue:  0.5 xxxx xxxxx xxxxx xxxx xxxxx xxxxx 12.9 xxxxx xxxxx xxxx xxxxx
Shrd ConDel:  9.4 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  155 xxxxx xxxxx xxxx xxxxx
Shared LOS:     A    *     *     *    *     *     *    F     *     *    *     *
ApproachDel:     xxxxxx           xxxxxx           155.1            xxxxxx
ApproachLOS:        *                *               F                 *
*****************************************************************************
Note: Queue reported is the number of cars per lane.
*****************************************************************************
```

```
--------------------------------------------------------------------------------
                        Canyon Hills Residential PA-32B
                                   Existing
                               Evening Peak Hour
--------------------------------------------------------------------------------

                     Level Of Service Computation Report
          2000 HCM Unsignalized Method (Base Volume Alternative)
********************************************************************************
Intersection #3 Murrieta Road (NS) at Canyon Hills Road(EW)
********************************************************************************
Average Delay (sec/veh):       4.2       Worst Case Level Of Service: C[ 19.8]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|----------------||----------------||----------------||----------------|
Control:      Uncontrolled     Uncontrolled       Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:       0  1  0  0  0    0  0  0  1  0    0  0  1! 0  0    0  0  0  0  0
------------|----------------||----------------||----------------||----------------|
Volume Module:
Base Vol:      32  329     0     0  250   142   145    0    42     0    0     0
Growth 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
Initial Bse:   32  329     0     0  250   142   145    0    42     0    0     0
User 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
PHF Adj:     0.98 0.98  0.98  0.98 0.98  0.98  0.98 0.98  0.98  0.98 0.98  0.98
PHF Volume:    33  334     0     0  254   144   147    0    43     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:   33  334     0     0  254   144   147    0    43     0    0     0
------------|----------------||----------------||----------------||----------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.4  6.5   6.2 xxxxx xxxx xxxxx
FollowUpTim:  2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|----------------||----------------||----------------||----------------|
Capacity Module:
Cnflict Vol:  398 xxxx xxxxx  xxxx xxxx xxxxx   725  725   326  xxxx xxxx xxxxx
Potent Cap.: 1171 xxxx xxxxx  xxxx xxxx xxxxx   395  354   720  xxxx xxxx xxxxx
Move Cap.:   1171 xxxx xxxxx  xxxx xxxx xxxxx   386  344   720  xxxx xxxx xxxxx
Volume/Cap:  0.03 xxxx  xxxx  xxxx xxxx  xxxx  0.38 0.00  0.06  xxxx xxxx  xxxx
------------|----------------||----------------||----------------||----------------|
Level Of Service Module:
2Way95thQ:    0.1 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  8.2 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  431 xxxxx  xxxx xxxx xxxxx
SharedQueue:  0.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  2.2 xxxxx xxxxx xxxx xxxxx
Shrd ConDel:  8.2 xxxx xxxxx xxxxx xxxx xxxxx xxxxx 19.8 xxxxx xxxxx xxxx xxxxx
Shared LOS:     A    *     *     *    *     *     *    C     *     *    *     *
ApproachDel:       xxxxxx           xxxxxx             19.8            xxxxxx
ApproachLOS:         *                *                  C                *
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
```

Existing Plus Project

Canyon Hills Residential PA-32B
Existing Plus Project
Morning Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #1 Railroad Canyon Road (NS) at Canyon Hills Road(EW)

Cycle (sec): 75 Critical Vol./Cap.(X): 0.667
Loss Time (sec): 16 (Y+R=4.0 sec) Average Delay (sec/veh): 28.6
Optimal Cycle: OPTIMIZED Level Of Service: C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Split Phase			Split Phase		
Rights:	Ovl			Include			Include			Include		
Min. Green:	7	7	7	7	7	7	7	7	7	7	7	7
Lanes:	1 0	3 0	1	1 0	3 0	1	1 0	0 1	0	1 1	0 1	0
Volume Module:												
Base Vol:	12	555	320	281	992	74	28	36	10	752	79	289
Growth 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
Initial Bse:	12	555	320	281	992	74	28	36	10	752	79	289
Added Vol:	0	0	7	0	0	0	0	0	0	21	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	12	555	327	281	992	74	28	36	10	773	79	289
User 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
PHF Adj:	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
PHF Volume:	14	668	394	338	1195	89	34	43	12	931	95	348
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	14	668	394	338	1195	89	34	43	12	931	95	348
PCE 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
MLF 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
FinalVolume:	14	668	394	338	1195	89	34	43	12	931	95	348
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	0.95	0.95	0.95
Lanes:	1.00	3.00	1.00	1.00	3.00	1.00	1.00	0.78	0.22	2.00	0.21	0.79
Final Sat.:	1900	5187	1900	1900	5187	1900	1900	1487	413	3610	387	1418
Capacity Analysis Module:												
Vol/Sat:	0.01	0.13	0.21	0.18	0.23	0.05	0.02	0.03	0.03	0.26	0.25	0.25
Crit Moves:	****				****			****		****		
Green/Cycle:	0.09	0.16	0.47	0.22	0.28	0.28	0.09	0.09	0.09	0.32	0.32	0.32
Volume/Cap:	0.08	0.82	0.44	0.82	0.81	0.17	0.19	0.31	0.31	0.81	0.77	0.77
Delay/Veh:	31.3	36.9	13.4	39.7	28.6	20.4	31.9	32.8	32.8	26.7	25.4	25.4
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	31.3	36.9	13.4	39.7	28.6	20.4	31.9	32.8	32.8	26.7	25.4	25.4
LOS by Move:	C	D	B	D	C	C	C	C	C	C	C	C
HCM2kAvgQ:	0	8	6	10	12	2	1	2	2	13	12	12

Note: Queue reported is the number of cars per lane.

Canyon Hills Residential PA-32B
Existing Plus Project
Evening Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #1 Railroad Canyon Road (NS) at Canyon Hills Road(EW)

Cycle (sec): 60 | Critical Vol./Cap.(X): 0.736
Loss Time (sec): 16 (Y+R=4.0 sec) | Average Delay (sec/veh): 23.3
Optimal Cycle: OPTIMIZED | Level Of Service: C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Split Phase			Split Phase		
Rights:	Ovl			Include			Include			Include		
Min. Green:	7	7	7	7	7	7	7	7	7	7	7	7
Lanes:	1 0	3 0	1	1 0	3 0	1	1 0	0 1	0	1 1	0 1	0
Volume Module:												
Base Vol:	62	1058	456	245	669	54	59	58	16	306	43	251
Growth 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
Initial Bse:	62	1058	456	245	669	54	59	58	16	306	43	251
Added Vol:	0	0	24	0	0	0	0	0	0	14	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	62	1058	480	245	669	54	59	58	16	320	43	251
User 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
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	66	1118	507	259	707	57	62	61	17	338	45	265
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	66	1118	507	259	707	57	62	61	17	338	45	265
PCE 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
MLF 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
FinalVolume:	66	1118	507	259	707	57	62	61	17	338	45	265
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	0.95	0.95	0.95
Lanes:	1.00	3.00	1.00	1.00	3.00	1.00	1.00	0.78	0.22	1.76	0.24	1.00
Final Sat.:	1900	5187	1900	1900	5187	1900	1900	1489	411	3182	428	1805
Capacity Analysis Module:												
Vol/Sat:	0.03	0.22	0.27	0.14	0.14	0.03	0.03	0.04	0.04	0.11	0.11	0.15
Crit Moves:		****		****				****				****
Green/Cycle:	0.20	0.27	0.45	0.17	0.23	0.23	0.12	0.12	0.12	0.18	0.18	0.18
Volume/Cap:	0.17	0.81	0.60	0.81	0.58	0.13	0.28	0.35	0.35	0.59	0.59	0.81
Delay/Veh:	20.1	24.3	13.6	38.2	21.1	18.3	24.9	25.4	25.4	23.3	23.3	29.7
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	20.1	24.3	13.6	38.2	21.1	18.3	24.9	25.4	25.4	23.3	23.3	29.7
LOS by Move:	C	C	B	D	C	B	C	C	C	C	C	C
HCM2kAvgQ:	1	10	8	7	5	1	1	2	2	4	4	8

Note: Queue reported is the number of cars per lane.

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--------------------------------------------------------------------------------
                    Canyon Hills Residential PA-32B
                        Existing Plus Project
                          Morning Peak Hour
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                    Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #2 Hermosa Drive (NS) at Canyon Hills Road(EW)
********************************************************************************
Average Delay (sec/veh):      0.9       Worst Case Level Of Service: B[ 11.4]
********************************************************************************
Approach:       North Bound      South Bound       East Bound        West Bound
Movement:      L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Uncontrolled      Uncontrolled
Rights:          Include          Include           Include           Include
Lanes:         1  0  0  0  1    0  0  0  0  0    0  0  0  1  0    0  1  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0    0     0     0    0     0     0  245     0     0  298     0
Growth 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
Initial Bse:    0    0     0     0    0     0     0  245     0     0  298     0
Added Vol:     21    0    21     0    0     0     0    0     7     7    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   21    0    21     0    0     0     0  245     7     7  298     0
User 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
PHF Adj:     0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95
PHF Volume:    22    0    22     0    0     0     0  258     7     7  314     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:   22    0    22     0    0     0     0  258     7     7  314     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  6.4 xxxx   6.2 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5 xxxx   3.3 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  590 xxxx   262  xxxx xxxx xxxxx  xxxx xxxx xxxxx   265 xxxx xxxxx
Potent Cap.:  474 xxxx   782  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1310 xxxx xxxxx
Move Cap.:    471 xxxx   782  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1310 xxxx xxxxx
Volume/Cap:  0.05 xxxx  0.03  xxxx xxxx  xxxx  xxxx xxxx  xxxx  0.01 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.1 xxxx   0.1  xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.0 xxxx xxxxx
Control Del: 13.0 xxxx   9.7 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.8 xxxx xxxxx
LOS by Move:    B    *     A     *    *     *     *    *     *     A    *     *
Movement:      LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   0.0 xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.8 xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     A    *     *
ApproachDel:       11.4             xxxxxx           xxxxxx            xxxxxx
ApproachLOS:         B                *                 *                 *
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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                    Canyon Hills Residential PA-32B
                         Existing Plus Project
                           Evening Peak Hour
--------------------------------------------------------------------------------

                  Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #2 Hermosa Drive (NS) at Canyon Hills Road(EW)
********************************************************************************
Average Delay (sec/veh):       1.1       Worst Case Level Of Service: B[ 10.5]
********************************************************************************
Approach:      North Bound      South Bound       East Bound        West Bound
Movement:     L  -  T  -  R   L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled      Uncontrolled
Rights:          Include          Include           Include          Include
Lanes:        1  0  0  0  1   0  0  0  0  0    0  0  0  1  0    0  1  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0    0     0     0    0     0     0  188     0     0  174     0
Growth 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
Initial Bse:    0    0     0     0    0     0     0  188     0     0  174     0
Added Vol:     14    0    14     0    0     0     0    0    24    24    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   14    0    14     0    0     0     0  188    24    24  174     0
User 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
PHF Adj:     0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95
PHF Volume:    15    0    15     0    0     0     0  198    25    25  183     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:   15    0    15     0    0     0     0  198    25    25  183     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  6.4 xxxx   6.2 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5 xxxx   3.3 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  444 xxxx   211  xxxx xxxx xxxxx  xxxx xxxx xxxxx   223 xxxx xxxxx
Potent Cap.:  575 xxxx   835  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1358 xxxx xxxxx
Move Cap.:    567 xxxx   835  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1358 xxxx xxxxx
Volume/Cap:  0.03 xxxx  0.02  xxxx xxxx  xxxx  xxxx xxxx  xxxx  0.02 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.1 xxxx   0.1  xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.1 xxxx xxxxx
Control Del: 11.5 xxxx   9.4 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.7 xxxx xxxxx
LOS by Move:    B    *     A     *    *     *     *    *     *     A    *     *
Movement:     LT - LTR - RT   LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   0.1 xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.7 xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     A    *     *
ApproachDel:       10.5           xxxxxx            xxxxxx            xxxxxx
ApproachLOS:         B               *                 *                 *
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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Canyon Hills Residential PA-32B
Existing Plus Project
Morning Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #3 Murrieta Road (NS) at Canyon Hills Road(EW)

Average Delay (sec/veh): 40.3 Worst Case Level Of Service: F[196.8]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 1	0	0 0	0 0	0	1 0	0 0	1!	0 0	0 0	0	0 0
Volume Module:												
Base Vol:	114	357	0	0	394	184	165	0	80	0	0	0
Growth 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
Initial Bse:	114	357	0	0	394	184	165	0	80	0	0	0
Added Vol:	2	0	0	0	0	5	14	0	6	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	116	357	0	0	394	189	179	0	86	0	0	0
User 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
PHF Adj:	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
PHF Volume:	130	399	0	0	441	211	200	0	96	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	130	399	0	0	441	211	200	0	96	0	0	0
Critical Gap Module:												
Critical Gp:	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	6.4	6.5	6.2	xxxxx	xxxx	xxxxx
FollowUpTim:	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	652	xxxx	xxxxx	xxxx	xxxx	xxxxx	1205	1205	546	xxxx	xxxx	xxxxx
Potent Cap.:	944	xxxx	xxxxx	xxxx	xxxx	xxxxx	205	185	541	xxxx	xxxx	xxxxx
Move Cap.:	944	xxxx	xxxxx	xxxx	xxxx	xxxxx	182	158	541	xxxx	xxxx	xxxxx
Volume/Cap:	0.14	xxxx	xxxx	xxxx	xxxx	xxxx	1.10	0.00	0.18	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	0.5	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	9.4	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	A	*	*	*	*	*	*	*	*	*	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	232	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	0.5	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	15.3	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	9.4	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	197	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	A	*	*	*	*	*	*	F	*	*	*	*
ApproachDel:	xxxxxx			xxxxxx			196.8			xxxxxx		
ApproachLOS:	*			*			F			*		

Note: Queue reported is the number of cars per lane.

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--------------------------------------------------------------------------------
                       Canyon Hills Residential PA-32B
                            Existing Plus Project
                      Morning Peak Hour With Improvements
--------------------------------------------------------------------------------

                      Level Of Service Computation Report
            2000 HCM Operations Method (Future Volume Alternative)
********************************************************************************
Intersection #3 Murrieta Road (NS) at Canyon Hills Road(EW)
********************************************************************************
Cycle (sec):            60               Critical Vol./Cap.(X):         0.833
Loss Time (sec):        12 (Y+R=4.0 sec) Average Delay (sec/veh):        23.9
Optimal Cycle: OPTIMIZED                 Level Of Service:                  C
********************************************************************************
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected         Permitted        Permitted
Rights:          Include          Include           Include          Include
Min. Green:     7     7     7    7     7     7    7     7     7    0     0     0
Lanes:        0  1  0  0  0    0  0  1  0  1    0  0  1! 0  0    0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     114  357     0     0  394   184   165    0    80     0    0     0
Growth 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
Initial Bse:  114  357     0     0  394   184   165    0    80     0    0     0
Added Vol:      2    0     0     0    0     5    14    0     6     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  116  357     0     0  394   189   179    0    86     0    0     0
User 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
PHF Adj:     0.89 0.89  0.89  0.89 0.89  0.89  0.89 0.89  0.89  0.89 0.89  0.89
PHF Volume:   130  399     0     0  441   211   200    0    96     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  130  399     0     0  441   211   200    0    96     0    0     0
PCE 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
MLF 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
FinalVolume:  130  399     0     0  441   211   200    0    96     0    0     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.25 0.75  0.00  0.00 1.00  1.00  0.68 0.00  0.32  0.00 0.00  0.00
Final Sat.:   466 1434     0     0 1900  1900  1283    0   617     0    0     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.28 0.28  0.00  0.00 0.23  0.11  0.16 0.00  0.16  0.00 0.00  0.00
Crit Moves:  ****                  ****        ****
Green/Cycle: 0.33 0.61  0.00  0.00 0.28  0.28  0.19 0.00  0.19  0.00 0.00  0.00
Volume/Cap:  0.83 0.45  0.00  0.00 0.83  0.40  0.83 0.00  0.83  0.00 0.00  0.00
Delay/Veh:   27.6  6.5   0.0   0.0 31.2  18.1  38.8  0.0  38.8   0.0  0.0   0.0
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  27.6  6.5   0.0   0.0 31.2  18.1  38.8  0.0  38.8   0.0  0.0   0.0
LOS by Move:    C    A     A     A    C     B     D    A     D     A    A     A
HCM2kAvgQ:     12    6     0     0   11     4     8    0     8     0    0     0
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
```

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--------------------------------------------------------------------------------
                       Canyon Hills Residential PA-32B
                           Existing Plus Project
                            Evening Peak Hour
--------------------------------------------------------------------------------

                      Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #3 Murrieta Road (NS) at Canyon Hills Road(EW)
********************************************************************************
Average Delay (sec/veh):       4.7       Worst Case Level Of Service: C[ 21.4]
********************************************************************************
Approach:      North Bound      South Bound       East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled      Stop Sign         Stop Sign
Rights:          Include          Include          Include           Include
Lanes:        0  1  0  0  0    0  0  0  1  0    0  0  1! 0  0    0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      32  329     0     0  250   142   145    0    42     0    0     0
Growth 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
Initial Bse:   32  329     0     0  250   142   145    0    42     0    0     0
Added Vol:      7    0     0     0    0    16     9    0     4     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   39  329     0     0  250   158   154    0    46     0    0     0
User 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
PHF Adj:     0.98 0.98  0.98  0.98 0.98  0.98  0.98 0.98  0.98  0.98 0.98  0.98
PHF Volume:    40  334     0     0  254   161   156    0    47     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:   40  334     0     0  254   161   156    0    47     0    0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.4  6.5   6.2 xxxxx xxxx xxxxx
FollowUpTim:  2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  415 xxxx xxxxx  xxxx xxxx xxxxx   748  748   334  xxxx xxxx xxxxx
Potent Cap.: 1155 xxxx xxxxx  xxxx xxxx xxxxx   383  343   712  xxxx xxxx xxxxx
Move Cap.:   1155 xxxx xxxxx  xxxx xxxx xxxxx   373  331   712  xxxx xxxx xxxxx
Volume/Cap:  0.03 xxxx  xxxx  xxxx xxxx  xxxx  0.42 0.00  0.07  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.1 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  8.2 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  419 xxxxx  xxxx xxxx xxxxx
SharedQueue:  0.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  2.6 xxxxx xxxxx xxxx xxxxx
Shrd ConDel:  8.2 xxxx xxxxx xxxxx xxxx xxxxx xxxxx 21.4 xxxxx xxxxx xxxx xxxxx
Shared LOS:     A    *     *     *    *     *     *    C     *     *    *     *
ApproachDel:     xxxxxx           xxxxxx            21.4            xxxxxx
ApproachLOS:        *                *                C                *
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
```

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--------------------------------------------------------------------------------
                        Canyon Hills Residential PA-32B
                             Existing Plus Project
                      Evening Peak Hour With Improvements
--------------------------------------------------------------------------------

                      Level Of Service Computation Report
             2000 HCM Operations Method (Future Volume Alternative)
********************************************************************************
Intersection #3 Murrieta Road (NS) at Canyon Hills Road(EW)
********************************************************************************
Cycle (sec):          60               Critical Vol./Cap.(X):         0.375
Loss Time (sec):       8 (Y+R=4.0 sec) Average Delay (sec/veh):         9.0
Optimal Cycle: OPTIMIZED               Level Of Service:                  A
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Permitted        Permitted         Permitted        Permitted
Rights:          Include          Include           Include          Include
Min. Green:    0    0     0    0    0     0     0    0     0     0    0     0
Lanes:        0  1  0  0  0   0  0  0  1  0    0  0  1! 0  0    0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      32  329     0     0  250   142   145     0    42     0     0     0
Growth 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
Initial Bse:   32  329     0     0  250   142   145     0    42     0     0     0
Added Vol:      7    0     0     0    0    16     9     0     4     0     0     0
PasserByVol:    0    0     0     0    0     0     0     0     0     0     0     0
Initial Fut:   39  329     0     0  250   158   154     0    46     0     0     0
User 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
PHF Adj:     0.98 0.98  0.98  0.98 0.98  0.98  0.98 0.98  0.98  0.98 0.98  0.98
PHF Volume:    40  334     0     0  254   161   156     0    47     0     0     0
Reduct Vol:     0    0     0     0    0     0     0     0     0     0     0     0
Reduced Vol:   40  334     0     0  254   161   156     0    47     0     0     0
PCE 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
MLF 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
FinalVolume:   40  334     0     0  254   161   156     0    47     0     0     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.11 0.89  0.00  0.00 0.61  0.39  0.77 0.00  0.23  0.00 0.00  0.00
Final Sat.:   201 1699     0     0 1164   736  1463     0   437     0     0     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.20 0.20  0.00  0.00 0.22  0.22  0.11 0.00  0.11  0.00 0.00  0.00
Crit Moves:                        ****        ****
Green/Cycle: 0.58 0.58  0.00  0.00 0.58  0.58  0.29 0.00  0.29  0.00 0.00  0.00
Volume/Cap:  0.34 0.34  0.00  0.00 0.38  0.38  0.38 0.00  0.38  0.00 0.00  0.00
Delay/Veh:    6.7  6.7   0.0   0.0  6.9   6.9  17.6  0.0  17.6   0.0  0.0   0.0
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:   6.7  6.7   0.0   0.0  6.9   6.9  17.6  0.0  17.6   0.0  0.0   0.0
LOS by Move:    A    A     A     A    A     A     B    A     B     A    A     A
HCM2kAvgQ:      4    4     0     0    4     4     3    0     3     0    0     0
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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Opening Year (2016) Without Project

Canyon Hills Residential PA-32B
Existing Plus Ambient Growth Plus Cumulative
Morning Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #1 Railroad Canyon Road (NS) at Canyon Hills Road(EW)

Cycle (sec):	100	Critical Vol./Cap.(X):	0.798
Loss Time (sec):	16 (Y+R=4.0 sec)	Average Delay (sec/veh):	34.6
Optimal Cycle:	OPTIMIZED	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Split Phase			Split Phase		
Rights:	Ovl			Include			Include			Include		
Min. Green:	7	7	7	7	7	7	7	7	7	7	7	7
Lanes:	1 0 3 0 1			1 0 3 0 1			1 0 0 1 0			1 1 0 1 0		
Volume Module:												
Base Vol:	12	555	320	281	992	74	28	36	10	752	79	289
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	12	577	333	292	1032	77	29	37	10	782	82	301
Added Vol:	0	69	44	0	108	0	0	0	0	131	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	12	646	377	292	1140	77	29	37	10	913	82	301
User 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
PHF Adj:	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
PHF Volume:	15	778	454	352	1372	93	35	45	13	1100	99	362
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	15	778	454	352	1372	93	35	45	13	1100	99	362
PCE 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
MLF 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
FinalVolume:	15	778	454	352	1372	93	35	45	13	1100	99	362
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	0.95	0.95	0.95
Lanes:	1.00	3.00	1.00	1.00	3.00	1.00	1.00	0.78	0.22	2.00	0.21	0.79
Final Sat.:	1900	5187	1900	1900	5187	1900	1900	1487	413	3610	387	1418
Capacity Analysis Module:												
Vol/Sat:	0.01	0.15	0.24	0.19	0.26	0.05	0.02	0.03	0.03	0.30	0.26	0.26
Crit Moves:		****		****				****		****		
Green/Cycle:	0.08	0.18	0.55	0.22	0.32	0.32	0.07	0.07	0.07	0.37	0.37	0.37
Volume/Cap:	0.09	0.83	0.44	0.83	0.83	0.15	0.26	0.43	0.43	0.83	0.70	0.70
Delay/Veh:	42.5	45.9	13.8	50.1	35.2	24.5	45.1	46.9	46.9	32.1	27.9	27.9
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	42.5	45.9	13.8	50.1	35.2	24.5	45.1	46.9	46.9	32.1	27.9	27.9
LOS by Move:	D	D	B	D	D	C	D	D	D	C	C	C
HCM2kAvgQ:	0	11	8	13	17	2	1	2	2	19	14	14

Note: Queue reported is the number of cars per lane.

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-----------------------------------------------------------------------------
                   Canyon Hills Residential PA-32B
            Existing Plus Ambient Growth Plus Cumulative
                          Evening Peak Hour
-----------------------------------------------------------------------------

                 Level Of Service Computation Report
          2000 HCM Operations Method (Future Volume Alternative)
*****************************************************************************
Intersection #1 Railroad Canyon Road (NS) at Canyon Hills Road(EW)
*****************************************************************************
Cycle (sec):         70              Critical Vol./Cap.(X):         0.763
Loss Time (sec):     16 (Y+R=4.0 sec) Average Delay (sec/veh):       25.0
Optimal Cycle: OPTIMIZED             Level Of Service:                 C
*****************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected       Split Phase      Split Phase
Rights:            Ovl            Include          Include          Include
Min. Green:    7     7     7    7     7     7    7     7     7    7     7     7
Lanes:        1  0  3  0  1    1  0  3  0  1    1  0  0  1  0    1  1  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      62 1058   456   245  669    54    59   58    16   306   43   251
Growth Adj:  1.04 1.04  1.04  1.04 1.04  1.04  1.04 1.04  1.04  1.04 1.04  1.04
Initial Bse:   64 1100   474   255  696    56    61   60    17   318   45   261
Added Vol:      0  131   148     0  104     0     0    0     0    87    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   64 1231   622   255  800    56    61   60    17   405   45   261
User 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
PHF Adj:     0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95
PHF Volume:    68 1302   658   269  845    59    65   64    18   428   47   276
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   68 1302   658   269  845    59    65   64    18   428   47   276
PCE 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
MLF 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
FinalVolume:   68 1302   658   269  845    59    65   64    18   428   47   276
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  1.00 0.91  1.00  1.00 0.91  1.00  1.00 1.00  1.00  0.95 0.95  0.95
Lanes:       1.00 3.00  1.00  1.00 3.00  1.00  1.00 0.78  0.22  1.80 0.20  1.00
Final Sat.:  1900 5187  1900  1900 5187  1900  1900 1489   411  3251  359  1805
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.04 0.25  0.35  0.14 0.16  0.03  0.03 0.04  0.04  0.13 0.13  0.15
Crit Moves:       ****        ****                  ****                   ****
Green/Cycle: 0.18 0.31  0.50  0.17 0.30  0.30  0.10 0.10  0.10  0.19 0.19  0.19
Volume/Cap:  0.20 0.81  0.70  0.81 0.54  0.10  0.34 0.43  0.43  0.70 0.70  0.81
Delay/Veh:   24.5 25.6  15.8  41.9 20.9  17.8  30.4 31.2  31.2  28.7 28.7  32.8
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  24.5 25.6  15.8  41.9 20.9  17.8  30.4 31.2  31.2  28.7 28.7  32.8
LOS by Move:    C    C     B     D    C     B     C    C     C     C    C     C
HCM2kAvgQ:      1   12    12     8    6     1     2    2     2     7    7     9
*****************************************************************************
Note: Queue reported is the number of cars per lane.
*****************************************************************************
```

```
-------------------------------------------------------------------------------
                      Canyon Hills Residential PA-32B
               Existing Plus Ambient Growth Plus Cumulative
                             Morning Peak Hour
-------------------------------------------------------------------------------
                    Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
*******************************************************************************
Intersection #2 Hermosa Drive (NS) at Canyon Hills Road(EW)
*******************************************************************************
Average Delay (sec/veh):      0.5       Worst Case Level Of Service: B[ 12.9]
*******************************************************************************
Approach:      North Bound      South Bound       East Bound        West Bound
Movement:     L  -  T  -  R   L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Uncontrolled      Uncontrolled
Rights:          Include          Include          Include           Include
Lanes:        1  0  0  0  1   0  0  0  0  0    0  0  0  1  0    0  1  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      0     0     0     0     0     0     0   245     0     0   298     0
Growth Adj:  1.04  1.04  1.04  1.04  1.04  1.04  1.04  1.04  1.04  1.04  1.04  1.04
Initial Bse:   0     0     0     0     0     0     0   255     0     0   310     0
Added Vol:    14     0    14     0     0     0     0   113     5     5    44     0
PasserByVol:   0     0     0     0     0     0     0     0     0     0     0     0
Initial Fut:  14     0    14     0     0     0     0   368     5     5   354     0
User 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
PHF Adj:     0.95  0.95  0.95  0.95  0.95  0.95  0.95  0.95  0.95  0.95  0.95  0.95
PHF Volume:   15     0    15     0     0     0     0   387     5     5   373     0
Reduct Vol:    0     0     0     0     0     0     0     0     0     0     0     0
FinalVolume:  15     0    15     0     0     0     0   387     5     5   373     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  6.4 xxxx   6.2 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5 xxxx   3.3 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  773 xxxx   390  xxxx xxxx xxxxx  xxxx xxxx xxxxx   392 xxxx xxxxx
Potent Cap.:  370 xxxx   663  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1177 xxxx xxxxx
Move Cap.:    369 xxxx   663  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1177 xxxx xxxxx
Volume/Cap:  0.04 xxxx  0.02  xxxx xxxx  xxxx  xxxx xxxx  xxxx  0.00 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.1 xxxx   0.1  xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.0 xxxx xxxxx
Control Del: 15.2 xxxx  10.6 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   8.1 xxxx xxxxx
LOS by Move:    C    *     B     *    *     *     *    *     *     A    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   0.0 xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   8.1 xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     A    *     *
ApproachDel:       12.9          xxxxxx           xxxxxx           xxxxxx
ApproachLOS:         B              *                *                *
*******************************************************************************
Note: Queue reported is the number of cars per lane.
*******************************************************************************
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--------------------------------------------------------------------------------
                      Canyon Hills Residential PA-32B
               Existing Plus Ambient Growth Plus Cumulative
                             Evening Peak Hour
--------------------------------------------------------------------------------

                    Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #2 Hermosa Drive (NS) at Canyon Hills Road(EW)
********************************************************************************
Average Delay (sec/veh):       0.5       Worst Case Level Of Service: B[ 11.7]
********************************************************************************
Approach:      North Bound      South Bound       East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled      Uncontrolled
Rights:           Include          Include          Include           Include
Lanes:        1  0  0  0  1    0  0  0  0  0    0  0  0  1  0    0  1  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0    0     0     0    0     0     0  187     0     0  174     0
Growth Adj:  1.04 1.04  1.04  1.04 1.04  1.04  1.04 1.04  1.04  1.04 1.04  1.04
Initial Bse:    0    0     0     0    0     0     0  194     0     0  181     0
Added Vol:      9    0     9     0    0     0     0   81    16    16  129     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    9    0     9     0    0     0     0  275    16    16  310     0
User 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
PHF Adj:     0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95
PHF Volume:     9    0     9     0    0     0     0  290    17    17  326     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    9    0     9     0    0     0     0  290    17    17  326     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  6.4 xxxx   6.2 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5 xxxx   3.3 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  658 xxxx   298  xxxx xxxx xxxxx  xxxx xxxx xxxxx   307 xxxx xxxxx
Potent Cap.:  432 xxxx   746  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1265 xxxx xxxxx
Move Cap.:    428 xxxx   746  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1265 xxxx xxxxx
Volume/Cap:  0.02 xxxx  0.01  xxxx xxxx  xxxx  xxxx xxxx  xxxx  0.01 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.1 xxxx   0.0  xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.0 xxxx xxxxx
Control Del: 13.6 xxxx   9.9 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.9 xxxx xxxxx
LOS by Move:    B    *     A     *    *     *     *    *     *     A    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   0.0 xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.9 xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     A    *     *
ApproachDel:        11.7            xxxxxx           xxxxxx           xxxxxx
ApproachLOS:          B                *                *                *
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
```

```
--------------------------------------------------------------------------------
                     Canyon Hills Residential PA-32B
                Existing Plus Ambient Growth Plus Cumulative
                           Morning Peak Hour
--------------------------------------------------------------------------------

                   Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #3 Murrieta Road (NS) at Canyon Hills Road(EW)
********************************************************************************
Average Delay (sec/veh):     172.3      Worst Case Level Of Service: F[724.9]
********************************************************************************
Approach:       North Bound      South Bound      East Bound       West Bound
Movement:      L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:         0  1  0  0  0   0  0  0  1  0   0  0  1! 0  0   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      114  357     0     0  394   184   165    0    80     0    0     0
Growth Adj:   1.04 1.04  1.04  1.04 1.04  1.04  1.04 1.04  1.04  1.04 1.04  1.04
Initial Bse:   119  371     0     0  410   191   172    0    83     0    0     0
Added Vol:      20   69     0     0   24    29    87    0    40     0    0     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   139  440     0     0  434   220   259    0   123     0    0     0
User 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
PHF Adj:      0.89 0.89  0.89  0.89 0.89  0.89  0.89 0.89  0.89  0.89 0.89  0.89
PHF Volume:    155  492     0     0  485   246   289    0   138     0    0     0
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:   155  492     0     0  485   246   289    0   138     0    0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:   4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.4  6.5   6.2 xxxxx xxxx xxxxx
FollowUpTim:   2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   731 xxxx xxxxx  xxxx xxxx xxxxx  1410 1410   608  xxxx xxxx xxxxx
Potent Cap.:   882 xxxx xxxxx  xxxx xxxx xxxxx   154  140   499  xxxx xxxx xxxxx
Move Cap.:     882 xxxx xxxxx  xxxx xxxx xxxxx   131  113   499  xxxx xxxx xxxxx
Volume/Cap:   0.18 xxxx  xxxx  xxxx xxxx  xxxx  2.20 0.00  0.28  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:     0.6 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:   9.9 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:     A    *     *     *    *     *     *    *     *     *    *     *
Movement:      LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.:  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  172 xxxxx  xxxx xxxx xxxxx
SharedQueue:   0.6 xxxx xxxxx xxxxx xxxx xxxxx xxxxx 36.3 xxxxx xxxxx xxxx xxxxx
Shrd ConDel:   9.9 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  725 xxxxx xxxxx xxxx xxxxx
Shared LOS:      A    *     *     *    *     *     *    F     *     *    *     *
ApproachDel:     xxxxxx           xxxxxx            724.9            xxxxxx
ApproachLOS:        *                *                F                *
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
```

```
--------------------------------------------------------------------------------
                        Canyon Hills Residential PA-32B
                 Existing Plus Ambient Growth Plus Cumulative
                      Morning Peak Hour With Improvements
--------------------------------------------------------------------------------

                      Level Of Service Computation Report
             2000 HCM Operations Method (Future Volume Alternative)
********************************************************************************
Intersection #3 Murrieta Road (NS) at Canyon Hills Road(EW)
********************************************************************************
Cycle (sec):          60               Critical Vol./Cap.(X):         0.703
Loss Time (sec):       8 (Y+R=4.0 sec) Average Delay (sec/veh):        13.8
Optimal Cycle: OPTIMIZED               Level Of Service:                  B
********************************************************************************
Approach:     North Bound      South Bound       East Bound       West Bound
Movement:    L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Permitted        Permitted        Permitted        Permitted
Rights:          Include          Include          Include          Include
Min. Green:     7    7     7    7    7     7    7    7     7    0    0     0
Lanes:       0  1  0  0  0   0  0  0  1  0   0  0  1! 0  0   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     114  357     0     0  394   184   165    0    80     0    0     0
Growth Adj:  1.04 1.04  1.04  1.04 1.04  1.04  1.04 1.04  1.04  1.04 1.04  1.04
Initial Bse:  119  371     0     0  410   191   172    0    83     0    0     0
Added Vol:     20   69     0     0   24    29    87    0    40     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  139  440     0     0  434   220   259    0   123     0    0     0
User 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
PHF Adj:     0.89 0.89  0.89  0.89 0.89  0.89  0.89 0.89  0.89  0.89 0.89  0.89
PHF Volume:   155  492     0     0  485   246   289    0   138     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  155  492     0     0  485   246   289    0   138     0    0     0
PCE 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
MLF 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
FinalVolume:  155  492     0     0  485   246   289    0   138     0    0     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.24 0.76  0.00  0.00 0.66  0.34  0.68 0.00  0.32  0.00 0.00  0.00
Final Sat.:   455 1445     0     0 1260   640  1287    0   613     0    0     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.34 0.34  0.00  0.00 0.38  0.38  0.22 0.00  0.22  0.00 0.00  0.00
Crit Moves:                        ****        ****
Green/Cycle: 0.55 0.55  0.00  0.00 0.55  0.55  0.32 0.00  0.32  0.00 0.00  0.00
Volume/Cap:  0.62 0.62  0.00  0.00 0.70  0.70  0.70 0.00  0.70  0.00 0.00  0.00
Delay/Veh:   10.5 10.5   0.0   0.0 12.2  12.2  21.7  0.0  21.7   0.0  0.0   0.0
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  10.5 10.5   0.0   0.0 12.2  12.2  21.7  0.0  21.7   0.0  0.0   0.0
LOS by Move:    B    B     A     A    B     B     C    A     C     A    A     A
HCM2kAvgQ:      9    9     0     0   11    11     8    0     8     0    0     0
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
```

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-----------------------------------------------------------------------------
                      Canyon Hills Residential PA-32B
               Existing Plus Ambient Growth Plus Cumulative
                             Evening Peak Hour
-----------------------------------------------------------------------------

                    Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
*****************************************************************************
Intersection #3 Murrieta Road (NS) at Canyon Hills Road(EW)
*****************************************************************************
Average Delay (sec/veh):     19.9      Worst Case Level Of Service: F[ 90.7]
*****************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:        0  1  0  0  0   0  0  0  1  0   0  0  1! 0  0   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      32  329     0     0  250   142   145    0    42     0    0     0
Growth Adj:  1.04 1.04  1.04  1.04 1.04  1.04  1.04 1.04  1.04  1.04 1.04  1.04
Initial Bse:   33  342     0     0  260   148   151    0    44     0    0     0
Added Vol:     47   46     0     0   78    98    58    0    33     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   80  388     0     0  338   246   209    0    77     0    0     0
User 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
PHF Adj:     0.98 0.98  0.98  0.98 0.98  0.98  0.98 0.98  0.98  0.98 0.98  0.98
PHF Volume:    82  394     0     0  343   250   212    0    78     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:   82  394     0     0  343   250   212    0    78     0    0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.4  6.5   6.2 xxxxx xxxx xxxxx
FollowUpTim:  2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  593 xxxx xxxxx  xxxx xxxx xxxxx  1026 1026   468  xxxx xxxx xxxxx
Potent Cap.:  993 xxxx xxxxx  xxxx xxxx xxxxx   262  237   599  xxxx xxxx xxxxx
Move Cap.:    993 xxxx xxxxx  xxxx xxxx xxxxx   245  216   599  xxxx xxxx xxxxx
Volume/Cap:  0.08 xxxx  xxxx  xxxx xxxx  xxxx  0.87 0.00  0.13  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.3 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  9.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  291 xxxxx  xxxx xxxx xxxxx
SharedQueue:  0.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx 10.3 xxxxx xxxxx xxxx xxxxx
Shrd ConDel:  9.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx 90.7 xxxxx xxxxx xxxx xxxxx
Shared LOS:     A    *     *     *    *     *     *    F     *     *    *     *
ApproachDel:     xxxxxx           xxxxxx            90.7            xxxxxx
ApproachLOS:        *                *                F                *
*****************************************************************************
Note: Queue reported is the number of cars per lane.
*****************************************************************************
```

Canyon Hills Residential PA-32B
Existing Plus Ambient Growth Plus Cumulative
Evening Peak Hour With Improvements

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #3 Murrieta Road (NS) at Canyon Hills Road(EW)

Cycle (sec):	60	Critical Vol./Cap.(X):	0.536
Loss Time (sec):	8 (Y+R=4.0 sec)	Average Delay (sec/veh):	10.2
Optimal Cycle:	OPTIMIZED	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Prot+Permit			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	7	7	7	7	7	7	7	7	7	0	0	0
Lanes:	0 1	0	0 0	0 0	0	1 0	0 0	1!	0 0	0 0	0	0 0
Volume Module:												
Base Vol:	32	329	0	0	250	142	145	0	42	0	0	0
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	33	342	0	0	260	148	151	0	44	0	0	0
Added Vol:	47	46	0	0	78	98	58	0	33	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	80	388	0	0	338	246	209	0	77	0	0	0
User 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
PHF Adj:	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
PHF Volume:	82	394	0	0	343	250	212	0	78	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	82	394	0	0	343	250	212	0	78	0	0	0
PCE 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
MLF 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
FinalVolume:	82	394	0	0	343	250	212	0	78	0	0	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.17	0.83	0.00	0.00	0.58	0.42	0.73	0.00	0.27	0.00	0.00	0.00
Final Sat.:	326	1574	0	0	1100	800	1390	0	510	0	0	0
Capacity Analysis Module:												
Vol/Sat:	0.25	0.25	0.00	0.00	0.31	0.31	0.00	0.00	0.15	0.00	0.00	0.00
Crit Moves:					****		****			****		
Green/Cycle:	0.58	0.58	0.00	0.00	0.58	0.58	0.28	0.00	0.28	0.00	0.00	0.00
Volume/Cap:	0.43	0.43	0.00	0.00	0.54	0.54	0.54	0.00	0.54	0.00	0.00	0.00
Delay/Veh:	7.3	7.3	0.0	0.0	8.1	8.1	19.2	0.0	19.2	0.0	0.0	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	7.3	7.3	0.0	0.0	8.1	8.1	19.2	0.0	19.2	0.0	0.0	0.0
LOS by Move:	A	A	A	A	A	A	B	A	B	A	A	A
HCM2kAvgQ:	5	5	0	0	7	7	5	0	5	0	0	0

Note: Queue reported is the number of cars per lane.

Opening Year (2016) With Project

Canyon Hills Residential PA-32B
Existing Plus Ambient Growth Plus Cumulative Plus Project
Morning Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #1 Railroad Canyon Road (NS) at Canyon Hills Road(EW)

Cycle (sec):	100	Critical Vol./Cap.(X):	0.806
Loss Time (sec):	16 (Y+R=4.0 sec)	Average Delay (sec/veh):	35.0
Optimal Cycle:	OPTIMIZED	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Split Phase			Split Phase		
Rights:	Ovl			Include			Include			Include		
Min. Green:	7	7	7	7	7	7	7	7	7	7	7	7
Lanes:	1 0	3	0 1	1 0	3	0 1	1 0	0	1 0	1 1	0	1 0

Volume Module:												
Base Vol:	12	555	320	281	992	74	28	36	10	752	79	289
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	12	577	333	292	1032	77	29	37	10	782	82	301
Added Vol:	0	69	51	0	108	0	0	0	0	152	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	12	646	384	292	1140	77	29	37	10	934	82	301
User 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
PHF Adj:	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
PHF Volume:	15	778	462	352	1372	93	35	45	13	1125	99	362
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	15	778	462	352	1372	93	35	45	13	1125	99	362
PCE 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
MLF 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
FinalVolume:	15	778	462	352	1372	93	35	45	13	1125	99	362
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	0.95	0.95	0.95
Lanes:	1.00	3.00	1.00	1.00	3.00	1.00	1.00	0.78	0.22	2.00	0.21	0.79
Final Sat.:	1900	5187	1900	1900	5187	1900	1900	1487	413	3610	387	1418
Capacity Analysis Module:												
Vol/Sat:	0.01	0.15	0.24	0.19	0.26	0.05	0.02	0.03	0.03	0.31	0.26	0.26
Crit Moves:		****		****				****		****		
Green/Cycle:	0.08	0.18	0.55	0.22	0.32	0.32	0.07	0.07	0.07	0.37	0.37	0.37
Volume/Cap:	0.09	0.84	0.44	0.84	0.84	0.15	0.26	0.43	0.43	0.84	0.69	0.69
Delay/Veh:	42.6	46.6	13.7	51.3	35.9	24.7	45.1	46.9	46.9	32.3	27.5	27.5
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	42.6	46.6	13.7	51.3	35.9	24.7	45.1	46.9	46.9	32.3	27.5	27.5
LOS by Move:	D	D	B	D	D	C	D	D	D	C	C	C
HCM2kAvgQ:	0	11	8	13	17	2	1	2	2	19	13	13

Note: Queue reported is the number of cars per lane.

```
--------------------------------------------------------------------------------
                       Canyon Hills Residential PA-32B
          Existing Plus Ambient Growth Plus Cumulative Plus Project
                              Evening Peak Hour
--------------------------------------------------------------------------------

                     Level Of Service Computation Report
           2000 HCM Operations Method (Future Volume Alternative)
********************************************************************************
Intersection #1 Railroad Canyon Road (NS) at Canyon Hills Road(EW)
********************************************************************************
Cycle (sec):           70                 Critical Vol./Cap.(X):         0.763
Loss Time (sec):       16 (Y+R=4.0 sec)  Average Delay (sec/veh):        25.2
Optimal Cycle: OPTIMIZED                  Level Of Service:                 C
********************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected       Split Phase      Split Phase
Rights:            Ovl             Include          Include          Include
Min. Green:    7     7     7    7     7     7    7     7     7    7     7     7
Lanes:        1  0  3  0  1   1  0  3  0  1   1  0  0  1  0   1  1  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      62 1058   456   245  669    54    59   58    16   306   43   251
Growth Adj:  1.04 1.04  1.04  1.04 1.04  1.04  1.04 1.04  1.04  1.04 1.04  1.04
Initial Bse:   64 1100   474   255  696    56    61   60    17   318   45   261
Added Vol:      0  131   171     0  104     0     0    0     0   101    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   64 1231   645   255  800    56    61   60    17   419   45   261
User 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
PHF Adj:     0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95
PHF Volume:    68 1302   682   269  845    59    65   64    18   443   47   276
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   68 1302   682   269  845    59    65   64    18   443   47   276
PCE 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
MLF 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
FinalVolume:   68 1302   682   269  845    59    65   64    18   443   47   276
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  1.00 0.91  1.00  1.00 0.91  1.00  1.00 1.00  1.00  0.95 0.95  0.95
Lanes:       1.00 3.00  1.00  1.00 3.00  1.00  1.00 0.78  0.22  1.81 0.19  1.00
Final Sat.:  1900 5187  1900  1900 5187  1900  1900 1489   411  3262  348  1805
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.04 0.25  0.36  0.14 0.16  0.03  0.03 0.04  0.04  0.14 0.14  0.15
Crit Moves:       ****        ****                   ****                    ****
Green/Cycle: 0.18 0.31  0.50  0.17 0.30  0.30  0.10 0.10  0.10  0.19 0.19  0.19
Volume/Cap:  0.20 0.81  0.72  0.81 0.54  0.10  0.34 0.43  0.43  0.72 0.72  0.81
Delay/Veh:   24.5 25.6  16.6  41.9 20.9  17.8  30.4 31.2  31.2  29.2 29.2  32.7
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  24.5 25.6  16.6  41.9 20.9  17.8  30.4 31.2  31.2  29.2 29.2  32.7
LOS by Move:    C    C     B     D    C     B     C    C     C     C    C     C
HCM2kAvgQ:      1   12    13     8    6     1     2    2     2     7    7     9
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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--------------------------------------------------------------------------------
                      Canyon Hills Residential PA-32B
          Existing Plus Ambient Growth Plus Cumulative Plus Project
                             Morning Peak Hour
--------------------------------------------------------------------------------
                    Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #2 Hermosa Drive (NS) at Canyon Hills Road(EW)
********************************************************************************
Average Delay (sec/veh):      1.2       Worst Case Level Of Service: B[ 13.5]
********************************************************************************
Approach:       North Bound      South Bound      East Bound       West Bound
Movement:      L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:         Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:         1  0  0  0  1    0  0  0  0  0    0  0  0  1  0    0  1  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        0    0     0     0    0     0     0  245     0     0  298     0
Growth Adj:   1.04 1.04  1.04  1.04 1.04  1.04  1.04 1.04  1.04  1.04 1.04  1.04
Initial Bse:     0    0     0     0    0     0     0  255     0     0  310     0
Added Vol:      34    0    34     0    0     0     0  113    12    12   44     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    34    0    34     0    0     0     0  368    12    12  354     0
User 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
PHF Adj:      0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95
PHF Volume:     36    0    36     0    0     0     0  387    13    13  373     0
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    36    0    36     0    0     0     0  387    13    13  373     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:   6.4 xxxx   6.2 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:   3.5 xxxx   3.3 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   791 xxxx   393  xxxx xxxx xxxxx  xxxx xxxx xxxxx   400 xxxx xxxxx
Potent Cap.:   361 xxxx   660  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1170 xxxx xxxxx
Move Cap.:     358 xxxx   660  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1170 xxxx xxxxx
Volume/Cap:   0.10 xxxx  0.05  xxxx xxxx  xxxx  xxxx xxxx  xxxx  0.01 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:     0.3 xxxx   0.2  xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.0 xxxx xxxxx
Control Del:  16.2 xxxx  10.8 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   8.1 xxxx xxxxx
LOS by Move:     C    *     B     *    *     *     *    *     *     A    *     *
Movement:      LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   0.0 xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   8.1 xxxx xxxxx
Shared LOS:      *    *     *     *    *     *     *    *     *     A    *     *
ApproachDel:        13.5           xxxxxx           xxxxxx           xxxxxx
ApproachLOS:          B               *                *                *
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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--------------------------------------------------------------------------------
                        Canyon Hills Residential PA-32B
           Existing Plus Ambient Growth Plus Cumulative Plus Project
                              Evening Peak Hour
--------------------------------------------------------------------------------

                     Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #2 Hermosa Drive (NS) at Canyon Hills Road(EW)
********************************************************************************
Average Delay (sec/veh):      1.2      Worst Case Level Of Service: B[ 12.5]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:          Include          Include          Include          Include
Lanes:        1  0  0  0  1    0  0  0  0  0    0  0  0  1  0    0  1  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0    0     0     0    0     0     0  187     0     0  174     0
Growth Adj:  1.04 1.04  1.04  1.04 1.04  1.04  1.04 1.04  1.04  1.04 1.04  1.04
Initial Bse:    0    0     0     0    0     0     0  194     0     0  181     0
Added Vol:     23    0    23     0    0     0     0   81    39    39  129     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   23    0    23     0    0     0     0  275    39    39  310     0
User 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
PHF Adj:     0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95
PHF Volume:    24    0    24     0    0     0     0  290    41    41  326     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:   24    0    24     0    0     0     0  290    41    41  326     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  6.4 xxxx   6.2 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5 xxxx   3.3 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  719 xxxx   311  xxxx xxxx xxxxx  xxxx xxxx xxxxx   331 xxxx xxxxx
Potent Cap.:  398 xxxx   734  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1240 xxxx xxxxx
Move Cap.:    388 xxxx   734  xxxx xxxx xxxxx  xxxx xxxx xxxxx  1240 xxxx xxxxx
Volume/Cap:  0.06 xxxx  0.03  xxxx xxxx  xxxx  xxxx xxxx  xxxx  0.03 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.2 xxxx   0.1  xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.1 xxxx xxxxx
Control Del: 14.9 xxxx  10.1 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   8.0 xxxx xxxxx
LOS by Move:    B    *     B     *    *     *     *    *     *     A    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   0.1 xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   8.0 xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     A    *     *
ApproachDel:       12.5           xxxxxx           xxxxxx           xxxxxx
ApproachLOS:         B               *                *                *
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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--------------------------------------------------------------------------------
                        Canyon Hills Residential PA-32B
           Existing Plus Ambient Growth Plus Cumulative Plus Project
                              Morning Peak Hour
--------------------------------------------------------------------------------

                      Level Of Service Computation Report
            2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #3 Murrieta Road (NS) at Canyon Hills Road(EW)
********************************************************************************
Average Delay (sec/veh):    197.8      Worst Case Level Of Service: F[803.1]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:        0  1  0  0  0   0  0  0  1  0    0  0  1! 0  0    0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     114  357     0     0  394   184   165    0    80     0    0     0
Growth Adj:  1.04 1.04  1.04  1.04 1.04  1.04  1.04 1.04  1.04  1.04 1.04  1.04
Initial Bse:  119  371     0     0  410   191   172    0    83     0    0     0
Added Vol:     22   69     0     0   24    34   102    0    46     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  141  440     0     0  434   225   274    0   129     0    0     0
User 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
PHF Adj:     0.89 0.89  0.89  0.89 0.89  0.89  0.89 0.89  0.89  0.89 0.89  0.89
PHF Volume:   157  492     0     0  485   252   306    0   144     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:  157  492     0     0  485   252   306    0   144     0    0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.4  6.5   6.2 xxxxx xxxx xxxxx
FollowUpTim:  2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  737 xxxx xxxxx  xxxx xxxx xxxxx  1418 1418   611  xxxx xxxx xxxxx
Potent Cap.:  878 xxxx xxxxx  xxxx xxxx xxxxx   152  138   497  xxxx xxxx xxxxx
Move Cap.:    878 xxxx xxxxx  xxxx xxxx xxxxx   129  111   497  xxxx xxxx xxxxx
Volume/Cap:  0.18 xxxx  xxxx  xxxx xxxx  xxxx  2.36 0.00  0.29  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.6 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del: 10.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT   LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  170 xxxxx  xxxx xxxx xxxxx
SharedQueue:  0.6 xxxx xxxxx xxxxx xxxx xxxxx xxxxx 39.4 xxxxx xxxxx xxxx xxxxx
Shrd ConDel: 10.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  803 xxxxx xxxxx xxxx xxxxx
Shared LOS:     A    *     *     *    *     *     *    F     *     *    *     *
ApproachDel:      xxxxxx           xxxxxx            803.1            xxxxxx
ApproachLOS:         *                *                F                *
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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Canyon Hills Residential PA-32B
Existing Plus Ambient Growth Plus Cumulative Plus Project
Morning Peak Hour With Improvments

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #3 Murrieta Road (NS) at Canyon Hills Road(EW)

Cycle (sec):	60	Critical Vol./Cap.(X):	0.721
Loss Time (sec):	8 (Y+R=4.0 sec)	Average Delay (sec/veh):	14.5
Optimal Cycle:	OPTIMIZED	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Permitted			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	7	7	7	7	7	7	7	7	7	0	0	0
Lanes:	0 1 0 0 0			0 0 0 1 0			0 0 1! 0 0			0 0 0 0 0		
Volume Module:												
Base Vol:	114	357	0	0	394	184	165	0	80	0	0	0
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	119	371	0	0	410	191	172	0	83	0	0	0
Added Vol:	22	69	0	0	24	34	102	0	46	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	141	440	0	0	434	225	274	0	129	0	0	0
User 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
PHF Adj:	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
PHF Volume:	157	492	0	0	485	252	306	0	144	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	157	492	0	0	485	252	306	0	144	0	0	0
PCE 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
MLF 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
FinalVolume:	157	492	0	0	485	252	306	0	144	0	0	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.24	0.76	0.00	0.00	0.66	0.34	0.68	0.00	0.32	0.00	0.00	0.00
Final Sat.:	460	1440	0	0	1250	650	1291	0	609	0	0	0
Capacity Analysis Module:												
Vol/Sat:	0.34	0.34	0.00	0.00	0.39	0.39	0.24	0.00	0.24	0.00	0.00	0.00
Crit Moves:					****		****					
Green/Cycle:	0.54	0.54	0.00	0.00	0.54	0.54	0.33	0.00	0.33	0.00	0.00	0.00
Volume/Cap:	0.64	0.64	0.00	0.00	0.72	0.72	0.72	0.00	0.72	0.00	0.00	0.00
Delay/Veh:	11.1	11.1	0.0	0.0	13.0	13.0	21.8	0.0	21.8	0.0	0.0	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	11.1	11.1	0.0	0.0	13.0	13.0	21.8	0.0	21.8	0.0	0.0	0.0
LOS by Move:	B	B	A	A	B	B	C	A	C	A	A	A
HCM2kAvgQ:	9	9	0	0	12	12	9	0	9	0	0	0

Note: Queue reported is the number of cars per lane.

Canyon Hills Residential PA-32B
Existing Plus Ambient Growth Plus Cumulative Plus Project
Evening Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #3 Murrieta Road (NS) at Canyon Hills Road(EW)

Average Delay (sec/veh): 25.6 Worst Case Level Of Service: F[115.4]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:		Uncontrolled			Uncontrolled			Stop Sign			Stop Sign	
Rights:		Include			Include			Include			Include	
Lanes:	0 1	0	0 0	0 0	0	1 0	0 0	1!	0 0	0 0	0	0 0
Volume Module:												
Base Vol:	32	329	0	0	250	142	145	0	42	0	0	0
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	33	342	0	0	260	148	151	0	44	0	0	0
Added Vol:	54	46	0	0	78	114	67	0	37	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	87	388	0	0	338	262	218	0	81	0	0	0
User 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
PHF Adj:	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
PHF Volume:	89	394	0	0	343	266	221	0	82	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	89	394	0	0	343	266	221	0	82	0	0	0
Critical Gap Module:												
Critical Gp:	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	6.4	6.5	6.2	xxxxx	xxxx	xxxxx
FollowUpTim:	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	609	xxxx	xxxxx	xxxx	xxxx	xxxxx	1048	1048	476	xxxx	xxxx	xxxxx
Potent Cap.:	979	xxxx	xxxxx	xxxx	xxxx	xxxxx	255	230	593	xxxx	xxxx	xxxxx
Move Cap.:	979	xxxx	xxxxx	xxxx	xxxx	xxxxx	236	208	593	xxxx	xxxx	xxxxx
Volume/Cap:	0.09	xxxx	xxxx	xxxx	xxxx	xxxx	0.94	0.00	0.14	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	0.3	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	9.0	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	A	*	*	*	*	*	*	*	*	*	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	282	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	0.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	12.1	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	9.0	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	115	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	A	*	*	*	*	*	*	F	*	*	*	*
ApproachDel:		xxxxxx			xxxxxx			115.4			xxxxxx	
ApproachLOS:		*			*			F			*	

Note: Queue reported is the number of cars per lane.

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--------------------------------------------------------------------------------
                      Canyon Hills Residential PA-32B
          Existing Plus Ambient Growth Plus Cumulative Plus Project
                    Evening Peak Hour With Improvements
--------------------------------------------------------------------------------

                     Level Of Service Computation Report
           2000 HCM Operations Method (Future Volume Alternative)
********************************************************************************
Intersection #3 Murrieta Road (NS) at Canyon Hills Road(EW)
********************************************************************************
Cycle (sec):          60                Critical Vol./Cap.(X):         0.554
Loss Time (sec):       8 (Y+R=4.0 sec)  Average Delay (sec/veh):        10.5
Optimal Cycle: OPTIMIZED                Level Of Service:                  B
********************************************************************************
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Permitted        Permitted        Permitted        Permitted
Rights:          Include          Include          Include          Include
Min. Green:     7    7     7     7    7     7     7    7     7     0    0     0
Lanes:        0  1  0  0  0    0  0  0  1  0    0  0  1! 0  0    0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      32  329     0     0  250   142   145    0    42     0    0     0
Growth Adj:  1.04 1.04  1.04  1.04 1.04  1.04  1.04 1.04  1.04  1.04 1.04  1.04
Initial Bse:   33  342     0     0  260   148   151    0    44     0    0     0
Added Vol:     54   46     0     0   78   114    67    0    37     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   87  388     0     0  338   262   218    0    81     0    0     0
User 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
PHF Adj:     0.98 0.98  0.98  0.98 0.98  0.98  0.98 0.98  0.98  0.98 0.98  0.98
PHF Volume:    89  394     0     0  343   266   221    0    82     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   89  394     0     0  343   266   221    0    82     0    0     0
PCE 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
MLF 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
FinalVolume:   89  394     0     0  343   266   221    0    82     0    0     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.18 0.82  0.00  0.00 0.56  0.44  0.73 0.00  0.27  0.00 0.00  0.00
Final Sat.:   349 1551     0     0 1071   829  1386    0   514     0    0     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.25 0.25  0.00  0.00 0.32  0.32  0.16 0.00  0.16  0.00 0.00  0.00
Crit Moves:                        ****        ****
Green/Cycle: 0.58 0.58  0.00  0.00 0.58  0.58  0.29 0.00  0.29  0.00 0.00  0.00
Volume/Cap:  0.44 0.44  0.00  0.00 0.55  0.55  0.55 0.00  0.55  0.00 0.00  0.00
Delay/Veh:    7.4  7.4   0.0   0.0  8.5   8.5  19.3  0.0  19.3   0.0  0.0   0.0
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:   7.4  7.4   0.0   0.0  8.5   8.5  19.3  0.0  19.3   0.0  0.0   0.0
LOS by Move:    A    A     A     A    A     A     B    A     B     A    A     A
HCM2kAvgQ:      5    5     0     0    8     8     5    0     5     0    0     0
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
```

APPENDIX E

Traffic Signal Warrant Worksheet

PEAK HOUR VOLUME WARRANT
(Rural Areas)

Existing

Major Street Name = **Murrieta Road**

Total of Both Approaches (VPH) = **753**

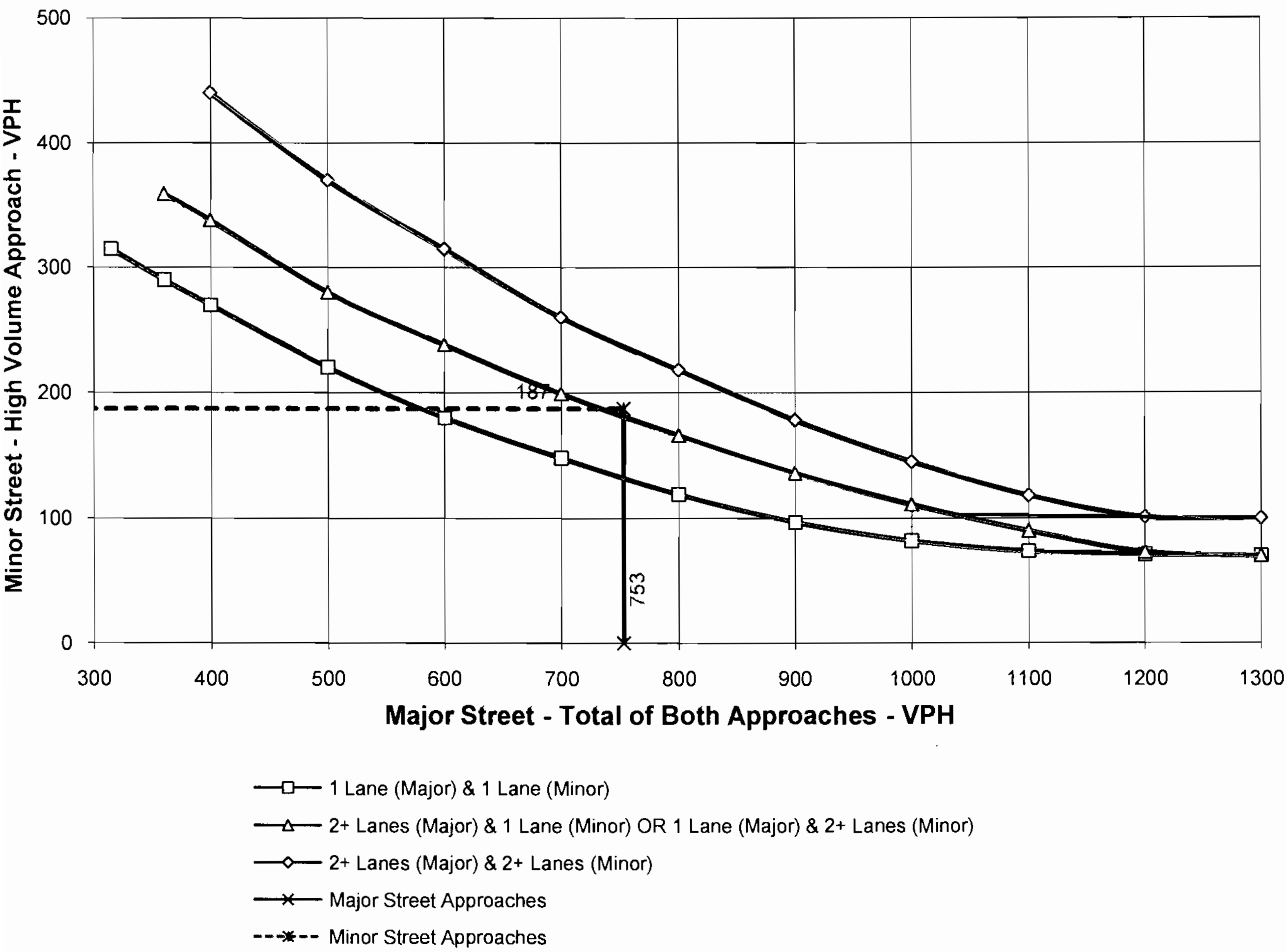
Number of Approach Lanes Major Street = **1**

Minor Street Name = **Holland Road**

High Volume Approach (VPH) = **187**

Number of Approach Lanes Minor Street = **1**

WARRANTED FOR A SIGNAL



** NOTE:

100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

KUNZMAN ASSOCIATES, INC.

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1111 Town & Country Road, Suite 34
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Appendix H

Cultural Resources Survey

[Confidential – Not For Public Distribution]