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East Warren Park, LLC
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Prepared By:
Ramboll Environ US Corporation
San Francisco, California

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PARC 55 COMMUNITY AIR QUALITY & GREENHOUSE GAS TECHNICAL REPORT

FREMONT, CALIFORNIA

RAMBOLL ENVIRON

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ACRONYMS AND ABBREVIATIONS

AQ	Air Quality
ADT	Average Daily Trip
ARB	California Air Resources Board
ASF	Age Sensitivity Factor
BAAQMD	Bay Area Air Quality Management District
BART	Bay Area Rapid Transit
CalEEMod®	California Emissions Estimator Model
Cal/EPA	California Environmental Protection Agency
CAP	Criteria Air Pollutant
CEQA	California Environmental Quality Act
CH_4	Methane
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent
CPF	Cancer Potency Factor
CRAF	Cancer Risk Adjustment Factor
cREL	Chronic Reference Exposure Level
DPF	Diesel Particulate Filter
DPM	Diesel Particulate Matter
EMFAC	California Air Resource's Board Emissions Factor Model
GHG	Greenhouse Gas
HI	Hazard Index
HQ	Hazard Quotient
HRA	Health Risk Analysis
IARC	International Agency for Research on Cancer
MEISR	Maximally Exposed Individual Sensitive Receptor
NED	National Elevation Dataset
N_2O	Nitrous Oxide
NO_X	Nitrogen Oxides
OEHHA	Office of Environmental Health Hazard Assessment
$PM_{2.5}$	Fine Particulate Matter Less than 2.5 Micrometers in Aerodynamic Diameter
PM_{10}	Respirable Particulate Matter Less than 10 Micrometers in Aerodynamic Diameter

REL	Reference Exposure Level
ROG	Reactive Organic Gases
TAC	Toxic Air Contaminant
TOG	Total Organic Gas
TSD	Technical Support Document
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
WHO	World Health Organization
χ/Q	"Chi Over Q", Also Known As A Dispersion Factor

Units

g	Gram	µg	Microgram
gal	Gallon	µg/m^3	Micrograms per cubic meter
hp	Horsepower	m^3/kg-day	Milligrams per kilogram per day
hr	Hour	m^3	Cubic meters
K	Kelvin	mg	Milligram
kg	Kilogram	mi	Mile
kW	Kilowatt	MT	Metric tonnes
L	Liter	s	Second
lb	Pound	tpy	Tons per year
m	Meter	yr	Year

1. INTRODUCTION

At the request of the East Warren Park, LLC, Ramboll Environ US Corporation (Ramboll Environ, formerly ENVIRON International Corporation [ENVIRON]), has prepared a technical report evaluating ambient air quality (AQ), performed a health risk assessment (HRA), and evaluated greenhouse gases (GHGs) (collectively referred to as the "technical report") associated with the proposed construction and operation of the residential Parc 55 Community development located at Warm Springs Road and Warren Avenue in Fremont, California ("Project"). A cumulative analysis of existing sources in the project vicinity was also performed as part of this technical report. Analyses followed recent California Environmental Quality Act (CEQA) Guidelines released by the Bay Area Air Quality Management District (BAAQMD or District) in May 2012 (BAAQMD 2012a). However, the May 2012 CEQA Air Quality Guidelines do not prescribe specific significance thresholds; therefore, the analysis uses the previously-adopted thresholds and methodologies from the 2011 BAAQMD CEQA Air Quality Guidelines to determine the potential impacts of the Project. These thresholds are based on substantial evidence identified in BAAQMD's 2009 Justification Report (BAAQMD 2009a) and are therefore used to support this assessment.[1] When evaluating whether existing environmental conditions will impact future residents of the Project, thresholds set in the approved "Plan Bay Area" (ABAG 2013), a long-range integrated transportation and land-use/housing strategy though 2040 for the San Francisco Bay Area, were used. BAAQMD was a contributing agency to this plan. The analyses described in this technical report were performed to support the Project's CEQA documentation.

1.1 Project Understanding

The proposed Project would be located in the Warm Springs residential community, south of Warren Avenue and west of Warm Springs Road, as shown in **Figure 1**. The Project site is comprised of six potential construction pads, totaling approximately 23.5 acres, all of which Ramboll Environ conservatively assumed could be disturbed by mass grading. **Figure 1** shows the Project boundary.

The proposed Project involves demolishing the existing buildings and developing age-restricted residences, a public senior community center, and associated parking. **Table 1a** shows the proposed land uses by parcel for the Project. Surrounding existing uses include a mixture of single-family, retail, services, offices, a church, a school, and commercial uses.

Table 1b shows an alternate land use scenario in which the senior community center is replaced with additional age-restricted apartments. While the AQ, risk, and GHG results for this scenario are not presented in this technical report, the scenario was analyzed and the results were found to be similar to the more likely development scenario (presented in **Table 1a**).

[1] The thresholds are the subject of a proceeding pending before the California Supreme Court, which granted review limited to the issue of under what circumstances, if any, CEQA requires an analysis of how existing environmental conditions will impact future residents or users of a proposed project. The methodologies to be used in this analysis will be consistent with the BAAQMD's May 2012 CEQA Guidelines, which were not set aside by the Court and remain in effect.

1.2 Objective and Methodology

The BAAQMD 2011 CEQA Guidelines contain recommended thresholds for criteria air pollutants (CAP) emissions and GHG emissions, and thresholds for risks and hazards associated with toxic air contaminant (TAC) emissions from an individual project undergoing environmental review pursuant to CEQA. In addition to the evaluation of an individual project, the CEQA Guidelines recommend a cumulative evaluation of a project in addition to other air emissions sources within a "zone of influence" surrounding the project. The BAAQMD CEQA Guidelines recommends analyses of carbon monoxide (CO) localized impact, and odor impact from the Project. Because the proposed Project is not anticipated to be a potential odor source, no analysis of odor impact has been conducted.

The following areas are included in this technical report: construction and operational CAP and GHG emissions; health impact of Project construction emissions on onsite and offsite receptors; health impact of offsite source emissions on onsite residential receptors; the cumulative impact to offsite sensitive receptors from construction, offsite stationary source and mobile source emissions, and CO localized impacts.

1.3 Thresholds Evaluated

1.3.1 Criteria Air Pollutants

This technical report evaluates emissions of three CAPs, nitrogen oxides (NOx), particulate matter less than 10 micron in aerodynamic diameter (PM_{10}), and particulate matter less than 2.5 micron in aerodynamic diameter ($PM_{2.5}$), from construction and operations of the Project. Additionally, reactive organic gases (ROG), precursors to ozone (also a CAP), are evaluated. The emissions are evaluated against the BAAQMD's May 2011 significance thresholds for emissions, which are:

Construction:

- Average daily ROG, $PM_{2.5}$ (exhaust), and NO_X emissions greater than 54 lb/day; and
- Average daily PM_{10} (exhaust) emissions greater than 82 lb/day.

Operation:

- Average daily ROG, $PM_{2.5}$, and NO_X emissions greater than 54 lb/day;
- Average daily PM_{10} emissions greater than 82 lb/day;
- Maximum annual ROG, $PM_{2.5}$, and NO_X emissions greater than 10 tons/year (tpy); and
- Maximum annual PM_{10} emissions greater than 15 tpy.

1.3.2 Greenhouse Gases

The evaluation compares Project-related operational and construction GHG emissions to BAAQMD's 2011 CEQA thresholds of significance. For operational GHG emissions, the threshold is 4.6 MT CO_2e/service population/year. BAAQMD does not have a threshold for construction GHG emissions, but recommends reporting the emissions.

1.3.3 Risk and Hazards

This technical report also includes an HRA, which evaluates the estimated excess lifetime cancer risk, noncancer chronic and acute hazard indices (HIs), and $PM_{2.5}$ concentration

associated with construction and operation of the Project on both onsite and offsite receptors. The cumulative analysis estimates excess lifetime cancer risks, noncancer HIs, and $PM_{2.5}$ concentrations that are attributable to offsite mobile and stationary sources within the "zone of influence" in addition to effects from the construction of the Project for offsite receptors. The HRA also evaluates the cancer risk, HIs, and $PM_{2.5}$ concentration from offsite mobile and stationary sources on the proposed onsite residents.

The HRA evaluates potential sensitive receptor locations including "people—children, adults, and seniors—occupying or residing in:

- Residential dwellings, including apartments, houses, condominiums;
- Schools, colleges, and universities;
- Daycare centers;
- Parks;
- Hospitals; and
- Senior-care facilities". (BAAQMD 2012b)

To meet these objectives, this HRA was conducted consistent with the following guidance:

- Air Toxics Hot Spots Program Risk Assessment Guidelines (California Environmental Protection Agency [Cal/EPA] 2003)[2],
- May 2012 BAAQMD CEQA Guidelines (BAAQMD 2012a), and
- BAAQMD Recommended Methods for Screening and Modeling Local Risks and Hazards (BAAQMD 2012b).

The results of the HRA are compared with the BAAQMD 2011 CEQA significance thresholds set in "Plan Bay Area". Construction health impacts are compared against the BAAQMD 2011 CEQA single source thresholds. Then the impacts from construction, combined with offsite sources of TACs are compared against the BAAQMD 2011 CEQA cumulative thresholds. Impacts to onsite residents from offsite sources are compared against the cumulative thresholds set place in "Plan Bay Area". The thresholds are:

BAAQMD 2011 CEQA Individual Project:

- An excess lifetime cancer risk level of more than 10 in one million;
- A noncancer (chronic or acute) HI greater than 1.0; and
- An incremental increase in the annual average $PM_{2.5}$ of greater than 0.3 micrograms per cubic meter ($\mu g/m^3$).

BAAQMD 2011 CEQA and "Plan Bay Area" Cumulative Impacts:

- An excess lifetime cancer risk level of more than 100 in one million;

[2] While CalEPA (2015) has recently updated their risk assessment methods and guidelines, the BAAQMD has not yet adopted the updated guidelines. The methods currently recommended by BAAQMD were followed in this technical report.

- A chronic noncancer HI greater than 10.0; and
- An incremental increase in the annual average $PM_{2.5}$ concentration of greater than 0.8 $\mu g/m^3$.

It is likely that construction and development of the Project pads may be staggered. Residents may move in to the Project while construction is still taking place on other construction pads, so the potential health impacts from construction emissions on residents that may be living in the Project during construction were also evaluated.

The construction HRA was performed for the scenario that would result in maximum exposure (the "worst-case" scenario). For this Project, due to local meteorology and Project design, the worst-case scenario for an onsite resident is development and inhabitation of the parcel on the Southeast side of the Project (the Cottages), referred to as "Phase I" throughout this document, followed by simultaneous construction of the remaining pads on the North and West sides of the Project, referred to as "Phase II" in **Tables 1a** and **1b**. For the onsite analysis scenario, construction of Phase I is assumed to start in 2016 and last approximately 1.65 years. For the offsite residents, emissions from the development and construction of both Phase I and Phase II are considered. For the offsite analysis scenario, construction is also assumed to start in July of 2016 and last for approximately 1.8 years.

1.4 Report Organization

This technical report is divided into nine sections as follows:

Section 1.0 – Introduction: describes the purpose and scope of this technical report, the objectives and methodology used in this technical report and outlines the report organization.

Section 2.0 – Emission Estimates: describes the methods used to estimate the emissions of CAPs, TACs, and GHGs from the Project;

Section 3.0 – Estimated Air Concentrations: discusses the air dispersion modeling, the selection of the dispersion models, the data used in the dispersion models (e.g., terrain, meteorology, source characterization), and the identification of residential and sensitive receptors evaluated in this technical report.

Section 4.0 – Risk Characterization Methods: provides an overview of the methodology for conducting the HRA.

Section 5.0 – Results for Project Analysis: presents the average daily and maximum annual CAP emissions, total annual GHG emissions, estimated excess lifetime cancer risks, and chronic and acute noncancer HIs, and $PM_{2.5}$ concentrations for the Project, and compares them to BAAQMD significance thresholds.

Section 6.0 - Localized CO Impacts from Motor Vehicle Traffic: summarizes the approach used in the CO screening analysis, and the corresponding conclusions.

Section 7.0 – Results for Cumulative Analysis: summarizes the approach used in the screening cumulative analysis and presents the estimated cumulative excess lifetime cancer risks, chronic noncancer HIs, and $PM_{2.5}$ concentrations for the Project and compares them to BAAQMD 2011 CEQA significance thresholds.

Section 8.0 – Uncertainties: identifies and describes the uncertainties associated with the risk estimates and discusses how these uncertainties may affect the HRA conclusions.

Section 9.0 – References: includes a listing of all references cited in this technical report.

2. EMISSION ESTIMATES

CAP, GHG, and TAC emissions from the construction and operation of the Project were estimated. Methodologies are summarized below.

2.1 Calculation Methodologies for Construction Emissions

Emissions from construction activities[3] were estimated using methodologies consistent with CalEEMod® (California Emissions Estimator Model; Version 2013.2.2). CalEEMod® was developed by ENVIRON in collaboration with the California Air Pollution Control Officers Association (CAPCOA) for use in developing emission inventories suitable for CEQA analysis. Sources of construction emissions are off-road equipment exhaust, on-road vehicle exhaust, and off-gassing from architectural coating applications. **Table 2** summarizes the emission estimation methodology. The emission estimates are based on the equipment inventory, equipment specifications and construction phase scheduling, generated using CalEEMod®. **Table 3a** shows the construction schedule for the entire Project which includes demolition, site preparation, grading, building construction, paving, and architectural coating phases.

The emissions from off-road construction equipment were estimated using emission factors and load factors provided in *Appendix D* of the CalEEMod® User's Guide (CAPCOA 2013) for construction year 2016. As described in **Table 2**, construction equipment emissions were calculated as the product of the equipment emission factor, load factor, horsepower, and period of usage. Construction emission calculation methodologies were consistent with the BAAQMD CEQA Guidelines (BAAQMD 2012a). The equipment list produced by CalEEMod® and the relevant associated metrics are presented in **Table 3b** for demolition and construction of Phases I and II.

On-road emission factors were obtained from EMFAC2011 for construction year 2016 and the distance the vehicles travel is assumed to be consistent with CalEEMod® defaults for Alameda County by trip type. On-road vehicle emissions include running and idling emissions, as described in **Table 2**. Vehicle emissions were calculated as the product of the emission factor, distance traveled or idling time, and number of one-way trips. **Table 3c** shows the default CalEEMod® trip rates and lengths used in the construction emission calculations.

ROG off-gassing from architectural coating is calculated based on the square footage of the dwelling units and the VOC content of the paint. The VOC content of the paint is assumed to be consistent with the limit set in BAAQMD Regulation 8, Rule 3 (BAAQMD 2009b).

Both CAP and GHG emissions from construction activities were estimated using CalEEMod® following the methodology described above. CAPs include ROG, NO_x, and PM_{10} and $PM_{2.5}$ exhaust emissions. Emissions from onsite construction-related equipment exhaust (annual diesel particulate matter [DPM] and $PM_{2.5}$ emissions) are used for the HRA. For the analyses presented in this technical report, exhaust PM_{10} was used as a surrogate for DPM.

In order to show that offsite risk will remain under the CEQA thresholds, two scenarios were considered in calculating the construction emissions, an uncontrolled scenario in which all the

[3] CalEEMod® GHG and CAP emissions include on-site and off-site vehicle activity as well as non-mobile emissions such as those from architectural coatings.

construction equipment is assumed to be the default mix of construction equipment produced by CalEEMod®, and a controlled scenario designed to reduce offsite health risks. The controlled scenario requires that idling of diesel powered construction equipment be limited to 2 minutes. In the BAAQMD CEQA 2011 CEQA Guidelines, Construction Mitigation Measure # 9 specifies: "minimizing the idling time of diesel powered construction equipment to two minutes" will result in a 20 percent reduction for NO_x and a 45 percent reduction of PM_{10} and $PM_{2.5}$ emissions.[4]

2.2 Calculation Methodologies for Operational Emissions

CalEEMod® was also used to estimate operational CAP and GHG emissions. The model employs widely accepted calculation methodologies for emission estimates combined with appropriate default data if site-specific information is not available. For this analysis, default CalEEMod® inputs were used unless explicitly mentioned. Emission estimates are based on CalEEMod® land use types and total square feet (as shown in **Table 1a**), as well as activity factors.

Three types of sources will generate both CAP and GHG emissions at the proposed Project. These are area sources, energy use, and Project-generated traffic. Consistent with BAAQMD guidelines, GHG emission estimates include indirect emissions, which are emissions associated with electricity generation and transportation, water and wastewater treatment and transportation, and solid waste disposal. The emission calculation methodologies of these sources are discussed below.

2.2.1 Area Sources

All direct area source emissions are based on CalEEMod® defaults for the designated land use category. Area emissions are based on number of dwelling units or total floor area and the operational year, which are used to determine activity. Fireplace default assumptions were used, which is conservative since BAAQMD Regulation 6, Rule 3 (BAAQMD 2008) limits wood burning devices in new construction. The Project's area source emissions are dominated by consumer goods and architectural coating. These sources include cleaning supplies and interior/exterior paint.

2.2.2 Project Traffic

Project traffic emits CAPs and GHGs through residents' trips as well as service vehicle trips. Trip rates were provided by traffic engineers at Fehr & Peers and are consistent with Institute of Transportation Engineers (ITE) Trip Generation 9th Edition. Senior adult housing trip rates and the public senior center are 3.44 trips per unit per day and 33.82 per thousand square feet per day, respectively. The emission factors were CalEEMod® defaults for Alameda County for calendar year 2017. Trip distances and types were also CalEEMod® defaults for Alameda County.

2.2.3 Energy Use

Residences use both electricity and natural gas and the associated emissions were estimated using CalEEMod®. The Project will receive energy from Pacific Gas and Electric Company (PG&E). Emissions from onsite natural gas use will contribute to both GHGs and CAPs, while electricity use will only contribute to indirect GHG emissions, consistent with BAAQMD guidance. Natural gas and electricity use were based on CalEEMod® defaults. The carbon

[4] BAAQMD. CEQA Air Quality Guidelines. May 2011. Table 8-2.

intensity of electricity was based on PG&E's projected carbon intensity for 2017 (PG&E 2013).

2.2.4 Water Use and Solid Waste

Other indirect emissions, such as emissions associated with water and wastewater treatment and transportation, and solid waste disposal, also contribute to GHG emissions. Current CalEEMod® methodology does not estimate CAP emissions from these sources. CalEEMod® default water usage and solid waste rates were used in this analysis.

2.3 Calculation Methodologies for Offsite TAC Emissions

Consistent with the BAAQMD CEQA guidelines, impacts from offsite sources within the "zone of influence" on onsite receptors and on the offsite maximally exposed individual sensitive receptor (MEIR) were evaluated. Offsite sources include BAAQMD permitted stationary sources, major roadways, and the adjacent railway. The BAAQMD screening tools were used for BAAQMD permitted sources and major roadways, as described in Sections 4.6.1 and 4.6.2. Emissions were not calculated separately for these sources.

BAAQMD does not have a screening tool for railways. Thus, emissions were estimated from the adjacent railway using a similar previously modeled project and a scaling method. Diesel freight trains operate on the adjacent railway, and a noise and vibration assessment was provided by the Project sponsor that included an estimate of train count. Four to six trains were estimated to have passed by the Project site over the three day assessment. Ramboll Environ conservatively assumed that six trains will pass by the Project site per day. The average time in mode profile, or duty cycle, for locomotives operating on the railway was assumed to be similar to the United States Environmental Protection Agency's (USEPA's) reported duty cycle profile for current locomotive line haul operations. When passing the site, trains were assumed to be traveling at a speed of 10 miles per hour (mph). Using this low speed represents a conservative assumption, as emission factors are expressed per unit time, and a lower speed along this portion of the railway means more time during which emissions occur along the Project length.

3. ESTIMATED AIR CONCENTRATIONS

To evaluate air toxics, BAAQMD recommends that the project applicant evaluate health risks and hazards (including $PM_{2.5}$ concentrations) imposed by a project upon the surrounding community and the risks and hazards imposed on a project by the surrounding community. This health risk and hazards analysis must be conducted both on a project-specific basis as well as a cumulative basis. As a screening evaluation, the impact to the surrounding community to be evaluated was limited to 1,000 feet from the proposed Project site. The maximally exposed individual was within this 1,000 feet, so the analysis area was not expanded. The methodologies used to evaluate concentrations for the Project and cumulative HRA were based on the most recent BAAQMD guidelines (BAAQMD 2012a).

3.1 Chemical Selection

The cancer risk and chronic non-cancer analyses in the HRA for the Project are based on diesel particulate matter, or DPM, concentrations. Diesel exhaust, a complex mixture that includes hundreds of individual constituents (Cal/EPA 1998), is identified by the State of California as a known carcinogen (Cal/EPA 2014). Under California regulatory guidelines, DPM is used as a surrogate measure of exposure for the mixture of chemicals that make up diesel exhaust as a whole. Cal/EPA and other proponents of using the surrogate approach to quantifying cancer risks associated with the diesel mixture indicate that this method is preferable to use of a component-based approach. A component-based approach involves estimating risks for each of the individual components of a mixture. Critics of the component-based approach believe it will underestimate the risks associated with diesel as a whole mixture because the identity of all chemicals in the mixture may not be known and/or exposure and health effects information for all chemicals identified within the mixture may not be available. Furthermore, Cal/EPA has concluded that "potential cancer risk from inhalation exposure to whole diesel exhaust will outweigh the multi-pathway cancer risk from the speciated components" (Cal/EPA 2003).

There is currently no acute non-cancer toxicity value available for DPM. Thus, speciated components of diesel total organic gases (TOGs) with acute toxicity values were included in the acute non-cancer hazard analysis.

3.2 Sources

As discussed in the next section, concentrations of TACs from Project construction emissions are estimated using AERMOD at offsite receptors. Concentrations were estimated for off-road equipment only because emissions from on-road trucks traveling near the Project would contribute minimally to emissions.[5] The TACs evaluated are DPM, $PM_{2.5}$, and speciated TOG from diesel exhaust from onsite construction activity.

Concentrations of TACs from offsite sources were also evaluated. As mentioned previously, offsite sources included in this analysis are BAAQMD permitted stationary sources, major roadways, and the adjacent railway. BAAQMD screening tools were used to estimate impacts from the stationary sources and roadways. Hence, these sources were not modeled and are not discussed further in this section. Railway risk was determined using a conservative

[5] While trucking emissions contribute substantially to overall Project emissions, they are spread over many miles. Hence, the portion of trucking emissions that would impact one receptor is much smaller than the emissions that the clustered off-road activity at the site would impact a receptor near the site. For example, the DPM emissions from truck travel within 1,000 feet of the Project are less than 1% of the total off-road DPM emissions.

screening method. Although a Bay Area Rapid Transit (BART) line will also run adjacent to the Project, emissions are not considered as BART runs on electricity.

3.3 AERMOD Modeling

The most recent version of the American Meteorological Society/Environmental Protection Agency regulatory air dispersion model (AERMOD Version 14134; USEPA 2004) was used to evaluate ambient air concentrations of DPM, $PM_{2.5}$, and TOG at on- and offsite receptors. For each receptor location, the model generates air concentrations (or air dispersion factors as unit emissions were modeled) that result from emissions from multiple sources.

Air dispersion models such as AERMOD require a variety of inputs such as source parameters, meteorological parameters, topography information, and receptor parameters. When site-specific information is unknown, default parameter sets that are designed to produce conservative (i.e., overestimates of) air concentrations were used. Modeling parameters for construction equipment are shown in **Table 4**. The Project boundary is shown in **Figure 1**.

Meteorological data: Air dispersion modeling applications require the use of meteorological data that ideally are spatially and temporally representative of conditions in the immediate vicinity of the site under consideration. For this technical report, meteorological data for years 1999 and 2002-2005 from the former NUMMI facility, a BAAQMD recommended site in Fremont, were used. This station is less than 2 miles away from the Project. **Figure 2** shows a wind rose of the meteorological data collected at the NUMMI facility.

Terrain considerations: Elevation and land use data were imported from the National Elevation Dataset (NED) maintained by the United States Geological Survey (USGS, 2013). An important consideration in an air dispersion modeling analysis is the selection of rural or urban dispersion coefficients. Due to the density of the areas surrounding the Project site, urban dispersion coefficients were used.

Emission rates: Emissions were modeled using the χ/Q ("chi over q") method, such that each source has a unit emission rate (i.e., 1 gram per second [g/s]), and the model estimates dispersion factors (with units of [$\mu g/m^3$]/[g/s]). Actual emissions were multiplied by the dispersion factors to obtain concentrations.

Emitting activities were modeled to reflect the actual hours of operation. For Project construction, emissions were modeled to occur between 7 AM and 5 PM. Project construction emissions are discussed in Section 2.1. Concentrations were estimated for off-road equipment only because emissions from on-road trucks traveling near the Project would contribute minimally to emissions. For the acute noncancer hazard analyses, the 1-hour maximum dispersion factor estimates were used. These dispersion factors were multiplied by the maximum 1-hour emission rate. For annual average ambient air concentrations, the estimated annual average dispersion factors were multiplied by the annual average emission rates. The model was set up to assume the same distribution of emissions during all days of the year.

Source parameters: Source location and parameters are necessary to model the dispersion of air emissions. Construction source parameters are detailed in **Table 4**.

The construction area was represented by a series of adjacent volume sources, consistent with past projects completed in the BAAQMD jurisdiction and South Coast Air Quality Management District (SCAQMD) Local Significance Threshold guidance (SCAQMD 2008). The volume sources were modeled with a size of 10-meters by 10-meters. A release height of 5 meters was used, with an initial vertical dimension of 1.2 meters and an initial lateral dimension of 2.3 meters.

Receptors: In order to evaluate health impacts to offsite receptors, nearby sensitive receptor populations were identified and included in the model. To identify possible residential receptors, a grid out to 1,000 feet (20 meter resolution) was modeled.[6] Receptors were modeled at 1.8 meters of height, consistent with BAAQMD guidance. As discussed previously, maximum hourly and average annual dispersion factors were estimated for each receptor location.

A grid of residential receptors with 10 m resolution was placed within the Project boundary to model impacts during construction at Phase I. Modeled offsite receptors and onsite receptors are shown in **Figure 3.**

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[6] If the model predicted concentrations showed that the maximum impact might occur outside of this 1,000 feet, further modeling would have been conducted. However, the model showed concentrations were much smaller at 1,000 feet from the Project, so additional receptors were not added.

4. RISK CHARACTERIZATION METHODS

The following sections discuss in detail the various components required to conduct the HRA.

4.1 Project Sources Evaluated

As discussed in Section 1.2, excess lifetime cancer risk, chronic and acute HIs, and $PM_{2.5}$ concentrations for the following scenarios (including duration as listed) were evaluated.

1. Offsite receptor exposure to emissions from Project construction (1.8 years);
2. Onsite Phase I receptor exposure to emissions from Phase II project construction (1.5 years; a surrogate for all onsite receptors using the most conservative construction development scheme); and
3. Offsite and onsite receptor exposure to nearby emissions sources during project operation (cumulative analysis).

4.2 Exposure Assessment

Potentially Exposed Populations: This evaluation conservatively evaluated the following receptor populations:

- Offsite child residents for the construction scenario.
- Onsite Phase I adult residents for the Phase II construction scenario (as a surrogate for all onsite adult residents).
- Offsite and onsite lifetime residents for the cumulative scenario.

As the residential exposure assumptions are more conservative than those for other sensitive receptor types, a conservative approach of considering all sensitive receptors as residential receptors was used in this HRA. However, a search for other sensitive receptors (defined in Section 1.2) was completed[7]. The offsite receptors were modeled using a modeling grid with 20 meter spacing within the 1,000 foot buffer. For long term health impacts (cancer risk, chronic HI, $PM_{2.5}$ concentration), receptors over commercial or industrial areas were removed. For acute HI, the entire receptor grid was considered.

Exposure Assumptions: The exposure parameters used to estimate excess lifetime cancer risks for all potentially exposed populations for the construction and offsite source scenarios were obtained using risk assessment guidelines from BAAQMD (BAAQMD 2010a), unless otherwise noted, and are presented in **Table 5**. The intake factor for the offsite resident child during construction is higher and therefore more conservative than that for the offsite resident adult, so only the offsite resident child was quantitatively evaluated for the construction scenario.

[7] Sensitive receptor locations were identified from searches of the following sources:
- Schools (public and private) – California Department of Education, California School Directory (CDE, 2013)
- Health Care Facilities – California Office of Statewide Health Planning and Development (OSHPD, 2014)
- Childcare and Elderly Care Centers – California Department of Social Services, Community Care Licensing Division (CCLD, 2012)

Calculation of Intake: The dose estimated for each exposure pathway is a function of the concentration of a chemical and the intake of that chemical. The intake factor for inhalation, IF_{inh}, can be calculated as follows:

$$IF_{inh} = \frac{DBR * ET * EF * ED * CF}{AT}$$

Where:

IF_{inh}	=	Intake Factor for Inhalation (m^3/kg-day)
DBR	=	Daily Breathing Rate (L/kg-day)
ET	=	Exposure Time (hours/24 hours)
EF	=	Exposure Frequency (days/year)
ED	=	Exposure Duration (years)
AT	=	Averaging Time (days)
CF	=	Conversion Factor, 0.001 (m^3/L)

The chemical intake or dose is estimated by multiplying the inhalation intake factor, IF_{inh}, by the chemical concentration in air, C_i. When coupled with the chemical concentration, this calculation is mathematically equivalent to the dose algorithm given in the Office of Environmental Health Hazard Assessment (OEHHA) Hot Spots guidance (Cal/EPA 2003).

4.3 Toxicity Assessment

The toxicity assessment characterizes the relationship between the magnitude of exposure and the nature and magnitude of adverse health effects that may result from such exposure. For purposes of calculating exposure criteria to be used in risk assessments, adverse health effects are classified into two broad categories – cancer and non-cancer endpoints. Toxicity values used to estimate the likelihood of adverse effects occurring in humans at different exposure levels are identified as part of the toxicity assessment component of a risk assessment.

Chronic toxicity values for DPM were used for cancer risk and chronic noncancer calculations, and acute toxicity values for chemicals in the speciation profile of diesel TOG were used for the calculation of acute HI. Toxicity values are summarized in **Table 6**.

4.4 Cancer Risk Adjustment Factors

The estimated excess lifetime cancer risks for a resident child was adjusted using the age sensitivity factors (ASFs) recommended in the Cal/EPA OEHHA Technical Support Document (TSD) (Cal/EPA 2009) and the cancer risk adjustment factors (CRAFs) recommended by BAAQMD (BAAQMD 2010a). This approach accounts for an "anticipated special sensitivity to carcinogens" of infants and children. Cancer risk estimates are weighted by a factor of 10 for exposures that occur from the third trimester of pregnancy to two years of age and by a factor of three for exposures that occur from two years through 15 years of age. No weighting factor (i.e., an ASF of one, which is equivalent to no adjustment) is applied to ages

16 to 70 years. **Table 7** shows the CRAFs used for offsite child and onsite adult residents for the construction period[8].

4.5 Risk Characterization

4.5.1 Estimation of Cancer Risks

Excess lifetime cancer risks are estimated as the upper-bound incremental probability that an individual will develop cancer over a lifetime as a direct result of exposure to potential carcinogens. The estimated risk is expressed as a unitless probability. The cancer risk attributed to a chemical is calculated by multiplying the chemical intake or dose at the human exchange boundaries (e.g., lungs) by the chemical-specific cancer potency factor (CPF).

The equation used to calculate the potential excess lifetime cancer risk for the inhalation pathway is as follows:

$$Risk_{inh} = C_i \times CF \times IF_{inh} \times CPF \times CRAF$$

Where:

$Risk_{inh}$	=	Cancer Risk; the incremental probability of an individual developing cancer as a result of inhalation exposure to a particular potential carcinogen (unit-less)
C_i	=	Annual Average Air Concentration for $Chemical_i$ (µg/m^3)
CF	=	Conversion Factor (mg/µg)
IF_{inh}	=	Intake Factor for Inhalation (m^3/kg-day)
CPF_I	=	Cancer Potency Factor for $Chemical_i$ (mg chemical/kg body weight-day)$^{-1}$
CRAF	=	Cancer Risk Adjustment Factor (unitless)

4.5.2 Estimation of Chronic and Acute Noncancer Hazard Quotients / Indices

Chronic HQ

The potential for exposure to result in adverse chronic noncancer effects is evaluated by comparing the estimated annual average air concentration (which is equivalent to the average daily air concentration) to the noncancer chronic reference exposure level (cREL) for each chemical. When calculated for a single chemical, the comparison yields a ratio termed a hazard quotient (HQ). To evaluate the potential for adverse chronic noncancer health effects from simultaneous exposure to multiple chemicals, the HQs for all chemicals are summed, yielding a HI. DPM is the only pollutant evaluated for chronic non-cancer hazard in this HRA; therefore the HQ for DPM is the same as the overall HI.

$$HQ_i = C_i / cREL_i$$

[8] As explained in Table 7, the project will accept senior residents age 55 and older so only resident adults will be onsite during construction and operation.

$$HI = \sum HQ_i$$

Where:

HQ_i	=	Chronic hazard quotient for chemical$_i$
HI	=	Hazard index
C_i	=	Annual average concentration of chemical$_i$ (µg/m^3)
$cREL_i$	=	Chronic noncancer reference exposure level for chemical$_i$ (µg/m^3)

Acute HI

The potential for exposure to result in adverse acute effects is evaluated by comparing the estimated one-hour maximum air concentration of chemical to the acute reference exposure level (aREL) for each chemical evaluated in this analysis. When calculated for a single chemical, the comparison yields an HQ. To evaluate the potential for adverse acute health effects from simultaneous exposure to multiple chemicals, the HQs for all chemicals are summed, yielding a HI.

$$HQ_i = C_i / aREL_i$$

$$HI = \sum HQ_i$$

Where:

HQ_i	=	Acute hazard quotient for chemical$_i$
HI	=	Hazard index
C_i	=	One-hour maximum concentration of chemical$_i$ (µg/m^3)
$aREL_i$	=	Acute reference exposure level for chemical$_i$ (µg/m^3)

4.6 Screening Analyses

BAAQMD provides screening tools to facilitate the review of health impacts from offsite sources. The tools present conservative estimates of impacts from these sources. BAAQMD's roadway screening tables and stationary source tool were used in this analysis.

4.6.1 Roadway Sources

BAAQMD's screening tables for Alameda County surface streets (BAAQMD 2011b) were used to estimate cancer risk and $PM_{2.5}$ concentrations from the major roadways with greater than 10,000 vehicles per day within 1,000 feet of the Project, consistent with BAAQMD guidance (the tool does not provide specific estimates for chronic HI because the maximum chronic HI from any distance and traffic volume is 0.03 (BAAQMD 2011b). These roadways are Warm Springs Avenue and Warren Avenue. A number of highway ramps and one highway are also present within 1,000 feet of the project, and are also included in the analysis. The average daily traffic (ADT) for surface streets was obtained from the City of Fremont (City of Fremont, 2013) and the ADT for the highway ramps and highway were obtained from the California Department of Transportation (2012a; 2012b).

Cancer risk and $PM_{2.5}$ concentration from the roadways were estimated at the offsite maximally exposed individual sensitive receptor (MEISR) from Project construction, in accordance with BAAQMD Guidance. Cancer risk and $PM_{2.5}$ concentration from the roadways were also estimated for a Phase I and Phase II resident. Phase I and Phase II onsite

residents were evaluated separately to account for their relative distances away from the roadways.

4.6.2 Stationary Sources

BAAQMD stationary source database (BAAQMD 2012c) shows several stationary sources within 1,000 feet of the Project. Consistent with BAAQMD guidance, a request was sent to BAAQMD to confirm the risks, hazards and $PM_{2.5}$ concentrations reported in the tool. The information received from BAAQMD in response to this request were used in this analysis and are discussed in Section 7.2.

5. RESULTS FOR PROJECT ANALYSIS

In this section, the analysis results are presented and compared to the relevant BAAQMD thresholds of significance.

5.1 Criteria Air Pollutants

5.1.1 Construction CAPs

The BAAQMD 2011 CEQA significance thresholds for construction-related CAPs and precursors are:

- Average daily ROG, $PM_{2.5}$, and NO_X emissions greater than 54 lb/day;
- Average daily PM_{10} emissions greater than 82 lb/day;

Table 8a shows the total CAP emissions associated with uncontrolled Project construction. The average daily incremental ROG (17 lb/day), NOx (29 lb/day), PM_{10} (1.4 lb/day), and $PM_{2.5}$ (1.3 lb/day) emissions associated with the Project operation are below the BAAQMD 2011 CEQA significance thresholds. **Table 8a** shows emissions for the uncontrolled scenario, which are calculated using off-road emission standards for the CalEEMod® default mix of construction equipment during the construction year.[9] **Table 8b** shows emissions for the controlled (mitigated) scenario. The average daily incremental ROG (17 lb/day), NO_X (24 lb/day), PM_{10} (0.83 lb/day), and $PM_{2.5}$ (0.64 lb/day) and emissions associated with the Project operation are below the BAAQMD 2011 CEQA significance thresholds. These results are achieved by restricting construction equipment to 2 minutes of idling time as described in Section 2.1.

5.1.2 Operational CAPs

Table 9 shows the expected vehicle miles travelled and CAP emissions expected from Project traffic. **Table 10** shows the total CAP emissions associated with the Project operation.

The BAAQMD 2011 CEQA significance thresholds for operation-related CAPs and precursors are:

- Average daily ROG, $PM_{2.5}$, and NO_X emissions greater than 54 lb/day;
- Average daily PM_{10} emissions greater than 82 lb/day;
- Maximum annual ROG, $PM_{2.5}$, and NO_X emissions greater than 10 tons/year (tpy); and,
- Maximum annual PM_{10} emissions greater than 15 tpy.

For the Project, the average daily incremental ROG (36 lb/day), NO_X (26 lb/day), PM_{10} (13 lb/day), and $PM_{2.5}$ (4.8 lb/day) emissions associated with the Project operation are below the BAAQMD CEQA thresholds. The maximum annual ROG (6.6 tpy), NO_X (4.8 tpy), PM_{10} (2.3 tpy), $PM_{2.5}$ (0.87 tpy) emissions associated with the Project operation are also below the BAAQMD 2011 CEQA significance thresholds.

[9] CARB. Off-Road Emission Standards. Available online: http://www.arb.ca.gov/msprog/ordiesel/documents/Off-Road_Diesel_Stds.xls. Accessed: March 2014.

5.2 Greenhouse Gases

5.2.1 Construction GHGs

Table 11 presents the total GHG emissions associated with Project construction. The total construction GHG emissions are 1,812 MT CO_2e. There are no CEQA thresholds for comparison for construction emissions.

5.2.2 Operational GHGs

Table 12 presents the total GHG emissions associated with Project operation. The GHG emissions from the Project-generated traffic, energy, waste, and water (4.0 MT CO_2e/service population/year) are below the BAAQMD 2011 CEQA significance threshold of 4.6 MT CO_2e/service population/year.

5.3 Risk and Hazards

5.3.1 Construction and Operational Risk and Hazards

Table 13a shows the excess lifetime cancer risk, chronic noncancer HI, and $PM_{2.5}$ concentration for the maximally exposed individual for both offsite and onsite receptors during Project uncontrolled construction and operation.

The BAAQMD 2011 CEQA significance thresholds for health risks and hazards from a Project single source are:

- An excess lifetime cancer risk level of more than 10 in one million;
- A noncancer (chronic or acute) HI greater than 1.0; and
- An incremental increase in the annual average $PM_{2.5}$ of greater than 0.3 micrograms per cubic meter ($\mu g/m^3$).

The analysis of the uncontrolled construction scenario demonstrates that the unmitigated Project will have potentially significant health impacts. The implementation of two minute idling restrictions on all diesel powered construction equipment will achieve the BAAQMD thresholds, as demonstrated for the controlled scenario shown in **Table 13b**. The estimated cancer risk, chronic and acute noncancer HIs, and $PM_{2.5}$ concentration due to controlled Project construction are below the respective BAAQMD 2011 CEQA significance thresholds.

6. LOCALIZED CO IMPACTS FROM MOTOR VEHICLE TRAFFIC

According to the BAAQMD's screening criteria for CO (BAAQMD 2011a), projects are considered less than significant if:

1. The project is consistent with an applicable congestion management program established by the county's congestion management agency for designated roads or highways, regional transportation plan, and local congestion management agency plans.
2. The project traffic would not increase traffic volumes at affected intersections to more than 44,000 vehicles per hour.
3. The project traffic would not increase traffic volumes at affected intersections to more than 24,000 vehicles per hour where vertical and/or horizontal mixing is substantially limited (e.g., tunnel, parking garage, bridge underpass, natural or urban street canyon, below-grade roadway).

Average daily traffic (ADT) for roadways within 1,000 feet of the Project was obtained for the roadway risk and hazards analysis and is shown in **Table 15**. The traffic volumes on these roads are much less than 24,000 vehicles per hour, even assuming up to 25% of daily traffic occurs during one hour. **Table 9** shows that the maximum daily trip rate for the Project is 2,434 trips per day. Thus, the Project will not increase traffic volumes at any intersection to over 44,000 or 24,000 vehicles per hour.

This Project is consistent with the applicable congestion management program established by the county's congestion management agency. Therefore, the Project will meet all the criteria at key intersections near the Project site and is less than significant for CO.

7. RESULTS FOR CUMULATIVE ANALYSIS

7.1 Cumulative Criteria Air Pollutants

As shown in **Table 8** and **Table 10**, both the Project construction and operation would generate criteria pollutant emissions (ROG, NO_X, PM_{10}, and $PM_{2.5}$). However, as discussed in Section 5.1, the amount generated would not exceed BAAQMD 2011 CEQA significance thresholds. Though emissions from the Project construction or operation could combine with concurrent emissions associated with other projects nearby, the Project does not exceed the project-level criteria air pollutant thresholds and would therefore not result in a considerable contribution to cumulative criteria air pollutant emissions.

7.2 Cumulative Risk and Hazards

7.2.1 Methodology

BAAQMD 2011 CEQA and "Plan Bay Area" significance thresholds for health risks and hazards from offsite sources on new Project receptors are:

- An excess lifetime cancer risk level of more than 100 in one million;
- A chronic noncancer HI greater than 10.0; and
- An incremental increase in the annual average $PM_{2.5}$ concentration of greater than 0.8 $\mu g/m^3$.

A cumulative analysis similar to the project analysis is conducted at the onsite and offsite MEISR identified for Project construction; results at each location are compared to the significance thresholds for cumulative impacts.

The incremental cancer risk, chronic HQ, and $PM_{2.5}$ offsite MEISR for Project construction was identified as a residential location within 1,000 feet of the Project; therefore, emissions from all identified sources within 1,000 feet of the Project were evaluated at this single location and added to the results from the Project's single source evaluation for offsite residents. Two onsite receptor locations were evaluated during the roadway and stationary source screening evaluation as described in Section 4.6; as a result, two onsite receptor cumulative analyses were performed: emissions from all identified sources within 1,000 feet of the Phase I area boundary and within 1,000 feet of the Project boundary (excluding the Phase I area) were evaluated and each were added to the results from the Project's single source evaluation for the onsite MEISR to calculate two distinct sets of cumulative results. The impacts from Project construction are summarized in Section 5.3.

As discussed in Section 4.6.1, offsite sources within 1,000 feet of the Project are major roadways and BAAQMD permitted stationary sources. The methodology to estimate impacts from the roadway and stationary sources is described in more detail in Section 4.6. The methodology to estimate impacts from the railway is described in Section 3.2. **Figure 4** shows the locations for which the cumulative analysis was performed.

7.2.2 Results

Table 14 shows the list of stationary offsite sources considered and their associated risk and hazards. **Table 15** shows the surrounding roadways and their associated risks and hazards to the onsite and offsite receptors. **Table 16a** shows a summary of the estimated excess lifetime cancer risks, chronic and acute noncancer HIs, and $PM_{2.5}$ concentrations for each of

the source types listed above evaluated at the Project's offsite and onsite MEISR during Project uncontrolled construction and operation.

Analysis of the uncontrolled construction scenario demonstrates that although impacts to onsite receptors are below BAAQMD 2011 CEQA thresholds, construction of the uncontrolled Project may result in potentially significant cumulative health impacts to offsite receptors. Application of mitigation as discussed in Section 5.3 results in Project health impacts that meet the thresholds discussed above. As shown in **Table 16b**, the estimated cumulative cancer risk at the offsite MEISR is 63 in one million, which is below the BAAQMD 2011 CEQA significance threshold of greater than 100 in one million. The chronic noncancer HI is 0.041, which is below the BAAQMD 2011 CEQA significance threshold of greater than 10. The acute noncancer HI is 0.067, which is below the BAAQMD 2011 CEQA significance threshold of greater than 10. The estimated $PM_{2.5}$ concentration is 0.48 $\mu g/m^3$, which is below the BAAQMD 2011 CEQA significance threshold of greater than 0.8 $\mu g/m^3$. As also shown in **Table 16b**, the estimated health impacts for onsite and onsite Phase I receptors are below the BAAQMD 2011 CEQA significance thresholds following application of mitigation.

8. UNCERTAINTIES

In accordance with risk assessment guidance, the uncertainties associated with this technical report, including emissions estimation, air dispersion modeling, and risk estimation, are evaluated. This HRA was performed using the best data and methodologies available at the time, notwithstanding the fact that there are the uncertainties outlined below.

Estimation of Emissions: There are uncertainties associated with the estimation of emissions from operation of the Project. Where project-specific data, such as emission factors, are not available, default assumptions in AP-42, EMFAC2011, and CalEEMod® were used.

Estimation of Exposure Concentrations: There is also uncertainty associated with the estimated exposure concentrations. The limitations of the air dispersion model provide a source of uncertainty in the estimation of exposure concentrations. According to USEPA, errors due to the limitation of the algorithms implemented in the air dispersion model in the highest estimated concentrations of +/- 10 percent to 40 percent are typical (USEPA 2005).

Source Representation: The source parameters used to model emission sources add uncertainty. For all emission sources, Ramboll Environ used source parameters which were source-specific, recommended as defaults, or expected to produce more conservative results. Discrepancies might exist in actual emissions characteristics of a source and its representation in the model; exposure concentrations used in this assessment represent approximate exposure concentrations.

Exposure Assumptions: For the risk and hazards calculations as well as the cumulative impact HRA, numerous assumptions must be made in order to estimate human exposure to chemicals. These assumptions include parameters such as breathing rates, exposure time and frequency, exposure duration, and human activity patterns. While a mean value derived from scientifically defensible studies is the best estimate of central tendency, most of the exposure variables used in this HRA are high-end estimates. For example, it is assumed that residential receptor exposure to the Project and stationary emissions occurs during the entire operational duration and exposure to the cumulative emissions sources occur 24 hours per day for 350 days per year, a highly conservative assumption since most residents do not remain in their homes for this period of time. The combination of several high-end estimates used as exposure parameters may substantially overestimate chemical intake. The excess lifetime cancer risks calculated in this assessment are therefore likely to be higher than may be required to be protective of public health.

Toxicity Assessment: The Cal/EPA CPF for DPM was used to estimate cancer risks associated with exposure to DPM from the offsite generator. However, the CPF derived by Cal/EPA for DPM is highly uncertain in both the estimation of response and dose. In the past, due to inadequate animal test data and epidemiology data on diesel exhaust, the International Agency for Research on Cancer (IARC), a branch of the World Health Organization (WHO), had classified DPM as Probably Carcinogenic to Humans (Group 2); the USEPA had also concluded that the existing data did not provide an adequate basis for quantitative risk assessment (USEPA 2002). However, based on two recent scientific studies (Attfield et al. 2012 and Silverman et al. 2012), IARC recently re-classified DPM as Carcinogenic to Humans to Group 1 (IARC 2012), which means that the agency has determined that there is "sufficient evidence of carcinogenicity" of a substance in humans and represents the

strongest weight-of-evidence rating in IARC's carcinogen classification scheme. This determination by the IARC may provide additional impetus for the USEPA to identify a quantitative dose-response relationship between exposure to DPM and cancer.

Risk Calculations: The USEPA notes that the conservative assumptions used in a risk assessment are intended to assure that the estimated risks do not underestimate the actual risks posed by a site and that the estimated risks do not necessarily represent actual risks experienced by populations at or near a site (USEPA 1989).

The estimated risks in this HRA are based primarily on a series of conservative assumptions related to predicted environmental concentrations, exposure, and chemical toxicity. The use of conservative assumptions tends to produce upper-bound estimates of risk. Although it is difficult to quantify the uncertainties associated with all the assumptions made in this risk assessment, the use of conservative assumptions is likely to result in substantial overestimates of exposure, and hence, risk. BAAQMD acknowledges this uncertainty by stating: "the methods used [to estimate risk] are conservative, meaning that the real risks from the source may be lower than the calculations, but it is unlikely that they will be higher" (BAAQMD 2010b).

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TABLES

Table 1a
Conceptual Layout of Proposed Development (Option 1)
Parc 55 Community
Fremont, California

Proposed Land Use	CalEEMod Land Use Type and Subtype	Proposed Number of Units	Unit	Unit Area (Square Feet)	Total Floor Area (Square Feet)	Total Plot Acreage	Phase
Apartments	Apartments - Mid Rise	110	dwelling units	450	49,500	2.5	II
Apartments - Parking	Parking Lot	83	parking spaces	400	33,000		
Senior Community Center	Health Club	--	--	--	15,000	1.0	II
Senior Community Center - Parking	Parking Lot	50	parking spaces	400	20,000		
Garden Flats	Apartments - Mid Rise	245	dwelling units	850	208,250	6.0	II
Garden Flats - Parking	Parking Lot	368	parking spaces	400	147,000		
Bungalows	Condo/Townhouse High Rise	75	dwelling units	1,800	135,000	5.5	II
Bungalows - Parking	Parking Lot	38	parking spaces	400	15,000		
Cottages	Single Family Housing	62	dwelling units	2,000	124,000	6.0	I
Cottages - Parking	Parking Lot	31	parking spaces	400	12,400		
Suites	Condo/Townhouse High Rise	68	dwelling units	1,000	68,000	2.5	II
Suites - Parking	Parking Lot	34	parking spaces	400	13,600		

Table 1b
Conceptual Layout of Proposed Development (Option 2)
Parc 55 Community
Fremont, California

Proposed Land Use	CalEEMod Land Use Type and Subtype	Proposed Number of Units	Unit	Unit Area (Square Feet)	Total Floor Area (Square Feet)	Total Plot Acreage	Phase
Apartments	Apartments - Mid Rise	110	dwelling units	450	49,500	2.5	II
Apartments - Parking	Parking Lot	83	parking spaces	400	33,000		
Garden Flats	Apartments - Mid Rise	310	dwelling units	850	263,500	7.0	II
Garden Flats - Parking	Parking Lot	465	parking spaces	400	186,000		
Bungalows	Condo/Townhouse High Rise	75	dwelling units	1,800	135,000	5.5	II
Bungalows - Parking	Parking Lot	38	parking spaces	400	15,200		
Cottages	Single Family Housing	62	dwelling units	2,000	124,000	6.0	I
Cottages - Parking	Parking Lot	31	parking spaces	400	12,400		
Suites	Condo/Townhouse High Rise	68	dwelling units	1,000	68,000	2.5	II
Suites - Parking	Parking Lot	34	parking spaces	400	13,600		

Table 2
Emissions Calculations Methodology
Parc 55 Community
Fremont, California

Type	Source	Methodology and Formula	Reference
Construction Equipment	Off-Road Equipment[1]	$Ec = \Sigma(EFc * HP * LF * Hr * C)$	OFFROAD 2011 (Unmitigated/Uncontrolled Construction) ARB/Carl Moyer Offroad Engine Standards ARB OFFROAD 2011 (Mitigated/Controlled Construction)
Operational On-Road Mobile Sources[2]	Running Exhaust, Brake Wear, Tire Wear, and Running Losses	$E_R = \Sigma(EF_R * VMT * C)$, where VMT = Trip Length * Trip Number	EMFAC2011
	Starting Exhaust and Evaporative ROG	$E_S = \Sigma(EF_S * \text{Trip Number} * C)$	EMFAC2011
	Idling Exhaust	$E_I = \Sigma(EF_I * \text{Trip Number})$	EMFAC2011

Notes:

1. Ec: off-road equipment exhaust emissions (lb).
   EFc: emission factor (g/hp-hr). CalEEMod 2013.2.2. default emission factors used.
   HP: equipment horsepower. OFFROAD2011.
   LF: equipment load factor. OFFROAD2011.
   Hr: equipment hours. The detailed equipment hours by construction phase will be presented in Table 3b.
   C: unit conversion factor.

2. Operational on-road mobile VMT is based on data from the Project sponsor and fleet mix based on CalEEMod defaults.

   E_R: emissions for running exhaust, brake wear, tire wear and running losses (lb).
   EF_R: emission factor (g/mile). From EMFAC2011.
   VMT: vehicle miles traveled
   C: unit conversion factor.

   E_S: vehicle starting exhaust and evaporative ROG emissions (lb).
   EFs: vehicle starting or evaporative ROG emission factor (g/trip). From EMFAC2011. EMFAC reports emission rates in g/vehicle/day, vehicle population and trips in trips/day. The emission factor is calculated as the product of emission rates and vehicle population, divided by the daily trips.
   C: unit conversion factor.

   E_I: vehicle idling emissions (lb).
   EF_I: vehicle idling emission factor (g/trip). From EMFAC2011. For passenger vehicles, EMFAC reports emission rates in g/vehicle/day, vehicle population and trips in trips/day. The emission factor is calculated as the product of emission rates and vehicle population, divided by the daily trips. For heavy duty trucks, the emission factors are provided in g/hour-vehicle.

Table 2
Emissions Calculations Methodology
Parc 55 Community
Fremont, California

Abbreviations:
ARB: California Air Resources Board
BAAQMD: Bay Area Air Quality Management District
CalEEMod: California Emissions Estimator Model
EF: emission factor
EP: Environmental Planning
g: gram
HP: Horsepower
Hr: hours
lb: pound
LF: Load Factor
mi: mile
VMT: vehicle miles travelled

References:
California Air Resources Board (ARB). 2013. ARB and USEPA Off-Road Compression-Ignition (Diesel) Engine Standards. Available online at: http://www.arb.ca.gov/msprog/ordiesel/documents/Off-Road_Diesel_Stds.xls.

ARB. 2011a. The Carl Moyer Program Guidelines. Available online at: http://www.arb.ca.gov/msprog/moyer/guidelines/2011gl/2011cmpgl_3_27_13.pdf.

CalEEMod Version 2013.2.2. Available Online at: http://www.caleemod.com.

Table 3a
Construction Schedule[1]
Parc 55 Community
Fremont, California

Demolition Quantities
Existing Building Area (Square Feet)
301,515

Construction Schedule				
Phase	**Start Date**	**End Date**	**Number of Days per Week**	**Total Construction Days**
Demolition	July 2016	July 2016	5	20
Site Preparation	July 2016	August 2016	5	10
Grading	August 2016	September 2016	5	35
Building Construction	September 2016	March 2018	5	370
Paving	March 2018	March 2018	5	20
Architectural Coating	March 2018	April 2018	5	20

Notes:
1. The construction schedule is based on CalEEMod default values for a project of this size.

Abbreviations:
CalEEMod: California Emissions Estimator Model

References:
CalEEMod Version 2013.2.2 Available Online at: http://www.caleemod.com

Table 3b
Equipment List[1]
Parc 55 Community
Fremont, California

Equipment List					
Phase	**Equipment**	**Quantity**	**Usage Hours per Day**	**Horsepower**	**Load Factor**
Demolition	Concrete/Industrial Saws	1	8	81	0.73
	Excavators	3	8	162	0.38
	Rubber Tired Dozers	2	8	255	0.4
Site Preparation	Rubber Tired Dozers	3	8	255	0.4
	Tractors/Loaders/Backhoes	4	8	97	0.37
Grading	Excavators	2	8	162	0.38
	Graders	1	8	174	0.41
	Rubber Tired Dozers	1	8	255	0.4
	Scrapers	2	8	361	0.48
	Tractors/Loaders/Backhoes	2	8	97	0.37
Building Construction	Cranes	1	7	226	0.29
	Forklifts	3	8	89	0.2
	Generator Sets	1	8	84	0.74
	Tractors/Loaders/Backhoes	3	7	97	0.37
	Welders	1	8	46	0.45
Paving	Pavers	2	8	125	0.42
	Paving Equipment	2	8	130	0.36
	Rollers	2	8	80	0.38
Architectural Coating	Air Compressors	1	6	78	0.48

Notes:
1. This equipment list is based on CalEEMod default values.

Abbreviations:
CalEEMod: California Emissions Estimator Model

References:
CalEEMod Version 2013.2.2 Available Online at: http://www.caleemod.com

Table 3c
Construction Trip Information[1]
Parc 55 Community
Fremont, California

Hauling Trips						
Phase Name	**Worker Trip Number (trips/day)**	**Vendor Trip Number (trips/day)**	**Hauling Trip Number (total trips)**	**Worker Trip Length (miles/trip)**	**Vendor Trip Length (miles/trip)**	**Hauling Trip Length (miles/trip)**
Demolition	15	0	1371	12.4	7.3	20
Site Preparation	18	0	0	12.4	7.3	20
Grading	20	0	0	12.4	7.3	20
Building Construction	488	102	0	12.4	7.3	20
Paving	15	0	0	12.4	7.3	20
Architectural Coating	98	0	0	12.4	7.3	20

Notes:
1. The construction trips are based on CalEEMod default values.

Abbreviations:
CalEEMod: California Emissions Estimator Model

References:
CalEEMod Version 2013.2.2 Available Online at: http://www.caleemod.com

Table 4
Modeling Parameters for Construction
Parc 55 Community
Fremont, California

Exposure Scenario	Area	Source	Source Type[1]	Source Dimension (m)	Number of Sources	Release Height[2] (m)	Initial Vertical Dimension[3] (m)	Initial Lateral Dimension[3] (m)
Offsite Receptors	All construction (23.8 acres)	Construction Equipment	Volume	Project Area	967	5	4.7	1.4
Onsite Receptors	Phase II Construction (17.7 acres)	Construction Equipment	Volume	Project Area	742	5	4.7	1.4

Notes:
1. Due to lack of specific instructions on modeling of construction emissions from BAAQMD, Ramboll Environ used methodology from the CRRP-HRA (BAAQMD 2012) when setting up the model. According to the CRRP-HRA methodology, construction sources were modeled as volume sources.
2. According to the CRRP-HRA methodology, release height of the modeled volume sources representing construction equipment was set to 5 meters
3. According to USEPA AERMOD User's Guide Volume II, initial lateral dimension of single volume sources is length of side divided by 4.3. For a volume source, the initial lateral dimension is the length of the side divided by 4.3.

Abbreviations:
AERMOD: AMS/EPA Regulatory Model
BAAQMD: Bay Area Air Quality Management District
CRRP: Community Risk Reduction Plan
g: gram
HRA: health risk assessment
m: meter
USEPA: United States Environmental Protection Agency

References:
BAAQMD. 2012. *The San Francisco Community Risk Reduction Plan: Technical Support Documentation, V9.*

USEPA. 2004. User's Guide for the AMS/EPA Regulatory Model - AERMOD. September. Available at

Table 5
Construction Exposure Parameters
Parc 55 Community
Fremont, California

Exposure Parameter	Units	Offsite	Onsite
		Resident Child	Resident Adult
		All Construction	Phase II
Daily Breathing Rate (DBR) [1]	(L/kg-day)	581	302
Exposure Time (ET) [2]	(hours/24 hours)	24	24
Exposure Frequency (EF) [3]	(days/year)	350	350
Exposure Duration (ED) [4,5]	(years)	1.8	1.5
Averaging Time (AT)	(days)	25,550	25,550
Intake Factor, Inhalation (IF_{inh})	(m^3/kg-day)	0.0145	0.0063

Equation used:

IF_{inh} = DBR * ET * EF * ED * CF / AT

CF: 0.001 (m^3/L)

Notes:

1. Daily breathing rates reflect default breathing rates for child and adult residents from
2. Exposure times reflect default exposure times for residents from BAAQMD 2010.
3. Exposure frequencies reflect default exposure frequencies for residents from BAAQMD 2010.
4. Construction exposure durations reflect the project construction schedule as estimated by CalEEMod.
5. The offsite construction analysis assumes construction of entire site; therefore the total exposure duration for the offsite resident is 665 days (1.8 years). The onsite construction analysis assumes Phase I occurs before Phase II and residents are able to move into the cottages on Phase I while Phase II is occuring (560 days or 1.5 years).

Abbreviations:

BAAQMD: Bay Area Air Quality Management District
kg: kilogram
L: liter
m^3: cubic meters

Reference:

Bay Area Air Quality Management District (BAAQMD). 2010. *BAAQMD Air Toxics NSR Program Health Risk Screening Analysis (HRSA) Guidelines.* January.

Table 6
Toxicity Values
Parc 55 Community
Fremont, California

Source	Analysis	Chemical		Cancer Potency Factor (mg/kg-day)$^{-1}$	Chronic Reference Exposure Level (µg/m^3)	Acute Reference Exposure Level (µg/m^3)
Construction	Cancer Risk and Chronic HI	Diesel PM[1]		1.1	5.0	
	Acute HI	TACS from Diesel TOG[1]	Acetaldehyde			4.7E+02
			Benzene			1.3E+03
			1,3-Butadiene			6.6E+02
			Methyl Ethyl Ketone (MEK) (2-Butanone)			1.3E+04
			Formaldehyde			5.5E+01
			Methanol			2.8E+04
			Styrene			2.1E+04
			Toluene			3.7E+04
			m-Xylene			2.2E+04
			o-Xylene			2.2E+04
			p-Xylene			2.2E+04

Notes:
All toxicity values from Cal/EPA (2014).

1. DPM is used as a surrogate measure of carcinogen exposure for the mixture of chemicals that make up diesel exhaust as a whole. There is currently no acute non-cancer toxicity value available for DPM. Thus, speciated components of diesel TOGs with acute toxicity values were included in the acute non-cancer hazard analysis.

Abbreviations:
(mg/kg-day): milligram per kilogram-day
µg/m^3: micrograms per cubic meter
ARB: California Air Resources Board
Cal/EPA: California Environmental Protection Agency
DPM: diesel particulate matter
HI: hazard index
OEHHA: Office of Environmental Health Hazard Assessment
PM: particulate matter
TAC: toxic air contaminant
TOG: total organic gas

Reference:
California Environmental Protection Agency (Cal/EPA). 2014. OEHHA/ARB Consolidated Table of Approved Risk Assessment Health Values. July.
http://www.arb.ca.gov/toxics/healthval/contable.pdf

Table 7
Cancer Risk Adjustment Factors
Parc 55 Community
Fremont, California

Location	Receptor	Source	Cancer Risk Adjustment Factor (CRAF)[1]
Offsite	Resident Child	Construction	10
Onsite[2]	Resident Adult		1

Notes:
1. Based on BAAQMD 2010.
2. The Project will accept senior residents age 55 and older; therefore only resident adults will be onsite during construction.

Abbreviation:
BAAQMD: Bay Area Air Quality Management District

Reference:
Bay Area Air Quality Management District (BAAQMD). 2010. *BAAQMD Air Toxics NSR Program Health Risk Screening Analysis (HRSA) Guidelines.* January.

Table 8a
Uncontrolled Construction Criteria Air Pollutant Emissions
Parc 55 Community
Fremont, California

	Construction Emissions[1]			
	ROG	**NOx**	**PM_{10} (Exhaust)**	**$PM_{2.5}$ (Exhaust)**
Project Emissions (tons)	*5.6*	*10*	*0.48*	*0.44*
Total Emissions (lbs)	11,100	19,034	951	888
Average Daily Emissions[2] (lbs/day)	*17*	*29*	*1.4*	*1.3*
BAAQMD Significance Threshold (lbs/day)	54	54	82	54
Exceeds Threshold?	No	No	No	No

Notes:
1. Emissions include those due to off-road construction equipment, on-road sources associated with construction (hauling, vendor, and worker trips), paving, and architectural coatings. All emissions were calculated in CalEEMod version 2013.2.2.
2. Emissions averaged over the estimated 665 days of construction.

Abbreviations:
CalEEMod: California Emissions Estimator Model
lbs: pounds
NO_x: nitrogen oxides
$PM_{2.5}$: particulate matter less than 2.5 micron in aerodynamic diameter
PM_{10}: particulate matter less than 10 micron in aerodynamic diameter
ROG: reactive organic gases
ton: short ton

Reference:
CalEEMod Version 2013.2.2, available online at: http://www.caleemod.com

Table 8b
Controlled[1] Construction Criteria Air Pollutant Emissions
Parc 55 Community
Fremont, California

	Construction Emissions[2]			
	ROG	**NOx**	**PM_{10} (Exhaust)**	**$PM_{2.5}$ (Exhaust)**
Project Emissions (tons)	*5.6*	*8.1*	*0.28*	*0.26*
Total Emissions (lbs)	11,100	16,188	554	518
Average Daily Emissions[3] (lbs/day)	*17*	*24*	*0.83*	*0.78*
BAAQMD Significance Threshold (lbs/day)	54	54	82	54
Exceeds Threshold?	No	No	No	No

Notes:
1. For the Controlled scenario, all construction equipment limited to idling time of two minutes.
2. Emissions include those due to off-road construction equipment, on-road sources associated with construction (hauling, vendor, and worker trips), paving, and architectural coatings. All emissions were calculated in CalEEMod version 2013.2.2.
3. Emissions averaged over the estimated 665 days of construction.

Abbreviations:
CalEEMod: California Emissions Estimator Model
lbs: pounds
NO_x: nitrogen oxides
$PM_{2.5}$: particulate matter less than 2.5 micron in aerodynamic diameter
PM_{10}: particulate matter less than 10 micron in aerodynamic diameter
ROG: reactive organic gases
ton: short ton

Reference:
CalEEMod Version 2013.2.2, available online at: http://www.caleemod.com

Table 9
Project Operational Criteria Air Pollutant Emissions - Traffic
Parc 55 Community
Fremont, California

Description	Pollutant	Trips and VMT		Emissions[3]	
		Average Daily Trips[1] (one-way trips)	Annual VMT[2] (vehicle-miles)	Average Daily Emissions (lb/day)	Maximum Annual Emissions (tpy)
Project Traffic	ROG	2,434	5,176,875	8.5	1.6
	NOx			26	4.8
	PM_{10}[4]			11	2.0
	$PM_{2.5}$[4]			3.1	0.57

Notes:
1. Number of vehicle trips provided by Fehr & Peers (2015)
2. The VMT data in this table is based on CalEEMod default trip lengths and percentage of each trip types (e.g., home to work, or home to shops). See the CalEEMod output run in Appendix A for more details.
3. Emissions were estimated using CalEEMod 2013.2.2.
4. Total PM_{10} and $PM_{2.5}$ (exhaust plus fugitives) presented.

Abbreviations:
ARB: California Air Resources Board
CalEEMod: California Emissions Estimator Model
lb: pound
NOx: oxides of nitrogen
PM: particulate matter
ROG: reactive organic compounds
tpy: tons per year
VMT: vehicle miles traveled
yr: year

Reference:
CalEEMod Version 2013.2.2. Available Online at: http://www.caleemod.com.

Fehr & Peers. 2015. Transportation Impact Analysis; Parc 55 Community Plan. November.

Table 10
Project Operational Criteria Air Pollutant Emissions
Parc 55 Community
Fremont, California

Source	Maximum Annual Emissions[1] (tpy)				Average Daily Emissions (lbs/day)			
	ROG	NO_X	PM_{10}	$PM_{2.5}$	ROG	NOx	PM_{10}	$PM_{2.5}$
Area[1]	5.0	0.069	0.27	0.27	27	0.38	1.5	1.5
Energy[1]	0.052	0.45	0.036	0.036	0.29	2.5	0.20	0.20
Mobile[1,2]	1.6	4.3	2.0	0.57	8.5	24	11	3.1
Total Emissions	**6.6**	**4.8**	**2.3**	**0.87**	**36**	**26**	**13**	**4.8**
Threshold	10	10	15	10	54	54	82	54
Above Threshold	No	No	No	No	No	No	No	No

Notes:
1. Emissions estimated using CalEEMod version 2013.2.2
2. See Table 9 for details.

Abbreviation:
CalEEMod: California Emissions Estimator Model
lb: pound
NOx: nitrogen oxide compounds ($NO + NO_2$)
PM: particulate matter
ROG: reactive organic gas
tpy: tons per year

Reference:
CalEEMod Version 2013.2.2 Available Online at: http://www.caleemod.com

Table 11
Construction Greenhouse Gas Emissions
Parc 55 Community
Fremont, California

Pollutant	Off-Road Mobile Emissions	Onroad Mobile Emissions	Total Emissions[1]	Construction Threshold	Above Threshold?
	[MT]				
2016	239	259	497	None	No
2017	313	789	1,101	None	No
2018	75	138	214	None	No
Total GHG (CO_2e)	627	1,185	1,812	None	No

Notes:
1. All emissions estimated using methodologies consistent with CalEEMod version 2013.2.2.

Abbreviations:
CalEEMod: California Emissions Estimator Model
CO_2e: carbon dioxide equivalents
GHG: greenhouse gas
MT: metric tonnes

Reference:
CalEEMod Version 2013.2.2 Available Online at: http://www.caleemod.com

Table 12
Project Operational Greenhouse Gas Emissions: All Sources
Parc 55 Community
Fremont, California

Source[1]	Units	2016 GHG Emissions
Non-Stationary Source GHG Emissions		
Area[2]	[MT CO_2e/yr]	62
Energy[2,3]		940
Mobile[2]		2,326
Waste[2]		167
Water[2]		92
Project Total		**3,586**
Service Population[4]	--	888
Project Total	**[MT CO_2e/SP/yr]**	**4.0**
BAAQMD Threshold[5]	**[MT CO_2e/SP/yr]**	**4.6**
Exceeds Threshold?	**--**	**No**

Notes:
1. Total operational emissions include yearly emissions from area, energy, mobile, waste, and water sources. It is assumed that carbon sequestration associated with vegetation change will be minimal and hence not included.
2. Emissions estimated using CalEEMod version 2013.2.2.
3. Energy emissions were calculated based on 2017 PG&E projected electricity emission factors from PG&E, which exceed current RPS:
http://www.pge.com/includes/docs/pdfs/shared/environment/calculator/pge_ghg_emission_factor_info_sheet.pdf.
4. Service population is the number of estimated residents.
5. BAAQMD significance threshold defined in the May 2011 BAAQMD CEQA Guidelines.

Abbreviations:
ARB: California Air Resources Board
BAAQMD: Bay Area Air Quality Management District
CalEEMod: California Emissions Estimator Model
CEQA: California Environmental Quality Act
CO_2e: carbon dioxide equivalents
GHG: greenhouse gases
MT: metric tonnes
PG&E: Pacific Gas and Electric
SP: Service Population
yr: year

References:
ARB. 2013. Documentation of California's 2000-2010 GHG Inventory — Index. Available online at:

BAAQMD. 2011. CEQA Air Quality Guidelines. May.

California Emissions Estimator Model (CalEEMod) Version 2013.2.2. Available online at: http://caleemod.com/

Table 13a
Modeled Excess Lifetime Cancer Risk, Chronic and Acute HIs, and PM2.5 Concentration - Uncontrolled
Parc 55 Community
Fremont, California

Source	Receptor	UTMx (m)	UTMy (m)	Lifetime Excess Cancer Risk[1] (in a million)	Chronic HI[2]	Acute HI[3,4]	$PM_{2.5}$ Concentration ($\mu g/m^3$)
Construction	**Offsite MEISR**	595,000	4,149,020	16	0.021	0.061	0.10
	Onsite MEISR	594,820	4,148,990	2.0	0.058	0.11	0.27
BAAQMD Individual Source Significance Threshold				**>10**	**>1**	**>1**	**>0.3**

Equations used:

$Risk_{inh} = \Sigma Risk_{inh,i} = \Sigma C_i \times MAF \times CF \times IF_{inh} \times CPF_i \times CRAF$

Where:

$Risk_{inh}$: Cancer Risk, as a result of inhalation exposure to Project emissions (unitless)
$Risk_{inh,i}$: Cancer Risk for Chemical i
C_i: Modeled Annual Average Concentration in air for Chemical i ($\mu g/m^3$)
MAF : Modeling Adjustment Factor
CF: Conversion Factor (mg/µg)
IF_{inh}: Intake Factor for Inhalation (m^3/kg-day)
CPF_i: Cancer Potency Factor for Chemical i (mg chemical/kg body weight-day)
CRAF: Cancer Risk Adjustment Factor

$Chronic\ HI_{inh} = \Sigma Chronic\ HQ_{inh,i} = \Sigma C_i/cREL_i$

Where:

Chronic HI_{inh}: Chronic hazard index, as a result of inhalation exposure to Project emissions (unitless)
Chronic $HQ_{inh,i}$: Chronic hazard quotient for Chemical i
C_i: Modeled Annual Average Concentration in air for Chemical i ($\mu g/m^3$)
$cREL_i$: Chronic reference exposure level for chemical i ($\mu g/m^3$)

$Acute\ HI_{inh} = \Sigma\ Acute\ HQ_{inh,i} = \Sigma C_i/aREL_i$

Where:

Acute HI_{inh}: Acute hazard index, as a result of inhalation exposure to Project emissions (unitless)
Acute $HQ_{inh,i}$: Acute hazard quotient for Chemical i
C_i: Modeled One-Hour Maximum Concentration in air for Chemical i ($\mu g/m^3$)
$aREL_i$: Acute reference exposure level for chemical i ($\mu g/m^3$)

Notes:

1. Excess lifetime cancer risks are estimated as the upper-bound incremental probability that an individual will develop cancer over a lifetime as a direct result of exposure to potential carcinogens. The estimated risk is expressed as a unitless probability. The cancer risks attributed to the emissions associated with construction and operation of the Project were calculated based on the modeled annual average air concentrations, the intake factors presented in Table 5, the CPF presented in Table 6, and the CRAFs presented in Table 7. These risks correspond to uncontrolled construction emissions and are not necessarily reflective of actual construction impacts.

2. The potential for exposure to result in adverse chronic noncancer effects is evaluated by comparing the estimated annual average air concentration (which is equivalent to the average daily air concentration) to the noncancer chronic REL for each chemical. When calculated for a single chemical, the comparison yields a ratio termed a hazard quotient. To evaluate the potential for adverse chronic noncancer health effects from simultaneous exposure to multiple chemicals, the hazard quotients for all chemicals are summed, yielding a hazard index. The chronic hazard indices attributed to the emissions associated with construction and operation of the Project were calculated based on the modeled annual average DPM concentrations presented in Table 8a and the chronic REL presented in Table 6.

3. The potential for exposure to result in adverse acute noncancer effects is evaluated by comparing the estimated one-hour maximum air concentration to the noncancer acute REL for each chemical. When calculated for a single chemical, the comparison yields a ratio termed a hazard quotient. To evaluate the potential for adverse acute noncancer health effects from simultaneous exposure to multiple chemicals, the hazard quotients for all chemicals are summed, yielding a hazard index. The acute hazard indices attributed to the emissions associated with construction and operation of the Project were calculated based on the modeled one-hour maximum diesel TOG concentrations presented in Table 8a and the acute RELs presented in Table 6.

4. The Acute HI results presented are at different locations than those listed.

Abbreviations:

m: meter
$\mu g/m^3$: micrograms per cubic meter
HI: hazard index
$PM_{2.5}$: particulate matter less than 2.5 micron in aerodynamic diameter
UTM: Universal Transverse Mercator

Table 13b
Modeled Excess Lifetime Cancer Risk, Chronic and Acute HIs, and PM2.5 Concentration - Controlled
Parc 55 Community
Fremont, California

Source	Receptor	UTMx (m)	UTMy (m)	Lifetime Excess Cancer Risk[1] (in a million)	Chronic HI[2]	Acute HI[3,4]	$PM_{2.5}$ Concentration ($\mu g/m^3$)
Construction	**Offsite MEISR**	595,000	4,149,020	9.6	0.012	0.061	0.056
	Onsite MEISR	594,820	4,148,990	1.2	0.033	0.11	0.16
BAAQMD Individual Source Significance Threshold				**>10**	**>1**	**>1**	**>0.3**

Equations used:

$Risk_{inh} = \Sigma Risk_{inh,i} = \Sigma C_i \times MAF \times CF \times IF_{inh} \times CPF_i \times CRAF$

Where:

$Risk_{inh}$: Cancer Risk, as a result of inhalation exposure to Project emissions (unitless)
$Risk_{inh,i}$: Cancer Risk for Chemical i
C_i: Modeled Annual Average Concentration in air for Chemical i ($\mu g/m^3$)
MAF : Modeling Adjustment Factor
CF: Conversion Factor (mg/µg)
IF_{inh}: Intake Factor for Inhalation (m^3/kg-day)
CPF_i: Cancer Potency Factor for Chemical i (mg chemical/kg body weight-day)
CRAF: Cancer Risk Adjustment Factor

$Chronic\ HI_{inh} = \Sigma Chronic\ HQ_{inh,i} = \Sigma C_i/cREL_i$

Where:

$Chronic\ HI_{inh}$: Chronic hazard index, as a result of inhalation exposure to Project emissions (unitless)
$Chronic\ HQ_{inh,i}$: Chronic hazard quotient for Chemical i
C_i: Modeled Annual Average Concentration in air for Chemical i ($\mu g/m^3$)
$cREL_i$: Chronic reference exposure level for chemical i ($\mu g/m^3$)

$Acute\ HI_{inh} = \Sigma\ Acute\ HQ_{inh,i} = \Sigma C_i/aREL_i$

Where:

$Acute\ HI_{inh}$: Acute hazard index, as a result of inhalation exposure to Project emissions (unitless)
$Acute\ HQ_{inh,i}$: Acute hazard quotient for Chemical i
C_i: Modeled One-Hour Maximum Concentration in air for Chemical i ($\mu g/m^3$)
$aREL_i$: Acute reference exposure level for chemical i ($\mu g/m^3$)

Notes:

1. Excess lifetime cancer risks are estimated as the upper-bound incremental probability that an individual will develop cancer over a lifetime as a direct result of exposure to potential carcinogens. The estimated risk is expressed as a unitless probability. The cancer risks attributed to the emissions associated with construction and operation of the Project were calculated based on the modeled annual average air concentrations, the intake factors presented in Table 5, the CPF presented in Table 6, and the CRAFs presented in Table 7. These risks correspond to uncontrolled construction emissions and are not necessarily reflective of actual construction impacts.

2. The potential for exposure to result in adverse chronic noncancer effects is evaluated by comparing the estimated annual average air concentration (which is equivalent to the average daily air concentration) to the noncancer chronic REL for each chemical. When calculated for a single chemical, the comparison yields a ratio termed a hazard quotient. To evaluate the potential for adverse chronic noncancer health effects from simultaneous exposure to multiple chemicals, the hazard quotients for all chemicals are summed, yielding a hazard index. The chronic hazard indices attributed to the emissions associated with construction and operation of the Project were calculated based on the modeled annual average DPM concentrations presented in Table 8a and the chronic REL presented in Table 6.

3. The potential for exposure to result in adverse acute noncancer effects is evaluated by comparing the estimated one-hour maximum air concentration to the noncancer acute REL for each chemical. When calculated for a single chemical, the comparison yields a ratio termed a hazard quotient. To evaluate the potential for adverse acute noncancer health effects from simultaneous exposure to multiple chemicals, the hazard quotients for all chemicals are summed, yielding a hazard index. The acute hazard indices attributed to the emissions associated with construction and operation of the Project were calculated based on the modeled one-hour maximum diesel TOG concentrations presented in Table 8a and the acute RELs presented in Table 6.

4. The Acute HI results presented are at different locations than those listed.

Abbreviations:

m: meter
$\mu g/m^3$: micrograms per cubic meter
HI: hazard index
$PM_{2.5}$: particulate matter less than 2.5 micron in aerodynamic diameter
UTM: Universal Transverse Mercator

Table 14
Stationary Offsite Sources
Parc 55 Community
Fremont, California

Facility Name	Street Address	Cancer Risk (in a million)	Chronic Hazard Index	$PM_{2.5}$ ($\mu g/m^3$)
#1 Cleaners And Alterations	47001 Warm Springs Blvd	0	0	0
City of Fremont - Fire Station #5	55 Hackamore Road	0.014	0	N/A
D & S Nitinol Technologies, Inc	47533 Westinghouse Dr	0	0.0010	0
D & S Nitinol Technologies, Inc	47600 Westinghouse Dr	0	0.0010	0
Palmaz Scientific, Inc	47621 Westinghouse Dr	0	0.0010	0.0020
Seagate Technology, LLC	47010 Kato Road	1.2	0.0035	0.0020
Truck-Rail Handling, Inc	620 Warren Avenue	0	0	0
Unitek	47333 Warm Springs Blvd	0	0	0
Warm Springs Auto Services Inc	47011 Warm Springs Blvd	1.2	0.0020	0

Notes:
1. The shortest distances between the Project boundary and the stationary source is reported. The distance was measured using ArcMap.
2. Stationary source screening values were obtained from the BAAQMD Stationary Source Screening Analysis Tool for Alameda County (BAAQMD 2012).

Abbreviations:
$\mu g/m^3$: microgram per cubic meter
BAAQMD: Bay Area Air Quality Management District
$PM_{2.5}$: particulate matter less than 2.5 micron in aerodynamic diameter

Reference:
BAAQMD. 2012. Stationary Source Screening Analysis Tool. Available online at: http://baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES/Tools-and-Methodology.aspx.

Table 15
Traffic Offsite Sources
Parc 55 Community
Fremont, California

Roadway Type	Roadway	Approximate Distance[1] (feet)			Average Daily Traffic (ADT) (vehicles/day)	Direction	Interpolated Lifetime Excess Cancer Risk[5] (in a million)			Interpolated Chronic Hazard Index[5]			Interpolated Acute Hazard Index[5]			Interpolated $PM_{2.5}$ Concentration[5] ($\mu g/m^3$)			Notes
		Offsite MEISR[2]	Onsite Phase I Resident[3]	Onsite Resident[4]			Offsite MEISR[2]	Onsite Phase I Resident[3]	Onsite Resident[4]	Offsite MEISR[2]	Onsite Phase I Resident[3]	Onsite Resident[4]	Offsite MEISR[2]	Onsite Phase I Resident[3]	Onsite Resident[4]	Offsite MEISR[2]	Onsite Phase I Resident[3]	Onsite Resident[4]	
Surface Street	Warm Springs	18	25	491	19,166	N-S	4.9	4.8	1.3	--	--	--	--	--	--	0.19	0.19	0.05	5,6
	Warren Avenue On	1,480	815	10	16,288	E-W	0.70	0.83	4.4	--	--	--	--	--	--	0.021	0.024	0.18	5,6
Highway Ramp	SB ON 880 FROM RTE 262 On	2,437	1,525	687	16,500	E-W	0.71	0.71	0.94	--	--	--	--	--	--	0.021	0.021	0.027	6,7
	NB OFF 880 TO NB RTE 262 On	2,450	1,537	813	20,700	E-W	0.81	0.81	0.97	--	--	--	--	--	--	0.025	0.025	0.028	6,7
	SEG SB 880 OFF TO NB RTE 262 On	2,478	1,559	837	17,100	E-W	0.72	0.72	0.84	--	--	--	--	--	--	0.022	0.022	0.025	6,7
	NB ON 880 FROM SB RTE 262 On	2,461	1,553	710	11,700	E-W	0.58	0.58	0.72	--	--	--	--	--	--	0.016	0.016	0.022	6,7
Highway	RTE 262	2,384	1,497	637	62,000	E-W	6.7	6.7	11	0.007	0.007	0.011	0.0050	0.0050	0.0069	0.053	0.053	0.088	8,9
						Total	**15**	**15**	**21**	**0.007**	**0.007**	**0.011**	**0.0050**	**0.0050**	**0.0069**	**0.35**	**0.35**	**0.42**	

Notes:
1. Any location greater than 1,000 feet from the associated roadway is evaluated at 1,000 feet, the maximum distance in the screening tables (BAAQMD 2011a; BAAQMD 2011b).
2. The shortest distance between the location of the mitigated MEISR as shown in Table 13b and the nearest travel lane of each roadway is shown.
3. The shortest distance between the Phase I area boundary and the nearest travel lane of each roadway is shown.
4. The shortest distance between the Project boundary for all pads except the Phase I area and the nearest travel lane of each roadway is shown.
5. Distance and ADT-interpolated estimates were completed according to BAAQMD recommendations (BAAQMD 2012).
6. Average daily traffic data (ADT) on surface streets was based on volumes presented by the City of Fremont (2013).
7. Screening values for surface streets and highway ramps were obtained from BAAQMD Roadway Screening Analysis Tables (BAAQMD 2011a).
8. ADT on highway ramps was based on volumes presented by the California Department of Transportation (CDOT 2012a).
9. ADT on Route 262 was based on volume presented by the California Department of Transportation (CDOT 2012b).
10. Screening values were obtained from the BAAQMD Highway Screening Analysis Tool for Alameda County (BAAQMD 2011b) based on a receptor height of 6 feet.

Abbreviations:
-- = Not available
$\mu g/m^3$: microgram per cubic meter
$PM_{2.5}$: particulate matter less than 2.5 micron in aerodynamic diameter
ADT: Average daily traffic
ARB: California Air Resources Board
BAAQMD: Bay Area Air Quality Management District
CDOT: California Department of Transportation
NB: North-bound
SB: South-bound
SEG: Segment
RTE: Route

References:

BAAQMD. 2011a. Roadway Screening Analysis Tables. Accessed March 2014. Available at: http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/County%20Surface%20Street%20Screening%20Tables%20Dec%202011.ashx?la=en
BAAQMD. 2011b. Highway Screening Analysis Tool. Accessed March 2014. Available at: http://baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES/Tools-and-Methodology.aspx.
BAAQMD. 2012.CEQA Air Quality Guidelines. May.
CDOT. 2012a. Ramp Volumes on California State Freeways. Accessed March 2014. Available at: http://traffic-counts.dot.ca.gov/
CDOT. 2012b. Traffic Volumes (Annual Average Daily Traffic (AADT)) for all vehicles on California State Highways. Accessed March 2014. Available at: http://traffic-counts.dot.ca.gov/
City of Fremont. 2013. Traffic Count Collections. Accessed March 2014. Available at http://www.fremont.gov/index.aspx?NID=869.

Table 16a
Cumulative Excess Lifetime Cancer Risk, Chronic and Acute HIs, and PM2.5 Concentration - Uncontrolled
Parc 55 Community
Fremont, California

Source	Cancer Risk (in a million)			Chronic Hazard Index			Acute Hazard Index			$PM_{2.5}$ ($\mu g/m^3$)		
	Offsite	Onsite Phase I	Onsite	Offsite	Onsite Phase I	Onsite	Offsite	Onsite Phase I	Onsite	Offsite	Onsite Phase I	Onsite
Uncontrolled Construction[1]	16	2.0		0.021	0.058		0.061	0.11		0.10	0.27	
Offsite Stationary Sources[2]	2.4			0.0085			--			0.0040		
Offsite Traffic[3]	15	15	21	0.0070	0.0070	0.011	0.0050	0.0050	0.0069	0.35	0.35	0.42
Railway[4]	36	9.2		0.013			--			0.067		
Cumulative Total	70	29	34	0.050	0.087	0.091	0.066	0.12	0.12	0.52	0.69	0.77
BAAQMD Cumulative Threshold	**>100**			**>10**			**>10**			**>0.8**		

Notes:
1. As presented in Table 13a.
2. As presented in Table 14.
3. As presented in Table 15.
4. Estimated using a conservative scaling method.

Abbreviations:
$\mu g/m^3$: microgram per cubic meter
$PM_{2.5}$: particulate matter less than 2.5 micron in aerodynamic diameter

Table 16b
Cumulative Excess Lifetime Cancer Risk, Chronic and Acute HIs, and PM2.5 Concentration - Controlled
Parc 55 Community
Fremont, California

Source	Risks or Hazards											
	Cancer Risk (in a million)			Chronic Hazard Index			Acute Hazard Index			$PM_{2.5}$ ($\mu g/m^3$)		
	Offsite	Onsite Phase I	Onsite	Offsite	Onsite Phase I	Onsite	Offsite	Onsite Phase I	Onsite	Offsite	Onsite Phase I	Onsite
Controlled Construction[1]	9.6	1.2		0.012	0.033		0.061	0.11		0.056	0.16	
Offsite Stationary Sources[2]	2.4			0.0085			--			0.0040		
Offsite Traffic[3]	15	15	21	0.0070	0.0070	0.011	0.0050	0.0050	0.0069	0.35	0.35	0.42
Railway[4]	36	9.2		0.013			--			0.067		
Cumulative Total	63	28	33	0.041	0.062	0.067	0.066	0.12	0.12	0.48	0.58	0.65
BAAQMD Cumulative Threshold	**>100**			**>10**			**>10**			**>0.8**		

Notes:
1. As presented in Table 13b.
2. As presented in Table 14.
3. As presented in Table 15.
4. Estimated using a conservative scaling method.

Abbreviations:
$\mu g/m^3$: microgram per cubic meter
$PM_{2.5}$: particulate matter less than 2.5 micron in aerodynamic diameter

FIGURES

RAMBOLL ENVIRON

Property Boundary

PARC 55 Senior Village

Fremont, CA

FIGURE

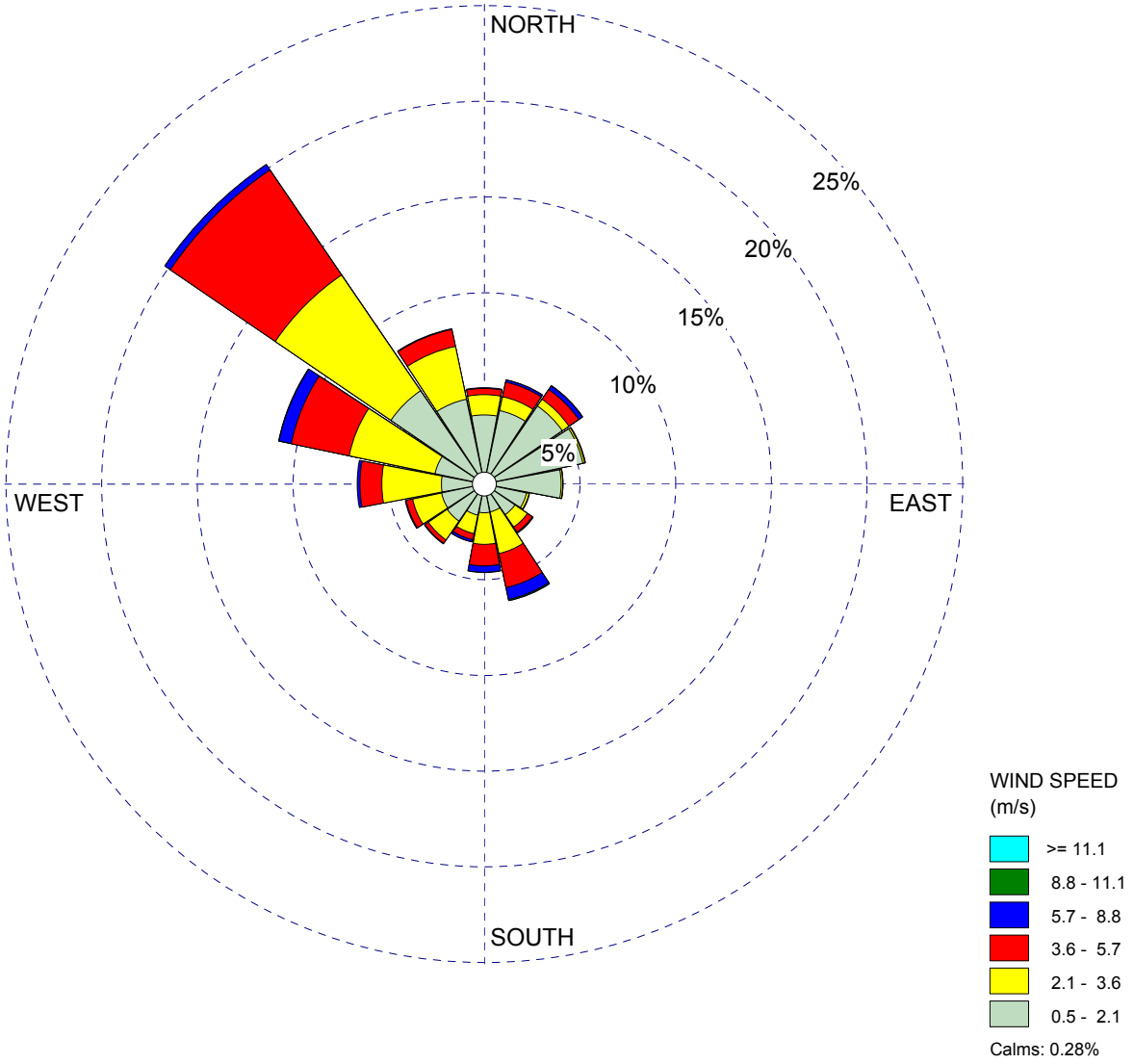
1

WIND ROSE PLOT:

NUMMI Facility - Fremont, CA

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	Start Date: 1/1/1999 - 00:00 **End Date: 12/31/2005 - 23:00**	ENVIRON	
		MODELER:	FIGURE 2
	CALM WINDS: **0.28%**	TOTAL COUNT: **43809 hrs.**	
	AVG. WIND SPEED: **2.43 m/s**	DATE: **2/19/2014**	PROJECT NO.: 0334231A

WRPLOT View - Lakes Environmental Software

RAMBOLL ENVIRON

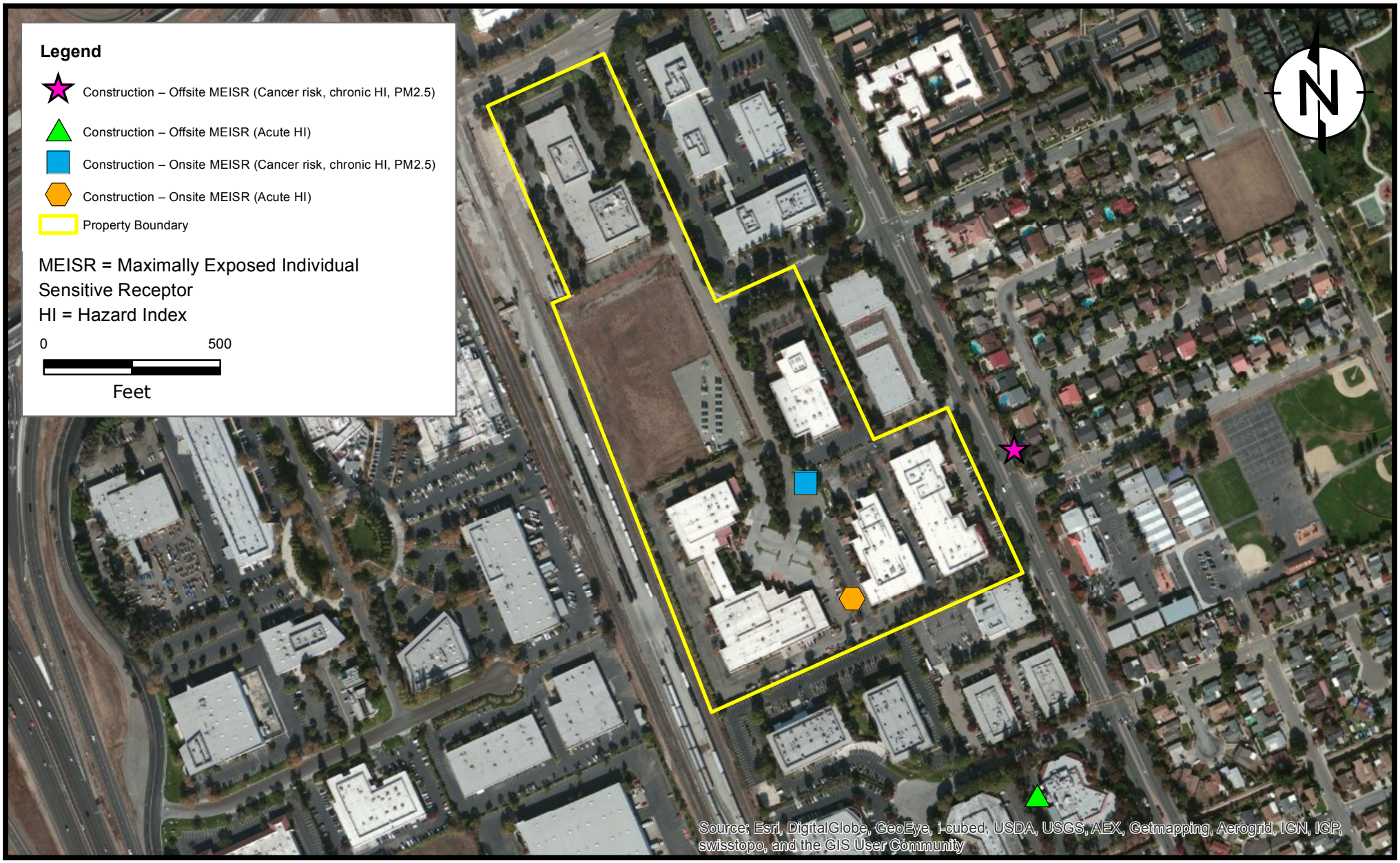
Modeling Extent

PARC 55 Community

Fremont, CA

FIGURE

3



RAMBOLL ENVIRON

Location of MEISRs

PARC 55 Community

Fremont, CA

FIGURE

4

APPENDIX A
CALEEMOD® OUTPUT FILES

Parc 55 1a (Option1)

Alameda County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	83.00	Space	0.00	33,000.00	0
Parking Lot	368.00	Space	0.00	147,000.00	0
Parking Lot	38.00	Space	0.00	15,000.00	0
Parking Lot	50.00	Space	0.00	20,000.00	0
Parking Lot	31.00	Space	0.00	12,400.00	0
Parking Lot	34.00	Space	0.00	13,600.00	0
Health Club	15.00	1000sqft	1.00	15,000.00	0
Apartments Mid Rise	110.00	Dwelling Unit	2.50	49,500.00	110
Apartments Mid Rise	245.00	Dwelling Unit	6.00	208,250.00	368
Condo/Townhouse High Rise	75.00	Dwelling Unit	5.60	135,000.00	150
Condo/Townhouse High Rise	68.00	Dwelling Unit	2.60	68,000.00	136
Single Family Housing	62.00	Dwelling Unit	6.10	124,000.00	124

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	63
Climate Zone	5			**Operational Year**	2017
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	349	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - PG&E 2017 CO2 Emissions Factor
http://www.pge.com/includes/docs/pdfs/shared/environment/calculator/pge_ghg_emission_factor_info_sheet.pdf

Land Use - Changed Square footage/acreage according land use spreadsheet
Added square footage for common areas and amenities

Construction Phase -

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Demolition -

Vehicle Trips - Adjusted trip rates for all housing.

Energy Use - 2013 Title 24

Construction Off-road Equipment Mitigation -

Table Name	Column Name	Default Value	New Value
tblEnergyUse	T24E	312.05	239.34
tblEnergyUse	T24E	135.74	104.11
tblEnergyUse	T24E	1.48	1.16
tblEnergyUse	T24E	248.69	158.17
tblEnergyUse	T24NG	7,191.67	6,918.39
tblEnergyUse	T24NG	21,338.24	20,527.39
tblEnergyUse	T24NG	18.78	15.62
tblEnergyUse	T24NG	44,827.08	41,913.32
tblLandUse	LandUseSquareFeet	147,200.00	147,000.00
tblLandUse	LandUseSquareFeet	15,200.00	15,000.00
tblLandUse	LandUseSquareFeet	33,200.00	33,000.00

tblLandUse	LandUseSquareFeet	110,000.00	49,500.00
tblLandUse	LandUseSquareFeet	245,000.00	208,250.00
tblLandUse	LandUseSquareFeet	75,000.00	135,000.00
tblLandUse	LandUseSquareFeet	111,600.00	124,000.00
tblLandUse	LotAcreage	0.28	0.00
tblLandUse	LotAcreage	0.31	0.00
tblLandUse	LotAcreage	3.31	0.00
tblLandUse	LotAcreage	0.34	0.00
tblLandUse	LotAcreage	0.45	0.00
tblLandUse	LotAcreage	0.75	0.00
tblLandUse	LotAcreage	0.34	1.00
tblLandUse	LotAcreage	2.89	2.50
tblLandUse	LotAcreage	6.45	6.00
tblLandUse	LotAcreage	1.06	2.60
tblLandUse	LotAcreage	1.17	5.60
tblLandUse	LotAcreage	20.13	6.10
tblLandUse	Population	315.00	110.00
tblLandUse	Population	701.00	368.00
tblLandUse	Population	194.00	136.00
tblLandUse	Population	215.00	150.00
tblLandUse	Population	177.00	124.00
tblProjectCharacteristics	CO2IntensityFactor	641.35	349
tblProjectCharacteristics	OperationalYear	2014	2017
tblVehicleTrips	ST_TR	7.16	3.44
tblVehicleTrips	ST_TR	7.16	3.44
tblVehicleTrips	ST_TR	20.87	33.82
tblVehicleTrips	ST_TR	10.08	3.44
tblVehicleTrips	SU_TR	6.07	3.44

tblVehicleTrips	SU_TR	6.07	3.44
tblVehicleTrips	SU_TR	26.73	33.82
tblVehicleTrips	SU_TR	8.77	3.44
tblVehicleTrips	WD_TR	6.59	3.44
tblVehicleTrips	WD_TR	6.59	3.44
tblVehicleTrips	WD_TR	32.93	33.82
tblVehicleTrips	WD_TR	9.57	3.44

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2016	0.4136	3.6202	3.5884	5.6900e-003	0.5754	0.1744	0.7497	0.1848	0.1620	0.3468	0.0000	495.7783	495.7783	0.0749	0.0000	497.3520
2017	0.7672	4.9552	7.2588	0.0135	0.6616	0.2537	0.9153	0.1778	0.2379	0.4157	0.0000	1,099.2692	1,099.2692	0.1059	0.0000	1,101.4933
2018	4.3694	0.9416	1.3583	2.6600e-003	0.1222	0.0474	0.1696	0.0328	0.0444	0.0772	0.0000	213.0021	213.0021	0.0244	0.0000	213.5134
Total	**5.5502**	**9.5170**	**12.2055**	**0.0219**	**1.3591**	**0.4754**	**1.8346**	**0.3954**	**0.4442**	**0.8396**	**0.0000**	**1,808.0497**	**1,808.0497**	**0.2052**	**0.0000**	**1,812.3587**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2016	0.4136	3.6202	3.5884	5.6900e-003	0.5754	0.1744	0.7497	0.1848	0.1620	0.3468	0.0000	495.7780	495.7780	0.0749	0.0000	497.3517
2017	0.7672	4.9552	7.2588	0.0135	0.6616	0.2537	0.9153	0.1778	0.2379	0.4157	0.0000	1,099.2689	1,099.2689	0.1059	0.0000	1,101.4929
2018	4.3694	0.9416	1.3583	2.6600e-003	0.1222	0.0474	0.1696	0.0328	0.0443	0.0772	0.0000	213.0020	213.0020	0.0244	0.0000	213.5133
Total	**5.5502**	**9.5170**	**12.2055**	**0.0219**	**1.3591**	**0.4754**	**1.8346**	**0.3954**	**0.4442**	**0.8396**	**0.0000**	**1,808.0489**	**1,808.0489**	**0.2052**	**0.0000**	**1,812.3579**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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	4.9749	0.0690	5.8712	1.7600e-003		0.2653	0.2653		0.2653	0.2653	24.8781	35.5426	60.4207	0.0556	1.8100e-003	62.1496
Energy	0.0524	0.4491	0.1980	2.8600e-003		0.0362	0.0362		0.0362	0.0362	0.0000	933.5843	933.5843	0.0444	0.0166	939.6759
Mobile	1.5570	4.3007	16.2588	0.0297	1.9362	0.0545	1.9907	0.5204	0.0502	0.5705	0.0000	2,323.7825	2,323.7825	0.0909	0.0000	2,325.6916
Waste						0.0000	0.0000		0.0000	0.0000	74.4287	0.0000	74.4287	4.3986	0.0000	166.7994
Water						0.0000	0.0000		0.0000	0.0000	11.8569	45.0593	56.9162	1.2216	0.0295	91.7231
Total	**6.5844**	**4.8188**	**22.3279**	**0.0344**	**1.9362**	**0.3560**	**2.2922**	**0.5204**	**0.3517**	**0.8720**	**111.1636**	**3,337.9687**	**3,449.1323**	**5.8111**	**0.0480**	**3,586.0397**

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	4.9749	0.0690	5.8712	1.7600e-003		0.2653	0.2653		0.2653	0.2653	24.8781	35.5426	60.4207	0.0556	1.8100e-003	62.1496
Energy	0.0524	0.4491	0.1980	2.8600e-003		0.0362	0.0362		0.0362	0.0362	0.0000	933.5843	933.5843	0.0444	0.0166	939.6759
Mobile	1.5570	4.3007	16.2588	0.0297	1.9362	0.0545	1.9907	0.5204	0.0502	0.5705	0.0000	2,323.7825	2,323.7825	0.0909	0.0000	2,325.6916
Waste						0.0000	0.0000		0.0000	0.0000	74.4287	0.0000	74.4287	4.3986	0.0000	166.7994
Water						0.0000	0.0000		0.0000	0.0000	11.8569	45.0593	56.9162	1.2213	0.0295	91.7042
Total	**6.5844**	**4.8188**	**22.3279**	**0.0344**	**1.9362**	**0.3560**	**2.2922**	**0.5204**	**0.3517**	**0.8720**	**111.1636**	**3,337.9687**	**3,449.1323**	**5.8108**	**0.0479**	**3,586.0208**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.10**	**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	7/1/2016	7/28/2016	5	20	
2	Site Preparation	Site Preparation	7/29/2016	8/11/2016	5	10	
3	Grading	Grading	8/12/2016	9/29/2016	5	35	
4	Building Construction	Building Construction	9/30/2016	3/1/2018	5	370	
5	Paving	Paving	3/2/2018	3/29/2018	5	20	
6	Architectural Coating	Architectural Coating	3/30/2018	4/26/2018	5	20	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 87.5

Acres of Paving: 0

Residential Indoor: 1,184,119; Residential Outdoor: 394,706; Non-Residential Indoor: 33,345; Non-Residential Outdoor: 11,115 (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
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
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	1,371.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	488.00	102.00	0.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	98.00	0.00	0.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Clean Paved Roads

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					
Fugitive Dust					0.1484	0.0000	0.1484	0.0225	0.0000	0.0225	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
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**	**0.1484**	**0.0229**	**0.1713**	**0.0225**	**0.0214**	**0.0438**	**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	0.0153	0.2057	0.1681	5.2000e-004	0.0116	2.6900e-003	0.0143	3.1800e-003	2.4800e-003	5.6600e-003	0.0000	47.3038	47.3038	3.5000e-004	0.0000	47.3112
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	5.7000e-004	8.5000e-004	8.1900e-003	2.0000e-005	1.3600e-003	1.0000e-005	1.3700e-003	3.6000e-004	1.0000e-005	3.7000e-004	0.0000	1.2385	1.2385	7.0000e-005	0.0000	1.2399
Total	**0.0159**	**0.2065**	**0.1763**	**5.4000e-004**	**0.0129**	**2.7000e-003**	**0.0156**	**3.5400e-003**	**2.4900e-003**	**6.0300e-003**	**0.0000**	**48.5423**	**48.5423**	**4.2000e-004**	**0.0000**	**48.5512**

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					0.1484	0.0000	0.1484	0.0225	0.0000	0.0225	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
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**	**0.1484**	**0.0229**	**0.1713**	**0.0225**	**0.0214**	**0.0438**	**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	0.0153	0.2057	0.1681	5.2000e-004	0.0116	2.6900e-003	0.0143	3.1800e-003	2.4800e-003	5.6600e-003	0.0000	47.3038	47.3038	3.5000e-004	0.0000	47.3112
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	5.7000e-004	8.5000e-004	8.1900e-003	2.0000e-005	1.3600e-003	1.0000e-005	1.3700e-003	3.6000e-004	1.0000e-005	3.7000e-004	0.0000	1.2385	1.2385	7.0000e-005	0.0000	1.2399
Total	**0.0159**	**0.2065**	**0.1763**	**5.4000e-004**	**0.0129**	**2.7000e-003**	**0.0156**	**3.5400e-003**	**2.4900e-003**	**6.0300e-003**	**0.0000**	**48.5423**	**48.5423**	**4.2000e-004**	**0.0000**	**48.5512**

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	3.4000e-004	5.1000e-004	4.9200e-003	1.0000e-005	8.2000e-004	1.0000e-005	8.2000e-004	2.2000e-004	1.0000e-005	2.2000e-004	0.0000	0.7431	0.7431	4.0000e-005	0.0000	0.7440
Total	**3.4000e-004**	**5.1000e-004**	**4.9200e-003**	**1.0000e-005**	**8.2000e-004**	**1.0000e-005**	**8.2000e-004**	**2.2000e-004**	**1.0000e-005**	**2.2000e-004**	**0.0000**	**0.7431**	**0.7431**	**4.0000e-005**	**0.0000**	**0.7440**

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					0.0903	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	18.4385	18.4385	5.5600e-003	0.0000	18.5553
Total	**0.0254**	**0.2732**	**0.2055**	**2.0000e-004**	**0.0903**	**0.0147**	**0.1050**	**0.0497**	**0.0135**	**0.0632**	**0.0000**	**18.4385**	**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	3.4000e-004	5.1000e-004	4.9200e-003	1.0000e-005	8.2000e-004	1.0000e-005	8.2000e-004	2.2000e-004	1.0000e-005	2.2000e-004	0.0000	0.7431	0.7431	4.0000e-005	0.0000	0.7440
Total	**3.4000e-004**	**5.1000e-004**	**4.9200e-003**	**1.0000e-005**	**8.2000e-004**	**1.0000e-005**	**8.2000e-004**	**2.2000e-004**	**1.0000e-005**	**2.2000e-004**	**0.0000**	**0.7431**	**0.7431**	**4.0000e-005**	**0.0000**	**0.7440**

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					0.1518	0.0000	0.1518	0.0629	0.0000	0.0629	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**	**0.1518**	**0.0627**	**0.2145**	**0.0629**	**0.0577**	**0.1207**	**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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.3400e-003	1.9800e-003	0.0191	4.0000e-005	3.1800e-003	3.0000e-005	3.2000e-003	8.5000e-004	2.0000e-005	8.7000e-004	0.0000	2.8897	2.8897	1.6000e-004	0.0000	2.8932
Total	**1.3400e-003**	**1.9800e-003**	**0.0191**	**4.0000e-005**	**3.1800e-003**	**3.0000e-005**	**3.2000e-003**	**8.5000e-004**	**2.0000e-005**	**8.7000e-004**	**0.0000**	**2.8897**	**2.8897**	**1.6000e-004**	**0.0000**	**2.8932**

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					0.1518	0.0000	0.1518	0.0629	0.0000	0.0629	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**	**0.1518**	**0.0627**	**0.2145**	**0.0629**	**0.0577**	**0.1207**	**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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.3400e-003	1.9800e-003	0.0191	4.0000e-005	3.1800e-003	3.0000e-005	3.2000e-003	8.5000e-004	2.0000e-005	8.7000e-004	0.0000	2.8897	2.8897	1.6000e-004	0.0000	2.8932
Total	**1.3400e-003**	**1.9800e-003**	**0.0191**	**4.0000e-005**	**3.1800e-003**	**3.0000e-005**	**3.2000e-003**	**8.5000e-004**	**2.0000e-005**	**8.7000e-004**	**0.0000**	**2.8897**	**2.8897**	**1.6000e-004**	**0.0000**	**2.8932**

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	0.1124	0.9407	0.6107	8.8000e-004		0.0649	0.0649		0.0610	0.0610	0.0000	79.9107	79.9107	0.0198	0.0000	80.3269
Total	**0.1124**	**0.9407**	**0.6107**	**8.8000e-004**		**0.0649**	**0.0649**		**0.0610**	**0.0610**	**0.0000**	**79.9107**	**79.9107**	**0.0198**	**0.0000**	**80.3269**

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
Vendor	0.0403	0.3404	0.4820	8.1000e-004	0.0218	5.1200e-003	0.0269	6.2500e-003	4.7100e-003	0.0110	0.0000	73.3537	73.3537	5.9000e-004	0.0000	73.3661
Worker	0.0616	0.0911	0.8796	1.7500e-003	0.1462	1.2500e-003	0.1474	0.0389	1.1500e-003	0.0400	0.0000	132.9604	132.9604	7.5300e-003	0.0000	133.1185
Total	**0.1019**	**0.4315**	**1.3616**	**2.5600e-003**	**0.1679**	**6.3700e-003**	**0.1743**	**0.0451**	**5.8600e-003**	**0.0510**	**0.0000**	**206.3141**	**206.3141**	**8.1200e-003**	**0.0000**	**206.4846**

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	0.1124	0.9407	0.6107	8.8000e-004		0.0649	0.0649		0.0610	0.0610	0.0000	79.9106	79.9106	0.0198	0.0000	80.3268
Total	**0.1124**	**0.9407**	**0.6107**	**8.8000e-004**		**0.0649**	**0.0649**		**0.0610**	**0.0610**	**0.0000**	**79.9106**	**79.9106**	**0.0198**	**0.0000**	**80.3268**

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	0.0403	0.3404	0.4820	8.1000e-004	0.0218	5.1200e-003	0.0269	6.2500e-003	4.7100e-003	0.0110	0.0000	73.3537	73.3537	5.9000e-004	0.0000	73.3661
Worker	0.0616	0.0911	0.8796	1.7500e-003	0.1462	1.2500e-003	0.1474	0.0389	1.1500e-003	0.0400	0.0000	132.9604	132.9604	7.5300e-003	0.0000	133.1185
Total	**0.1019**	**0.4315**	**1.3616**	**2.5600e-003**	**0.1679**	**6.3700e-003**	**0.1743**	**0.0451**	**5.8600e-003**	**0.0510**	**0.0000**	**206.3141**	**206.3141**	**8.1200e-003**	**0.0000**	**206.4846**

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	0.4033	3.4327	2.3568	3.4900e-003		0.2316	0.2316		0.2175	0.2175	0.0000	311.3228	311.3228	0.0766	0.0000	312.9319
Total	**0.4033**	**3.4327**	**2.3568**	**3.4900e-003**		**0.2316**	**0.2316**		**0.2175**	**0.2175**	**0.0000**	**311.3228**	**311.3228**	**0.0766**	**0.0000**	**312.9319**

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
Vendor	0.1491	1.2013	1.8219	3.1800e-003	0.0857	0.0175	0.1032	0.0246	0.0161	0.0407	0.0000	284.1141	284.1141	2.2200e-003	0.0000	284.1607
Worker	0.2149	0.3213	3.0801	6.8700e-003	0.5758	4.6800e-003	0.5805	0.1532	4.3100e-003	0.1575	0.0000	503.8323	503.8323	0.0271	0.0000	504.4007
Total	**0.3639**	**1.5225**	**4.9020**	**0.0101**	**0.6616**	**0.0221**	**0.6837**	**0.1778**	**0.0204**	**0.1982**	**0.0000**	**787.9464**	**787.9464**	**0.0293**	**0.0000**	**788.5614**

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	0.4033	3.4327	2.3568	3.4900e-003		0.2316	0.2316		0.2175	0.2175	0.0000	311.3225	311.3225	0.0766	0.0000	312.9315
Total	**0.4033**	**3.4327**	**2.3568**	**3.4900e-003**		**0.2316**	**0.2316**		**0.2175**	**0.2175**	**0.0000**	**311.3225**	**311.3225**	**0.0766**	**0.0000**	**312.9315**

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
Vendor	0.1491	1.2013	1.8219	3.1800e-003	0.0857	0.0175	0.1032	0.0246	0.0161	0.0407	0.0000	284.1141	284.1141	2.2200e-003	0.0000	284.1607
Worker	0.2149	0.3213	3.0801	6.8700e-003	0.5758	4.6800e-003	0.5805	0.1532	4.3100e-003	0.1575	0.0000	503.8323	503.8323	0.0271	0.0000	504.4007
Total	**0.3639**	**1.5225**	**4.9020**	**0.0101**	**0.6616**	**0.0221**	**0.6837**	**0.1778**	**0.0204**	**0.1982**	**0.0000**	**787.9464**	**787.9464**	**0.0293**	**0.0000**	**788.5614**

3.5 Building Construction - 2018

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	0.0587	0.5117	0.3857	5.9000e-004		0.0329	0.0329		0.0309	0.0309	0.0000	52.0893	52.0893	0.0128	0.0000	52.3570
Total	**0.0587**	**0.5117**	**0.3857**	**5.9000e-004**		**0.0329**	**0.0329**		**0.0309**	**0.0309**	**0.0000**	**52.0893**	**52.0893**	**0.0128**	**0.0000**	**52.3570**

3.5 Building Construction - 2018

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	0.0237	0.1842	0.2953	5.4000e-004	0.0145	2.7400e-003	0.0173	4.1700e-003	2.5200e-003	6.6900e-003	0.0000	47.2525	47.2525	3.7000e-004	0.0000	47.2602
Worker	0.0323	0.0489	0.4649	1.1600e-003	0.0975	7.6000e-004	0.0982	0.0259	7.1000e-004	0.0266	0.0000	82.0973	82.0973	4.2100e-003	0.0000	82.1856
Total	**0.0560**	**0.2331**	**0.7601**	**1.7000e-003**	**0.1120**	**3.5000e-003**	**0.1155**	**0.0301**	**3.2300e-003**	**0.0333**	**0.0000**	**129.3498**	**129.3498**	**4.5800e-003**	**0.0000**	**129.4458**

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	0.0587	0.5117	0.3857	5.9000e-004		0.0329	0.0329		0.0309	0.0309	0.0000	52.0893	52.0893	0.0128	0.0000	52.3570
Total	**0.0587**	**0.5117**	**0.3857**	**5.9000e-004**		**0.0329**	**0.0329**		**0.0309**	**0.0309**	**0.0000**	**52.0893**	**52.0893**	**0.0128**	**0.0000**	**52.3570**

3.5 Building Construction - 2018

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	0.0237	0.1842	0.2953	5.4000e-004	0.0145	2.7400e-003	0.0173	4.1700e-003	2.5200e-003	6.6900e-003	0.0000	47.2525	47.2525	3.7000e-004	0.0000	47.2602
Worker	0.0323	0.0489	0.4649	1.1600e-003	0.0975	7.6000e-004	0.0982	0.0259	7.1000e-004	0.0266	0.0000	82.0973	82.0973	4.2100e-003	0.0000	82.1856
Total	**0.0560**	**0.2331**	**0.7601**	**1.7000e-003**	**0.1120**	**3.5000e-003**	**0.1155**	**0.0301**	**3.2300e-003**	**0.0333**	**0.0000**	**129.3498**	**129.3498**	**4.5800e-003**	**0.0000**	**129.4458**

3.6 Paving - 2018

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	0.0161	0.1716	0.1449	2.2000e-004		9.3900e-003	9.3900e-003		8.6400e-003	8.6400e-003	0.0000	20.3687	20.3687	6.3400e-003	0.0000	20.5019
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0161**	**0.1716**	**0.1449**	**2.2000e-004**		**9.3900e-003**	**9.3900e-003**		**8.6400e-003**	**8.6400e-003**	**0.0000**	**20.3687**	**20.3687**	**6.3400e-003**	**0.0000**	**20.5019**

3.6 Paving - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.5000e-004	6.8000e-004	6.5000e-003	2.0000e-005	1.3600e-003	1.0000e-005	1.3700e-003	3.6000e-004	1.0000e-005	3.7000e-004	0.0000	1.1470	1.1470	6.0000e-005	0.0000	1.1483
Total	**4.5000e-004**	**6.8000e-004**	**6.5000e-003**	**2.0000e-005**	**1.3600e-003**	**1.0000e-005**	**1.3700e-003**	**3.6000e-004**	**1.0000e-005**	**3.7000e-004**	**0.0000**	**1.1470**	**1.1470**	**6.0000e-005**	**0.0000**	**1.1483**

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	0.0161	0.1716	0.1449	2.2000e-004		9.3900e-003	9.3900e-003		8.6400e-003	8.6400e-003	0.0000	20.3687	20.3687	6.3400e-003	0.0000	20.5019
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0161**	**0.1716**	**0.1449**	**2.2000e-004**		**9.3900e-003**	**9.3900e-003**		**8.6400e-003**	**8.6400e-003**	**0.0000**	**20.3687**	**20.3687**	**6.3400e-003**	**0.0000**	**20.5019**

3.6 Paving - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.5000e-004	6.8000e-004	6.5000e-003	2.0000e-005	1.3600e-003	1.0000e-005	1.3700e-003	3.6000e-004	1.0000e-005	3.7000e-004	0.0000	1.1470	1.1470	6.0000e-005	0.0000	1.1483
Total	**4.5000e-004**	**6.8000e-004**	**6.5000e-003**	**2.0000e-005**	**1.3600e-003**	**1.0000e-005**	**1.3700e-003**	**3.6000e-004**	**1.0000e-005**	**3.7000e-004**	**0.0000**	**1.1470**	**1.1470**	**6.0000e-005**	**0.0000**	**1.1483**

3.7 Architectural Coating - 2018

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	4.2322					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.9900e-003	0.0201	0.0185	3.0000e-005		1.5100e-003	1.5100e-003		1.5100e-003	1.5100e-003	0.0000	2.5533	2.5533	2.4000e-004	0.0000	2.5584
Total	**4.2352**	**0.0201**	**0.0185**	**3.0000e-005**		**1.5100e-003**	**1.5100e-003**		**1.5100e-003**	**1.5100e-003**	**0.0000**	**2.5533**	**2.5533**	**2.4000e-004**	**0.0000**	**2.5584**

3.7 Architectural Coating - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.9500e-003	4.4600e-003	0.0424	1.1000e-004	8.9000e-003	7.0000e-005	8.9600e-003	2.3700e-003	6.0000e-005	2.4300e-003	0.0000	7.4940	7.4940	3.8000e-004	0.0000	7.5020
Total	**2.9500e-003**	**4.4600e-003**	**0.0424**	**1.1000e-004**	**8.9000e-003**	**7.0000e-005**	**8.9600e-003**	**2.3700e-003**	**6.0000e-005**	**2.4300e-003**	**0.0000**	**7.4940**	**7.4940**	**3.8000e-004**	**0.0000**	**7.5020**

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	4.2322					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.9900e-003	0.0201	0.0185	3.0000e-005		1.5100e-003	1.5100e-003		1.5100e-003	1.5100e-003	0.0000	2.5533	2.5533	2.4000e-004	0.0000	2.5584
Total	**4.2352**	**0.0201**	**0.0185**	**3.0000e-005**		**1.5100e-003**	**1.5100e-003**		**1.5100e-003**	**1.5100e-003**	**0.0000**	**2.5533**	**2.5533**	**2.4000e-004**	**0.0000**	**2.5584**

3.7 Architectural Coating - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.9500e-003	4.4600e-003	0.0424	1.1000e-004	8.9000e-003	7.0000e-005	8.9600e-003	2.3700e-003	6.0000e-005	2.4300e-003	0.0000	7.4940	7.4940	3.8000e-004	0.0000	7.5020
Total	**2.9500e-003**	**4.4600e-003**	**0.0424**	**1.1000e-004**	**8.9000e-003**	**7.0000e-005**	**8.9600e-003**	**2.3700e-003**	**6.0000e-005**	**2.4300e-003**	**0.0000**	**7.4940**	**7.4940**	**3.8000e-004**	**0.0000**	**7.5020**

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	1.5570	4.3007	16.2588	0.0297	1.9362	0.0545	1.9907	0.5204	0.0502	0.5705	0.0000	2,323.7825	2,323.7825	0.0909	0.0000	2,325.6916
Unmitigated	1.5570	4.3007	16.2588	0.0297	1.9362	0.0545	1.9907	0.5204	0.0502	0.5705	0.0000	2,323.7825	2,323.7825	0.0909	0.0000	2,325.6916

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Mid Rise	378.40	378.40	378.40	844,727	844,727
Apartments Mid Rise	842.80	842.80	842.80	1,881,438	1,881,438
Condo/Townhouse High Rise	258.00	258.00	258.00	575,950	575,950
Condo/Townhouse High Rise	233.92	233.92	233.92	522,195	522,195
Health Club	507.30	507.30	507.30	876,445	876,445
Parking Lot	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Single Family Housing	213.28	213.28	213.28	476,119	476,119
Total	2,433.70	2,433.70	2,433.70	5,176,875	5,176,875

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Mid Rise	12.40	4.30	5.40	26.10	29.10	44.80	86	11	3
Apartments Mid Rise	12.40	4.30	5.40	26.10	29.10	44.80	86	11	3
Condo/Townhouse High Rise	12.40	4.30	5.40	26.10	29.10	44.80	86	11	3
Condo/Townhouse High Rise	12.40	4.30	5.40	26.10	29.10	44.80	86	11	3
Health Club	9.50	7.30	7.30	16.90	64.10	19.00	52	39	9
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Single Family Housing	12.40	4.30	5.40	26.10	29.10	44.80	86	11	3

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.541334	0.061893	0.168156	0.111955	0.031019	0.004607	0.019268	0.049011	0.001782	0.003693	0.005649	0.000207	0.001427

5.0 Energy Detail

4.4 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 Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	414.6834	414.6834	0.0345	7.1300e-003	417.6171
NaturalGas Mitigated	0.0524	0.4491	0.1980	2.8600e-003		0.0362	0.0362		0.0362	0.0362	0.0000	518.9009	518.9009	9.9500e-003	9.5100e-003	522.0588
NaturalGas Unmitigated	0.0524	0.4491	0.1980	2.8600e-003		0.0362	0.0362		0.0362	0.0362	0.0000	518.9009	518.9009	9.9500e-003	9.5100e-003	522.0588
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	414.6834	414.6834	0.0345	7.1300e-003	417.6171

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					
Apartments Mid Rise	943843	5.0900e-003	0.0435	0.0185	2.8000e-004		3.5200e-003	3.5200e-003		3.5200e-003	3.5200e-003	0.0000	50.3671	50.3671	9.7000e-004	9.2000e-004	50.6736
Condo/Townhouse High Rise	1.59653e+006	8.6100e-003	0.0736	0.0313	4.7000e-004		5.9500e-003	5.9500e-003		5.9500e-003	5.9500e-003	0.0000	85.1970	85.1970	1.6300e-003	1.5600e-003	85.7154
Condo/Townhouse High Rise	1.76088e+006	9.4900e-003	0.0811	0.0345	5.2000e-004		6.5600e-003	6.5600e-003		6.5600e-003	6.5600e-003	0.0000	93.9672	93.9672	1.8000e-003	1.7200e-003	94.5391
Health Club	337800	1.8200e-003	0.0166	0.0139	1.0000e-004		1.2600e-003	1.2600e-003		1.2600e-003	1.2600e-003	0.0000	18.0263	18.0263	3.5000e-004	3.3000e-004	18.1360
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Single Family Housing	2.98259e+006	0.0161	0.1374	0.0585	8.8000e-004		0.0111	0.0111		0.0111	0.0111	0.0000	159.1622	159.1622	3.0500e-003	2.9200e-003	160.1308
Apartments Mid Rise	2.1022e+006	0.0113	0.0969	0.0412	6.2000e-004		7.8300e-003	7.8300e-003		7.8300e-003	7.8300e-003	0.0000	112.1812	112.1812	2.1500e-003	2.0600e-003	112.8639
Total		**0.0524**	**0.4491**	**0.1980**	**2.8700e-003**		**0.0362**	**0.0362**		**0.0362**	**0.0362**	**0.0000**	**518.9009**	**518.9009**	**9.9500e-003**	**9.5100e-003**	**522.0588**

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					
Condo/Townhouse High Rise	1.59653e+006	8.6100e-003	0.0736	0.0313	4.7000e-004		5.9500e-003	5.9500e-003		5.9500e-003	5.9500e-003	0.0000	85.1970	85.1970	1.6300e-003	1.5600e-003	85.7154
Condo/Townhouse High Rise	1.76088e+006	9.4900e-003	0.0811	0.0345	5.2000e-004		6.5600e-003	6.5600e-003		6.5600e-003	6.5600e-003	0.0000	93.9672	93.9672	1.8000e-003	1.7200e-003	94.5391
Health Club	337800	1.8200e-003	0.0166	0.0139	1.0000e-004		1.2600e-003	1.2600e-003		1.2600e-003	1.2600e-003	0.0000	18.0263	18.0263	3.5000e-004	3.3000e-004	18.1360
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Single Family Housing	2.98259e+006	0.0161	0.1374	0.0585	8.8000e-004		0.0111	0.0111		0.0111	0.0111	0.0000	159.1622	159.1622	3.0500e-003	2.9200e-003	160.1308
Apartments Mid Rise	2.1022e+006	0.0113	0.0969	0.0412	6.2000e-004		7.8300e-003	7.8300e-003		7.8300e-003	7.8300e-003	0.0000	112.1812	112.1812	2.1500e-003	2.0600e-003	112.8639
Apartments Mid Rise	943843	5.0900e-003	0.0435	0.0185	2.8000e-004		3.5200e-003	3.5200e-003		3.5200e-003	3.5200e-003	0.0000	50.3671	50.3671	9.7000e-004	9.2000e-004	50.6736
Total		**0.0524**	**0.4491**	**0.1980**	**2.8700e-003**		**0.0362**	**0.0362**		**0.0362**	**0.0362**	**0.0000**	**518.9009**	**518.9009**	**9.9500e-003**	**9.5100e-003**	**522.0588**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Mid Rise	389690	61.6895	5.1300e-003	1.0600e-003	62.1259
Apartments Mid Rise	867947	137.3992	0.0114	2.3600e-003	138.3713
Condo/Townhouse High Rise	287712	45.5459	3.7800e-003	7.8000e-004	45.8681
Condo/Townhouse High Rise	317330	50.2345	4.1700e-003	8.6000e-004	50.5898
Health Club	119250	18.8777	1.5700e-003	3.2000e-004	19.0113
Parking Lot	10912	1.7274	1.4000e-004	3.0000e-005	1.7396
Parking Lot	11968	1.8946	1.6000e-004	3.0000e-005	1.9080
Parking Lot	129360	20.4782	1.7000e-003	3.5000e-004	20.6230
Parking Lot	13200	2.0896	1.7000e-004	4.0000e-005	2.1044
Parking Lot	17600	2.7862	2.3000e-004	5.0000e-005	2.8059
Parking Lot	29040	4.5971	3.8000e-004	8.0000e-005	4.6297
Single Family Housing	425534	67.3636	5.6000e-003	1.1600e-003	67.8402
Total		**414.6834**	**0.0345**	**7.1200e-003**	**417.6171**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Mid Rise	389690	61.6895	5.1300e-003	1.0600e-003	62.1259
Apartments Mid Rise	867947	137.3992	0.0114	2.3600e-003	138.3713
Condo/Townhouse High Rise	287712	45.5459	3.7800e-003	7.8000e-004	45.8681
Condo/Townhouse High Rise	317330	50.2345	4.1700e-003	8.6000e-004	50.5898
Health Club	119250	18.8777	1.5700e-003	3.2000e-004	19.0113
Parking Lot	10912	1.7274	1.4000e-004	3.0000e-005	1.7396
Parking Lot	11968	1.8946	1.6000e-004	3.0000e-005	1.9080
Parking Lot	129360	20.4782	1.7000e-003	3.5000e-004	20.6230
Parking Lot	13200	2.0896	1.7000e-004	4.0000e-005	2.1044
Parking Lot	17600	2.7862	2.3000e-004	5.0000e-005	2.8059
Parking Lot	29040	4.5971	3.8000e-004	8.0000e-005	4.6297
Single Family Housing	425534	67.3636	5.6000e-003	1.1600e-003	67.8402
Total		**414.6834**	**0.0345**	**7.1200e-003**	**417.6171**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	4.9749	0.0690	5.8712	1.7600e-003		0.2653	0.2653		0.2653	0.2653	24.8781	35.5426	60.4207	0.0556	1.8100e-003	62.1496
Unmitigated	4.9749	0.0690	5.8712	1.7600e-003		0.2653	0.2653		0.2653	0.2653	24.8781	35.5426	60.4207	0.0556	1.8100e-003	62.1496

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.4232					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	3.2836					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	1.1369	0.0200	1.6654	1.5400e-003		0.2424	0.2424		0.2424	0.2424	24.8781	28.7394	53.6175	0.0487	1.8100e-003	55.2026
Landscaping	0.1313	0.0490	4.2057	2.2000e-004		0.0228	0.0228		0.0228	0.0228	0.0000	6.8032	6.8032	6.8500e-003	0.0000	6.9470
Total	**4.9750**	**0.0690**	**5.8712**	**1.7600e-003**		**0.2653**	**0.2653**		**0.2653**	**0.2653**	**24.8781**	**35.5426**	**60.4207**	**0.0556**	**1.8100e-003**	**62.1496**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.4232					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	3.2836					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	1.1369	0.0200	1.6654	1.5400e-003		0.2424	0.2424		0.2424	0.2424	24.8781	28.7394	53.6175	0.0487	1.8100e-003	55.2026
Landscaping	0.1313	0.0490	4.2057	2.2000e-004		0.0228	0.0228		0.0228	0.0228	0.0000	6.8032	6.8032	6.8500e-003	0.0000	6.9470
Total	**4.9750**	**0.0690**	**5.8712**	**1.7600e-003**		**0.2653**	**0.2653**		**0.2653**	**0.2653**	**24.8781**	**35.5426**	**60.4207**	**0.0556**	**1.8100e-003**	**62.1496**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	56.9162	1.2213	0.0295	91.7042
Unmitigated	56.9162	1.2216	0.0295	91.7231

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Mid Rise	23.1297 / 14.5818	35.2297	0.7560	0.0183	56.7710
Condo/Townhouse High Rise	9.31703 / 5.87378	14.1911	0.3045	7.3600e-003	22.8683
Health Club	0.887147 / 0.543735	1.3426	0.0290	7.0000e-004	2.1688
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	4.03955 / 2.54667	6.1528	0.1320	3.1900e-003	9.9149
Total		**56.9162**	**1.2216**	**0.0295**	**91.7231**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Mid Rise	23.1297 / 14.5818	35.2297	0.7559	0.0183	56.7593
Condo/Townhouse High Rise	9.31703 / 5.87378	14.1911	0.3045	7.3500e-003	22.8636
Health Club	0.887147 / 0.543735	1.3426	0.0290	7.0000e-004	2.1684
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	4.03955 / 2.54667	6.1528	0.1320	3.1900e-003	9.9129
Total		**56.9162**	**1.2213**	**0.0295**	**91.7042**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	74.4287	4.3986	0.0000	166.7994
Unmitigated	74.4287	4.3986	0.0000	166.7994

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Mid Rise	163.3	33.1484	1.9590	0.0000	74.2878
Condo/Townhouse High Rise	65.78	13.3528	0.7891	0.0000	29.9244
Health Club	85.5	17.3557	1.0257	0.0000	38.8953
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	52.08	10.5718	0.6248	0.0000	23.6920
Total		**74.4287**	**4.3986**	**0.0000**	**166.7994**

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Mid Rise	163.3	33.1484	1.9590	0.0000	74.2878
Condo/Townhouse High Rise	65.78	13.3528	0.7891	0.0000	29.9244
Health Club	85.5	17.3557	1.0257	0.0000	38.8953
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	52.08	10.5718	0.6248	0.0000	23.6920
Total		**74.4287**	**4.3986**	**0.0000**	**166.7994**

9.0 Operational Offroad

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

10.0 Vegetation