

City of Malibu

Malibu Memorial Cemetery Project

Greenhouse Gas Emissions Study



March 2016

Environmental Scientists Planners Engineers



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March 3, 2016
Project No. 15-02065

Jake Jesson
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**RE: GREENHOUSE GAS STUDY
Malibu Memorial Cemetery Project, Malibu, California**

Dear Mr. Jesson:

Rincon Consultants, Inc. is pleased to submit the attached Greenhouse Gas Study for the proposed Malibu Memorial Cemetery project in Malibu, California. Calculations of CO₂, CH₄, and N₂O emissions are provided to identify the magnitude of potential project effects. The proposed project would result in 551 metric tons CO₂E per year, and would not result in a significant impact. If you have any questions regarding this study or if we can provide you with other environmental consulting services, please feel free to contact us.

Sincerely,

RINCON CONSULTANTS, INC.

A handwritten signature in black ink, appearing to read "Chris Bersbach", written over a light blue horizontal line.

Chris Bersbach
Technical Services Program Supervisor

A handwritten signature in black ink, appearing to read "Joe Power", written over a light blue horizontal line.

Joe Power, AICP
Principal

Malibu Memorial Cemetery Project

Greenhouse Gas Study

Prepared for:

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Malibu Memorial Cemetery Project Greenhouse Gas Study

Table of Contents

	Page
Cover Letter	
Project Description.....	1
Setting	1
Overview of Climate Change.....	1
Greenhouse Gases (GHGs).....	2
Greenhouse Gas Inventory	4
Effects of Climate Change.....	4
Regulatory Setting	7
Climate Change Impact Analysis	11
Methodology.....	11
Estimate of GHG Emissions	13
References	18
 List of Tables	
Table 1 Estimated Construction Emissions of Greenhouse Gases	13
Table 2 Estimated Annual Energy-Related Greenhouse Gas Emissions.....	14
Table 3 Estimated Annual Solid Waste Greenhouse Gas Emissions	14
Table 4 Estimated Greenhouse Gas Emissions from Water Use	15
Table 5 Estimated Annual Mobile Emissions of Greenhouse Gases	15
Table 6 Combined Annual Emissions of Greenhouse Gases.....	16
 Appendices	
Appendix: CalEEMod GHG Model Worksheets	
N ₂ O from Mobile Emissions GHG Calculation Worksheet	
Daily Backhoe Operation Emissions Calculation	



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MALIBU MEMORIAL CEMETERY PROJECT MALIBU, LOS ANGELES COUNTY GREENHOUSE GAS STUDY

This report is an analysis of the potential greenhouse gas (GHG) emissions impacts of the proposed Malibu Memorial Cemetery project located in Malibu, California in Los Angeles County. The report has been prepared by Rincon Consultants, Inc. under contract to Green Acres, LLC for use by the City of Malibu, in support of the environmental documentation being prepared pursuant to the California Environmental Quality Act (CEQA). The purpose of this study is to analyze the proposed project's GHG emissions and the associated impact to climate change. This study describes climate change, GHGs, and the current regulatory framework, quantifies GHG emissions for the proposed project, compares forecast emissions to quantitative thresholds, and discusses the project's consistency with applicable mitigation strategies.

PROJECT DESCRIPTION

Green Acres, LLC, is developing the Malibu Memorial Cemetery Park and Chapel Project, comprised of approximately 21.0 acres of a 28.7-acre property located east of Malibu Canyon Road, west of Civic Center Way, and north of Pacific Coast Highway in the City of Malibu, California (the "Project"). The unstable slope areas along the perimeter of the site comprise the remaining 7 acres of the parcel that Green Acres has elected not to develop. The proposed Memorial Park project contains approximately 17,500 GSF of FAR development and would include the construction of a 8,500 SF Main Chapel facility, 8,500 SF subterranean parking basement, 48 free-standing Mausoleum structures totaling approximately 9,000 SF (approximately 186 SF/each), approximately 30,600 plot spaces for various crypt configurations, cremation and fractional burial options, as well as surface unenclosed parking for guest vehicles along the entry drive and Chapel ring.

The original Project EIR was approved by the City of Malibu in 1998. To satisfy Mitigation Measure 8.1 of the Rancho Malibu Hotel Environmental Impact Report (City of Malibu 1997), a Cultural Resources Management Plan (CRMP) was developed to reduce potential impacts to an archaeological site located on the property (Wlodarski 1995). The revised CRMP was developed in response to three basic factors: 1) the need to incorporate burial crypts within areas of the site previously slated to be grubbed and capped; 2) changes in the condition of the site over the past 15 years since the plan was developed; and, 3) new grading of unstable slopes and required retaining walls on the site. The project was revised in October 2015 to exclude work in unstable slope areas, remove mounding within sensitive areas, and contain grading within the City-stipulated thresholds of 1,000 cubic yards per acre, reducing the overall project footprint to 21 acres.

SETTING

Overview of Climate Change

Climate change is the observed increase in the average temperature of the Earth's atmosphere and oceans along with other substantial changes in climate (such as wind patterns, precipitation, and



storms) over an extended period of time. The term “climate change” is often used interchangeably with the term “global warming,” but “climate change” is preferred to “global warming” because it helps convey that there are other changes in addition to rising temperatures. The baseline against which these changes are measured originates in historical records identifying temperature changes that have occurred in the past, such as during previous ice ages. The global climate is continuously changing, as evidenced by repeated episodes of substantial warming and cooling documented in the geologic record. The rate of change has typically been incremental, with warming or cooling trends occurring over the course of thousands of years. The past 10,000 years have been marked by a period of incremental warming, as glaciers have steadily retreated across the globe. However, scientists have observed acceleration in the rate of warming during the past 150 years. Per the United Nations Intergovernmental Panel on Climate Change (IPCC, 2013), the understanding of anthropogenic warming and cooling influences on climate has led to a high confidence (95% or greater chance) that the global average net effect of human activities has been the dominant cause of warming since the mid-20th century (IPCC, 2013).

Greenhouse Gases (GHGs)

Gases that absorb and re-emit infrared radiation in the atmosphere are called greenhouse gases (GHGs). The gases that are widely seen as the principal contributors to human-induced climate change include carbon dioxide (CO₂), methane (CH₄), nitrous oxides (N₂O), fluorinated gases such as hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆). Water vapor is excluded from the list of GHGs because it is short-lived in the atmosphere and its atmospheric concentrations are largely determined by natural processes, such as oceanic evaporation.

GHGs are emitted by both natural processes and human activities. Of these gases, CO₂ and CH₄ are emitted in the greatest quantities from human activities. Emissions of CO₂ are largely by-products of fossil fuel combustion, whereas CH₄ results from off-gassing associated with agricultural practices and landfills. Observations of CO₂ concentrations, globally-averaged temperature, and sea level rise are generally well within the range of the extent of the earlier IPCC projections. The recently observed increases in CH₄ and N₂O concentrations are smaller than those assumed in the scenarios in the previous assessments. Each IPCC assessment has used new projections of future climate change that have become more detailed as the models have become more advanced.

Man-made GHGs, many of which have greater heat-absorption potential than CO₂, include fluorinated gases and sulfur hexafluoride (SF₆) (California Environmental Protection Agency [CalEPA], 2006). Different types of GHGs have varying global warming potentials (GWPs). The GWP of a GHG is the potential of a gas or aerosol to trap heat in the atmosphere over a specified timescale (generally, 100 years). Because GHGs absorb different amounts of heat, a common reference gas (CO₂) is used to relate the amount of heat absorbed to the amount of the gas emissions, referred to as “carbon dioxide equivalent” (CO₂e), and is the amount of a GHG emitted multiplied by its GWP. Carbon dioxide has a GWP of one. By contrast, methane (CH₄) has a GWP of 21, meaning its global warming effect is 21 times greater than carbon dioxide on a molecule per molecule basis (IPCC, 1997).



The accumulation of GHGs in the atmosphere regulates the earth's temperature. Without the natural heat trapping effect of GHG, Earth's surface would be about 34° C cooler (CalEPA, 2006). However, it is believed that emissions from human activities, particularly the consumption of fossil fuels for electricity production and transportation, have elevated the concentration of these gases in the atmosphere beyond the level of naturally occurring concentrations. The following discusses the primary GHGs of concern.

Carbon Dioxide. The global carbon cycle is made up of large carbon flows and reservoirs. Billions of tons of carbon in the form of CO₂ are absorbed by oceans and living biomass (i.e., sinks) and are emitted to the atmosphere annually through natural processes (i.e., sources). When in equilibrium, carbon fluxes among these various reservoirs are roughly balanced (United States Environmental Protection Agency [USEPA], April 2014). CO₂ 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. Concentrations of CO₂ in the atmosphere have risen approximately 40% since the industrial revolution. The global atmospheric concentration of CO₂ has increased from a pre-industrial value of about 280 parts per million (ppm) to 391 ppm in 2011 (IPCC, 2007; Oceanic and Atmospheric Association [NOAA], 2010). The average annual CO₂ concentration growth rate was larger between 1995 and 2005 (average: 1.9 ppm per year) than it has been since the beginning of continuous direct atmospheric measurements (1960–2005 average: 1.4 ppm per year), although there is year-to-year variability in growth rates (NOAA, 2010). Currently, CO₂ represents an estimated 74% of total GHG emissions (IPCC, 2007). The largest source of CO₂, and of overall GHG emissions, is fossil fuel combustion.

Methane. Methane (CH₄) is an effective absorber of radiation, though its atmospheric concentration is less than that of CO₂ and its lifetime in the atmosphere is limited to 10 to 12 years. It has a global warming potential (GWP) approximately 21 times that of CO₂. Over the last 250 years, the concentration of CH₄ in the atmosphere has increased by 148% (IPCC, 2007), although emissions have declined from 1990 levels. Anthropogenic sources of CH₄ include enteric fermentation associated with domestic livestock, landfills, natural gas and petroleum systems, agricultural activities, coal mining, wastewater treatment, stationary and mobile combustion, and certain industrial processes (USEPA, April 2014).

Nitrous Oxide. Concentrations of nitrous oxide (N₂O) began to rise at the beginning of the industrial revolution and continue to increase at a relatively uniform growth rate (NOAA, 2010). N₂O is produced by microbial processes in soil and water, including those reactions that occur in fertilizers that contain nitrogen, fossil fuel combustion, and other chemical processes. Use of these fertilizers has increased over the last century. Agricultural soil management and mobile source fossil fuel combustion are the major sources of N₂O emissions. Nitrous oxide's GWP is approximately 298 times that of CO₂ (IPCC, 2007).

Fluorinated Gases (HFCS, PFCS and SF₆). Fluorinated gases, such as hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfurhexafluoride (SF₆), are powerful GHGs that are emitted from a variety of industrial processes. Fluorinated gases are used as substitutes for ozone-depleting substances such as chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs), and halons, which have been regulated since the mid-1980s because of their ozone-destroying potential and are phased out under the Montreal Protocol (1987) and Clean Air Act Amendments of 1990. Electrical transmission and distribution systems account for most SF₆ emissions, while PFC



emissions result from semiconductor manufacturing and as a by-product of primary aluminum production. Fluorinated gases are typically emitted in smaller quantities than CO₂, CH₄, and N₂O, but these compounds have much higher GWPs. SF₆ is the most potent GHG the IPCC has evaluated.

Greenhouse Gas Inventory

Worldwide anthropogenic emissions of GHG were approximately 46,000 million metric tons (MMT) CO₂e in 2010 (IPCC, 2014). CO₂ emissions from fossil fuel combustion and industrial processes contributed about 65% of total emissions in 2010. Of anthropogenic GHGs, carbon dioxide was the most abundant accounting for 76% of total 2010 emissions. Methane emissions accounted for 16% of the 2010 total, while nitrous oxide and fluorinated gases account for 6 and 2 percent respectively (IPCC, 2014).

Total U.S. GHG emissions were 6,525.6 MMT CO₂e in 2012 (USEPA, April 2014). Total U.S. emissions have increased by 4.7% since 1990, emissions decreased by 3.4% from 2011 to 2012 (USEPA, April 2014). This decrease from 2011 to 2012 was due to a decrease in the carbon intensity of fuels used to generate electricity due to a decrease in coal consumption, with increased natural gas consumption. Additionally, relatively mild winter conditions, especially in regions of the United States where electricity is important for heating, resulted in an overall decrease in electricity demand in most sectors. Since 1990, U.S. emissions have increased at an average annual rate of 0.2%. In 2012, the transportation and industrial end-use sectors accounted for 28.2% and 27.9% (with electricity-related emissions distributed), respectively. Meanwhile, the residential and commercial end-use sectors accounted for 16.3% and 16.4%, respectively, of CO₂, respectively (USEPA, 2014).

Based upon the California Air Resources Board (ARB) *California Greenhouse Gas Inventory for 2000-2012* (ARB, March 2014), California produced 459 MMT CO₂e in 2012. The major source of GHG in California is transportation, contributing 36% of the state's total GHG emissions. Electric power is the second largest source, contributing 21% of the state's GHG emissions (ARB, March 2014). The industrial sector accounted for approximately 19 percent of the total emissions. California emissions are due in part to its large size and large population compared to other states. Another factor that reduces California's per capita fuel use and GHG emissions, as compared to other states, is its relatively mild climate. ARB has projected statewide unregulated GHG emissions for the year 2020 will be 507 MMT CO₂e (ARB, August 2013). These projections represent the emissions that would be expected to occur in the absence of any GHG reduction actions.

Effects of Climate Change

Globally, climate change has the potential to affect numerous environmental resources through potential impacts related to future air temperatures and precipitation patterns. Scientific modeling predicts that continued GHG emissions at or above current rates would induce more extreme climate changes during the 21st century than were observed during the 20th century. Long-term trends have found that each of the past three decades has been warmer than all the previous decades in the instrumental record, and the decade from 2000 through 2010 has been the warmest. The global combined land and ocean temperature data show an increase of about 0.89°C (0.69°C–1.08°C) over the period 1901–2012 and about 0.72°C (0.49°C–0.89°C) over the



period 1951–2012 when described by a linear trend. Several independently analyzed data records of global and regional Land-Surface Air Temperature (LSAT) obtained from station observations are in agreement that LSAT as well as sea surface temperatures have increased. In addition to these projections, there are identifiable signs that global warming is currently taking place, including substantial ice loss in the Arctic over the past two decades (IPCC, 2013). According to the CalEPA's *2010 Climate Action Team Biennial Report*, potential impacts of climate change in California may include loss in snow pack, sea level rise, more extreme heat days per year, more high ozone days, more large forest fires, and more drought years (CalEPA, April 2010). Below is a summary of some of the potential effects that could be experienced in California as a result of climate change.

Sea Level Rise. According to *The Impacts of Sea-Level Rise on the California Coast*, prepared by the California Climate Change Center (CCCC) (May 2009), climate change has the potential to induce substantial sea level rise in the coming century. The rising sea level increases the likelihood and risk of flooding. Sea levels are rising faster now than in the previous two millennia, and the rise is expected to accelerate, even with robust GHG emission control measures. The most recent IPCC report (2013) predicts a mean sea-level rise of 11-38 inches by 2100. This prediction is more than 50 percent higher than earlier projections of 7-23 inches, when comparing the same emissions scenarios and time periods. The previous IPCC report (2007) identified a sea level rise on the California coast over the past century of approximately eight inches. Based on the results of various global climate change models, sea level rise is expected to continue. The California Climate Adaptation Strategy (December 2009) estimates a sea level rise of up to 55 inches by the end of this century.

Air Quality. Higher temperatures, which are conducive to air pollution formation, could worsen air quality in California. Climate change may increase the concentration of ground-level ozone, but the magnitude of the effect, and therefore its indirect effects, are uncertain. If higher temperatures are accompanied by drier conditions, the potential for large wildfires could increase, which, in turn, would further worsen air quality. However, if higher temperatures are accompanied by wetter, rather than drier conditions, the rains would tend to temporarily clear the air of particulate pollution and reduce the incidence of large wildfires, thereby ameliorating the pollution associated with wildfires. Additionally, severe heat accompanied by drier conditions and poor air quality could increase the number of heat-related deaths, illnesses, and asthma attacks throughout the state (CEC March 2009).

Water Supply. Analysis of paleoclimatic data (such as tree-ring reconstructions of stream flow and precipitation) indicates a history of naturally and widely varying hydrologic conditions in California and the west, including a pattern of recurring and extended droughts. Uncertainty remains with respect to the overall impact of climate change on future water supplies in California. However, the average early spring snowpack in the Sierra Nevada decreased by about 10 percent during the last century, a loss of 1.5 million acre-feet of snowpack storage. During the same period, sea level rose eight inches along California's coast. California's temperature has risen 1°F, mostly at night and during the winter, with higher elevations experiencing the highest increase. Many Southern California cities have experienced their lowest recorded annual precipitation twice within the past decade. In a span of only two years, Los Angeles experienced both its driest and wettest years on record (California Department of Water Resources [DWR], 2008; CCCC, May 2009).



This uncertainty complicates the analysis of future water demand, especially where the relationship between climate change and its potential effect on water demand is not well understood. The Sierra snowpack provides the majority of California's water supply by accumulating snow during our wet winters and releasing it slowly when we need it during our dry springs and summers. Based upon historical data and modeling DWR projects that the Sierra snowpack will experience a 25 to 40 percent reduction from its historic average by 2050. Climate change is also anticipated to bring warmer storms that result in less snowfall at lower elevations, reducing the total snowpack (DWR, 2008).

Hydrology. As discussed above, climate change could potentially affect: the amount of snowfall, rainfall, and snow pack; the intensity and frequency of storms; flood hydrographs (flash floods, rain or snow events, coincidental high tide and high runoff events); sea level rise and coastal flooding; coastal erosion; and the potential for salt water intrusion. The rate of increase of global mean sea levels over the 2001-2010 decade, as observed by satellites, ocean buoys and land gauges, was approximately 3.2 mm per year, which is double the observed 20th century trend of 1.6 mm per year (World Meteorological Organization [WMO], 2013). As a result, sea levels averaged over the last decade were about 8 inches higher than those of 1880 (WMO, 2013). Sea level rise may be a product of climate change through two main processes: expansion of sea water as the oceans warm and melting of ice over land. A rise in sea levels could result in coastal flooding and erosion and could jeopardize California's water supply due to salt water intrusion. Increased storm intensity and frequency could affect the ability of flood-control facilities, including levees, to handle storm events.

Agriculture. California has a \$30 billion agricultural industry that produces half of the country's fruits and vegetables. Higher CO₂ levels can stimulate plant production and increase plant water-use efficiency. However, if temperatures rise and drier conditions prevail, water demand could increase; crop-yield could be threatened by a less reliable water supply; and greater air pollution could render plants more susceptible to pest and disease outbreaks. In addition, temperature increases could change the time of year certain crops, such as wine grapes, bloom or ripen, and thereby affect their quality (CCCC, 2006).

Ecosystems and Wildlife. Climate change and the potential resulting changes in weather patterns could have ecological effects on a global and local scale. Increasing concentrations of GHGs are likely to accelerate the rate of climate change. Scientists project that the average global surface temperature could rise by 1.0-4.5°F (0.6-2.5°C) in the next 50 years, and 2.2-10°F (1.4-5.8°C) in the next century, with substantial regional variation. Soil moisture is likely to decline in many regions, and intense rainstorms are likely to become more frequent. Rising temperatures could have four major impacts on plants and animals: (1) timing of ecological events; (2) geographic range; (3) species' composition within communities; and (4) ecosystem processes, such as carbon cycling and storage (Parmesan, 2006).

While the above-mentioned potential impacts identify the possible effects of climate change at a global and potentially statewide level, in general scientific modeling tools are currently unable to predict what impacts would occur locally with a similar degree of accuracy. In general, regional and local predictions are made based on downscaling statewide models (CEC, March 2009).



Regulatory Setting

The following regulations address both climate change and GHG emissions.

International and Federal Regulations. The United States is, and has been, a participant in the United Nations Framework Convention on Climate Change (UNFCCC) since it was produced by the United Nations in 1992. The objective of the treaty is “stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.” This is generally understood to be achieved by stabilizing global GHG concentrations between 350 and 400 ppm, in order to limit the global average temperature increases between 2 and 2.4°C above pre-industrial levels (IPCC 2007). The UNFCCC itself does not set limits on GHG emissions for individual countries or enforcement mechanisms. Instead, the treaty provides for updates, called “protocols,” that would identify mandatory emissions limits.

Five years later, the UNFCCC brought nations together again to draft the Kyoto Protocol (1997). The Kyoto Protocol established commitments for industrialized nations to reduce their collective emissions of six GHGs (CO₂, CH₄, N₂O, SF₆, HFCs, and PFCs) to 5.2 percent below 1990 levels by 2012. The United States is a signatory of the Kyoto Protocol, but Congress has not ratified it and the United States has not bound itself to the Protocol’s commitments (UNFCCC, 2007). The first commitment period of the Kyoto Protocol ended in 2012. Governments, including 38 industrialized countries, agreed to a second commitment period of the Kyoto Protocol beginning January 1, 2013 and ending either on December 31, 2017 or December 31, 2020, to be decided by the Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol at its seventeenth session (UNFCCC, November 2011).

In Durban (17th session of the Conference of the Parties in Durban, South Africa, December 2011), governments decided to adopt a universal legal agreement on climate change as soon as possible, but not later than 2015. Work will begin on this immediately under a new group called the Ad Hoc Working Group on the Durban Platform for Enhanced Action. Progress was also made regarding the creation of a Green Climate Fund (GCF) for which a management framework was adopted (UNFCCC, December 2011; United Nations, November 2011).

In December 2015, the 21st session of the Conference of the Parties (COP21) adopted the Paris Agreement. The deal requires all countries that ratify it to commit to cutting greenhouse gas emissions, with the goal of peaking greenhouse gas emissions “as soon as possible” (Worland, 2015). The agreement includes commitments to (1) achieve a balance between sources and sinks of greenhouse gases in the second half of this century; (2) to keep global temperature increase “well below” 2 degrees Celsius (C) or 3.6 degrees Fahrenheit (F) and to pursue efforts to limit it to 1.5 C; (3) to review progress every five years; and (4) to spend \$100 billion a year in climate finance for developing countries by 2020 (UNFCCC, 2015). The agreement includes both legally binding measures, like reporting requirements, as well as voluntary or non-binding measures while, such as the setting of emissions targets for any individual country (Worland, 2015).

The United States Supreme Court in *Massachusetts et al. v. Environmental Protection Agency et al.* ([2007] 549 U.S. 05-1120) held that the United States Environmental Protection Agency (EPA) has the authority to regulate motor-vehicle GHG emissions under the federal Clean Air Act.



The USEPA issued a Final Rule for mandatory reporting of GHG emissions in October 2009. This Final Rule applies to fossil fuel suppliers, industrial gas suppliers, direct GHG emitters, and manufacturers of heavy-duty and off-road vehicles and vehicle engines, and requires annual reporting of emissions. The first annual reports for these sources were due in March 2011.

On May 13, 2010, the U.S. EPA issued a Final Rule that took effect on January 2, 2011, setting a threshold of 75,000 tons CO₂e per year for GHG emissions. New and existing industrial facilities that meet or exceed that threshold will require a permit after that date. On November 10, 2010, the U.S. EPA published the "PSD and Title V Permitting Guidance for Greenhouse Gases." The U.S. EPA's guidance document is directed at state agencies responsible for air pollution permits under the Federal Clean Air Act to help them understand how to implement GHG reduction requirements while mitigating costs for industry. It is expected that most states will use the U.S. EPA's new guidelines when processing new air pollution permits for power plants, oil refineries, cement manufacturing, and other large pollution point sources.

On January 2, 2011, the U.S. EPA implemented the first phase of the Tailoring Rule for GHG emissions Title V Permitting. Under the first phase of the Tailoring Rule, all new sources of emissions are subject to GHG Title V permitting if they are otherwise subject to Title V for another air pollutant and they emit at least 75,000 tons CO₂e per year. Under Phase 1, no sources were required to obtain a Title V permit solely due to GHG emissions. Phase 2 of the Tailoring Rule went into effect July 1, 2011. At that time new sources were subject to GHG Title V permitting if the source emits 100,000 tons CO₂e per year, or they are otherwise subject to Title V permitting for another pollutant and emit at least 75,000 tons CO₂e per year.

On July 3, 2012 the U.S. EPA issued the final rule that retains the GHG permitting thresholds that were established in Phases 1 and 2 of the GHG Tailoring Rule. These emission thresholds determine when Clean Air Act permits under the New Source Review Prevention of Significant Deterioration (PSD) and Title V Operating Permit programs are required for new and existing industrial facilities.

California Regulations. ARB is responsible for the coordination and oversight of State and local air pollution control programs in California. California has a numerous regulations aimed at reducing the state's GHG emissions. These initiatives are summarized below.

Assembly Bill (AB) 1493 (2002), California's Advanced Clean Cars program (referred to as "Pavley"), requires ARB to develop and adopt regulations to achieve "the maximum feasible and cost-effective reduction of GHG emissions from motor vehicles." On June 30, 2009, U.S. EPA granted the waiver of Clean Air Act preemption to California for its greenhouse gas emission standards for motor vehicles beginning with the 2009 model year. Pavley I took effect for model years starting in 2009 to 2016 and Pavley II, which is now referred to as "LEV (Low Emission Vehicle) III GHG" will cover 2017 to 2025. Fleet average emission standards would reach 22 percent reduction by 2012 and 30 percent by 2016. The Advanced Clean Cars program coordinates the goals of the Low Emissions Vehicles (LEV), Zero Emissions Vehicles (ZEV), and Clean Fuels Outlet programs and would provide major reductions in GHG emissions. By 2025,



when the rules will be fully implemented, new automobiles will emit 34 percent fewer GHGs and 75 percent fewer smog-forming emissions from their model year 2016 levels (ARB, 2011).

In 2005, former Governor Schwarzenegger issued Executive Order (EO) S-3-05, establishing statewide GHG emissions reduction targets. EO S-3-05 provides that by 2010, emissions shall be reduced to 2000 levels; by 2020, emissions shall be reduced to 1990 levels; and by 2050, emissions shall be reduced to 80 percent below 1990 levels (CalEPA, 2006). In response to EO S-3-05, CalEPA created the Climate Action Team (CAT), which in March 2006 published the Climate Action Team Report (the “2006 CAT Report”) (CalEPA, 2006). The 2006 CAT Report identified a recommended list of strategies that the state could pursue to reduce GHG emissions. These are strategies that could be implemented by various state agencies to ensure that the emission reduction targets in EO S-3-05 are met and can be met with existing authority of the state agencies. The strategies include the reduction of passenger and light duty truck emissions, the reduction of idling times for diesel trucks, an overhaul of shipping technology/infrastructure, increased use of alternative fuels, increased recycling, and landfill methane capture, etc.

California’s major initiative for reducing GHG emissions is outlined in Assembly Bill 32 (AB 32), the “California Global Warming Solutions Act of 2006,” signed into law in 2006. AB 32 codifies the statewide goal of reducing GHG emissions to 1990 levels by 2020 (essentially a 15 percent reduction below 2005 emission levels; the same requirement as under S-3-05), and requires ARB to prepare a Scoping Plan that outlines the main State strategies for reducing GHGs to meet the 2020 deadline. In addition, AB 32 requires ARB to adopt regulations to require reporting and verification of statewide GHG emissions.

After completing a comprehensive review and update process, ARB approved a 1990 statewide GHG level and 2020 limit of 427 MMT CO₂e. The Scoping Plan approved by ARB on December 11, 2008 included measures to address GHG emission reduction strategies related to energy efficiency, water use, and recycling and solid waste, among other measures. Many of the GHG reduction measures including in the Scoping Plan (e.g., Low Carbon Fuel Standard, Advanced Clean Car standards, and Cap-and-Trade) have been adopted over the last five years. Implementation activities are ongoing and ARB is currently the process of updating the Scoping Plan.

In May 2014, ARB approved the first update to the AB 32 Scoping Plan. The 2013 Scoping Plan update defines ARB’s climate change priorities for the next five years and sets the groundwork to reach post-2020 goals set forth in EO S-3-05. The update highlights California’s progress toward meeting the “near-term” 2020 GHG emission reduction goals defined in the original Scoping Plan. It also evaluates how to align the State’s longer-term GHG reduction strategies with other State policy priorities, such as for water, waste, natural resources, clean energy and transportation, and land use (ARB, June 2014).

Senate Bill (SB) 97, signed in August 2007, acknowledges that climate change is an environmental issue that requires analysis in California Environmental Quality Act (CEQA) documents. In March 2010, the California Resources Agency (Resources Agency) adopted amendments to the State CEQA Guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions. The adopted guidelines give lead agencies the discretion to set



quantitative or qualitative thresholds for the assessment and mitigation of GHGs and climate change impacts.

ARB Resolution 07-54 establishes 25,000 MT of GHG emissions as the threshold for identifying the largest stationary emission sources in California for purposes of requiring the annual reporting of emissions. This threshold is just over 0.005 percent of California's total inventory of GHG emissions for 2004.

Senate Bill (SB) 375, signed in August 2008, enhances the state's ability to reach AB 32 goals by directing ARB to develop regional GHG emission reduction targets to be achieved from vehicles for 2020 and 2035. In addition, SB 375 directs each of the state's 18 major Metropolitan Planning Organizations (MPO) to prepare a "sustainable communities strategy" (SCS) that contains a growth strategy to meet these emission targets for inclusion in the Regional Transportation Plan (RTP). On September 23, 2010, ARB adopted final regional targets for reducing GHG emissions from 2005 levels by 2020 and 2035.

The Southern California Association of Governments (SCAG) was assigned targets of an 8% reduction in GHGs from transportation sources by 2020 and a 13% reduction in GHGs from transportation sources by 2035. In the SCAG region, SB 375 also provides the option for the coordinated development of subregional plans by the subregional councils of governments and the county transportation commissions to meet SB 375 requirements.

In October 2015, Governor Brown signed SB 350 requiring California to generate 50 percent of its electricity from renewable energy by 2030.

For more information on the Senate and Assembly Bills, Executive Orders, and reports discussed above, and to view reports and research referenced above, please refer to the following websites: www.climatechange.ca.gov and www.arb.ca.gov/cc/cc.htm.

Local Regulations and CEQA Requirements. Pursuant to the requirements of SB 97, the Resources Agency has adopted amendments to the State CEQA Guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions. The adopted CEQA Guidelines provide general regulatory guidance on the analysis and mitigation of GHG emissions in CEQA documents, but contain no suggested thresholds of significance for GHG emissions. Instead, they give lead agencies the discretion to set quantitative or qualitative thresholds for the assessment and mitigation of GHGs and climate change impacts. The general approach to developing a Threshold of Significance for GHG emissions is to identify the emissions level for which a project would not be expected to substantially conflict with existing California legislation adopted to reduce statewide GHG emissions needed to move the state towards climate stabilization. If a project would generate GHG emissions above the threshold level, its contribution to cumulative impacts would be considered significant. To date, the BAAQMD, the SCAQMD, and the SJVAPCD have adopted quantitative significance thresholds for GHGs. The SCAQMD threshold, which was adopted in December 2008, considers emissions of over 10,000 metric tons CO₂e/year to be significant. However, the SCAQMD's threshold applies only to stationary sources and is expressly intended to apply only when the SCAQMD is the CEQA lead agency. Although not yet adopted, the SCAQMD recommends a quantitative threshold for all land use types of 3,000 metric tons CO₂e/year (SCAQMD, "Proposed Tier 3 Quantitative



Thresholds – Option 1”, September 2010). No air district has the power to establish definitive thresholds that will completely relieve a lead agency of the obligation to determine significance on a case-by-case basis for a specific project.

CLIMATE CHANGE IMPACT ANALYSIS

Pursuant to the requirements of SB 97, the Resources Agency adopted amendments to the State CEQA Guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions in March 2010. These guidelines are used in evaluating the cumulative significance of GHG emissions from the proposed project. According to the adopted CEQA Guidelines, impacts related to GHG emissions from the proposed project would be significant if the project would:

- *Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment; and/or*
- *Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases.*

The vast majority of individual projects do not generate sufficient GHG emissions to create a project-specific impact through a direct influence to climate change; therefore, the issue of climate change typically involves an analysis of whether a project’s contribution towards an impact is cumulatively considerable. “Cumulatively considerable” means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, other current projects, and probable future projects (CEQA Guidelines, Section 15355).

For future projects, the significance of GHG emissions may be evaluated based on locally adopted quantitative thresholds, or consistency with a regional GHG reduction plan (such as a Climate Action Plan). However, because the SCAQMD has not yet adopted GHG emissions thresholds that apply to land use projects where the SCAQMD is not the lead agency and no GHG emissions reduction plan or GHG emissions thresholds have been adopted in the City of Malibu, the proposed project is evaluated based on the SCAQMD’s recommended/preferred option threshold for all land use types – including retail – of 3,000 metric tons CO_{2e} per year (SCAQMD, “Proposed Tier 3 Quantitative Thresholds – Option 1”, September 2010).

The proposed project would have a significant impact related to GHG emissions if the project would generate more than 3,000 metric tons of CO_{2e} per year. In addition, in order to determine whether or not the proposed project’s GHG emissions are “cumulatively considerable,” an inconsistency with applicable GHG emissions reductions strategies would be a significant impact under the second significance checklist item discussed above.

Methodology

Calculations of CO₂, CH₄, and N₂O emissions are provided to identify the magnitude of potential project effects. The analysis focuses on CO₂, CH₄, and N₂O because these make up 98.9% of all GHG emissions by volume (IPCC, 2007) and are the GHG emissions that the project would emit in the largest quantities. Fluorinated gases, such as HFCs, PFCs, and SF₆, were also considered for the analysis. However, emissions of fluorinated gases are primarily associated with



industrial processes; because the project involves the development of religious memorial site, the quantity of fluorinated gases would be minimal. Emissions of all GHGs are converted into their equivalent weight in CO₂ (CO₂e). Minimal amounts of other main GHGs (such as chlorofluorocarbons [CFCs]) would be emitted, and these other GHG emissions would not substantially add to the calculated CO₂e amounts. Calculations are based on the methodologies discussed in the California Air Pollution Control Officers Association (CAPCOA) *CEQA and Climate Change* white paper (January 2008) and included the use of the California Climate Action Registry (CCAR) General Reporting Protocol (January 2009).

This analysis calculates GHG emissions by quantifying the project's amenities and design features and also takes into account current state and federal measures that are intended to reduce GHG emissions. State and federal measures that are built into the emissions model calculation include Title 24 Energy Standards, Pavley (Clean Car Standards) and Low Carbon Fuel Standards.

Construction Emissions. Although construction activity is addressed in this analysis, CAPCOA does not discuss whether any of the suggested threshold approaches (as discussed below in *GHG Cumulative Significance*) adequately address impacts from temporary construction activity. As stated in the *CEQA and Climate Change* white paper, "more study is needed to make this assessment or to develop separate thresholds for construction activity" (CAPCOA, 2008). Nevertheless, the SCAQMD has recommended amortizing construction-related emissions over a 30-year period in conjunction with the proposed project's operational emissions.

Construction of the proposed project would generate GHG emissions, primarily due to the operation of construction equipment and truck trips. Project construction was estimated to be completed within 17 months. For this analysis, it was assumed that construction would commence in January 2016 and would be completed at the end of August of 2017. Emissions associated with the construction period were estimated using the California Emissions Estimator Model (CalEEMod) software, based on the projected maximum amount of equipment that would be used on-site at one time. Complete CalEEMod results and assumptions can be viewed in the Appendix.

On-site Operational Emissions. Operational emissions from energy use (electricity and natural gas use) for the proposed project were estimated using CalEEMod (see Appendix for CalEEMod output). The default values on which CalEEMod are based include the California Energy Commission (CEC) sponsored California Commercial End Use Survey (CEUS) and Residential Appliance Saturation Survey (RASS) studies. CalEEMod provides operational emissions of CO₂, N₂O and CH₄. This methodology is considered reasonable and reliable for use, as it has been subjected to peer review by numerous public and private stakeholders, and in particular by the CEC. It is also recommended by CAPCOA (January 2008).

Emissions associated with area sources, including consumer products, landscape maintenance, and architectural coating were calculated in CalEEMod and utilize standard emission rates from CARB, USEPA, and district supplied emission factor values (CalEEMod User Guide, 2011).

Emissions from waste generation were also calculated in CalEEMod and are based on the IPCC's methods for quantifying GHG emissions from solid waste using the degradable organic content of waste (CalEEMod User Guide, 2011). Waste disposal rates by land use and overall composition of



municipal solid waste in California was primarily based on data provided by the California Department of Resources Recycling and Recovery (CalRecycle).

Emissions from water and wastewater usage calculated in CalEEMod were based on the default electricity intensity from the CEC's 2006 Refining Estimates of Water-Related Energy Use in California using the average values for Northern and Southern California.

In addition to emissions estimated using CalEEMod, emission factors from the OFFROAD2007 tool were used to estimate the emissions associated with operation of a backhoe on a daily basis for excavation activities related to the project's cemetery use.

Direct Emissions from Mobile Combustion. Emissions of CO₂ and CH₄ from transportation sources for the proposed project were quantified using CalEEMod. Because CalEEMod does not calculate N₂O emissions from mobile sources, N₂O emissions were quantified using the California Climate Action Registry General Reporting Protocol (January 2009) direct emissions factors for mobile combustion (see Appendix for calculations). The estimate of total daily trips, associated with development of the proposed project, was based on the Institute of Traffic Engineers, Trip Generation manual, 9th Edition. Total vehicle trips generated by the project were then calculated and extrapolated to derive total annual mileage in CalEEMod. Emission rates for N₂O emissions were based on the vehicle mix output generated by CalEEMod and the emission factors found in the California Climate Action Registry General Reporting Protocol.

Estimate of GHG Emissions

Construction Emissions. Construction activity is assumed to occur over a period of approximately 17 months. Based on CalEEMod results, construction activity for the project would generate an estimated 2,206 metric tons of CO₂e (as shown in Table 1). Amortized over a 30-year period (the assumed life of the project), construction of the proposed project would generate approximately 74 metric tons of CO₂e per year.

Table 1
Estimated Construction Emissions of Greenhouse Gases

	Annual Emissions (CO ₂ e)
Total	2,205.7 metric tons
Amortized over 30 years	73.5 metric tons per year

Sources: See Appendix for CalEEMod output and for GHG emission factor assumptions.

Operational Indirect and Stationary Direct Emissions.

Energy Use. Operation of on-site development would consume both electricity and natural gas (see Appendix for CalEEMod output). The generation of electricity through combustion of fossil fuels typically yields CO₂, and to a smaller extent, N₂O and CH₄. As



discussed above, annual electricity and natural gas emissions can be calculated using default values from the CEC sponsored CEUS and RASS studies which are built into CalEEMod.

Electricity consumption associated with the project would generate approximately 210 metric tons of CO_{2e} per year. As shown in Table 2, natural gas use would generate approximately 20 metric tons of CO_{2e} per year. Thus, overall energy use at the project site would generate approximately 231 metric tons of CO_{2e} per year.

Table 2
Estimated Annual Energy-Related Greenhouse Gas Emissions

Emission Source	Annual Emissions (CO_{2e})
Electricity	210.4 metric tons
Natural Gas	20.3 metric tons
Total	230.7 metric tons

Sources: See Appendix for CalEEMod output and for GHG emission factor assumptions.

Solid Waste Emissions. For solid waste generated on-site, it was assumed that the project would include a recycling program that would achieve the 50% diversion rate required by the California Integrated Waste Management Act of 1989 and reinforced by the objectives of the Conservation Element of the City’s General Plan. The project is estimated to dispose of 51 metric tons of solid waste in landfills after diversion. As shown in Table 3, based on this estimate, the project would result in approximately 46 metric tons of CO_{2e} per year, which would be reduced to 23 metric tons of CO_{2e} with the 50% diversion rate as required by the California Integrated Waste Management Act.

Table 3
Estimated Annual Solid Waste Greenhouse Gas Emissions

	Annual Emissions (CO_{2e})
Solid Waste	46.1 metric tons
Total Waste Diverted ¹	23.1 metric tons
Total Waste Disposed at Landfill	23.1 metric tons

Source: See Appendix for CalEEMod output and GHG emission factor assumptions.

¹*Based on a 50% diversion rate, as required by the California Integrated Waste Management Act.*

Water Use Emissions. It is anticipated that the project would use approximately 23 million gallons of water per year. Based on the amount of electricity generated in order to supply this amount of water, as shown in Table 4, the project would generate approximately 77



metric tons of CO₂e per year. It should be noted that, if the project uses recycled water, actual water use and associated electricity would be reduced.

Table 4
Estimated Greenhouse Gas Emissions from Water Use

Emission Source	Annual Emissions (CO₂e)
Water Use	77.0 metric tons

Source: See Appendix for CalEEMod output and GHG emission factor assumptions.

Transportation Emissions. Mobile source GHG emissions were estimated using the average daily trips derived from the trip generation rates for a cemetery from the Institute of Traffic Engineers, Trip Generation manual 9th Edition, and by the total VMT estimated in CalEEMod. On-site development would generate approximately 238,179 annual VMT.

Table 5 shows the estimated mobile emissions of GHGs for the project based on the estimated annual VMT. As noted above, CalEEMod does not calculate N₂O emissions related to mobile sources. As such, N₂O emissions were calculated based on the project’s VMT using calculation methods provided by the California Climate Action Registry General Reporting Protocol (January 2009). As shown in Table 5, the project would generate approximately 146.4 metric tons of CO₂e associated with mobile emissions.

Table 5
Estimated Annual Mobile Emissions of Greenhouse Gases

Emission Source	Annual Emissions (CO₂e)
Mobile Emissions (CO ₂ & CH ₄) ¹	106.8 metric tons
Mobile Emissions (N ₂ O)	5.3 metric tons
Daily Backhoe Activity (on-site) ²	34.3 metric tons
Total	146.4 metric tons

Sources: See Appendix for CalEEMod output and GHG emission factor assumptions.

¹ California Climate Action Registry General Reporting Protocol, Reporting Entity-Wide Greenhouse Gas Emissions, Version 3.1, January 2009, page 30-35.

² OFFROAD2007, based on estimated average daily backhoe operation of up to 4 hours per day. Refer to Appendix for calculations.

Combined Construction, Stationary and Mobile Source Emissions. Table 6 combines the construction, operational and mobile GHG emissions associated with on-site development for the proposed project. As discussed above, construction emissions associated with construction activity (approximately 2,205.7 metric tons CO₂e) are amortized over 30 years (the anticipated life of the project).



**Table 6
 Combined Annual Emissions of Greenhouse Gases**

Emission Source	Annual Emissions
Construction	73.5 metric tons CO ₂ e
Operational	
Energy	230.7 metric tons CO ₂ e
Solid Waste	23.1 metric tons CO ₂ e
Water	77.0 metric tons CO ₂ e
Mobile	146.4 metric tons CO ₂ e
Total	550.7 metric tons CO₂e

Sources: See Appendix for CalEEMod output and for GHG emission factor assumptions.

For the proposed project, the combined annual emissions would total approximately 551 metric tons of CO₂e per year.

GHG Cumulative Significance. CalEPA’s Climate Action Team (CAT) published the 2006 CAT Report which includes GHG emissions reduction strategies intended for projects emitting less than 10,000 tons CO₂e/year. In addition, the California Attorney General’s Office has developed Global Warming Measures (2008) and OPR’s CEQA and Climate Change (CAPCOA, 2008) document includes GHG reduction measures intended to reduce GHG emissions in order to achieve statewide emissions reduction goals. All of these measures aim to curb the GHG emissions through suggestions pertaining to land use, transportation, renewable energy, and energy efficiency. Several of these actions are already required by California regulations, such as:

- *AB 1493 (Pavley) requires the state to develop and adopt regulations that achieve the maximum feasible and cost-effective reduction of climate change emissions emitted by passenger vehicles and light duty trucks.*
- *In 2004, ARB adopted a measure to limit diesel-fueled commercial motor vehicle idling.*
- *The Integrated Waste Management Act of 1989, (AB 939, Sher, Chapter 1095, Statutes of 1989) established a 50% waste diversion mandate for California.*
- *Public Resources Code 25402 authorizes the CEC to adopt and periodically update its building energy efficiency standards (that apply to newly constructed buildings and additions to and alterations to existing buildings).*
- *California’s Renewable Portfolio Standard (RPS), established in 2002, requires that all load serving entities achieve a goal of 33 percent of retail electricity sales from renewable energy sources by 2020, within certain cost constraints.*
- *Green Building Executive Order, S-20-04 (CA 2004), sets a goal of reducing energy use in public and private buildings by 20 percent by the year 2015, as compared with 2003 levels.*

The proposed project does not include any elements that would conflict with state or local regulations intended to reduce GHG emissions from new development. Consistency with these state regulations and goals illustrates that the project would not conflict with the state’s GHG-related legislation and would not contribute to the inability to meet reduction goals. The project



would not conflict with any of these statewide emissions reduction strategies. In addition, the proposed project not conflict with applicable City General Plan policies that support energy efficiency and sustainability, including policies related to outdoor lighting, electric landscaping equipment, and solid waste/wastewater. Therefore, the project would not conflict with any applicable state plan, policy or regulation intended to reduce GHG emissions, and impacts would be less than significant.



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Appendix



*CalEEMod GHG Model Worksheets/N₂O from Mobile
Emissions GHG Calculation Worksheet*

Daily Backhoe Operation Emissions Calculation

**Malibu Memorial Cemetery Project
Los Angeles-South Coast County, Annual**

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Place of Worship	17.50	1000sqft	0.40	17,500.00	0
Enclosed Parking Structure	2.00	Acre	2.00	87,120.00	0
City Park	18.80	Acre	18.80	818,928.00	0

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.2	Precipitation Freq (Days)	33
Climate Zone	8			Operational Year	2017
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 - The place of worship is the square footage for the chapel and mausoleum combined. The parking includes all paved areas. The park accounts for all remaining space.

Construction Phase - Architectural coating phase lengthened to more accurately predict the actual constructing phasing for the project.

Grading -

Vehicle Trips - The trip rates were taking from the ITE Trip Generation manual 9th edition for a Cemetery (566).

Construction Off-road Equipment Mitigation -

Area Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	20.00	325.00
tblConstructionPhase	PhaseEndDate	11/29/2018	9/28/2017
tblConstructionPhase	PhaseEndDate	10/26/2017	9/28/2017
tblConstructionPhase	PhaseStartDate	9/1/2017	7/1/2016
tblConstructionPhase	PhaseStartDate	9/29/2017	9/1/2017
tblGrading	MaterialExported	0.00	21,000.00
tblProjectCharacteristics	OperationalYear	2014	2017
tblVehicleTrips	ST_TR	1.59	0.00
tblVehicleTrips	ST_TR	10.37	7.13
tblVehicleTrips	SU_TR	1.59	0.00
tblVehicleTrips	SU_TR	36.63	9.14
tblVehicleTrips	WD_TR	1.59	0.00
tblVehicleTrips	WD_TR	9.11	5.68

2.0 Emissions Summary

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	4.4075	0.0000	5.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	9.5000e-004	9.5000e-004	0.0000	0.0000	1.0100e-003
Energy	2.0400e-003	0.0186	0.0156	1.1000e-004		1.4100e-003	1.4100e-003		1.4100e-003	1.4100e-003	0.0000	229.7792	229.7792	0.0100	2.3600e-003	230.7223
Mobile	0.0633	0.1574	0.6357	1.3800e-003	0.0903	2.0800e-003	0.0924	0.0242	1.9100e-003	0.0261	0.0000	106.7545	106.7545	4.4900e-003	0.0000	106.8488
Waste						0.0000	0.0000		0.0000	0.0000	20.5772	0.0000	20.5772	1.2161	0.0000	46.1148
Water						0.0000	0.0000		0.0000	0.0000	0.1737	75.9793	76.1530	0.0213	1.1400e-003	76.9557
Total	4.4728	0.1759	0.6518	1.4900e-003	0.0903	3.4900e-003	0.0938	0.0242	3.3200e-003	0.0275	20.7509	412.5140	433.2649	1.2519	3.5000e-003	460.6426

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	4.4075	0.0000	5.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	9.5000e-004	9.5000e-004	0.0000	0.0000	1.0100e-003
Energy	2.0400e-003	0.0186	0.0156	1.1000e-004		1.4100e-003	1.4100e-003		1.4100e-003	1.4100e-003	0.0000	229.7792	229.7792	0.0100	2.3600e-003	230.7223
Mobile	0.0633	0.1574	0.6357	1.3800e-003	0.0903	2.0800e-003	0.0924	0.0242	1.9100e-003	0.0261	0.0000	106.7545	106.7545	4.4900e-003	0.0000	106.8488
Waste						0.0000	0.0000		0.0000	0.0000	20.5772	0.0000	20.5772	1.2161	0.0000	46.1148
Water						0.0000	0.0000		0.0000	0.0000	0.1737	75.9793	76.1530	0.0213	1.1400e-003	76.9554
Total	4.4728	0.1759	0.6518	1.4900e-003	0.0903	3.4900e-003	0.0938	0.0242	3.3200e-003	0.0275	20.7509	412.5140	433.2649	1.2519	3.5000e-003	460.6423

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2016	1/28/2016	5	20	
2	Site Preparation	Site Preparation	1/29/2016	2/11/2016	5	10	
3	Grading	Grading	2/12/2016	3/31/2016	5	35	
4	Building Construction	Building Construction	4/1/2016	8/31/2017	5	370	
5	Architectural Coating	Architectural Coating	7/1/2016	9/28/2017	5	325	
6	Paving	Paving	9/1/2017	9/28/2017	5	20	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 87.5

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 1,385,322; Non-Residential Outdoor: 461,774 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	162	0.38
Demolition	Rubber Tired Dozers	2	8.00	255	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	255	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
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
Architectural Coating	Air Compressors	1	6.00	78	0.48
Paving	Pavers	2	8.00	125	0.42
Paving	Paving Equipment	2	8.00	130	0.36
Paving	Rollers	2	8.00	80	0.38

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	2,625.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	388.00	151.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	78.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Demolition - 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	0.0429	0.4566	0.3503	4.0000e-004		0.0229	0.0229		0.0214	0.0214	0.0000	37.0974	37.0974	0.0101	0.0000	37.3092
Total	0.0429	0.4566	0.3503	4.0000e-004		0.0229	0.0229		0.0214	0.0214	0.0000	37.0974	37.0974	0.0101	0.0000	37.3092

3.2 Demolition - 2016

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	6.6000e-004	9.6000e-004	9.9800e-003	2.0000e-005	1.6400e-003	2.0000e-005	1.6600e-003	4.4000e-004	1.0000e-005	4.5000e-004	0.0000	1.6039	1.6039	9.0000e-005	0.0000	1.6058
Total	6.6000e-004	9.6000e-004	9.9800e-003	2.0000e-005	1.6400e-003	2.0000e-005	1.6600e-003	4.4000e-004	1.0000e-005	4.5000e-004	0.0000	1.6039	1.6039	9.0000e-005	0.0000	1.6058

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	0.0429	0.4566	0.3503	4.0000e-004		0.0229	0.0229		0.0214	0.0214	0.0000	37.0973	37.0973	0.0101	0.0000	37.3092
Total	0.0429	0.4566	0.3503	4.0000e-004		0.0229	0.0229		0.0214	0.0214	0.0000	37.0973	37.0973	0.0101	0.0000	37.3092

3.2 Demolition - 2016

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	6.6000e-004	9.6000e-004	9.9800e-003	2.0000e-005	1.6400e-003	2.0000e-005	1.6600e-003	4.4000e-004	1.0000e-005	4.5000e-004	0.0000	1.6039	1.6039	9.0000e-005	0.0000	1.6058
Total	6.6000e-004	9.6000e-004	9.9800e-003	2.0000e-005	1.6400e-003	2.0000e-005	1.6600e-003	4.4000e-004	1.0000e-005	4.5000e-004	0.0000	1.6039	1.6039	9.0000e-005	0.0000	1.6058

3.3 Site Preparation - 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					
Fugitive Dust					0.0903	0.0000	0.0903	0.0497	0.0000	0.0497	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0254	0.2732	0.2055	2.0000e-004		0.0147	0.0147		0.0135	0.0135	0.0000	18.4386	18.4386	5.5600e-003	0.0000	18.5554
Total	0.0254	0.2732	0.2055	2.0000e-004	0.0903	0.0147	0.1050	0.0497	0.0135	0.0632	0.0000	18.4386	18.4386	5.5600e-003	0.0000	18.5554

3.3 Site Preparation - 2016

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	3.9000e-004	5.7000e-004	5.9900e-003	1.0000e-005	9.9000e-004	1.0000e-005	1.0000e-003	2.6000e-004	1.0000e-005	2.7000e-004	0.0000	0.9624	0.9624	5.0000e-005	0.0000	0.9635
Total	3.9000e-004	5.7000e-004	5.9900e-003	1.0000e-005	9.9000e-004	1.0000e-005	1.0000e-003	2.6000e-004	1.0000e-005	2.7000e-004	0.0000	0.9624	0.9624	5.0000e-005	0.0000	0.9635

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					0.0407	0.0000	0.0407	0.0223	0.0000	0.0223	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0254	0.2732	0.2055	2.0000e-004		0.0147	0.0147		0.0135	0.0135	0.0000	18.4385	18.4385	5.5600e-003	0.0000	18.5553
Total	0.0254	0.2732	0.2055	2.0000e-004	0.0407	0.0147	0.0553	0.0223	0.0135	0.0359	0.0000	18.4385	18.4385	5.5600e-003	0.0000	18.5553

3.3 Site Preparation - 2016

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	3.9000e-004	5.7000e-004	5.9900e-003	1.0000e-005	9.9000e-004	1.0000e-005	1.0000e-003	2.6000e-004	1.0000e-005	2.7000e-004	0.0000	0.9624	0.9624	5.0000e-005	0.0000	0.9635
Total	3.9000e-004	5.7000e-004	5.9900e-003	1.0000e-005	9.9000e-004	1.0000e-005	1.0000e-003	2.6000e-004	1.0000e-005	2.7000e-004	0.0000	0.9624	0.9624	5.0000e-005	0.0000	0.9635

3.4 Grading - 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					
Fugitive Dust					0.1530	0.0000	0.1530	0.0631	0.0000	0.0631	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1134	1.3092	0.8599	1.0800e-003		0.0627	0.0627		0.0577	0.0577	0.0000	101.8425	101.8425	0.0307	0.0000	102.4876
Total	0.1134	1.3092	0.8599	1.0800e-003	0.1530	0.0627	0.2157	0.0631	0.0577	0.1208	0.0000	101.8425	101.8425	0.0307	0.0000	102.4876

3.4 Grading - 2016

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	0.0240	0.3876	0.2938	9.8000e-004	0.0225	5.4500e-003	0.0279	6.1600e-003	5.0200e-003	0.0112	0.0000	89.5323	89.5323	6.7000e-004	0.0000	0.0000	89.5463
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	0.0000
Worker	1.5300e-003	2.2300e-003	0.0233	5.0000e-005	3.8400e-003	4.0000e-005	3.8700e-003	1.0200e-003	3.0000e-005	1.0500e-003	0.0000	3.7425	3.7425	2.1000e-004	0.0000	0.0000	3.7469
Total	0.0256	0.3899	0.3171	1.0300e-003	0.0263	5.4900e-003	0.0318	7.1800e-003	5.0500e-003	0.0122	0.0000	93.2747	93.2747	8.8000e-004	0.0000	0.0000	93.2932

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					0.0688	0.0000	0.0688	0.0284	0.0000	0.0284	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1134	1.3092	0.8599	1.0800e-003		0.0627	0.0627		0.0577	0.0577	0.0000	101.8424	101.8424	0.0307	0.0000	102.4875
Total	0.1134	1.3092	0.8599	1.0800e-003	0.0688	0.0627	0.1316	0.0284	0.0577	0.0861	0.0000	101.8424	101.8424	0.0307	0.0000	102.4875

3.4 Grading - 2016

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	0.0240	0.3876	0.2938	9.8000e-004	0.0225	5.4500e-003	0.0279	6.1600e-003	5.0200e-003	0.0112	0.0000	89.5323	89.5323	6.7000e-004	0.0000	89.5463
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	1.5300e-003	2.2300e-003	0.0233	5.0000e-005	3.8400e-003	4.0000e-005	3.8700e-003	1.0200e-003	3.0000e-005	1.0500e-003	0.0000	3.7425	3.7425	2.1000e-004	0.0000	3.7469
Total	0.0256	0.3899	0.3171	1.0300e-003	0.0263	5.4900e-003	0.0318	7.1800e-003	5.0500e-003	0.0122	0.0000	93.2747	93.2747	8.8000e-004	0.0000	93.2932

3.5 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	0.3338	2.7936	1.8137	2.6300e-003		0.1928	0.1928		0.1812	0.1812	0.0000	237.3105	237.3105	0.0589	0.0000	238.5465
Total	0.3338	2.7936	1.8137	2.6300e-003		0.1928	0.1928		0.1812	0.1812	0.0000	237.3105	237.3105	0.0589	0.0000	238.5465

3.5 Building Construction - 2016

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	0.0000
Vendor	0.1330	1.3539	1.7586	3.2400e-003	0.0908	0.0203	0.1111	0.0259	0.0187	0.0446	0.0000	294.6046	294.6046	2.2000e-003	0.0000	294.6508	
Worker	0.1661	0.2426	2.5291	5.3000e-003	0.4167	4.0200e-003	0.4207	0.1107	3.6900e-003	0.1144	0.0000	406.5828	406.5828	0.0231	0.0000	407.0674	
Total	0.2991	1.5965	4.2877	8.5400e-003	0.5074	0.0244	0.5318	0.1366	0.0224	0.1589	0.0000	701.1874	701.1874	0.0253	0.0000	701.7182	

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	0.3338	2.7936	1.8137	2.6300e-003		0.1928	0.1928		0.1812	0.1812	0.0000	237.3102	237.3102	0.0589	0.0000	238.5462
Total	0.3338	2.7936	1.8137	2.6300e-003		0.1928	0.1928		0.1812	0.1812	0.0000	237.3102	237.3102	0.0589	0.0000	238.5462

3.5 Building Construction - 2016

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	0.1330	1.3539	1.7586	3.2400e-003	0.0908	0.0203	0.1111	0.0259	0.0187	0.0446	0.0000	294.6046	294.6046	2.2000e-003	0.0000	294.6508
Worker	0.1661	0.2426	2.5291	5.3000e-003	0.4167	4.0200e-003	0.4207	0.1107	3.6900e-003	0.1144	0.0000	406.5828	406.5828	0.0231	0.0000	407.0674
Total	0.2991	1.5965	4.2877	8.5400e-003	0.5074	0.0244	0.5318	0.1366	0.0224	0.1589	0.0000	701.1874	701.1874	0.0253	0.0000	701.7182

3.5 Building Construction - 2017

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	0.2699	2.2973	1.5772	2.3300e-003		0.1550	0.1550		0.1456	0.1456	0.0000	208.3468	208.3468	0.0513	0.0000	209.4237
Total	0.2699	2.2973	1.5772	2.3300e-003		0.1550	0.1550		0.1456	0.1456	0.0000	208.3468	208.3468	0.0513	0.0000	209.4237

3.5 Building Construction - 2017

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	0.0000
Vendor	0.1077	1.0951	1.4773	2.8800e-003	0.0806	0.0161	0.0967	0.0230	0.0148	0.0378	0.0000	257.3583	257.3583	1.8900e-003	0.0000	0.0000	257.3980
Worker	0.1321	0.1948	2.0280	4.7000e-003	0.3699	3.4200e-003	0.3733	0.0983	3.1500e-003	0.1014	0.0000	347.4195	347.4195	0.0189	0.0000	0.0000	347.8172
Total	0.2397	1.2899	3.5053	7.5800e-003	0.4505	0.0195	0.4700	0.1212	0.0179	0.1392	0.0000	604.7778	604.7778	0.0208	0.0000	0.0000	605.2151

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	0.2699	2.2973	1.5772	2.3300e-003		0.1550	0.1550		0.1456	0.1456	0.0000	208.3466	208.3466	0.0513	0.0000	0.0000	209.4234
Total	0.2699	2.2973	1.5772	2.3300e-003		0.1550	0.1550		0.1456	0.1456	0.0000	208.3466	208.3466	0.0513	0.0000	0.0000	209.4234

3.5 Building Construction - 2017

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	0.0000
Vendor	0.1077	1.0951	1.4773	2.8800e-003	0.0806	0.0161	0.0967	0.0230	0.0148	0.0378	0.0000	257.3583	257.3583	1.8900e-003	0.0000	0.0000	257.3980
Worker	0.1321	0.1948	2.0280	4.7000e-003	0.3699	3.4200e-003	0.3733	0.0983	3.1500e-003	0.1014	0.0000	347.4195	347.4195	0.0189	0.0000	0.0000	347.8172
Total	0.2397	1.2899	3.5053	7.5800e-003	0.4505	0.0195	0.4700	0.1212	0.0179	0.1392	0.0000	604.7778	604.7778	0.0208	0.0000	0.0000	605.2151

3.6 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	4.3136					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0241	0.1554	0.1234	1.9000e-004		0.0129	0.0129		0.0129	0.0129	0.0000	16.7238	16.7238	1.9700e-003	0.0000	0.0000	16.7652
Total	4.3377	0.1554	0.1234	1.9000e-004		0.0129	0.0129		0.0129	0.0129	0.0000	16.7238	16.7238	1.9700e-003	0.0000	0.0000	16.7652

3.6 Architectural Coating - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0223	0.0326	0.3398	7.1000e-004	0.0560	5.4000e-004	0.0565	0.0149	5.0000e-004	0.0154	0.0000	54.6295	54.6295	3.1000e-003	0.0000	54.6946
Total	0.0223	0.0326	0.3398	7.1000e-004	0.0560	5.4000e-004	0.0565	0.0149	5.0000e-004	0.0154	0.0000	54.6295	54.6295	3.1000e-003	0.0000	54.6946

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	4.3136					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0241	0.1554	0.1234	1.9000e-004		0.0129	0.0129		0.0129	0.0129	0.0000	16.7238	16.7238	1.9700e-003	0.0000	16.7652
Total	4.3377	0.1554	0.1234	1.9000e-004		0.0129	0.0129		0.0129	0.0129	0.0000	16.7238	16.7238	1.9700e-003	0.0000	16.7652

3.6 Architectural Coating - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0223	0.0326	0.3398	7.1000e-004	0.0560	5.4000e-004	0.0565	0.0149	5.0000e-004	0.0154	0.0000	54.6295	54.6295	3.1000e-003	0.0000	54.6946
Total	0.0223	0.0326	0.3398	7.1000e-004	0.0560	5.4000e-004	0.0565	0.0149	5.0000e-004	0.0154	0.0000	54.6295	54.6295	3.1000e-003	0.0000	54.6946

3.6 Architectural Coating - 2017

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	6.3880					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0322	0.2120	0.1812	2.9000e-004		0.0168	0.0168		0.0168	0.0168	0.0000	24.7666	24.7666	2.6100e-003	0.0000	24.8215
Total	6.4203	0.2120	0.1812	2.9000e-004		0.0168	0.0168		0.0168	0.0168	0.0000	24.7666	24.7666	2.6100e-003	0.0000	24.8215

3.6 Architectural Coating - 2017

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0296	0.0437	0.4546	1.0500e-003	0.0829	7.7000e-004	0.0837	0.0220	7.1000e-004	0.0227	0.0000	77.8699	77.8699	4.2400e-003	0.0000	77.9590
Total	0.0296	0.0437	0.4546	1.0500e-003	0.0829	7.7000e-004	0.0837	0.0220	7.1000e-004	0.0227	0.0000	77.8699	77.8699	4.2400e-003	0.0000	77.9590

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	6.3880					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0322	0.2120	0.1812	2.9000e-004		0.0168	0.0168		0.0168	0.0168	0.0000	24.7665	24.7665	2.6100e-003	0.0000	24.8214
Total	6.4203	0.2120	0.1812	2.9000e-004		0.0168	0.0168		0.0168	0.0168	0.0000	24.7665	24.7665	2.6100e-003	0.0000	24.8214

3.6 Architectural Coating - 2017

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0296	0.0437	0.4546	1.0500e-003	0.0829	7.7000e-004	0.0837	0.0220	7.1000e-004	0.0227	0.0000	77.8699	77.8699	4.2400e-003	0.0000	77.9590
Total	0.0296	0.0437	0.4546	1.0500e-003	0.0829	7.7000e-004	0.0837	0.0220	7.1000e-004	0.0227	0.0000	77.8699	77.8699	4.2400e-003	0.0000	77.9590

3.7 Paving - 2017

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	0.0191	0.2030	0.1473	2.2000e-004		0.0114	0.0114		0.0105	0.0105	0.0000	20.6934	20.6934	6.3400e-003	0.0000	20.8266
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0191	0.2030	0.1473	2.2000e-004		0.0114	0.0114		0.0105	0.0105	0.0000	20.6934	20.6934	6.3400e-003	0.0000	20.8266

3.7 Paving - 2017

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	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	0.0000
Worker	5.9000e-004	8.7000e-004	9.0100e-003	2.0000e-005	1.6400e-003	2.0000e-005	1.6600e-003	4.4000e-004	1.0000e-005	4.5000e-004	0.0000	1.5438	1.5438	8.0000e-005	0.0000	1.5456	
Total	5.9000e-004	8.7000e-004	9.0100e-003	2.0000e-005	1.6400e-003	2.0000e-005	1.6600e-003	4.4000e-004	1.0000e-005	4.5000e-004	0.0000	1.5438	1.5438	8.0000e-005	0.0000	1.5456	

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	0.0191	0.2030	0.1473	2.2000e-004		0.0114	0.0114		0.0105	0.0105	0.0000	20.6934	20.6934	6.3400e-003	0.0000	20.8265
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0191	0.2030	0.1473	2.2000e-004		0.0114	0.0114		0.0105	0.0105	0.0000	20.6934	20.6934	6.3400e-003	0.0000	20.8265

3.7 Paving - 2017

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	5.9000e-004	8.7000e-004	9.0100e-003	2.0000e-005	1.6400e-003	2.0000e-005	1.6600e-003	4.4000e-004	1.0000e-005	4.5000e-004	0.0000	1.5438	1.5438	8.0000e-005	0.0000	1.5456
Total	5.9000e-004	8.7000e-004	9.0100e-003	2.0000e-005	1.6400e-003	2.0000e-005	1.6600e-003	4.4000e-004	1.0000e-005	4.5000e-004	0.0000	1.5438	1.5438	8.0000e-005	0.0000	1.5456

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0633	0.1574	0.6357	1.3800e-003	0.0903	2.0800e-003	0.0924	0.0242	1.9100e-003	0.0261	0.0000	106.7545	106.7545	4.4900e-003	0.0000	106.8488
Unmitigated	0.0633	0.1574	0.6357	1.3800e-003	0.0903	2.0800e-003	0.0924	0.0242	1.9100e-003	0.0261	0.0000	106.7545	106.7545	4.4900e-003	0.0000	106.8488

4.2 Trip Summary Information

Land Use	Average Daily Trip Rate			Unmitigated	Mitigated
	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	0.00	0.00	0.00		
Enclosed Parking Structure	0.00	0.00	0.00		
Place of Worship	99.40	124.78	159.95	238,179	238,179
Total	99.40	124.78	159.95	238,179	238,179

4.3 Trip Type Information

Land Use	Miles			Trip %			Trip Purpose %		
	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
City Park	16.60	8.40	6.90	33.00	48.00	19.00	66	28	6
Enclosed Parking Structure	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Place of Worship	16.60	8.40	6.90	0.00	95.00	5.00	64	25	11

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.532559	0.058242	0.178229	0.125155	0.038934	0.006273	0.016761	0.032323	0.002478	0.003154	0.003685	0.000544	0.001663

5.0 Energy Detail

~~5.1 Fleet Mix~~

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	209.5703	209.5703	9.6300e-003	1.9900e-003	210.3905
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	209.5703	209.5703	9.6300e-003	1.9900e-003	210.3905
NaturalGas Mitigated	2.0400e-003	0.0186	0.0156	1.1000e-004		1.4100e-003	1.4100e-003		1.4100e-003	1.4100e-003	0.0000	20.2089	20.2089	3.9000e-004	3.7000e-004	20.3319
NaturalGas Unmitigated	2.0400e-003	0.0186	0.0156	1.1000e-004		1.4100e-003	1.4100e-003		1.4100e-003	1.4100e-003	0.0000	20.2089	20.2089	3.9000e-004	3.7000e-004	20.3319

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					
Place of Worship	378700	2.0400e-003	0.0186	0.0156	1.1000e-004		1.4100e-003	1.4100e-003		1.4100e-003	1.4100e-003	0.0000	20.2089	20.2089	3.9000e-004	3.7000e-004	20.3319
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Enclosed Parking Structure	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		2.0400e-003	0.0186	0.0156	1.1000e-004		1.4100e-003	1.4100e-003		1.4100e-003	1.4100e-003	0.0000	20.2089	20.2089	3.9000e-004	3.7000e-004	20.3319

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Place of Worship	378700	2.0400e-003	0.0186	0.0156	1.1000e-004		1.4100e-003	1.4100e-003		1.4100e-003	1.4100e-003	0.0000	20.2089	20.2089	3.9000e-004	3.7000e-004	20.3319
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Enclosed Parking Structure	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		2.0400e-003	0.0186	0.0156	1.1000e-004		1.4100e-003	1.4100e-003		1.4100e-003	1.4100e-003	0.0000	20.2089	20.2089	3.9000e-004	3.7000e-004	20.3319

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
Enclosed Parking Structure	570636	163.2971	7.5100e-003	1.5500e-003	163.9362
Place of Worship	161700	46.2732	2.1300e-003	4.4000e-004	46.4543
Total		209.5703	9.6400e-003	1.9900e-003	210.3905

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
Enclosed Parking Structure	570636	163.2971	7.5100e-003	1.5500e-003	163.9362
Place of Worship	161700	46.2732	2.1300e-003	4.4000e-004	46.4543
Total		209.5703	9.6400e-003	1.9900e-003	210.3905

6.0 Area Detail

6.1 Mitigation Measures Area

No Hearths Installed

	ROG	NOx	CO	SO2	Fugitive 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	4.4075	0.0000	5.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	9.5000e-004	9.5000e-004	0.0000	0.0000	1.0100e-003
Unmitigated	4.4075	0.0000	5.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	9.5000e-004	9.5000e-004	0.0000	0.0000	1.0100e-003

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	1.0702					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	3.3372					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	5.0000e-005	0.0000	5.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	9.5000e-004	9.5000e-004	0.0000	0.0000	1.0100e-003
Total	4.4075	0.0000	5.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	9.5000e-004	9.5000e-004	0.0000	0.0000	1.0100e-003

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	1.0702					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	3.3372					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	5.0000e-005	0.0000	5.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	9.5000e-004	9.5000e-004	0.0000	0.0000	1.0100e-003
Total	4.4075	0.0000	5.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	9.5000e-004	9.5000e-004	0.0000	0.0000	1.0100e-003

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	76.1530	0.0213	1.1400e-003	76.9554
Unmitigated	76.1530	0.0213	1.1400e-003	76.9557

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 22.3998	71.2162	3.2700e-003	6.8000e-004	71.4949
Enclosed Parking Structure	0 / 0	0.0000	0.0000	0.0000	0.0000
Place of Worship	0.547556 / 0.856434	4.9369	0.0181	4.7000e-004	5.4608
Total		76.1530	0.0213	1.1500e-003	76.9557

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 22.3998	71.2162	3.2700e-003	6.8000e-004	71.4949
Enclosed Parking Structure	0 / 0	0.0000	0.0000	0.0000	0.0000
Place of Worship	0.547556 / 0.856434	4.9369	0.0181	4.7000e-004	5.4605
Total		76.1530	0.0213	1.1500e-003	76.9554

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	20.5772	1.2161	0.0000	46.1148
Unmitigated	20.5772	1.2161	0.0000	46.1148

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	1.62	0.3289	0.0194	0.0000	0.7370
Enclosed Parking Structure	0	0.0000	0.0000	0.0000	0.0000
Place of Worship	99.75	20.2484	1.1966	0.0000	45.3779
Total		20.5772	1.2161	0.0000	46.1148

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	1.62	0.3289	0.0194	0.0000	0.7370
Enclosed Parking Structure	0	0.0000	0.0000	0.0000	0.0000
Place of Worship	99.75	20.2484	1.1966	0.0000	45.3779
Total		20.5772	1.2161	0.0000	46.1148

9.0 Operational Offroad

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

Greenhouse Gas Emission Worksheet
N₂O Mobile Emissions

From CalEEMod Vehicle Fleet Mix for SCAQMD:

Annual VMT: 238,179

Vehicle Type	Percent Type	CH4 Emission Factor (g/mile)*	CH4 Emission (g/mile)**	N2O Emission Factor (g/mile)*	N2O Emission (g/mile)**
Light Auto	53.4%	0.04	0.02136	0.04	0.02136
Light Truck < 3750 lbs	5.8%	0.05	0.0029	0.06	0.00348
Light Truck 3751-5750 lbs	17.8%	0.05	0.0089	0.06	0.01068
Med Truck 5751-8500 lbs	12.5%	0.12	0.015	0.2	0.025
Lite-Heavy Truck 8501-10,000 lbs	3.9%	0.12	0.00468	0.2	0.0078
Lite-Heavy Truck 10,001-14,000 lbs	0.6%	0.09	0.00054	0.125	0.00075
Med-Heavy Truck 14,001-33,000 lbs	1.7%	0.06	0.00102	0.05	0.00085
Heavy-Heavy Truck 33,001-60,000 lbs	3.2%	0.06	0.00192	0.05	0.0016
Other Bus	0.2%	0.06	0.00012	0.05	0.0001
Urban Bus	0.3%	0.06	0.00018	0.05	0.00015
Motorcycle	0.4%	0.09	0.00036	0.01	0.00004
School Bus	0.1%	0.06	0.00006	0.05	0.00005
Motor Home	0.1%	0.09	0.00009	0.125	0.000125
Total	100.0%		0.05713		0.071985

Total Emissions (metric tons) =
Emission Factor by Vehicle Mix (g/mi) x Annual VMT(mi) x 0.000001 metric tons/g

Conversion to Carbon Dioxide Equivalency (CO₂e) Units based on Global Warming Potential (GWP)

CH₄ 21 GWP
 N₂O 310 GWP
 1 ton (short, US) = 0.90718474 metric ton

Annual Mobile Emissions:

	Total Emissions	Total CO ₂ e units
N ₂ O Emissions:	0.0171 metric tons N ₂ O	5.32 metric tons CO ₂ e
Project Total:		5.32 metric tons CO₂e

References

* from Table C.4: Methane and Nitrous Oxide Emission Factors for Mobile Sources by Vehicle and Fuel Type (g/mile).
 in California Climate Action Registry General Reporting Protocol, Reporting Entity-Wide Greenhouse Gas Emissions, Version 3.1, January 2009.
 Assume Model year 2000-present, gasoline fueled.
 ** Source: California Climate Action Registry General Reporting Protocol, Reporting Entity-Wide Greenhouse Gas Emissions, Version 3.1, January 2009.

Exhaust Emission Factors - OFFROAD2007

Equipment	Fuel Type	MaxHP	ROG (lbs/hr)	NOX (lbs/hr)	CO (lbs/hr)	SO2 (lbs/hr)	PM (lbs/hr)	CO2 (lbs/hr)	CH4 (lbs/hr)
Backhoe	Diesel	120	5.29E-02	3.54E-01	3.46E-01	6.06E-04	2.56E-02	5.17E+01	4.77E-03

For offroad diesel internal combustion, total particulate matter = PM10, while PM2.5 is 0.92 (92%) of PM10 (CARB, CEIDARS, 2007).

GHG Global Warming Potential

CO2	1
CH4	25
N2O	298

Based on 100 Yr GWP from IPCC Fourth Assessment, 2007

Note: 1 ton (short, US) = 0.90718474 metric ton

Equipment	# Units	Daily Hours	ROG (lbs/day)	NOX (lbs/day)	CO (lbs/day)	SO2 (lbs/day)	PM (lbs/day)	CO2 (lbs/day)	CH4 (lbs/day)	CO2e (mt/day)
Backhoe	1	4	0.21	1.42	1.38	0.00	0.10	206.73	0.02	0.09
			ROG (tons/year)	NOX (tons/year)	CO (tons/year)	SO2 (tons/year)	PM (tons/year)	CO2 (tons/year)	CH4 (tons/year)	CO2e (mt/year)
			0.04	0.26	0.25	0.00	0.02	37.73	0.00	34.30