HARMONY GROVE VILLAGE SOUTH

APPENDIX J

GREENHOUSE GASES ANALYSES REPORT

for the

FINAL ENVIRONMENTAL IMPACT REPORT

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GREENHOUSE GAS ANALYSES REPORT
INFORMATION FOR THE READER

This is the Final Greenhouse Gas (GHG) Analyses Report prepared for the Harmony Grove Village South Project (Project) and circulated as part of the Draft Environmental Impact Report (DEIR) for the Project from April 20 to June 20, 2017; with amendments made in the Recirculated Revised DEIR (RDEIR), circulated from February 22 to April 9, 2018. The Global Climate Change Supplemental Letter prepared by Ldn Consulting, Inc. comprises Part I of this final technical report and amplifies the original GHG Analyses Report, located in Part II.

The recirculated RDEIR augmented the previous analysis, and focused on clarification of Project Design Features (PDFs); including additional information related to Project on-site photovoltaic (PV; solar) panels as independently verified through third-party review; Project-related increases in carbon dioxide (CO_2) sequestration by approximately 100 percent over the existing conditions through the planting of new trees (a minimum of 2,045); and incorporation of information related to the 2017 California Air Resources Board (CARB) Scoping Plan Update.

The technical efforts found that the Project would result in GHG emissions impacts that would require implementation of mitigation measures to reach less-than-significant impacts under the California Environmental Quality Act (CEQA). Two mitigation measures were identified, M-GHG-1 to address construction-period impacts and M-GHG-2 to address operational impacts. Through the purchase of carbon credits, construction- and operation-related GHG emissions would be reduced to zero and therefore result in a less-than-significant contribution to cumulative GHG impacts.

Since public circulation, and in response to comments received on the RDEIR, new PDFs have been added (e.g., provision of two on-site electric vehicles and a location for future bus turn out to make the Project transit ready), additional PDFs have been revised for clarity, and some editorial changes have been made. Consistent with the recirculated RDEIR, post-mitigation Project-related GHG emissions would be less than significant. Project effects would be carbon neutral net zero.

In addition, the County Climate Action Plan (CAP) was adopted by the County's Board of Supervisors approximately one week before the Project's Revised GHG Analysis was recirculated on February 22, 2018. Given the Project's unique situation of being processed while the County's CAP has been in flux and is currently the subject of litigation, the County reasonably concluded that the most appropriate and conservative way for the Project to achieve less-than-significant impacts is for the Applicant to commit to achieve carbon neutrality through all feasible on-site design measures and off-site mitigation, including through purchase of carbon credits. Because the CAP is still under challenge, and it is uncertain if the CAP will remain exactly as currently proposed, the analysis takes a conservative approach and proves the Project achieves less-than-significant impacts independently rather than relying on CAP consistency alone as a basis for Project approval.

However, the Project is consistent with and does not conflict with the CAP. The Project would achieve no net increase in GHG emissions over existing baseline conditions (which are assumed to be zero) with the implementation of the recommended design features and mitigation measures.

Additionally, the Project incorporates more emission-reducing features than those listed within the CAP, relying on the CARB Scoping Plan (e.g., offset of 100 percent of Project on-site electrical/ energy use through solar, an electric vehicle charging station at the Center House and plumbing for such use in the Project's residential garages, a commitment to a future bus stop on site, and HOA-owned on-site electric vehicles for use on site and to HGV). Although the Project did not rely on the CAP, for clarity, it is noted that the Project has completed a consistency list, which immediately follows this information sheet. The Project is therefore consistent with and would not conflict with the County's CAP because the Project would implement all feasible and applicable CAP measures. Finally, Mitigation Measures M-GHG-1 and M-GHG-2 require the Project to purchase and retire carbon offsets in a quantity sufficient to achieve net zero emissions, in accordance with Mitigation Measure GHG-1 from the County's Supplemental EIR (SCH No. 2016101055) for its CAP. An element of the circulated Greenhouse Gas (GHG) emissions mitigation measures follow-up has been deleted. This element was related to GHG offset credits purchased for operational impacts. The text allowed for potential reductions in the amount of credits purchased if improvements in technology resulted in fewer Project-related emissions that required mitigation (offset). The Applicant has committed to purchase of the full number of credits identified in this report and the current EIR, with no opportunity to reduce their purchase obligation.

These changes would additionally lower the assessed Project impacts. They are clarifying in nature and consistent with CEQA significance conclusions reached in the circulated RDEIR. No changes were identified to less-than-significant impact assessments based on these data. The additional information provides clarification and additional documentation, but does not result in any significant new information requiring recirculation.

HGV South GHG Consistency List

The Project includes an approximately 111-acre site in an unincorporated portion of San Diego County in the community of Harmony Grove. The Project site is located approximately 2.5 miles west of Interstate (I-) 15 and approximately 2.6 miles south of State Route (SR) 78. Escondido Creek flows east-west just north of the Project, and the City of Escondido is located to the east. The Proposed Project would contain 453 residential units and a small community center with limited retail/commercial uses (the Center House). The total square footage of structures associated with the Center House use would be approximately 5,000 square feet, with a minimum of 1,500 square feet of commercial/civic use. The residential units would be a mix of multi- and single-family units.

The Proposed Project would include design features to reduce GHG emissions, which include the purchasing of carbon credits that result in a net neutral or zero emissions for construction and operations. Although the Project did not utilize consistency with the County Climate Action Plan (CAP) as its threshold of significance, the Project would not increase net GHG emissions above existing levels. The Project does not conflict with the CAP's emission reduction targets, and the incorporation of all of the applicable CAP measures as shown on Attachment B demonstrates that the Project would not be in conflict with the CAP.

The purpose of this attachment is to assess the consistency of the HGV South Project with the County Climate Action Plan. Where potentially applicable, this attachment then discusses whether the Project implements identified, and/or other comparable, strategies designed to reduce greenhouse gas emissions. As illustrated by the tabular analysis that follows, the Project implements a wide range of strategies that will reduce greenhouse gas emissions on the Project site.

The following analysis has been prepared based upon the County's CAP Consistency Review Checklist (Checklist) from the CAP that applies to new development projects. The CAP presents the County's comprehensive strategy to reduce GHG emissions to meet its reduction targets.

The purpose of the Checklist is to implement GHG reduction measures that will meet its reduction targets.

Evaluation of Project's Utilization of Project Design Features and Reduction Measures

Consistency Questions	Project Evaluation
Is the proposed project consistent with the existing General Plan regional category, land use designations, and zoning designations?	No
Does the project include a land use element and/or zoning designation amendment that would result in an equivalent or less GHG-intensive project when compared to the existing designations? Has the project provided an estimated project GHG emissions under both existing and proposed designation(s) for comparison to substantiate the conclusions/findings. Has the project prepared a separate, detailed project-level GHG analysis? Does the project propose an increase in density or intensity above that which is allowed under existing General Plan designations and consequently would the project result in an equivalent or less GHG-intensive project when compared to the existing designations, after incorporation of design features of mitigation measures?	Yes Yes, a detailed analysis has been prepared. Yes, the proposed density is higher than currently designated in the General Plan. After incorporation of design features and mitigation measures (purchase of carbon credits) the Project would result in not net increase of GHG emissions and thus would be less intensive when compared with the existing use and/or designation.
Reducing Vehicle Miles Traveled: Non-Residential: For non-residential projects with anticipated tenant occupants of 25 or more, will the project achieve a 15% reduction in emissions from commute vehicle miles traveled (VMT), and commit to monitoring and reporting results to demonstrate on-going compliance? VMT reduction may be achieved through a combination of Transportation Demand Management (TDM) and parking strategies, as long as the 15% reduction can be substantiated. This would not be applicable if the project is a residential project or if the project would not accommodate more than 25 tenant-occupants.	This measure is primarily for non-residential projects and is not-applicable as the Project principally proposes to establish a residential community with a small commercial/civic use with at most 10 employees (please see below). As illustrated in DEIR Subchapter 2.7, the Project would result in an equivalent or less GHG-intensive project when compared to the existing designations based on implementation of the recommended mitigation framework. Specifically, with its mitigation (which requires the purchase of carbon offsets and implementation of Project PDFs), the HGV South Project would result in no net increase in GHG emissions from the existing, baseline conditions. The County notes that this is a conservative approach because the CAP's inventory projections assumed a

Consistency Questions	Project Evaluation
	General Plan-compliant level of development on the project Site.
Shared and Reduced Parking: Non-Residential: For non-residential projects with anticipated tenant occupants of 24 or less, will the project implement shared and reduced parking strategies that achieves a 10% reduction in emissions from commute VMT? This would not be applicable if the project is a residential project or if the project would accommodate 25 or more tenant-occupants	This measure is primarily for non-residential projects and is not-applicable as the Project principally proposes to establish a residential community with a small commercial/civic use. It is anticipated that the Center House would have as many as 10 employees (one per 500 square feet, conservatively analyzed based on 5,000 square feet of commercial space with no civic uses) but as few as 2 employees. It is noted, however, that the Project will provide designated, preferential parking for electric vehicles and install two level 2 EV charging stations in the common areas. Additionally, the Project is proposing to provide two Electric Vehicles on site for residents to utilize that will reduce conventional gasoline powered miles traveled. The anticipated employee commutes would result in 20 trips per day (10 employees at two trips) at an average trip length of 7.88 miles per the traffic study, and would result in 157.6 miles per day or 57,524 VMT annually. A 10% reduction for all commute-related VMT would be equal to 5,722.4 VMT annually. The installation of the two level 2 EV chargers is anticipated to reduce the annual VMT by 116,800 Vehicle Miles Traveled *(please see Attachment A for more detail).* This more than exceeds the 10% commute related VMT reductions needed.

Consistency Questions	Project Evaluation
Electric or Alternatively-Fueled Water Heating Systems: Residential: For projects that include residential construction, will the project, as a condition of approval, install the following types of electric or alternatively fueled water heating system(s)? Examples of the types of system(s) would be Solar thermal water heater, Tankless electric water heater, Storage electric water heaters, Electric heat pump water heater, Tankless gas water heater or another comparable unit. This would not applicable if the project does not contain any residential uses.	Yes, it is anticipated that the Project's residences will be equipped with tankless electric or gas water heaters. Confirmation of such installation shall be verified at building plan check and compliance with this measure shall be made a condition of the Project's approvals.
Water Efficient Appliances and Plumbing Fixtures: Residential: For new residential projects, will the project comply with all of the following water efficiency and conservation BMPs, including CALGreen Tier 1 residential voluntary measure A4.303 of the California Green Building Standards Code? Kitchen Faucets: The maximum flow rate of kitchen faucets shall not exceed 1.5 gallons per minute at 60 psi. Kitchen faucets may temporarily increase the flow above the maximum rate, but not to exceed 2.2 gallons per minute at 60 psi, and must default to a maximum flow rate of 1.5 gallons per minute at 60 psi (Where complying faucets are unavailable, aerators or other means may be used to achieve reduction). Energy Efficient Appliances: Install at least one qualified ENERGY STAR dishwasher or clothes washer per unit. This would not applicable if the project does not contain any residential uses.	Yes, it is anticipated that the Project's residences will be equipped with water efficient appliances and plumbing fixtures. More specifically, EnergyStar or equivalent appliances are required by the Specific Plan, as well as low-flow bathroom faucets, kitchen faucets, toilets and showers per the applicable version of the CALGreen Code (Cal. Code Regs., Title 24, Part 11). Confirmation of such installation shall be verified at building plan check and compliance with this measure shall be made a condition of the Project's approvals. The maximum flow rate of kitchen faucets shall not exceed 1.5 gallons per minute at 60 psi.
Rain Barrel Installations: Residential: For new residential projects, will the project make use of incentives to install one rain barrel per every 500 square feet of available roof area? This would not applicable if the project is a non-residential project; if State, regional or local incentives/rebates to purchase rain barrels are not available; or if funding for programs/rebates has been exhausted.	Yes, the Project shall submit building plans illustrating that the project would install one rain barrel per every 500 square feet of available roof area provided that State, regional or local incentives/rebates are available to fund the purchase of such rain barrels and roof area is available to feasibly install the barrels.

Consistency Questions	Project Evaluation
Reduce Outdoor Water Use: Residential: Will the project submit a Landscape Document Package that is compliant with the County's Water Conservation in Landscaping Ordinance (http://www.sandiegocounty.gov/content/dam/sdc/cob/ordinances/ord10427.pdf.) and demonstrates a 40% reduction in current Maximum Applied Water Allowance (MAWA) for outdoor use? Non-Residential: Will the project submit a Landscape Document Package that is compliant with the County's Water Conservation in Landscaping Ordinance and demonstrates a 40% reduction in current MAWA for outdoor use? This would not applicable if the project does not propose any landscaping, or if the aggregate landscaped area is between 500 – 2,499 square feet and elects to comply with the Prescriptive Compliance Option within the Water Conservation in Landscaping Ordinance.	The Project shall submit a Landscape Document Package that complies with the referenced County Ordinance and demonstrates a 40 percent reduction in outdoor use. The Landscape Document Package shall be submitted to the County for review and approval prior to issuance of any building permits and compliance with this measure shall be made a condition of the Project's approval.
Agricultural and Farming Equipment: Will the project use the San Diego County Air Pollution Control District's (SDAPCD's) farm equipment incentive program to convert gas- and diesel powered farm equipment to electric equipment? This would not applicable if the project does not contain any agricultural or farming operations; if the SDAPCD incentive program is no longer available; or if funding for the incentive program has been exhausted. Existing agricultural operations would not be subject to this item, unless a proposed expansion is subject to discretionary review and requires environmental review pursuant to CEQA.	The Project does not propose any agricultural or farming operations.

Consistency Questions	Project Evaluation
Electric Irrigation Pumps: Will the project use SDAPCD's farm equipment incentive program to convert diesel- or gas-powered irrigation pumps to electric irrigation pumps? This would not applicable if the project does not contain any agricultural or farming operations; if the SDAPCD incentive program is no longer available; or if funding for the incentive program has been exhausted. Existing agricultural operations would not be subject to this item, unless a proposed expansion is subject to discretionary review and requires environmental review pursuant to CEQA.	The Project does not propose any agricultural or farming operations.
Tree Planting: Residential: For residential projects, will the project plant, at a minimum, two trees per every new residential dwelling unit proposed? This would not applicable if the project is a non-residential project.	Yes, confirmation of the tree plantings required by this measure shall be verified in conjunction with County review of the master landscape plan design and compliance with this measure shall be made a condition of the Project's approvals. Please note: the project will install 2,045 trees, or 4.5 trees per home.
Additional Project Design Features	
See Chapter 1.0 of the EIR (Table 1-2) for a list of additional design features. All Project Design Features (PDFs) will be included as conditions of approval for the Project or are requirements of the Specific Plan; will be monitored as set forth in the PDF as appropriate; any related plans will be prepared as stated, and will have review and approval by County staff prior to implementation.	

Attachment A: Implement shared and reduced parking strategies that achieves a 10% reduction in emissions from commute VMT

The project would install two Level II Chargers. For purposes of this analysis, it's assumed that each charging location would be utilized between 3 and 5 hours per day or an average of 4 hrs. Each Level 2 charging location runs on a 220-volt system and is capable of providing between 6.6 to 19.2 kW of power. For purposes of this analysis a 13.4 kW system will be utilized.

As background to EVs, a standard petroleum-based car is rated in miles per gallon (MPG), Zero Emission Vehicles (ZEVs) such as EV are typically rated in kilowatt hours per 100 miles traveled. The U.S. Department of Energy has developed a mile per gallon gasoline equivalent unit (MPGe) of 0.337 kWh/100 miles traveled (Department of Energy, 2000) or 33.7 kWh to one MPGe. The U.S. Department of Energy estimates that the average fuel economy for ZEVs in 2017 is as high as 136 MPGe for the midsize Hyundai Ioniq, 112 MPGe for the Nissan Leaf, 119 MPGe for the Chevy Bolt and 126 MPGe for the Tesla Model 3.

For purposes of this analysis, a 100 MPGe efficiency was assumed. Given this and the proposed charger, each hour of charging will provide a range of 40 miles and over 365 days would provide 14,600 miles of charge. Using a 4-hour charge time per day, the project would provide charge for 116,800 Vehicle Miles Traveled (VMT) of charging.

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PART I

SUPPLEMENTAL LETTER

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July 12, 2018

RCS Harmony Partners, LLC
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San Diego, CA 92106

RE: Global Climate Change Supplemental Letter – Harmony Grove Village South Residential Development (PDS2015-GPA-15-002) County of San Diego, CA

Background

This letter will serve to augment the DEIR's evaluation of the potential environmental impacts associated with the proposed Project's emissions of greenhouse gases (GHG) in response to the recent court decision described below and to the public comments received asserting that greater emission reductions should be required for new development. This Supplemental letter is based on information provided in the original GHG Study prepared by Helix Environmental Planning, dated April 2017 ("Global Climate Change Study") and other information found in the DEIR that was circulated for public review from April 20, 2017 to June 20, 2017.

During this public review period of the Project's Draft EIR, the Superior Court in Sierra Club v. County of San Diego, Case No. 2012-0101054/ Golden Door Properties LLC v. County of San Diego, Case No. 2016-0037402 (April 28, 2017) ruled that the 2016 Guidance Document and its "County Efficiency Metric" may not be used to provide the basis for CEQA review of GHG impacts for development proposals within the unincorporated County lands. Comments were also received objecting to the use of the "County Efficiency Metric." As a result, this Supplemental Letter was prepared to utilize the significance criteria in Appendix G of the CEQA Guidelines related to GHG emissions to evaluate the project's GHG emissions resulting from both the project's construction/vegetation and operational changes in emissions.

In addition, comments received during public review asserted that new development projects should provide significantly greater emission reductions than merely meeting a statewide target. Therefore, in response to these comments, the Project applicant has decided to reduce Project emissions to "net zero" (i.e., no net GHG emissions) by purchasing off-site carbon credits. The Project's commitment to achieve net zero GHG emissions, made enforceable through mitigation as described below, would be realized through the purchase

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and retirement of off-site carbon offsets; this framework would ensure that the project results in achieving carbon neutrality (i.e., no net GHG emissions)

The Global Climate Change Study originally concluded that, before the implementation of mitigation measures, the project would generate a total of approximately 3,682 Metric Tons (MT) CO2e from construction. Additionally, the study concluded that operationally, after the removal of the amortized annual construction emissions anticipated for the Project of 184 MT CO2e, the project would generate approximately 5,088 MT CO2e each year at full project buildout in the year 2021 with the incorporation of the project design features that are listed on EIR Table 2-1 as well as in EIR Chapter 7.0, List of Mitigation Measures and Project Design Features ("Project Design Features"); including installing only natural gas hearths, waste divergence, energy efficient appliances, and solar panels to off-set 100% energy use.

As concluded in the Global Climate Change Study, after analyzing and requiring all reasonable and feasible on-site mitigation measures for avoiding or reducing GHG-related impacts, it was determined that no additional mitigation measures were needed to achieve an efficiency ratio of 4.6 MT CO2e/year/service population and maintain a less-than-significant level of GHG emissions.

This Supplemental Letter concludes that, after incorporation of all current regulatory reductions and the design features (described below), the project would generate approximately 4,411 MT CO2e during construction. This is based upon the Global Climate Change Study construction emissions of 3,682 MT CO2e and a one-time vegetation loss during construction of 729 MT CO2e that is described in more detail below. Additionally, the Global Climate Change Study concluded that the project would generate 5,088 MT CO2e annually during operations at full buildout with the incorporation of the Project Design Features. Table 9 of the Global Climate Change Study shows total operational emissions of 5,272 MT CO2e, this included amortized construction emissions of 184 MT CO2e. The amortized construction emissions were removed because the project will purchase off-site carbon offsets to reduce the project's GHG emissions to achieve net zero when the emissions would occur, so no amortization is required.

One comment received during public review of the Draft GHG technical report identified an error in trip category lengths on Table 4.3 in Appendix A of EIR Appendix J. This was corrected in response to the comment and was used to produce this supplemental analysis and the revised data are included here as ***Attachment C***. It was concluded based on this modeling update that the operational emissions would be 5,222 MT CO2e annually at full

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buildout with the incorporation of the Project Design Features as opposed to the original 5,088 MT CO2e. More detail on the updated operational emmisions is provided below.

As explained above, the project applicant has committed to reducing the Project's emissions to net zero by purchase and retire off-site carbon offsets to reduce the project's GHG emissions to net zero. This shall be required through Mitigation Measures GHG-1 and GHG-2.

The project applicant has committed to achieving carbon neutrality (i.e., no net GHG emissions). To reflect this commitment, mitigation measures GHG-1 and GHG-2 have been added to the Final EIR, which require the purchase of off-site carbon offsets. The project will purchase and retire GHG offsets to reduce the project's GHG emissions to net zero as described below.

Through the purchase of carbon credits, construction and operationally related GHG emissions the mitigated project would result in no net increase to the existing GHG emissions, the project would not have a substantial contribution to a cumulatively considerable GHG impact. The project's commitment to achieve net zero GHG emissions also ensures that the project would not conflict with applicable plans, policies or regulations adopted for the purpose of reducing GHG emissions. In summary, with the projects additional commitment to purchase and retire off-site carbon offset credits to reduce the project's GHG emissions to net zero, the project would not result in a significant impact to global climate change.

CEQA Thresholds of Significance

A number of agencies throughout the state, including multiple air districts, have drafted and/or adopted varying threshold approaches and guidelines for analyzing GHG emissions and global climate change in CEQA documents. The State of California has developed guidelines to address the significance of climate change impacts based on Appendix G of the CEQA Guidelines, which contains two significance criteria for evaluating GHG emissions of a project.

A project would have a significant environmental impact if it would:

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

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The two questions were intended to satisfy the Legislative directive in Public Resources Code Section 21083.05 that the effects of GHG emissions be analyzed under CEQA. Similarly (as indicated in the Global Climate Change Study), CEQA Guidelines Section 15064.4 states that the "determination of the significance of greenhouse gas emissions calls for a careful judgment by the lead agency consistent with the provisions in section 15064. A lead agency should make a good-faith effort, based to the extent possible on scientific and factual data, to describe, calculate or estimate the amount of greenhouse gas emissions resulting from a project." Section 15064.4(b) further states a lead agency should consider the following non-exclusive list of factors when assessing the significance of GHG emissions:

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

CEQA Guidelines Section 15064(h)(1) states that "the lead agency shall consider whether the cumulative impact is significant and whether the effects of the project are cumulatively considerable." A cumulative impact may be significant when the project's incremental effect, though individually limited, is cumulatively considerable. As discussed above, climate change results from incremental contributions of GHG emissions on a global scale. The analysis contained herein relies upon Appendix G of the CEQA Guidelines as the threshold of the significance for evaluating the environmental effects of the GHG emissions of the project.

Discussion

Project buildout was anticipated to be in 2021 and the proposed start date for construction of the project was anticipated to begin in the 2018; the dates are retained because they result in conservative modeling as GHG emissions would improve over time as stricter regulations are adopted. The original construction emissions modeling contained in the Global Climate Change Study remains the same. The construction equipment, intensity, and duration will also remain the same and are based on the original modeling in the Global Climate Change Study.

Consistent with the above description, full operation of the Project also is not expected to occur until the year 2021. Therefore, at a minimum, the project would: be required to comply

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with the 2016 Title 24 Energy Code (which went into effect January 1, 2017); the 2016 CALGreen Building Code (Part 11 of Title 24);; and prepare a Construction and Demolition Debris Management Plan in compliance with Sections 68.508 through 68.518 of the County of San Diego Municipal Code (which requires 90 percent of inerts and 70 percent of all other materials to be recycled).

Vegetation, as it grows, collects carbon from the air and stores it in the leaves, stems, and roots. A project that changes the existing land use type, with respect to vegetation, can result in changes in CO_2 sequestration from the atmosphere. CalEEMod has general sequestration numbers that can be used to estimate the amount of CO_2 that either is gained or lost from vegetation-based sequestration, depending on the project.

The existing site conditions generally are non-native grass land, scrubs and a small mix of woodlands and riparian areas according to the project's Biological Technical Report (HELIX, April 2017). The project's Specific Plan provides for trees to be planted on slopes, along streets, within HOA open space areas, and around all perimeters of the project to visually buffer the community from view. Relatedly, site landscape shall require the approval of a Landscape Plan(s) from the County's Planning & Development Services Department; the plan(s) shall comply with the landscape provisions of the project's Specific Plan, County's Water Conservation in Landscape Ordinance, the Water Efficiency Landscape Design Manual, and other applicable regulatory standards. Native trees and shrubs, such as sycamores, oaks, madrone, currant and toyon as well as local apricot, lemon, orange, guava, and avocado, may be planted along parkways.

CalEEMod uses the IPCC's protocol for vegetation sequestration calculations. Based on this, the model estimates how much CO_2 newly planted trees will sequester and reports the sequestration as a one-time carbon-stock change. Per the IPCC, trees sequester CO_2 while they are actively growing and the one-time stock is based on a 20-year lifecycle. The IPCC concludes that a tree's ability to sequester carbon decreases significantly after 20 years and credit after 20 years is not applied. By this logic, removing trees in excess of 20 years and replacing them with the same number of comparable new trees would prolong the sequestration process.

During the construction phases, the project would remove approximately 80.4 acres of vegetation on the project site. Helix Environmental Planning incorporated the vegetation removal into CalEEMod. The results are provided in more detail in ***Attachment A*** to this report. As calculated by Helix Environmental Planning, the project's removal of existing

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vegetation on the 80.4 acres would result in approximately 729 MT CO_2e of sequestered carbon from vegetation. Therefore, the project's construction-related emissions would total approximately 4,411 MT CO_2e (3,682 plus 729) as shown in Table 1. According to the Project's Landscape Plans, the project also would plant a minimum of 2,045 new trees during the construction phase. Helix Environmental Planning incorporated the proposed tree plantings into CalEEMod. It should be noted, for purposes of this analysis, carbon sequestration credit for the new trees planted was not taken. For disclosure purposes only, CalEEMod estimates that the new tree plantings would sequester approximately 1,448 MT CO_2e.

The Global Climate Change Study utilized CalEEMod to determine the Project's operational emissions from area, energy, mobile, solid waste and water uses. The project's proposed land uses, as modeled within the Global Climate Change Study, are shown in Table 2 below. The Global Climate Change Study, identified the Project Design Features the project would implement to reduce GHG emissions during operations, such as: a 2 dual-port Level 2 EV charging station (serving 2 parking spaces) at the Center House, incorporating water conservation measures (including the 2016 CALGreen mandate to reduce water consumption by 20 percent), installation of the low-flow water features, and the use of drought-tolerant landscape as shown in the executive summary of the Global Climate Change Study.

For purposes of providing additional information to augment the findings of the Global Climate Change Study pertaining to the operational emissions of the Project, ConSol, a building energy efficiency consultant, was retained to calculate the residential energy demand for the project. ConSol modeled the energy demand of prototype residences with CEC's public-domain compliance software, known as California Building Energy Code Compliance – Residential. The objective of the ConSol report is to calculate the annual energy use with options that achieve: (i) compliance with the 2016 Title 24 Standards (California's Energy Code) and (ii) Zero Net Energy (ZNE) standards as defined in the California Energy Commission's (CEC's) 2015 Integrated Energy Policy Report. The ConSol analysis also calculates the estimated size of a rooftop solar photovoltaic (PV) system that would produce the amount of electricity required for each building to achieve 100% offsets of all fuel uses, based on Time Dependent Valuation (TDV) values, thus achieving ZNE.

The ConSol modeling uses the CEC's public-domain compliance software, California Building Energy Code Compliance – Residential (CBECC-Res), which calculates Title 24 compliance and annual energy use. The estimated energy use of each prototype was calculated for both a code-based compliance scenario and a Zero Net Energy attainment scenario. ConSol's report also separates both electrical and natural gas demand into regulated and unregulated loads. Regulated loads are attributed to sources such as heating, cooling and water heating.

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Unregulated loads are attributed to interior and exterior lighting, appliances, cooking and other plug loads. ConSol's report is provided as ***Attachment B*** to this report.

ConSol's ZNE attainment scenario, assumed that each of the residential prototypes was designed in accordance with the CEC's definition of ZNE. Based on ConSol's analysis, the project's residences can achieve ZNE through a combination of energy efficiency enhancements to the building envelope and regulated loads, and the provision of on-site solar. Therefore, the design feature to off-set 100% of the energy usage provided in the Global Climate Change Study is achievable. Additionally, according to ConSol's report, the project could also off-set all the natural gas energy use with an increased solar system. The Global Climate Change Study determined that the natural gas usage would result in approximately 308 MT CO2e. It should be noted, for purposes of providing a conservative analysis, ZNE credit for the reduction of natural gas emissions was not taken in this analysis.

For simplicity, a summary of the GHG emissions from the Global Climate Change Study is provided in Table 1 along with the sequestration emissions associated with vegetation removal, included as part of the construction emissions of the project. After incorporation of all reductions from the Global Climate Change Study and the Project Design Features, the project would generate a total of 4,411 MT CO2e during construction (based upon the original construction emissions modeling contained in the Global Climate Change Study and a one-time vegetation loss during construction of 729 MT CO2e).

As stated above, a comment received during public review of the Draft GHG technical report identified an error in trip category lengths on Table 4.3 in Appendix A of EIR Appendix J. This was corrected in response to the comment and was used to produce this supplemental analysis It was concluded based on modeling updates conducted in November 2017 that the operational emissions would be 5,222 MT CO2e annually at full buildout with the incorporation of the Project Design Features such as installing only natural gas hearths, waste divergence, energy efficient appliances, and solar panels to off-set 100% energy use. as opposed to the original 5,088 MT CO2e. The increase in operational emissions was due to a slight deviation in the project's mobile emissions from an adjustment on the trip length. The updated operational emissions are provided in Table 1 and the updated CalEEMod results are provided as ***Attachment C*** to this letter.

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Table 1: Expected Mitigated Operational Emissions Summary MT/Year[1]

CO_2e Generator	Total Project CO_2e Emissions (Metric Tons)
Operational Emissions Total after Reductions	**5,222[1]**
Total Construction Emissions and Vegetation Removal	**4,411[1,2]**

[1] Source: Harmony Grove Village South CalEEMod modeling update provided in Attachment C*, Helix Environmental Planning, November 2017

[2] Harmony Grove Village South Sequestration Memorandum, Helix Environmental Planning, August 2017

*Attachment C provides the following information:

1. Pages 1 through 45 reflect changes resulting from the correction made to the trip generation data shown in Table 4.3 and on; updated from Appendix A of EIR Appendix J.
2. The Emission Reduction Adjustments have been updated to reflect changes in item 1 above. This was Appendix B to EIR Appendix J.

After analyzing and applying all reasonable and feasible on-site project design features and strategies recommended by CARB in the Scoping Plan Second Update, provided in ***Attachment D*** of this report, Project applicant has determined that additional off-site mitigation measures can further reduce impacts from GHG emissions to a less-than-significant level, through the purchase of off-site carbon offset credits.

In November 2017, CARB released *California's 2017 Climate Change Scoping Plan* (*Second Update*) for public review and comment (CARB, 2017). CARB's Governing Board adopted the *Second Update* in December 2017. Appendix B of Scoping Plan Second Update identified examples of on-site project design features, mitigation measures and direct regional investments that may be utilized to minimize GHG emissions from land use development projects. CARB states that Appendix B "should be viewed as a general reference document;" it "should not be interpreted as official guidance or as dictating requirements." CARB also provides the following caveat:

> "[n]ot all of the listed local measures or CEQA measures listed will be relevant to, or appropriate for, a given area or project. Nothing in the Scoping Plan or this appendix limits the discretion conferred to lead agencies in determining the appropriate level and type of mitigation, so long as their decisions are supportable by evidence in the record as required by CEQA. There is no 'one size fits all' solution and different policies will be more suitable in urban and suburban areas versus rural areas, among other considerations."

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Attachment D to this Supplemental Letter provides an assessment of the mitigation measures referenced in Appendix B of Scoping Plan Second Update as applied to the Project. After analyzing and applying all of the reasonable and feasible on-site project design features and strategies recommended by CARB in the Scoping Plan Second Update, the County has determined that, additional off-site measures can further reduce impacts from GHG emissions to a less-than-significant level, through the purchase of off-site carbon offset credits. In order to be conservative, no emission reductions were taken for any project design features described in ***Attachment D*** to this Report that was added or augmented from what was identified in the Global Climate Change Study.

CARB recommended that lead agencies prioritize on-site design features and direct investments in GHG reductions in the vicinity of the project to help generate real demand side benefits and local jobs. However, CARB also recognized that it may be appropriate to mitigate project emissions through purchasing and retiring carbon credits issued by a recognized and reputable, accredited carbon registry when on site measures or regional investments are infeasible or non-effective. Similarly, the CEQA Guidelines Section 15126.4(c) recognizes that in appropriate situations, off-site mitigation, which may include purchased offsets, may be used as mitigation for GHG emissions.

The project shall be conditioned to implement the following mitigation measures:

GHG-1 Prior to issuance of the first grading permit, the applicant shall provide evidence to the County of San Diego (County) Planning & Development Services (PDS) that they have purchased and retired carbon credits, in the amount of 4,411 MT CO2e (note: this number reflects all the construction-related GHG emissions after applying all Project Design Features and reductions along with a one-time vegetation loss) pursuant to the performance standards and requirements described below. Construction emissions include all grading, site preparation, vegetation removal, worker trips, building construction and architectural coatings related to GHG emissions.

i. The carbon offsets that are purchased to reduce GHG emissions as described in this measure shall achieve real, permanent, quantifiable, verifiable, and enforceable reductions as set forth in Cal. Health & Saf. Code Section 38562(d)(1).

ii. One carbon offset credit shall mean the past reduction or sequestration of one metric ton of carbon dioxide equivalent that is "not otherwise required" (CEQA Guidelines section 15126.4(c)(3)).

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iii. Carbon offsets shall be purchased through a CARB-approved registry, such as the Climate Action Reserve, American Carbon Registry, or Verified Carbon Standard. If no CARB-approved registry is in existence, then the applicant or its designee shall purchase off-site carbon offset credits from any other reputable registry or entity, to the satisfaction of the Director of PDS.

iv. The County will consider, to the satisfaction of the Director of PDS, the following geographic priorities for GHG reduction features, and off-site carbon offset projects: 1) project design features/on-site reduction measures; 2) off-site within the unincorporated areas of the County of San Diego; 3) off-site within the County of San Diego; 4) off-site within the State of California; 5) off-site within the United States; and 6) off-site internationally.

GHG-2 Prior to the County's issuance of building permits for each implementing Site Plan ("D" Designator), the project applicant or designee shall provide evidence to PDS (consisting of documentation from the issuing registry or a County-approved third party verifier) that the Project applicant or designee has purchased and retired carbon offsets for the incremental portion of the project within the Site Plan in a quantity sufficient to offset, for a 30- year period, the operational GHG emissions from that incremental amount of development to net zero, consistent with the performance standards and requirements set forth below.

The amount of carbon offsets required for each implementing Site Plan shall be based on the GHG emissions for each land use within the implementing Site Plan, as identified in the Table 2 below. The project's operational emissions would be 5,222 MT CO2e at the time of full buildout. Therefore, the project shall be required to reduce the annual emissions by 5,222 MT CO2e/year for a 30-year period (project life) or a total of 156,660 MT CO2e. The "project life" is 30 years, which is consistent with the methodology used by the South Coast Air Quality Management District's GHG guidance (SCAQMD 2008). The project applicant shall include in each implementing Site Plan a tabulation that identifies the overall carbon offsets required to mitigate the entire project's GHG emissions, the amount of carbon offsets purchased to date, and the remaining carbon offsets required to reduce the project's emissions to net zero.

i. The carbon offsets that are purchased to reduce GHG emissions as described in this measure shall achieve real, permanent, quantifiable, verifiable, and enforceable reductions as set forth in Cal. Health & Saf. Code Section 38562(d)(1).

ii. One carbon offset credit shall mean the past reduction or sequestration of one metric ton of carbon dioxide equivalent that is "not otherwise required" (CEQA Guidelines section 15126.4(c)(3)).

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iii. Carbon offsets shall be purchased through a CARB-approved registry, such as the Climate Action Reserve, American Carbon Registry, or Verified Carbon Standard. If no CARB-approved registry is in existence, then the applicant or its designee shall purchase off-site carbon offset credits from any other reputable registry or entity to the satisfaction of the Director of PDS.

iv. The County will consider, to the satisfaction of the Director of PDS, the following geographic priorities for GHG reduction features, and off-site carbon offset projects: 1) project design features/on-site reduction measures; 2) off-site within the unincorporated areas of the County of San Diego; 3) off-site within the County of San Diego; 4) off-site within the State of California; 5) off-site within the United States; and 6) off-site internationally.

Table 2 represents the proposed project operational emissions by individual land use category following implementation of project-specific GHG reduction features based on the updated CalEEMod modeling conducted by Helix Environmental Planning, November 2017. The emissions for each land use are taken directly from the CalEEMod outputs.

Table 2: Operational GHG Emissions and Off-Site Carbon Offsets per Land Use[1]

CO_2e Generator	Single Family CO_2e Emissions (Metric Tons)	Multi Family CO_2e Emissions (Metric Tons)	Center House CO_2e Emissions (Metric Tons)	Park CO_2e Emissions (Metric Tons)	WTWRF Generators CO_2e Emissions (Metric Tons)
Area	135.55	182.60	3.51	7.02	--
Electricity	--	--	--	--	--
Natural Gas	182.47	123.23	0.47	--	--
Mobile Emissions	1,792.20	2,414.36	-	--	--
Waste	25.74	13.60	0.60	0.01	--
Water	79.17	106.65	2.31	5.35	--
WTWRF Operations	--	--	--	--	147.0[2]
Total with Reductions	**2,215.13**	**2,840.44**	**6.89**	**12.39**	**147.00**
Percent of Emissions	**42.42%**	**54.40%**	**0.13%**	**0.24%**	**2.82%**
Carbon Offset Needed	**2,215.13**	**2,840.44**	**6.89**	**12.39**	**147.00**
Number of Units	**193**	**260**	**1**	**1**	**1**
Carbon Offset per Unit/Use	**11.48**	**10.92**	**6.89**	**12.39**	**147.00**

[1] Source: Harmony Grove Village South CalEEMod modeling update, HELIX, November 2017; see EIR Tables 2.7-3 and 2.7-4.
[2] Emissions are based on annual usage per CalEEMod (HELIX, 2017).

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All the Project Design Features are identified in Subchapter 2.7 of the EIR, as revised, and shall be applied. (See also EIR Table 1-2, Project Design Features, as well as in EIR Chapter 7.0, List of Mitigation Measures and Project Design Features.)

Consistency with SANDAG's San Diego Forward: The Regional Plan

Regarding consistency with SANDAG's RTP/SCS, the project would include site design elements and project design features developed to support the policy objectives of the RTP and SB 375. The Project would implement land use and design measures that would create an environment that promotes alternative mode choice (e.g., pedestrian/bicycle networks and proximity to bus routes). The design of the project is based on a compact neighborhood design, where pedestrian and bicycle path provide access to the community facilities such as parks and clubhouse as well as the proposed bike lane and pathway.

As a design feature, the developer will provide to all homeowners an informative brochure to educate homeowners regarding water conservation measures, recycling, location of the electric vehicle charging stations and conduits, location of outdoor electric outlets to promote using electrical lawn and garden equipment, and location of nearby resources such as dining and entertainment venues, small commercial centers, and civic uses to reduce vehicle miles traveled. The Project will encourage daily physical activity associated with walking and bicycling, by providing public riding and hiking trails as well as creating a public place for the community to gather and have access to cultural activities at the proposed park and Center House, which will include many health and physical training activities. The project will include sidewalks/pathways throughout the site. Given the preservation of approximately 70% of the project site as open space, the proposed trail system will allow the future residents to enjoy the preserve and open space areas while engaging in physical activity and recreational benefits.

Plan Consistency Evaluation

Because the project would not increase net GHG emissions above existing levels following implementation of the Project Design Features and mitigation measures GHG-1 through GHG-2, above, the project would not conflict with any local or state plans, policies, or regulations adopted for the purpose of reducing GHG emissions. However, for information purposes, the following provides additional discussion of plans, policies, and regulations adopted for the purpose of reducing GHG emissions and the determination that the project does not conflict with such plans, policies, or regulations.

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Consistency with Relevant General Plan Policies

This discussion analyzes the project's potential to conflict with an applicable plan. The County of San Diego's General Plan contains various goals, policies, and objectives related to the reduction of GHG emissions and global climate change. The project's consistency with specific General Plan Conservation and Open Space Element policies is provided below in Table 3.

Table 3: County General Plan Policies

Policy	Project Consistency
COS14.3 Sustainable Development. Require design of residential subdivisions and nonresidential development through "green" and sustainable land development practices to conserve energy, water, open space, and natural resources.	*Consistent*. As discussed, the Project includes many Project Design Features to reduce energy and water use.
COS14.7 Alternative Energy Sources for Development Projects. Encourage development projects that use energy recovery, photovoltaic, and wind energy.	*Consistent*. Renewable energy would supply 100 percent of the Project's electricity needs through the required installation of rooftop solar PV panels (a photovoltaic solar system) on all residential units and the Center House, within the Project site, as well as the WTWRF if located within the Project site.
COS14.10 Low Emission Construction Vehicles and Equipment. Require County contractors and encourage other developers to use low-emission construction vehicles and equipment to improve air quality and reduce GHG emissions.	*Consistent*. All project-related construction equipment would be required to meet Tier 3 emissions standards.
COS15.1 Design and Construction of New Buildings. Require that new buildings be designed and constructed in accordance with "green building" programs that incorporate techniques and materials that maximize energy efficiency, incorporate the use of sustainable resources and recycled materials, and reduce emissions of GHGs and toxic air contaminants.	*Consistent*. The Project proposes sustainability and efficiency features consistent with Title 24, Part 6 of the California Code of Regulations (2016) requirements.
COS15.4 Title 24 Energy Standards. Require development to minimize energy impacts from new buildings in accordance with or exceeding Title 24 energy standards.	*Consistent*. The Project proposes implementing energy efficiency features that would meet 2016 Title 24 standards.
COS17.1 Reduction of Solid Waste Materials. Reduce GHG emissions and future landfill capacity needs through reduction, reuse, or recycling of all types of solid waste that is generated. Divert solid waste from landfills in compliance with State law.	*Consistent*. Areas for storage and collection of recyclables and yard waste would be provided.
COS17.2 Construction and Demolition Waste. Require recycling, reduction and reuse of construction and demolition debris.	*Consistent*. The Project would prepare a Construction Debris Management Plan that complies with Section 68.508-68.518 of the County Municipal Code and would divert at least 90 percent of inerts and 70 percent of construction waste from landfills through reuse and recycling.

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Conclusion

With implementation of the identified design features described in the EIR and with the addition of GHG-1 and GHG-2 described above, the project's net GHG emissions would be reduced to zero. With the incorporation of the project design features that will be conditions of approval for the Project and mitigation measures GHG-1 and -2, the project would have no net increase in GHG emissions, as compared to the existing environmental setting (see CEQA Guidelines Section 15064.4(b)(1)). Because the mitigated project would have no net increase in the GHG emissions level, the project would not generate GHG emissions that may have a significant impact on the environment. Further, the project would not result in a considerable contribution to cumulative global GHG emissions. The project would not conflict with any adopted and applicable local or state plans, policies or regulations to reduce GHG emissions.

The project complies with the CARB's Second Update to the Scoping Plan, which states that "achieving no net additional increase in GHG emissions, resulting in no contribution to GHG impacts, is an appropriate overall objective."

Sincerely,
Ldn Consulting, Inc.

Jeremy Louden, Principal

References

California Energy Commission. (2015, June 3). Retrieved from http://www.energy.ca.gov/title24/2016standards/rulemaking/documents/15-day_language/impact_analysis/2016_Impact_Analysis_2015-06-03.pdf
CAPCOA. (August 2010). *Quantifying Greenhouse Gas Mitigation Measures.*
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HELIX. (April 2017). *Harmony Grove Village South Biological Technical Report.*

Attachments

Attachment A: Sequestration Calcualation and Memorandom (Helix, 2017)
Attachment B: Harmony Grove Village South Energy Report (ConSol)
Attachment C: Updated CalEEMod modeling results (Helix, 2017)
Attachment D: Climate Change Scoping Plan Recommend Mitigation Measures

ATTACHMENT A

HARMONY GROVE VILLAGE SOUTH PROJECT

SEQUESTRATION ANALYSIS - HELIX

Memorandum

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Date: August 31, 2017

To: David Kovach, Kovach Group of Companies

Cc:

From: Joanne Dramko, AICP, HELIX Environmental Planning, Inc.
Victor Ortiz, HELIX Environmental Planning, Inc.

Subject: Sequestration Analysis for the Harmony Grove Village South Project

HELIX Proj. No.: KOV-01

Message:

Development under the Project would result in changes in CO_2 sequestration from the atmosphere, first by removing existing vegetation on site and second by the planting of new trees. To ensure the Project GHG emissions are fully offset to zero, emissions from this land use change have been estimated according to the Intergovernmental Panel on Climate Change (IPCC) protocol for carbon accumulation. The one-time loss through the removal of existing vegetation is estimated by multiplying the acreage of vegetated land to be removed by CO_2 accumulation rates published by the IPCC. Table 1, *One-Time Carbon Loss Through Land Use Change*, presents the estimate of CO_2 released into the atmosphere through the removal of existing vegetation. Vegetated acreages were obtained from Table 2.3-4 of the DEIR.

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HELIX Environmental Planning

Table 1
ONE-TIME CARBON LOSS THROUGH LAND USE CHANGE

Vegetation Community	Acres Impacted[1]	CO_2 Accumulation per Acre (MT CO_2/acre)[2]	Total CO_2 Lost (MT)
Non-native vegetation (11000)	0.9	6.2	5.6
Disturbed habitat (11300)	3.9	4.3	16.8
Diegan coastal sage scrub (32500)	10.4	14.3	148.7
Coastal sage-chaparral transition (37G00)	4.5	14.3	64.4
Southern mixed chaparral (37121)	15.6	14.3	223.1
Non-native grassland (42200)	44.2	4.3	190.5
Southern [willow] riparian forest (61300)	0.71	111	78.8
Coast live oak woodland (71160)	0.2	6.2	1.2
		TOTAL	**729.1**

Notes:
[1] Table 2.3-4 of the DEIR
[2] CalEEMod Appendix A

Planting trees will sequester CO_2 and is considered to result in a one-time carbon-stock change. Trees sequester CO_2 while they are actively growing. Total sequestered CO_2 is calculated by multiplying the number of trees by the annual CO_2 accumulation rate per year and the total active growing period. Table 2, *Carbon Sequestered by New Trees*, presents the estimate of CO_2 to be sequestered by the new trees planted on the project site. The number of new trees was provided by the landscape architect for the Project (Project Design Consultants 2017). Note that this estimate includes tree plantings only and does not account for other re-vegetation that the Project would provide; therefore, the estimate of CO_2 sequestration is conservative. The CO_2 accumulation rate and active growing period were obtained from the IPCC protocol.

Table 2
CARBON SEQUESTERED BY NEW TREES

New Trees[1]	MT CO_2 Accumulated per Tree per Year[2]	Active Growing Period (years)	Total CO_2 Sequestered (MT)
2,045	0.0354	20	1,448

Notes:
[1] Project Design Consultants, Harmony Grove Village South Carbon Sequestration Analysis, August 2017.
[2] CalEEMod Appendix A

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As demonstrated in Tables 1 and 2, development of the Project would result in the one-time loss of 729 MT CO_2 and the additional sequestration of 1,448 MT CO_2 through the planting of new trees. The Project's change in vegetation would result in a net carbon sink sequestering an additional 719 MT CO_2 over the life of the Project.

Sincerely,

Victor Ortiz
Air Quality Specialist

Joanne M. Dramko
Senior Technical Specialist

ATTACHMENT B

HARMONY GROVE VILLAGE SOUTH

BUILDING ANALYSIS - CONSOL

HARMONY GROVE VILLAGE SOUTH

Building Analysis (August 2017)

An estimation of annual energy use and PV production for two sample residential buildings designed to comply with 2016 California Energy Code and the California Energy Commission's Zero Net Energy definition from the 2015 Integrated Energy Policy Report.

CONSOL

Contents

EXECUTIVE SUMMARY

This report analyzes a sample design for a single-family residence (SFR) and a sample design for a multi-family residence (MFR), representing a typical home and a typical multi-family building, for the proposed Harmony Grove Village South (HGVS) master planned community in North San Diego County. Sample residences are used for this analysis as building plans have yet to be developed for the site.

The objective of this report is to calculate the annual energy use when each building is configured with options that achieve: (i) compliance with the 2016 Title 24 Standards (California's Energy Code) and (ii) Zero Net Energy (ZNE) as defined in the California Energy Commission's (CEC's) 2015 Integrated Energy Policy Report (2015 IEPR). This analysis also calculates the estimated size of a rooftop solar photovoltaic (PV) system that would produce the amount of electricity required for each building to achieve ZNE. In this analysis, total estimated annual energy use (in kWh and therms) was calculated for each of the prototype residences. This estimate includes "regulated loads" (space heating, space cooling, and water heating) and "unregulated loads," such as plug-in uses, which are not regulated by Title 24.

The sample building configuration used in this analysis for the single-family detached residence is a 1,815 square foot, two-story home. The multi-family residence is a 22,950 square foot, three-story building, with 15 flat units. The plans for all buildings were taken from ConSol's library of building plans[1].

As a result of discussion between ConSol and the client, it was decided not to model a prototype similar to the HGVS Center House. The Center House is proposed to be a 5,000 square foot, single story community use building, which would mean moderate estimated energy consumption and plenty of roof space for a PV system to offset energy use. Being a public building means there is the possibility of using parking areas for solar canopies if need be. It was assumed, with the information available at this time, that the building should be able to easily meet a ZNE requirement.

Residential Assessment

Methods and Assumptions

After reviewing the conceptual plans and the specifications for the proposed buildings in the Harmony Grove Village South (HGVS) community, ConSol chose prototype buildings to model from their library of plans. ConSol chose to model a 2 story 1,815 sf single family home, and a 3 story, 15 unit multi-family building. The prototype single family home was selected to represent an average residential product type available in HGVS community. A 2 story house of this size would give a conservative estimate of meeting the energy consumption of the home with a rooftop PV system. In other words, an 1800 square foot 2

[1]The HGVS community would result in a variety of detached, single-family residential product types that may range from approximately 1,300 to 2,700 square feet. The prototype residence studied in this report was selected to represent an average residential product type, providing a reasonable representation of building energy consumption for purposes of the community's environmental analysis and specifically the estimation of the community's greenhouse gas emissions in the utilized modeling platform (the California Emissions Estimator Model). Similarly, the 22,950 sf, 15 unit multi-family building studied in this report was selected to represent a multi-family building product type in the community's development plan that will present challenges for reaching ZNE.

story home may have somewhat less roof space available for solar than a one story home of the same size, and less than a larger 2 story home. The assumption is that if this home can accommodate enough rooftop PV, then some of the less challenging home designs will easily meet the ZNE requirement. The size of the prototype home also provides a reasonable representation of typical building energy consumption for the purposes of the HGVS environmental analysis.

The prototype multi-family building was selected to represent one of the multi-family building configurations within the HGVS community. The multi-family prototype modeled represents a more challenging building design, with regards to reaching ZNE. A 3 story, 15 unit building has a small amount of roof space in relation to a larger number of individual living units within the building. In other words, 15 individual units means each unit will have its own appliances, heating and cooling, etc., as opposed to a building of the same size which might contain 6 or 8 townhomes, having fewer appliances, etc. The assumption is that if this multi-family building can accommodate enough rooftop PV to reach ZNE, then some of the less challenging multi-family designs will easily meet the ZNE requirement. The configuration of this building also provides a reasonable representation of typical multi-family building energy consumption for the purposes of the HGVS environmental analysis.

ConSol modeled the prototype residences using the CEC's public-domain compliance software, California Building Energy Code Compliance – Residential (CBECC-Res), which calculates Title 24 compliance and annual energy use. The residential building was modeled in Climate Zone 10 (Escondido).

In the software, the unregulated loads are set inputs determined by the CEC and based upon standard occupancy assumptions. These assumptions are detailed in the *HERS Technical Manual*[2] and the more recent *Plug Loads and Lighting Modeling* study.[3] Because these calculations cannot be modified by the user, CBECC produced the same unregulated energy use for both the home modeled to comply with the 2016 Standards and the home modeled to reach ZNE. The rounding function in the software causes slight differences in the total kWh from one model to the other, but these differences are not significant.

ConSol modeled the buildings using energy efficiency features that California builders are most likely to use to achieve compliance with the 2016 BEES. The features used in the calculations were selected based on common industry practices, ConSol's experience with builder preferences, and cost-effectiveness. Code compliance is based on the CEC's 2016 Time Dependent Valuation (TDV) energy metric. Time Dependent Valuation energy assigns greater value to electricity produced or consumed at peak periods. This report will refer to Proposed Design TDV energy, which is the projected TDV energy consumed by the residence when modeling the proposed features thereby increasing the energy efficiency of the building. The Proposed Design TDV energy will be compared to the Standard Design TDV energy, which is the projected TDV energy consumed by the building when the residence meets the prescriptive requirements listed in Table 150.1-A (Package A) of the 2016 California Energy Code. For a building to be code compliant, the proposed design TDV energy must be less than the standard design TDV energy.

[2] http://www.energy.ca.gov/2008publications/CEC-400-2008-012/CEC-400-2008-012-CMF.PDF
[3] http://www.bwilcox.com/BEES/docs/Rubin%20-%202016%20T24CASE%20Report%20-%20Plug%20Load%20and%20Ltg%20Modeling%20-%20June%202016.pdf

The prototype residence was modeled using the 2016 TDV values. The 2019 code is proposing different TDV values that may cause an increase in the PV system size needed to reach ZNE. During development and build-out, the project should consider additional information regarding the achievement of ZNE as it becomes available.

An additional model was created to achieve compliance with the ZNE definition in the 2015 IEPR. An estimated increased efficiency above the 2016 code is intended to represent efficiency improvements likely to be included in a Zero Net Energy home design. In this report, an 11% increase in the TDV efficiency of the ZNE model over the model that meets the 2016 code is shown and represents an assumption of the energy efficiency requirements that may be seen in the next code cycle (2019 Title 24, Part 6). The site energy was calculated for the 2016 code compliant and the ZNE residences in kWh and therms.

Using the CBECC-Res software, an Energy Design Rating (EDR) was calculated for each prototype residence to demonstrate that the building is designed to reach ZNE. The EDR is a type of rating that compares the regulated energy consumption, unregulated energy consumption, and annual PV production of a proposed home to the reference home (a 2006 IECC compliant home). An EDR of 100 means that a proposed home uses the same energy as a 2006 IECC compliant home and an EDR of zero meets the CEC's definition of a ZNE home. All energy measurements (consumption and production) are measured in TDV. To achieve ZNE on a residence, the EDR of the efficiency features must be less than the EDR of the PV system (i.e., the sum of the efficiency EDR and renewable EDR must be equal to or less than zero).

CBECC can separately analyze the energy efficiency of a building for scenarios in which it is facing north, south, east, or west. This is called a cardinal orientation analysis and it can be used to determine the "worst case" (uses most energy) orientation. ConSol used the worst-case orientation to determine the energy features required to achieve compliance for all orientations. The worst-case orientation also represents the most amount of energy the sample building would consume.

For each building analyzed, the first column in Table 1 and Table 3 represents the building energy efficiency requirements needed to comply with the 2016 code**.** The second column, in each of those same tables, represents the building energy efficiency requirements needed to achieve ZNE prior to the addition of the PV system. Features that are highlighted in yellow represent a change from the features listed in the 2016 code compliance configuration. Tables 2 and 4 show the site energy uses and PV sizing requirements necessary for the home to reach ZNE.

For the PV sizing on each building, standard 285 watt panels and standard central inverters were used in the analysis. In each CBECC model, the PV system was sized for the worst-case building orientation, as stated above, consuming the greatest amount of energy. All panels are assumed to be facing south (180°) to give the PV system size required to meet ZNE. It is important to note that if the residence is built in orientations other than the one reviewed, the PV system size would likely be different. A typical neighborhood will have houses facing in a variety of directions; therefore, the roof planes available for solar panel installation could also be facing a variety of directions. It is still possible for any given home to reach ZNE, regardless of which direction the home faces; however, annual solar generation will vary depending on the directional attributes of the installed solar panels. In some cases, the size of the solar system for a

given house may be larger than the system identified by the model for the prototype residence (e.g., if some panels need to be installed facing north, east or west). In some cases, the size of the solar system could be smaller than the system identified by the model (e.g., if the house is facing an orientation where energy use is lower and there is south or west facing roof available for PV panel installation). In each analysis, given the orientation of the building and the actual roof design of the sample residence, an example is given of how the PV system size may differ from the size the CBECC model calculates.

*Another consideration is to utilize more efficient, higher wattage PV panels which will reduce the number of panels needed, thus reducing the roof area needed, to achieve the required annual kWh production. For example, using 305 watt panels instead of 285 watt panels will reduce the number of panels needed to achieve the same kWh annual production.

Estimated Energy Consumption – 1,815 Square Foot / 2-Story / Single Family

CBECC-Res estimates an annual site energy consumption for the 1,815 square foot house in Escondido (Climate Zone 10) that complies with the 2016 code of 1,106 kWh and 176 therms for the regulated loads and 5,448 kWh and 17 therms for the unregulated loads. This equates to a total annual site energy consumption of 6,554 kWh and 193 therms for the 2016 code compliant residence. The energy consumption of the home designed to achieve ZNE is calculated to be 1,009 kWh and 151 therms for regulated loads and 5,448 kWh and 17 therms for the unregulated loads. This equates to a total annual site energy consumption of 6,457 kWh and 168 therms for the ZNE residence (these figures can be seen in Table 2). While conservatively not reflected in the model, it is reasonable to anticipate future decreases in the calculated energy use of unregulated loads as the CEC (and others) adopt regulations and programs to minimize the energy consumption of appliances and other plug loads.

The CBECC-Res software calculates the TDV energy use of the residence to verify that the proposed design complies with the current code. As previously mentioned, for a residence to be code compliant, the proposed design TDV energy must be equal to or less than the standard design TDV energy. In this analysis, the home designed to comply with the 2016 Standards has a TDV energy of 44.84 kTDV/ft^2-yr. This is a 0.2% (0.07 kTDV/ft^2-yr) improvement over the standard design. The TDV energy use for the home designed to achieve ZNE is calculated to be 39.82 kTDV/ft^2-yr, an 11.3% (5.09 kTDV/ft^2-yr) improvement over the 2016 code standard design.

PV Sizing to meet ZNE – 1,815 Square Foot / 2-Story / Single Family

ConSol also used the CBECC-Res software to determine the required PV system size needed to achieve ZNE as defined in the 2015 IEPR. The PV system was sized in the CBECC model using the worst-case building orientation, which represents the largest PV system required to achieve ZNE. The inputs used assume standard efficiency panels with all PV panels facing south.

As shown in Table 2, the system configuration for this prototype residence requires a 4.9 kW PV system to reach ZNE. Also shown in Table 2, the prototype residence has an efficiency EDR of 37.5 while the PV system has an EDR of 38.3. A minimum of 8,118 kWh of annual PV production is needed for the residence

to be ZNE. Standard 285-watt panels and a standard central inverter were used to calculate the PV system size. More efficient panels, however, may be used to achieve ZNE if the minimum annual PV production is achieved.

To meet the required production, seventeen standard 285-watt panels (approx. 5.5 ft x 3.5 ft) are needed if they are all facing south. This equates to approximately 327.25 square feet of south facing roof area. The California Fire Code (Section 605.11) dictates that PV arrays must be a minimum of three feet from the ridge, have one-and-a-half-foot clearance on each side of the array, as well as one-and-a-half-foot clearance from hips and valleys. If the required roof area is unavailable on south facing roofs, additional PV panels can be located on remaining roof orientations to meet the minimum required yearly production. If additional roof orientations are used, the PV system size may need to be increased due to PV production being proportional to orientation, as described above. For example, the prototype residence analyzed in this report does not have enough roof space facing south to accommodate 17 (seventeen) standard solar panels. The assessment of the prototype home showed that 7 (seven) PV panels installed on the south facing roof plane, 10 (ten) PV panels on the west facing roof plane and an additional 2 (two) PV panels on the east facing roof plane would give an annual production of 8,251 kWh / year, allowing the home to reach ZNE.

A 2 story, approximately 1,800 square foot home has a smaller roof footprint than other possible single family home designs and represents the challenge of a smaller roof accommodating enough solar for the home to be ZNE. In developing a plan for ZNE homes or a ZNE community, it is important to design buildings with adequate solar roof areas. During the building design phase, it is recommended that builders be mindful of roof penetrations (vents, chimneys, skylights, etc.) in roof surfaces where the PV system will be located to maximize the roof area available for solar. A possible option for roof penetrations is to locate those penetrations in the clearance areas required by the Fire Code.

The analysis provided in this report demonstrates the energy efficiency features and PV system size that would need to be included in the construction of a single-family residence, similar in size to the sample building, in Climate Zone 10 (Escondido), to achieve ZNE. The building plans used for the sample residence are representative of an entry-level single-family residence. Single-family residences of varying sizes likely would have different energy profiles and therefore, different PV requirements to meet the ZNE definition.

PV Sizing to cover site electric use only – 1,815 Square Foot / 2-Story / Single Family

When the same single-family home is modeled to size the PV system to only cover the electric load of the building, the required PV system size would be 3.2 kW, consisting of 11 standard 285 watt solar panels, all facing south, and producing a minimum of 5,301 kWh / year. The prototype single-family building analyzed for this report could accommodate a 3.4 kW system, with 7 panels facing south and 5 panels facing west, to produce an estimated 5,365 kWh / year, thereby meeting the electric use of the building.

*Another consideration is to utilize more efficient, higher wattage PV panels which will reduce the number of panels needed, thus reducing the roof area needed, to achieve the required annual kWh production. For example, using 305 watt panels instead of 285 watt panels will reduce the number of panels needed to achieve the same kWh annual production.

TABLE 1: 2016 CALIFORNIA ENERGY CODE AND ZNE COMPLIANCE OPTIONS

Harmony Grove Village South Escondido Climate Zone 10 1815 Sqft / 2-Story / 15.5% Glazing	2016 Building Features	ZNE Building Features
Run	Base	Base w/ PV (ZNE)
File Number	0	1
Software	CBECC-Res 2016.2.1 (868)	CBECC-Res 2016.2.1 (868)
Compliance Margins		
Worst Case % Above Code (2016 Code)	**0.2%**	**11.3%**
Worst Case Magin Above Code (2016 Code) - kTDV	**0.07**	**5.09**
Proposed Design Budget	**44.84**	**39.82**
Envelope: Opaque Surfaces		
Wall Insulation - 2x6 Exterior Walls	R-21+R4	R-21+R4
Wall Insulation - 2x6 Interior Garage Walls	R-21	R-21
Insulated Entry Door(s)	N/A	N/A
Wall Insulation - 2x6 Exterior Garage Walls	R-0+R4	R-0+R4
Attic Insulation - Flat Portions	R-38	R-38
Attic Insulation - At Furnace Platform	R-21	R-21
Floor Insulation - Above Garage	R-19	R-19
Insulation Installation [Verification] - QII	Required	Required
Air Infiltration [Testing] - Blower Door	5.0 ACH	5.0 ACH
Roofing Material	Tile	Tile
Roofing Properties (Reflectance / Emittance)	0.10 / 0.85	0.10 / 0.85
Below Roof Deck Insulation	R-13	**R-19**
Ventilated Attic (Yes / No)	Yes	Yes
Envelope: Glazing (U-Factor / SHGC)		
Horizontal Slider	0.32 / 0.25	0.32 / 0.25
Single Hung	0.32 / 0.25	0.32 / 0.25
Fixed	0.32 / 0.25	0.32 / 0.25
Patio Door	0.32 / 0.25	0.32 / 0.25
French Door	0.32 / 0.25	0.32 / 0.25
HVAC: Space Heating, Cooling Systems		
Space Heating Type	Furnace	Furnace
Space Heating Efficiency (AFUE)	0.80	**0.92**
Space Cooling Type	ACSplit	ACSplit
Space Cooling Efficiency (SEER / EER)	14 / 12.2	**15 / 13.0**
SEER [Verification]	N/A	**Required**
EER [Verification]	Required	Required
Refrigerant Charge [Verification/Testing]	Required	Required
Fan Watt Draw [Testing]	0.58 W/cfm	0.58 W/cfm
Adequate Airflow [Testing]	350 cfm/ton	350 cfm/ton
HVAC: Duct System		
Duct Insulation R-Value	R-8	R-8
Duct Location	Attic	Attic
Buried Ducts [Verification]	N/A	N/A
Low Leakage (Tight) Ducts [Testing]	Required @ 5%	Required @ 5%
HVAC: Mechanical Ventilation		
Minimum Whole-House Ventilation, Continuous	63 cfm	63 cfm
Ventilation System Type	Exhaust	Exhaust
Ventilation System Efficiency (cfm / W/cfm)	63 / 0.25	63 / 0.25
Water Heating		
Water Heater Type	Tankless	Tankless
Water Heater Efficiency (EF)	0.82	**0.95**
Fuel Source	Natural Gas	Natural Gas
Distribution Type	Standard	Standard

Table 2: SITE ENERGY USES AND PV sizing

Harmony Grove Village South Escondido Climate Zone 10 1815 Sqft / 2-Story / 15.5% Glazing	2016 Building Features	ZNE Building Features
Run	**Base**	**Base w/ PV (ZNE)**
File Number	**0**	**1**
Software	CBECC-Res 2016.2.1 (868)	CBECC-Res 2016.2.1 (868)
Regulated Loads from CBEEC Log File (Space Heating, Cooling & Water Heating)		
kWh	1,106	1,009
Therms	176	151
Unregulated Loads from CBECC Log File (Inside & Exterior Lighting, Appliance & Cook, Plug Loads)		
Interior Lighting kWh	453	453
Appliance & Cooking kWh	2,173	2,173
Plug Load kWh	2,717	2,717
Exterior Lighting kWh	105	105
Appliance & Cooking Therms	17	17
Total kWh	6,554	6,457
Total Therms	193	167
Final EDR of Proposed Design w/ PV		-1.0
PV Sizing (kW)		4.9
PV Production kWH		8,118
PV Production TDV		107.8
PV Production EDR		53.3
Proposed Design TDV		105.8
Proposed Design EDR		52.3

Estimated Energy Consumption – 22,950 Square Foot / 3-Story / 15-Plex

CBECC-Res estimates the annual site energy consumption for the 22,950 square foot multi-family building in Escondido (Climate Zone 10) that meets the 2016 code is 14,353 kWh and 1,488 therms for the regulated loads and 61,775 kWh and 209 therms for the unregulated loads. This equates to a total annual site energy consumption of 76,128 kWh and 1,697 therms for the 2016 code compliant residence. The energy consumption of the residence designed to achieve ZNE is calculated to be 12,523 kWh and 1,427 therms for regulated loads and 61,775 kWh and 209 therms for the unregulated loads. This equates to a total annual site energy consumption of 74,298 kWh and 1,636 therms for the ZNE residence (these figures can be seen in Table 4).

The CBECC-Res software calculates the TDV energy use of the multi-family residence to verify that the proposed design complies with the current code. As previously mentioned, for a residence to be code compliant, the proposed design TDV energy must be equal to or less than the standard design TDV energy. In this analysis, the residence designed to meet the 2016 code has a TDV energy of 36.92 kTDV/ft²-yr. This is a 0.8% (0.31 kTDV/ft²-yr) improvement over the standard design. The TDV energy use for the residence designed to achieve ZNE is calculated to be 32.49 kTDV/ft²-yr, a 12.7% (4.72 kTDV/ft²-yr) improvement over the 2016 code standard design.

PV Sizing to meet ZNE – 22,950 Square Foot / 3-Story / 15-Plex

ConSol also used the CBECC-Res software to determine the required PV system size needed to achieve ZNE as defined in the 2015 IEPR. The PV system was sized in the CBECC model using the worst-case building orientation, which represents the largest PV system required to achieve ZNE; and the inputs used assume standard efficiency panels with all PV panels facing south.

As shown in Table 4, the system configuration for this prototype residence requires a 53 kW PV system to reach ZNE. The prototype residence has an EDR of 37.5 while the PV system has an EDR of 38.3 (see Table 2). A minimum of 87,804 kWh of annual PV production is needed for the residence to be ZNE. Standard 285-watt panels and a standard central inverter were used to calculate the PV system size. More efficient panels, however, may be used to achieve ZNE if the minimum annual PV production is achieved.

To meet the required production, one hundred and eighty six (186) standard 285-watt panels (approx. 5.5 ft x 3.5 ft) are needed, if all panels are facing 180°. This equates to approximately 3,580.5 square feet of south facing roof area. The California Fire Code (Section 605.11) dictates that PV arrays must be a minimum of three feet from the ridge, have one-and-a-half-foot clearance on each side of the array, as well as one-and-a-half-foot clearance from hips and valleys. If the required roof area is unavailable on south facing roofs, additional PV panels can be located on remaining roof orientations to meet the minimum required yearly production. If additional roof orientations are used, the PV system size may need to be increased due to PV production being proportional to orientation, as described above. For example, the prototype residence analyzed in this report would not be able to accommodate any solar panels facing south. An alternate configuration of 110 solar panels facing west (270°) and 105 solar panels facing east (90°) is possible, and

would produce an estimated 88,005 kWh / year, thereby meeting the minimum PV production required for the building to be ZNE.

The analysis provided in this report demonstrates the energy efficiency features and PV system size that would need to be included in the construction of a multi-family residence, similar in size to the sample building, in Climate Zone 10 (Escondido), to reach the current working definition of ZNE. The building plans used for the prototype residence are representative of a 3 story 15 unit, multi-family residence; multi-family buildings of varying sizes likely would have different energy profiles and therefore different PV requirements to meet the ZNE definition.

PV Sizing to cover site electric use only – 22,950 Square Foot / 3-Story / 15-Plex

When the model for the same multi-family building is run to size the PV system to only cover the electric load of the building, the required PV system size would be 36 kW, consisting of 126 standard 285 watt solar panels, all facing south, and producing a minimum of 59,640 kWh / year. The prototype multi-family building analyzed for this report could accommodate a 41.6 kW system, with 80 panels facing west and 66 panels facing east to produce an estimated 59,864 kWh / year, thereby meeting the electric use of the building.

*Another consideration is to utilize more efficient, higher wattage PV panels which will reduce the number of panels needed, thus reducing the roof area needed, to achieve the required annual kWh production. For example, using 305 watt panels instead of 285 watt panels will reduce the number of panels needed to achieve the same kWh annual production.

Table 3: 2016 California Energy CODE and ZNE COMPLANCE OPTIONS

Harmony Grove Village South Escondido Climate Zone 10 22,950 Sqft / 3-Story / 15-Plex / 11.8% Glazing	2016 Building Features	ZNE Building Features
Run	**Base**	**Base w/ PV (ZNE)**
File Number	**0**	**1**
Software	CBECC-Res 2016.2.1 (868)	CBECC-Res 2016.2.1 (868)
Compliance Margins		
Worst Case % Above Code (2016 Code)	**0.8%**	**12.7%**
Worst Case Magin Above Code (2016 Code) - kTDV	**0.31**	**4.72**
Proposed Design Budget	**36.92**	**32.49**
Envelope: Opaque Surfaces		
Wall Insulation - 2x6 Exterior Walls	R-21+R4	R-21+R4
Insulated Entry Door(s)	R-5	R-5
Wall Insulation - 2x6 Exterior Garage Walls	R-0+R4	R-0+R4
Attic Insulation - Flat Portions	R-38	R-38
Floor Insulation - Above Garage	R-19	**R-30**
Floor Insulation - Between Zones	R-0	R-0
Insulation Installation [Verification] - QII	Required	Required
Air Infiltration [Testing] - Blower Door	7.0 ACH	7.0 ACH
Roofing Material	Tile	Tile
Roofing Properties (Reflectance / Emittance)	0.10 / 0.85	0.10 / 0.85
Below Roof Deck Insulation	R-13	**R-19**
Ventilated Attic (Yes / No)	Yes	Yes
Envelope: Glazing (U-Factor / SHGC)		
Horizontal Slider	0.31 / 0.22	0.31 / 0.22
Single Hung	0.31 / 0.22	0.31 / 0.22
Fixed	0.31 / 0.22	0.31 / 0.22
Patio Door	0.31 / 0.22	0.31 / 0.22
French Door	0.31 / 0.22	0.31 / 0.22
HVAC: Space Heating, Cooling Systems		
Space Heating Type	Furnace	Furnace
Space Heating Efficiency (AFUE)	0.80	0.80
Space Cooling Type	ACSplit	ACSplit
Space Cooling Efficiency (SEER / EER)	14 / 11.7	**15 / 13.0**
SEER [Verification]	N/A	**Required**
EER [Verification]	N/A	**Required**
Refrigerant Charge [Verification/Testing]	Required	Required
Fan Watt Draw [Testing]	0.58 W/cfm	0.58 W/cfm
Adequate Airflow [Testing]	350 cfm/ton	350 cfm/ton
HVAC: Duct System		
Duct Insulation R-Value	R-4.2	R-4.2
Duct Location	Cond. Space	Cond. Space
Low Leakage (Tight) Ducts [Testing]	Total Leakage <= 12.0% or Leakage to Outdoors <= 5.0%	Total Leakage <= 12.0% or Leakage to Outdoors <= 5.0%
HVAC: Mechanical Ventilation		
Minimum Whole-House Ventilation, Continuous	End Unit - 84 cfm Int. Unit - 71 cfm	End Unit - 84 cfm Int. Unit - 71 cfm
Ventilation System Type	Exhaust	Exhaust
Ventilation System Efficiency (cfm / W/cfm)	End Unit - 75 / 0.25 Int. Unit - 71 / 0.25	End Unit - 75 / 0.25 Int. Unit - 71 / 0.25
Water Heating		
Water Heater Type	Tankless	Tankless
Water Heater Efficiency (EF)	0.82	**0.95**
Fuel Source	Natural Gas	Natural Gas
Distribution Type	Standard	**Pipe Insulation, All Line (HERS Req'd)**

Table 4: SITE ENERGY USES AND PV sizing

Harmony Grove Village South Escondido Climate Zone 10 22,950 Sqft / 3-Story / 15-Plex / 11.8% Glazing	2016 Building Features	ZNE Building Features
Run	Base	Base w/ PV (ZNE)
File Number	0	1
Software	CBECC-Res 2016.2.1 (868)	CBECC-Res 2016.2.1 (868)
Regulated Loads from CBEEC Log File (Space Heating, Cooling & Water Heating)		
kWh	14,353	12,523
Therms	1,488	1,427
Unregulated Loads from CBECC Log File (Inside & Exterior Lighting, Appliance & Cook, Plug Loads)		
Interior Lighting kWh	5,733	5,733
Appliance & Cooking kWh	24,314	24,315
Plug Load kWh	30,388	30,388
Exterior Lighting kWh	1,340	1,340
Appliance & Cooking Therms	209	209
Total kWh	76,127	74,299
Total Therms	1,697	1,635
Final EDR of Proposed Design w/ PV		-0.7
PV Sizing (kW)		53.0
PV Production kWH		87,804
PV Production TDV		92.2
PV Production EDR		56.9
Proposed Design TDV		91.0
Proposed Design EDR		56.2

ATTACHMENT C

HARMONY GROVE VILLAGE SOUTH PROJECT

UPDATED CALEEMOD MODELING RESULTS (Corrected Pages to Attachment A of the Global Climate Change Study) AND VEHICLE EMISSION REDUCTIONS – HELIX

Attachment C provides the following information:

1. Pages 1 through 45 reflect changes resulting from the correction made to the trip generation data shown in Table 4.3 and on; updated from Appendix A of EIR Appendix J.
2. The Emission Reduction Adjustments have been updated to reflect changes in item 1 above. This was Appendix B to EIR Appendix J.

Harmony Grove Village South

San Diego County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	46.00	Space	0.41	18,400.00	0
City Park	1.50	Acre	1.50	65,340.00	0
Condo/Townhouse	260.00	Dwelling Unit	16.25	260,000.00	744
Single Family Housing	193.00	Dwelling Unit	62.66	347,400.00	552
Strip Mall	5.00	1000sqft	0.11	5,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	40
Climate Zone	13			**Operational Year**	2021
Utility Company	San Diego Gas & Electric				
CO2 Intensity (lb/MWhr)	720.49	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Based on input from Kovach (dated 02-27-2017)

Off-road Equipment -

Off-road Equipment - typical equipment used for the backbone infrastructure phase

Off-road Equipment - Based on input from Moffatt & Nichol

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Off-road Equipment - Crusher added to process Blasing debris

Trips and VMT -

Grading -

Architectural Coating - Low-VOC coatings per design feature

Vehicle Trips - Trip generation based on LLG2014; trip length based on LLG2016.

Vechicle Emission Factors -

Vechicle Emission Factors -

Vechicle Emission Factors -

Construction Off-road Equipment Mitigation -

Area Mitigation - Natural Gas hearths and low-VOC coatings per design features

Energy Mitigation - CalEEMod default is 2008 T24. 2013 is 25% improved over 2008. 2016 is 28% improved over 2013. (1-.25)*(1-.28)=54% - 46% improvement

Water Mitigation -

Waste Mitigation -

Operational Off-Road Equipment - WTWRF generator sets

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	250.00	100.00
tblArchitecturalCoating	EF_Nonresidential_Interior	250.00	100.00
tblArchitecturalCoating	EF_Residential_Exterior	250.00	100.00

tblArchitecturalCoating	EF_Residential_Interior	250.00	50.00
tblAreaMitigation	UseLowVOCPaintNonresidentialExteriorValue	250	100
tblAreaMitigation	UseLowVOCPaintNonresidentialInteriorValue	250	100
tblAreaMitigation	UseLowVOCPaintResidentialExteriorValue	250	100
tblAreaMitigation	UseLowVOCPaintResidentialInteriorValue	250	50
tblConstructionPhase	NumDays	110.00	109.00
tblConstructionPhase	NumDays	1,550.00	262.00
tblConstructionPhase	NumDays	1,550.00	589.00
tblConstructionPhase	NumDays	155.00	65.00
tblConstructionPhase	NumDays	110.00	109.00
tblConstructionPhase	NumDays	60.00	65.00
tblConstructionPhase	PhaseEndDate	3/2/2022	9/30/2021
tblConstructionPhase	PhaseEndDate	6/30/2020	3/31/2020
tblConstructionPhase	PhaseEndDate	7/4/2022	9/30/2021
tblConstructionPhase	PhaseEndDate	6/28/2019	6/30/2019
tblConstructionPhase	PhaseEndDate	3/2/2022	9/30/2021
tblConstructionPhase	PhaseEndDate	9/28/2018	9/30/2018
tblConstructionPhase	PhaseEndDate	3/29/2019	3/31/2019
tblConstructionPhase	PhaseStartDate	10/1/2021	5/1/2021
tblConstructionPhase	PhaseStartDate	7/1/2019	4/1/2019
tblConstructionPhase	PhaseStartDate	4/1/2020	7/1/2019
tblConstructionPhase	PhaseStartDate	10/1/2021	5/1/2021
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	2.00

tblProjectCharacteristics	OperationalYear	2014	2021
tblVehicleTrips	CC_TL	7.30	7.88
tblVehicleTrips	CC_TL	7.30	7.88
tblVehicleTrips	CC_TL	7.30	7.88
tblVehicleTrips	CNW_TL	7.30	7.88
tblVehicleTrips	CNW_TL	7.30	7.88
tblVehicleTrips	CNW_TL	7.30	7.88
tblVehicleTrips	CW_TL	9.50	7.88
tblVehicleTrips	CW_TL	9.50	7.88
tblVehicleTrips	CW_TL	9.50	7.88
tblVehicleTrips	HO_TL	7.50	7.88
tblVehicleTrips	HO_TL	7.50	7.88
tblVehicleTrips	HS_TL	7.30	7.88
tblVehicleTrips	HS_TL	7.30	7.88
tblVehicleTrips	HW_TL	10.80	7.88
tblVehicleTrips	HW_TL	10.80	7.88
tblVehicleTrips	ST_TR	1.59	0.00
tblVehicleTrips	ST_TR	7.16	9.93
tblVehicleTrips	ST_TR	10.08	9.93
tblVehicleTrips	ST_TR	42.04	0.00
tblVehicleTrips	SU_TR	1.59	0.00
tblVehicleTrips	SU_TR	6.07	9.93
tblVehicleTrips	SU_TR	8.77	9.93
tblVehicleTrips	SU_TR	20.43	0.00
tblVehicleTrips	WD_TR	1.59	0.00
tblVehicleTrips	WD_TR	6.59	9.93
tblVehicleTrips	WD_TR	9.57	9.93
tblVehicleTrips	WD_TR	44.32	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2018	0.2571	2.5760	1.9592	2.9200e-003	0.5963	0.1344	0.7307	0.3252	0.1245	0.4497	0.0000	263.4093	263.4093	0.0756	0.0000	264.9973
2019	0.9145	7.7422	8.0294	0.0162	0.7449	0.3819	1.1268	0.2413	0.3585	0.5998	0.0000	1,330.0340	1,330.0340	0.2136	0.0000	1,334.5198
2020	0.5716	4.1474	5.5395	0.0119	0.4512	0.2049	0.6560	0.1213	0.1930	0.3143	0.0000	925.7016	925.7016	0.1109	0.0000	928.0311
2021	3.0949	2.8710	4.1013	8.6600e-003	0.3014	0.1418	0.4431	0.0809	0.1327	0.2136	0.0000	673.4264	673.4264	0.1001	0.0000	675.5289
Total	**4.8381**	**17.3365**	**19.6294**	**0.0398**	**2.0937**	**0.8629**	**2.9567**	**0.7686**	**0.8088**	**1.5774**	**0.0000**	**3,192.5712**	**3,192.5712**	**0.5003**	**0.0000**	**3,203.0771**

2.1 Overall Construction

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					
2018	0.2571	2.5760	1.9592	2.9200e-003	0.2734	0.1344	0.4078	0.1477	0.1245	0.2722	0.0000	263.4090	263.4090	0.0756	0.0000	264.9970
2019	0.9145	7.7422	8.0294	0.0162	0.5898	0.3819	0.9717	0.1770	0.3585	0.5355	0.0000	1,330.0330	1,330.0330	0.2136	0.0000	1,334.5189
2020	0.5716	4.1474	5.5395	0.0119	0.4512	0.2049	0.6560	0.1213	0.1930	0.3143	0.0000	925.7011	925.7011	0.1109	0.0000	928.0306
2021	3.0949	2.8710	4.1013	8.6600e-003	0.3014	0.1418	0.4431	0.0809	0.1327	0.2136	0.0000	673.4259	673.4259	0.1001	0.0000	675.5285
Total	**4.8381**	**17.3365**	**19.6294**	**0.0398**	**1.6158**	**0.8629**	**2.4787**	**0.5268**	**0.8088**	**1.3356**	**0.0000**	**3,192.5690**	**3,192.5690**	**0.5003**	**0.0000**	**3,203.0749**

	ROG	NOx	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**	**22.83**	**0.00**	**16.17**	**31.46**	**0.00**	**15.33**	**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	32.2773	0.4246	38.3867	0.0139		4.9380	4.9380		4.9379	4.9379	467.9298	201.7382	669.6681	0.4372	0.0368	690.2581
Energy	0.0482	0.4117	0.1754	2.6300e-003		0.0333	0.0333		0.0333	0.0333	0.0000	1,322.6341	1,322.6341	0.0432	0.0158	1,328.4343
Mobile	2.2553	4.4400	22.3150	0.0629	4.3077	0.0706	4.3782	1.1521	0.0651	1.2172	0.0000	4,305.6929	4,305.6929	0.1628	0.0000	4,309.1120
Offroad	0.0929	0.8232	0.9580	1.7100e-003		0.0436	0.0436		0.0436	0.0436	0.0000	146.9539	146.9539	7.5000e-003	0.0000	147.1114
Waste						0.0000	0.0000		0.0000	0.0000	71.3107	0.0000	71.3107	4.2143	0.0000	159.8119
Water						0.0000	0.0000		0.0000	0.0000	9.4812	202.0455	211.5267	0.9819	0.0247	239.7970
Total	**34.6737**	**6.0995**	**61.8352**	**0.0811**	**4.3077**	**5.0855**	**9.3931**	**1.1521**	**5.0799**	**6.2320**	**548.7217**	**6,179.0647**	**6,727.7864**	**5.8469**	**0.0773**	**6,874.5248**

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	3.1238	0.0389	3.3731	1.8000e-004		0.0410	0.0410		0.0408	0.0408	0.0000	326.6201	326.6201	0.0115	5.8900e-003	328.6863
Energy	0.0308	0.2628	0.1120	1.6800e-003		0.0212	0.0212		0.0212	0.0212	0.0000	304.3124	304.3124	5.8300e-003	5.5800e-003	306.1644
Mobile	2.2553	4.4400	22.3150	0.0629	4.3077	0.0706	4.3782	1.1521	0.0651	1.2172	0.0000	4,305.6929	4,305.6929	0.1628	0.0000	4,309.1120
Offroad	0.0929	0.8232	0.9580	1.7100e-003		0.0436	0.0436		0.0436	0.0436	0.0000	146.9539	146.9539	7.5000e-003	0.0000	147.1114
Waste						0.0000	0.0000		0.0000	0.0000	17.8277	0.0000	17.8277	1.0536	0.0000	39.9530
Water						0.0000	0.0000		0.0000	0.0000	7.5849	163.2919	170.8768	0.7855	0.0197	193.4867
Total	**5.5028**	**5.5649**	**26.7582**	**0.0664**	**4.3077**	**0.1764**	**4.4841**	**1.1521**	**0.1707**	**1.3228**	**25.4126**	**5,246.8712**	**5,272.2839**	**2.0267**	**0.0312**	**5,324.5138**

	ROG	NOx	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	**84.40**	**22.26**	**58.28**	**20.15**	**0.00**	**97.39**	**52.73**	**0.00**	**97.50**	**79.47**	**95.37**	**17.46**	**23.82**	**65.47**	**59.62**	**24.69**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	7/1/2018	9/30/2018	5	65	
2	Backbone Infrastructure	Trenching	10/1/2018	3/31/2019	5	130	
3	Grading	Grading	4/1/2019	6/30/2019	5	65	
4	Bridge Construction	Building Construction	4/1/2019	3/31/2020	5	262	
5	Building Construction	Building Construction	7/1/2019	9/30/2021	5	589	
6	Paving	Paving	5/1/2021	9/30/2021	5	109	
7	Architectural Coating	Architectural Coating	5/1/2021	9/30/2021	5	109	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 162.5

Acres of Paving: 0

Residential Indoor: 1,229,985; Residential Outdoor: 409,995; Non-Residential Indoor: 106,338; Non-Residential Outdoor: 35,446 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Crushing/Proc. Equipment	1	8.00	85	0.78
Site Preparation	Rubber Tired Dozers	3	8.00	255	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Backbone Infrastructure	Forklifts	1	8.00	89	0.20
Backbone Infrastructure	Off-Highway Trucks	2	8.00	400	0.38
Backbone Infrastructure	Other Material Handling Equipment	1	8.00	167	0.40
Backbone Infrastructure	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Backbone Infrastructure	Trenchers	1	8.00	80	0.50
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
Bridge Construction	Cranes	2	7.00	226	0.29
Bridge Construction	Forklifts	1	8.00	89	0.20
Bridge Construction	Generator Sets	2	8.00	84	0.74
Bridge Construction	Pumps	1	8.00	84	0.74
Bridge Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Bridge Construction	Welders	0	8.00	46	0.45
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
Site Preparation	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Backbone Infrastructure	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Bridge Construction	9	293.00	63.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	293.00	63.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	59.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Site Preparation - 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					
Fugitive Dust					0.5872	0.0000	0.5872	0.3228	0.0000	0.3228	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1615	1.6298	1.3206	1.5000e-003		0.0877	0.0877		0.0815	0.0815	0.0000	135.7510	135.7510	0.0380	0.0000	136.5480
Total	**0.1615**	**1.6298**	**1.3206**	**1.5000e-003**	**0.5872**	**0.0877**	**0.6748**	**0.3228**	**0.0815**	**0.4043**	**0.0000**	**135.7510**	**135.7510**	**0.0380**	**0.0000**	**136.5480**

3.2 Site Preparation - 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	1.8400e-003	2.4400e-003	0.0229	6.0000e-005	5.2100e-003	4.0000e-005	5.2500e-003	1.3900e-003	4.0000e-005	1.4200e-003	0.0000	4.4945	4.4945	2.2000e-004	0.0000	4.4991
Total	**1.8400e-003**	**2.4400e-003**	**0.0229**	**6.0000e-005**	**5.2100e-003**	**4.0000e-005**	**5.2500e-003**	**1.3900e-003**	**4.0000e-005**	**1.4200e-003**	**0.0000**	**4.4945**	**4.4945**	**2.2000e-004**	**0.0000**	**4.4991**

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					0.2642	0.0000	0.2642	0.1452	0.0000	0.1452	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1615	1.6298	1.3206	1.5000e-003		0.0877	0.0877		0.0815	0.0815	0.0000	135.7508	135.7508	0.0380	0.0000	136.5479
Total	**0.1615**	**1.6298**	**1.3206**	**1.5000e-003**	**0.2642**	**0.0877**	**0.3519**	**0.1452**	**0.0815**	**0.2268**	**0.0000**	**135.7508**	**135.7508**	**0.0380**	**0.0000**	**136.5479**

3.2 Site Preparation - 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	1.8400e-003	2.4400e-003	0.0229	6.0000e-005	5.2100e-003	4.0000e-005	5.2500e-003	1.3900e-003	4.0000e-005	1.4200e-003	0.0000	4.4945	4.4945	2.2000e-004	0.0000	4.4991
Total	**1.8400e-003**	**2.4400e-003**	**0.0229**	**6.0000e-005**	**5.2100e-003**	**4.0000e-005**	**5.2500e-003**	**1.3900e-003**	**4.0000e-005**	**1.4200e-003**	**0.0000**	**4.4945**	**4.4945**	**2.2000e-004**	**0.0000**	**4.4991**

3.3 Backbone Infrastructure - 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	0.0924	0.9419	0.5982	1.3100e-003		0.0467	0.0467		0.0429	0.0429	0.0000	119.7411	119.7411	0.0373	0.0000	120.5239
Total	**0.0924**	**0.9419**	**0.5982**	**1.3100e-003**		**0.0467**	**0.0467**		**0.0429**	**0.0429**	**0.0000**	**119.7411**	**119.7411**	**0.0373**	**0.0000**	**120.5239**

3.3 Backbone Infrastructure - 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	1.4000e-003	1.8600e-003	0.0174	5.0000e-005	3.9700e-003	3.0000e-005	4.0000e-003	1.0500e-003	3.0000e-005	1.0800e-003	0.0000	3.4227	3.4227	1.7000e-004	0.0000	3.4263
Total	**1.4000e-003**	**1.8600e-003**	**0.0174**	**5.0000e-005**	**3.9700e-003**	**3.0000e-005**	**4.0000e-003**	**1.0500e-003**	**3.0000e-005**	**1.0800e-003**	**0.0000**	**3.4227**	**3.4227**	**1.7000e-004**	**0.0000**	**3.4263**

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	0.0924	0.9419	0.5982	1.3100e-003		0.0467	0.0467		0.0429	0.0429	0.0000	119.7409	119.7409	0.0373	0.0000	120.5237
Total	**0.0924**	**0.9419**	**0.5982**	**1.3100e-003**		**0.0467**	**0.0467**		**0.0429**	**0.0429**	**0.0000**	**119.7409**	**119.7409**	**0.0373**	**0.0000**	**120.5237**

3.3 Backbone Infrastructure - 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	1.4000e-003	1.8600e-003	0.0174	5.0000e-005	3.9700e-003	3.0000e-005	4.0000e-003	1.0500e-003	3.0000e-005	1.0800e-003	0.0000	3.4227	3.4227	1.7000e-004	0.0000	3.4263
Total	**1.4000e-003**	**1.8600e-003**	**0.0174**	**5.0000e-005**	**3.9700e-003**	**3.0000e-005**	**4.0000e-003**	**1.0500e-003**	**3.0000e-005**	**1.0800e-003**	**0.0000**	**3.4227**	**3.4227**	**1.7000e-004**	**0.0000**	**3.4263**

3.3 Backbone Infrastructure - 2019

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	0.0816	0.8021	0.5639	1.2700e-003		0.0395	0.0395		0.0364	0.0364	0.0000	114.2035	114.2035	0.0361	0.0000	114.9623
Total	**0.0816**	**0.8021**	**0.5639**	**1.2700e-003**		**0.0395**	**0.0395**		**0.0364**	**0.0364**	**0.0000**	**114.2035**	**114.2035**	**0.0361**	**0.0000**	**114.9623**

3.3 Backbone Infrastructure - 2019

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	1.2600e-003	1.6700e-003	0.0156	5.0000e-005	3.8500e-003	3.0000e-005	3.8800e-003	1.0200e-003	3.0000e-005	1.0500e-003	0.0000	3.1989	3.1989	1.5000e-004	0.0000	3.2022
Total	**1.2600e-003**	**1.6700e-003**	**0.0156**	**5.0000e-005**	**3.8500e-003**	**3.0000e-005**	**3.8800e-003**	**1.0200e-003**	**3.0000e-005**	**1.0500e-003**	**0.0000**	**3.1989**	**3.1989**	**1.5000e-004**	**0.0000**	**3.2022**

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	0.0816	0.8021	0.5639	1.2700e-003		0.0395	0.0395		0.0364	0.0364	0.0000	114.2033	114.2033	0.0361	0.0000	114.9621
Total	**0.0816**	**0.8021**	**0.5639**	**1.2700e-003**		**0.0395**	**0.0395**		**0.0364**	**0.0364**	**0.0000**	**114.2033**	**114.2033**	**0.0361**	**0.0000**	**114.9621**

3.3 Backbone Infrastructure - 2019

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	1.2600e-003	1.6700e-003	0.0156	5.0000e-005	3.8500e-003	3.0000e-005	3.8800e-003	1.0200e-003	3.0000e-005	1.0500e-003	0.0000	3.1989	3.1989	1.5000e-004	0.0000	3.2022
Total	**1.2600e-003**	**1.6700e-003**	**0.0156**	**5.0000e-005**	**3.8500e-003**	**3.0000e-005**	**3.8800e-003**	**1.0200e-003**	**3.0000e-005**	**1.0500e-003**	**0.0000**	**3.1989**	**3.1989**	**1.5000e-004**	**0.0000**	**3.2022**

3.4 Grading - 2019

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					0.2819	0.0000	0.2819	0.1169	0.0000	0.1169	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1590	1.7614	1.3094	2.0100e-003		0.0814	0.0814		0.0749	0.0749	0.0000	180.1829	180.1829	0.0570	0.0000	181.3801
Total	**0.1590**	**1.7614**	**1.3094**	**2.0100e-003**	**0.2819**	**0.0814**	**0.3633**	**0.1169**	**0.0749**	**0.1918**	**0.0000**	**180.1829**	**180.1829**	**0.0570**	**0.0000**	**181.3801**

3.4 Grading - 2019

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	1.7000e-003	2.2600e-003	0.0211	6.0000e-005	5.2100e-003	4.0000e-005	5.2500e-003	1.3900e-003	4.0000e-005	1.4200e-003	0.0000	4.3319	4.3319	2.1000e-004	0.0000	4.3362
Total	**1.7000e-003**	**2.2600e-003**	**0.0211**	**6.0000e-005**	**5.2100e-003**	**4.0000e-005**	**5.2500e-003**	**1.3900e-003**	**4.0000e-005**	**1.4200e-003**	**0.0000**	**4.3319**	**4.3319**	**2.1000e-004**	**0.0000**	**4.3362**

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					0.1269	0.0000	0.1269	0.0526	0.0000	0.0526	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1590	1.7614	1.3094	2.0100e-003		0.0814	0.0814		0.0749	0.0749	0.0000	180.1827	180.1827	0.0570	0.0000	181.3799
Total	**0.1590**	**1.7614**	**1.3094**	**2.0100e-003**	**0.1269**	**0.0814**	**0.2083**	**0.0526**	**0.0749**	**0.1275**	**0.0000**	**180.1827**	**180.1827**	**0.0570**	**0.0000**	**181.3799**

3.4 Grading - 2019

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	1.7000e-003	2.2600e-003	0.0211	6.0000e-005	5.2100e-003	4.0000e-005	5.2500e-003	1.3900e-003	4.0000e-005	1.4200e-003	0.0000	4.3319	4.3319	2.1000e-004	0.0000	4.3362
Total	**1.7000e-003**	**2.2600e-003**	**0.0211**	**6.0000e-005**	**5.2100e-003**	**4.0000e-005**	**5.2500e-003**	**1.3900e-003**	**4.0000e-005**	**1.4200e-003**	**0.0000**	**4.3319**	**4.3319**	**2.1000e-004**	**0.0000**	**4.3362**

3.5 Bridge Construction - 2019

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	0.2948	2.8800	2.2056	3.8700e-003		0.1621	0.1621		0.1546	0.1546	0.0000	340.0689	340.0689	0.0655	0.0000	341.4450
Total	**0.2948**	**2.8800**	**2.2056**	**3.8700e-003**		**0.1621**	**0.1621**		**0.1546**	**0.1546**	**0.0000**	**340.0689**	**340.0689**	**0.0655**	**0.0000**	**341.4450**

3.5 Bridge Construction - 2019

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	0.0567	0.4453	0.7322	1.4700e-003	0.0404	6.6900e-003	0.0471	0.0116	6.1600e-003	0.0177	0.0000	127.1286	127.1286	9.5000e-004	0.0000	127.1485
Worker	0.0756	0.1002	0.9348	2.8500e-003	0.2314	1.6800e-003	0.2331	0.0615	1.5600e-003	0.0631	0.0000	192.3389	192.3389	9.2200e-003	0.0000	192.5326
Total	**0.1323**	**0.5455**	**1.6670**	**4.3200e-003**	**0.2718**	**8.3700e-003**	**0.2802**	**0.0731**	**7.7200e-003**	**0.0808**	**0.0000**	**319.4675**	**319.4675**	**0.0102**	**0.0000**	**319.6811**

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	0.2948	2.8800	2.2056	3.8700e-003		0.1621	0.1621		0.1546	0.1546	0.0000	340.0685	340.0685	0.0655	0.0000	341.4445
Total	**0.2948**	**2.8800**	**2.2056**	**3.8700e-003**		**0.1621**	**0.1621**		**0.1546**	**0.1546**	**0.0000**	**340.0685**	**340.0685**	**0.0655**	**0.0000**	**341.4445**

3.5 Bridge Construction - 2019

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	0.0567	0.4453	0.7322	1.4700e-003	0.0404	6.6900e-003	0.0471	0.0116	6.1600e-003	0.0177	0.0000	127.1286	127.1286	9.5000e-004	0.0000	127.1485
Worker	0.0756	0.1002	0.9348	2.8500e-003	0.2314	1.6800e-003	0.2331	0.0615	1.5600e-003	0.0631	0.0000	192.3389	192.3389	9.2200e-003	0.0000	192.5326
Total	**0.1323**	**0.5455**	**1.6670**	**4.3200e-003**	**0.2718**	**8.3700e-003**	**0.2802**	**0.0731**	**7.7200e-003**	**0.0808**	**0.0000**	**319.4675**	**319.4675**	**0.0102**	**0.0000**	**319.6811**

3.5 Bridge Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0875	0.8626	0.7137	1.2800e-003		0.0464	0.0464		0.0442	0.0442	0.0000	110.9573	110.9573	0.0212	0.0000	111.4031
Total	**0.0875**	**0.8626**	**0.7137**	**1.2800e-003**		**0.0464**	**0.0464**		**0.0442**	**0.0442**	**0.0000**	**110.9573**	**110.9573**	**0.0212**	**0.0000**	**111.4031**

3.5 Bridge Construction - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0177	0.1251	0.2333	4.8000e-004	0.0133	1.9800e-003	0.0153	3.8100e-003	1.8200e-003	5.6300e-003	0.0000	40.9868	40.9868	3.0000e-004	0.0000	40.9931
Worker	0.0236	0.0309	0.2883	9.4000e-004	0.0764	5.5000e-004	0.0769	0.0203	5.1000e-004	0.0208	0.0000	60.9048	60.9048	2.8900e-003	0.0000	60.9656
Total	**0.0413**	**0.1560**	**0.5216**	**1.4200e-003**	**0.0897**	**2.5300e-003**	**0.0922**	**0.0241**	**2.3300e-003**	**0.0264**	**0.0000**	**101.8916**	**101.8916**	**3.1900e-003**	**0.0000**	**101.9587**

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	0.0875	0.8626	0.7137	1.2800e-003		0.0464	0.0464		0.0442	0.0442	0.0000	110.9571	110.9571	0.0212	0.0000	111.4030
Total	**0.0875**	**0.8626**	**0.7137**	**1.2800e-003**		**0.0464**	**0.0464**		**0.0442**	**0.0442**	**0.0000**	**110.9571**	**110.9571**	**0.0212**	**0.0000**	**111.4030**

3.5 Bridge Construction - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0177	0.1251	0.2333	4.8000e-004	0.0133	1.9800e-003	0.0153	3.8100e-003	1.8200e-003	5.6300e-003	0.0000	40.9868	40.9868	3.0000e-004	0.0000	40.9931
Worker	0.0236	0.0309	0.2883	9.4000e-004	0.0764	5.5000e-004	0.0769	0.0203	5.1000e-004	0.0208	0.0000	60.9048	60.9048	2.8900e-003	0.0000	60.9656
Total	**0.0413**	**0.1560**	**0.5216**	**1.4200e-003**	**0.0897**	**2.5300e-003**	**0.0922**	**0.0241**	**2.3300e-003**	**0.0264**	**0.0000**	**101.8916**	**101.8916**	**3.1900e-003**	**0.0000**	**101.9587**

3.6 Building Construction - 2019

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	0.1552	1.3837	1.1299	1.7700e-003		0.0848	0.0848		0.0798	0.0798	0.0000	154.5210	154.5210	0.0376	0.0000	155.3105
Total	**0.1552**	**1.3837**	**1.1299**	**1.7700e-003**		**0.0848**	**0.0848**		**0.0798**	**0.0798**	**0.0000**	**154.5210**	**154.5210**	**0.0376**	**0.0000**	**155.3105**

3.6 Building Construction - 2019

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	0.0380	0.2984	0.4906	9.8000e-004	0.0270	4.4800e-003	0.0315	7.7400e-003	4.1200e-003	0.0119	0.0000	85.1826	85.1826	6.4000e-004	0.0000	85.1960
Worker	0.0507	0.0671	0.6264	1.9100e-003	0.1551	1.1300e-003	0.1562	0.0412	1.0400e-003	0.0423	0.0000	128.8768	128.8768	6.1800e-003	0.0000	129.0066
Total	**0.0887**	**0.3655**	**1.1170**	**2.8900e-003**	**0.1821**	**5.6100e-003**	**0.1877**	**0.0490**	**5.1600e-003**	**0.0541**	**0.0000**	**214.0594**	**214.0594**	**6.8200e-003**	**0.0000**	**214.2026**

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	0.1552	1.3837	1.1299	1.7700e-003		0.0848	0.0848		0.0798	0.0798	0.0000	154.5208	154.5208	0.0376	0.0000	155.3104
Total	**0.1552**	**1.3837**	**1.1299**	**1.7700e-003**		**0.0848**	**0.0848**		**0.0798**	**0.0798**	**0.0000**	**154.5208**	**154.5208**	**0.0376**	**0.0000**	**155.3104**

3.6 Building Construction - 2019

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	0.0380	0.2984	0.4906	9.8000e-004	0.0270	4.4800e-003	0.0315	7.7400e-003	4.1200e-003	0.0119	0.0000	85.1826	85.1826	6.4000e-004	0.0000	85.1960
Worker	0.0507	0.0671	0.6264	1.9100e-003	0.1551	1.1300e-003	0.1562	0.0412	1.0400e-003	0.0423	0.0000	128.8768	128.8768	6.1800e-003	0.0000	129.0066
Total	**0.0887**	**0.3655**	**1.1170**	**2.8900e-003**	**0.1821**	**5.6100e-003**	**0.1877**	**0.0490**	**5.1600e-003**	**0.0541**	**0.0000**	**214.0594**	**214.0594**	**6.8200e-003**	**0.0000**	**214.2026**

3.6 Building Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2766	2.5000	2.2019	3.5100e-003		0.1458	0.1458		0.1371	0.1371	0.0000	302.1514	302.1514	0.0736	0.0000	303.6973
Total	**0.2766**	**2.5000**	**2.2019**	**3.5100e-003**		**0.1458**	**0.1458**		**0.1371**	**0.1371**	**0.0000**	**302.1514**	**302.1514**	**0.0736**	**0.0000**	**303.6973**

3.6 Building Construction - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0712	0.5043	0.9404	1.9500e-003	0.0537	7.9800e-003	0.0617	0.0154	7.3400e-003	0.0227	0.0000	165.2082	165.2082	1.2200e-003	0.0000	165.2339
Worker	0.0951	0.1245	1.1619	3.7900e-003	0.3078	2.2400e-003	0.3100	0.0818	2.0700e-003	0.0839	0.0000	245.4932	245.4932	0.0117	0.0000	245.7381
Total	**0.1663**	**0.6289**	**2.1024**	**5.7400e-003**	**0.3615**	**0.0102**	**0.3717**	**0.0971**	**9.4100e-003**	**0.1066**	**0.0000**	**410.7014**	**410.7014**	**0.0129**	**0.0000**	**410.9720**

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	0.2766	2.5000	2.2019	3.5100e-003		0.1458	0.1458		0.1371	0.1371	0.0000	302.1510	302.1510	0.0736	0.0000	303.6969
Total	**0.2766**	**2.5000**	**2.2019**	**3.5100e-003**		**0.1458**	**0.1458**		**0.1371**	**0.1371**	**0.0000**	**302.1510**	**302.1510**	**0.0736**	**0.0000**	**303.6969**

3.6 Building Construction - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0712	0.5043	0.9404	1.9500e-003	0.0537	7.9800e-003	0.0617	0.0154	7.3400e-003	0.0227	0.0000	165.2082	165.2082	1.2200e-003	0.0000	165.2339
Worker	0.0951	0.1245	1.1619	3.7900e-003	0.3078	2.2400e-003	0.3100	0.0818	2.0700e-003	0.0839	0.0000	245.4932	245.4932	0.0117	0.0000	245.7381
Total	**0.1663**	**0.6289**	**2.1024**	**5.7400e-003**	**0.3615**	**0.0102**	**0.3717**	**0.0971**	**9.4100e-003**	**0.1066**	**0.0000**	**410.7014**	**410.7014**	**0.0129**	**0.0000**	**410.9720**

3.6 Building Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1846	1.6907	1.6124	2.6100e-003		0.0931	0.0931		0.0875	0.0875	0.0000	224.9104	224.9104	0.0542	0.0000	226.0482
Total	**0.1846**	**1.6907**	**1.6124**	**2.6100e-003**		**0.0931**	**0.0931**		**0.0875**	**0.0875**	**0.0000**	**224.9104**	**224.9104**	**0.0542**	**0.0000**	**226.0482**

3.6 Building Construction - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0499	0.3078	0.6720	1.4500e-003	0.0400	5.3400e-003	0.0453	0.0114	4.9200e-003	0.0164	0.0000	122.7641	122.7641	9.1000e-004	0.0000	122.7831
Worker	0.0674	0.0870	0.8199	2.8200e-003	0.2291	1.6900e-003	0.2308	0.0609	1.5700e-003	0.0624	0.0000	179.6661	179.6661	8.3500e-003	0.0000	179.8416
Total	**0.1173**	**0.3948**	**1.4918**	**4.2700e-003**	**0.2690**	**7.0300e-003**	**0.2761**	**0.0723**	**6.4900e-003**	**0.0788**	**0.0000**	**302.4302**	**302.4302**	**9.2600e-003**	**0.0000**	**302.6247**

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	0.1846	1.6907	1.6124	2.6100e-003		0.0931	0.0931		0.0875	0.0875	0.0000	224.9101	224.9101	0.0542	0.0000	226.0479
Total	**0.1846**	**1.6907**	**1.6124**	**2.6100e-003**		**0.0931**	**0.0931**		**0.0875**	**0.0875**	**0.0000**	**224.9101**	**224.9101**	**0.0542**	**0.0000**	**226.0479**

3.6 Building Construction - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0499	0.3078	0.6720	1.4500e-003	0.0400	5.3400e-003	0.0453	0.0114	4.9200e-003	0.0164	0.0000	122.7641	122.7641	9.1000e-004	0.0000	122.7831
Worker	0.0674	0.0870	0.8199	2.8200e-003	0.2291	1.6900e-003	0.2308	0.0609	1.5700e-003	0.0624	0.0000	179.6661	179.6661	8.3500e-003	0.0000	179.8416
Total	**0.1173**	**0.3948**	**1.4918**	**4.2700e-003**	**0.2690**	**7.0300e-003**	**0.2761**	**0.0723**	**6.4900e-003**	**0.0788**	**0.0000**	**302.4302**	**302.4302**	**9.2600e-003**	**0.0000**	**302.6247**

3.7 Paving - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0671	0.6900	0.7822	1.2200e-003		0.0363	0.0363		0.0334	0.0334	0.0000	106.8063	106.8063	0.0345	0.0000	107.5317
Paving	5.4000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0676**	**0.6900**	**0.7822**	**1.2200e-003**		**0.0363**	**0.0363**		**0.0334**	**0.0334**	**0.0000**	**106.8063**	**106.8063**	**0.0345**	**0.0000**	**107.5317**

3.7 Paving - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.9300e-003	2.4900e-003	0.0235	8.0000e-005	6.5600e-003	5.0000e-005	6.6000e-003	1.7400e-003	4.0000e-005	1.7900e-003	0.0000	5.1414	5.1414	2.4000e-004	0.0000	5.1464
Total	**1.9300e-003**	**2.4900e-003**	**0.0235**	**8.0000e-005**	**6.5600e-003**	**5.0000e-005**	**6.6000e-003**	**1.7400e-003**	**4.0000e-005**	**1.7900e-003**	**0.0000**	**5.1414**	**5.1414**	**2.4000e-004**	**0.0000**	**5.1464**

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	0.0671	0.6900	0.7822	1.2200e-003		0.0363	0.0363		0.0334	0.0334	0.0000	106.8062	106.8062	0.0345	0.0000	107.5316
Paving	5.4000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0676**	**0.6900**	**0.7822**	**1.2200e-003**		**0.0363**	**0.0363**		**0.0334**	**0.0334**	**0.0000**	**106.8062**	**106.8062**	**0.0345**	**0.0000**	**107.5316**

3.7 Paving - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.9300e-003	2.4900e-003	0.0235	8.0000e-005	6.5600e-003	5.0000e-005	6.6000e-003	1.7400e-003	4.0000e-005	1.7900e-003	0.0000	5.1414	5.1414	2.4000e-004	0.0000	5.1464
Total	**1.9300e-003**	**2.4900e-003**	**0.0235**	**8.0000e-005**	**6.5600e-003**	**5.0000e-005**	**6.6000e-003**	**1.7400e-003**	**4.0000e-005**	**1.7900e-003**	**0.0000**	**5.1414**	**5.1414**	**2.4000e-004**	**0.0000**	**5.1464**

3.8 Architectural Coating - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	2.7040					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0119	0.0832	0.0991	1.6000e-004		5.1300e-003	5.1300e-003		5.1300e-003	5.1300e-003	0.0000	13.9152	13.9152	9.5000e-004	0.0000	13.9353
Total	**2.7159**	**0.0832**	**0.0991**	**1.6000e-004**		**5.1300e-003**	**5.1300e-003**		**5.1300e-003**	**5.1300e-003**	**0.0000**	**13.9152**	**13.9152**	**9.5000e-004**	**0.0000**	**13.9353**

3.8 Architectural Coating - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.5900e-003	9.7900e-003	0.0923	3.2000e-004	0.0258	1.9000e-004	0.0260	6.8500e-003	1.8000e-004	7.0300e-003	0.0000	20.2229	20.2229	9.4000e-004	0.0000	20.2426
Total	**7.5900e-003**	**9.7900e-003**	**0.0923**	**3.2000e-004**	**0.0258**	**1.9000e-004**	**0.0260**	**6.8500e-003**	**1.8000e-004**	**7.0300e-003**	**0.0000**	**20.2229**	**20.2229**	**9.4000e-004**	**0.0000**	**20.2426**

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	2.7040					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0119	0.0832	0.0991	1.6000e-004		5.1300e-003	5.1300e-003		5.1300e-003	5.1300e-003	0.0000	13.9152	13.9152	9.5000e-004	0.0000	13.9353
Total	**2.7159**	**0.0832**	**0.0991**	**1.6000e-004**		**5.1300e-003**	**5.1300e-003**		**5.1300e-003**	**5.1300e-003**	**0.0000**	**13.9152**	**13.9152**	**9.5000e-004**	**0.0000**	**13.9353**

3.8 Architectural Coating - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.5900e-003	9.7900e-003	0.0923	3.2000e-004	0.0258	1.9000e-004	0.0260	6.8500e-003	1.8000e-004	7.0300e-003	0.0000	20.2229	20.2229	9.4000e-004	0.0000	20.2426
Total	**7.5900e-003**	**9.7900e-003**	**0.0923**	**3.2000e-004**	**0.0258**	**1.9000e-004**	**0.0260**	**6.8500e-003**	**1.8000e-004**	**7.0300e-003**	**0.0000**	**20.2229**	**20.2229**	**9.4000e-004**	**0.0000**	**20.2426**

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	2.2553	4.4400	22.3150	0.0629	4.3077	0.0706	4.3782	1.1521	0.0651	1.2172	0.0000	4,305.6929	4,305.6929	0.1628	0.0000	4,309.1120
Unmitigated	2.2553	4.4400	22.3150	0.0629	4.3077	0.0706	4.3782	1.1521	0.0651	1.2172	0.0000	4,305.6929	4,305.6929	0.1628	0.0000	4,309.1120

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	0.00	0.00	0.00		
Condo/Townhouse	2,581.80	2,581.80	2581.80	6,575,137	6,575,137
Parking Lot	0.00	0.00	0.00		
Single Family Housing	1,916.49	1,916.49	1916.49	4,880,775	4,880,775
Strip Mall	0.00	0.00	0.00		
Total	4,498.29	4,498.29	4,498.29	11,455,912	11,455,912

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
City Park	7.88	7.88	7.88	33.00	48.00	19.00	66	28	6
Condo/Townhouse	7.88	7.88	7.88	41.60	18.80	39.60	86	11	3
Parking Lot	7.88	7.88	7.88	0.00	0.00	0.00	0	0	0
Single Family Housing	7.88	7.88	7.88	41.60	18.80	39.60	86	11	3
Strip Mall	7.88	7.88	7.88	16.60	64.40	19.00	45	40	15

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.512811	0.073496	0.191363	0.130940	0.036084	0.005147	0.012550	0.023118	0.001871	0.002053	0.006546	0.000576	0.003444

4.4 Fleet Mix

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

Percent of Electricity Use Generated with Renewable Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	845.8687	845.8687	0.0341	7.0400e-003	848.7674
NaturalGas Mitigated	0.0308	0.2628	0.1120	1.6800e-003		0.0212	0.0212		0.0212	0.0212	0.0000	304.3124	304.3124	5.8300e-003	5.5800e-003	306.1644
NaturalGas Unmitigated	0.0482	0.4117	0.1754	2.6300e-003		0.0333	0.0333		0.0333	0.0333	0.0000	476.7654	476.7654	9.1400e-003	8.7400e-003	479.6669

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					
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	5.33712e+006	0.0288	0.2459	0.1047	1.5700e-003		0.0199	0.0199		0.0199	0.0199	0.0000	284.8092	284.8092	5.4600e-003	5.2200e-003	286.5425
Strip Mall	11450	6.0000e-005	5.6000e-004	4.7000e-004	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.6110	0.6110	1.0000e-005	1.0000e-005	0.6147
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Condo/Townhouse	3.58567e+006	0.0193	0.1652	0.0703	1.0500e-003		0.0134	0.0134		0.0134	0.0134	0.0000	191.3452	191.3452	3.6700e-003	3.5100e-003	192.5097
Total		**0.0482**	**0.4117**	**0.1754**	**2.6200e-003**		**0.0333**	**0.0333**		**0.0333**	**0.0333**	**0.0000**	**476.7654**	**476.7654**	**9.1400e-003**	**8.7400e-003**	**479.6669**

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					
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	3.39866e+006	0.0183	0.1566	0.0666	1.0000e-003		0.0127	0.0127		0.0127	0.0127	0.0000	181.3653	181.3653	3.4800e-003	3.3300e-003	182.4691
Strip Mall	8690	5.0000e-005	4.3000e-004	3.6000e-004	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005	0.0000	0.4637	0.4637	1.0000e-005	1.0000e-005	0.4666
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Condo/Townhouse	2.29525e+006	0.0124	0.1058	0.0450	6.8000e-004		8.5500e-003	8.5500e-003		8.5500e-003	8.5500e-003	0.0000	122.4833	122.4833	2.3500e-003	2.2500e-003	123.2288
Total		**0.0308**	**0.2628**	**0.1120**	**1.6800e-003**		**0.0212**	**0.0212**		**0.0212**	**0.0212**	**0.0000**	**304.3124**	**304.3124**	**5.8400e-003**	**5.5900e-003**	**306.1644**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
Condo/Townhouse	1.12689e+006	368.2782	0.0148	3.0700e-003	369.5402
Parking Lot	16192	5.2917	2.1000e-004	4.0000e-005	5.3098
Single Family Housing	1.37498e+006	449.3569	0.0181	3.7400e-003	450.8967
Strip Mall	70200	22.9420	9.2000e-004	1.9000e-004	23.0206
Total		**845.8687**	**0.0340**	**7.0400e-003**	**848.7674**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
Condo/Townhouse	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	0	0.0000	0.0000	0.0000	0.0000
Strip Mall	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Residential Interior

Use Low VOC Paint - Residential Exterior

Use Low VOC Paint - Non-Residential Interior

Use Low VOC Paint - Non-Residential Exterior

Use only Natural Gas Hearths

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	3.1238	0.0389	3.3731	1.8000e-004		0.0410	0.0410		0.0408	0.0408	0.0000	326.6201	326.6201	0.0115	5.8900e-003	328.6863
Unmitigated	32.2773	0.4246	38.3867	0.0139		4.9380	4.9380		4.9379	4.9379	467.9298	201.7382	669.6681	0.4372	0.0368	690.2581

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	1.0323					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	2.7188					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	28.4240	0.3856	35.0154	0.0137		4.9194	4.9194		4.9193	4.9193	467.9298	196.2430	664.1728	0.4318	0.0368	684.6510
Landscaping	0.1022	0.0389	3.3714	1.8000e-004		0.0186	0.0186		0.0186	0.0186	0.0000	5.4953	5.4953	5.3300e-003	0.0000	5.6072
Total	**32.2773**	**0.4246**	**38.3867**	**0.0139**		**4.9380**	**4.9380**		**4.9379**	**4.9379**	**467.9298**	**201.7382**	**669.6681**	**0.4372**	**0.0368**	**690.2581**

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	0.2704					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	2.7188					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0325	0.0000	1.7700e-003	0.0000		0.0224	0.0224		0.0222	0.0222	0.0000	321.1248	321.1248	6.1500e-003	5.8900e-003	323.0791
Landscaping	0.1022	0.0389	3.3714	1.8000e-004		0.0186	0.0186		0.0186	0.0186	0.0000	5.4953	5.4953	5.3300e-003	0.0000	5.6072
Total	**3.1238**	**0.0389**	**3.3731**	**1.8000e-004**		**0.0410**	**0.0410**		**0.0408**	**0.0408**	**0.0000**	**326.6201**	**326.6201**	**0.0115**	**5.8900e-003**	**328.6863**

7.0 Water Detail

7.1 Mitigation Measures Water

Use Reclaimed Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

Use Water Efficient Irrigation System

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	170.8768	0.7855	0.0197	193.4867
Unmitigated	211.5267	0.9819	0.0247	239.7970

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 1.78722	6.4891	2.6000e-004	5.0000e-005	6.5114
Condo/Townhouse	16.94 / 10.6796	116.2365	0.5565	0.0140	132.2487
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	12.5747 / 7.92755	86.2833	0.4131	0.0104	98.1692
Strip Mall	0.370363 / 0.226996	2.5177	0.0122	3.0000e-004	2.8677
Total		**211.5267**	**0.9819**	**0.0247**	**239.7970**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 1.46929	5.3348	2.1000e-004	4.0000e-005	5.3531
Condo/Townhouse	13.552 / 8.77981	93.8466	0.4451	0.0112	106.6524
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	10.0598 / 6.51732	69.6631	0.3304	8.2800e-003	79.1689
Strip Mall	0.29629 / 0.186616	2.0324	9.7300e-003	2.4000e-004	2.3123
Total		**170.8768**	**0.7855**	**0.0197**	**193.4867**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	17.8277	1.0536	0.0000	39.9530
Unmitigated	71.3107	4.2143	0.0000	159.8119

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	0.13	0.0264	1.5600e-003	0.0000	0.0591
Condo/Townhouse	119.6	24.2777	1.4348	0.0000	54.4079
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	226.32	45.9409	2.7150	0.0000	102.9566
Strip Mall	5.25	1.0657	0.0630	0.0000	2.3883
Total		**71.3107**	**4.2143**	**0.0000**	**159.8119**

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	0.0325	6.6000e-003	3.9000e-004	0.0000	0.0148
Condo/Townhouse	29.9	6.0694	0.3587	0.0000	13.6020
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	56.58	11.4852	0.6788	0.0000	25.7391
Strip Mall	1.3125	0.2664	0.0158	0.0000	0.5971
Total		**17.8277**	**1.0536**	**0.0000**	**39.9530**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
Generator Sets	2	8.00	260	84	0.74	Diesel

UnMitigated/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
Equipment Type	tons/yr										MT/yr					
Generator Sets	0.0929	0.8232	0.9580	1.7100e-003		0.0436	0.0436		0.0436	0.0436	0.0000	146.9539	146.9539	7.5000e-003	0.0000	147.1114
Total	**0.0929**	**0.8232**	**0.9580**	**1.7100e-003**		**0.0436**	**0.0436**		**0.0436**	**0.0436**	**0.0000**	**146.9539**	**146.9539**	**7.5000e-003**	**0.0000**	**147.1114**

10.0 Vegetation

MOBILE SOURCE EMISSION REDUCTION ADJUSTMENTS FOR HARMONY GROVE VILLAGE SOUTH PROJECT

Methodology for Calculating Reduction Credits for the Project with Design Features

Transportation-related emissions reductions would be achieved through mandatory regulations applicable to all vehicle emissions within the state and are not attributable to specific GHG reduction features of the Project. Energy-related emissions reductions would be achieved partly through state regulations, goals, and policies.

As summarized in Table 1, reduction credits are based on the CARB Scoping Plan reductions for sector-specific activity. For example, Pavley II reductions counted towards the 2020 target is 4 MMT CO_2e and projected 2020 unmitigated transportation-related emissions is 168.2 MMT CO_2e, therefore the reduction is 2.38 percent (4 MMT CO_2e/168.2 MMT CO_2e). This percentage reduction can be applied to the Project's transportation emissions.

Table 1
SCOPING PLAN GHG EMISSION REDUCTIONS
(ANNUAL MMTCO_2e)

Statewide Land Use-Adjusted 2020 GHG Emissions Inventory[1]		AB 32 Scoping Plan GHG Emission Reductions[2]		Percent Reduction
Sector	**Emissions**	**Measure**	**Emissions Reduction**	
Transportation	168.2	Pavley II	4.0	2.38

Source: CARB 2014
[1] From CARB's 2020 BAU Forecast
[2] From CARB's Greenhouse Gas Reductions from Ongoing, Adopted and Foreseeable Scoping Plan Measures

Methodology for Calculating Unmitigated and Mitigated Mobile Emissions

The County of San Diego allows the Project to apply GHG reduction credits for Pavley II towards the Project. Therefore, adjustments were made to the CalEEMod model outputs to account for the allowable reduction as shown in Table 2.

Table 2
UNCORRECTED AND CORRECTED CALEEMOD OUTPUTS FOR PROJECT EMISSIONS - MOBILE
(ANNUAL MT CO_2e)

Source	Project Emissions (uncorrected)	Project Emissions (corrected)[1]
Mobile Emissions	4,309.11	4,206.56

Notes:
All model results include built in emission reductions for Pavley I regulations (model default).
[1] Includes reduction of 2.38% for Pavely II regulations

ATTACHMENT D

ASSESSMENT OF MITIGATION MEASURES

RECOMMENDED BY THE CALIFORNIA AIR RESOURCES BOARD

TO REDUCE GREENHOUSE GAS EMISSIONS

Appendix B of *California's 2017 Climate Change Scoping Plan* (November 2017) is a reference document prepared by the California Air Resources Board (CARB) regarding mitigation measures that could be required of individual projects under the California Environmental Quality Act (CEQA), if feasible, when the local jurisdiction is the lead agency.

CARB states that the appendix "should be viewed as a general reference document;" it "should not be interpreted as official guidance or as dictating requirements." CARB relatedly notes that "[n]ot all of the listed local measures or CEQA measures listed will be relevant to, or appropriate for, a given area or project. Nothing in the Scoping Plan or this appendix limits the discretion conferred to lead agencies in determining the appropriate level and type of mitigation, so long as their decisions are supportable by evidence in the record as required by CEQA. There is no 'one size fits all' solution and different policies will be more suitable in urban and suburban areas versus rural areas, among other considerations."

The purpose of this attachment is to assess the potential applicability of CARB's identified mitigation measures to the Project. Where potentially applicable, this attachment then discusses whether the Project implements the identified mitigation measures and/or other comparable strategies designed to reduce greenhouse gas emissions. As illustrated by the tabular analysis that follows, the Project implements a wide range of strategies that will reduce greenhouse gas emissions on the Project site and within the County of San Diego.

Evaluation of the Project's Utilization of Mitigation Measures
Identified by The California Air Resources Board in Appendix B of the 2017 Scoping Plan Update

Mitigation Options	Project Evaluation
Construction	
Enforce idling time restrictions for construction vehicles	*Consistent*. As a matter of regulatory compliance, construction equipment shall be operated in accordance with the California Air Resources Board's (CARB) Airborne Toxic Control Measure (ATCM) that limits diesel-fueled commercial motor vehicle idling. In accordance with the subject ATCM (see Cal. Code Regs., tit. 13, §2485), the drivers of diesel-fueled commercial motor vehicles meeting certain specifications shall not idle the vehicle's primary diesel engine for longer than five minutes at any location. The ATCM requires the owners and motor carriers that own or dispatch such vehicles to ensure compliance with the ATCM requirements. For additional information, please see https://www.arb.ca.gov/msprog/truck-idling/truck-idling.htm.
Require construction vehicles to operate with the highest tier engines commercially available	*Consistent*. Tier III or higher construction equipment will be used, with the exception of concrete/industrial saws, generator sets, welders, air compressors, or construction equipment where Tier III or higher is not available.
Divert and recycle construction and demolition waste, and use locally-sourced building materials with a high recycled material content to the greatest extent feasible	*Consistent*. As a matter of regulatory compliance, the Project would comply with the County of San Diego's ordinance regarding the disposal of construction and demolition debris. The subject ordinance requires that 90% of inert materials and 70% of all other materials associated with construction and demolition activities be recycled. The ordinance also requires the preparation and submittal of a Construction and Demolition Debris Management Plan and a refundable Performance Guarantee prior to building permit issuance. For additional information, please see http://www.sandiegocounty.gov/dpw/recycling/cdhome.html.

Mitigation Options	Project Evaluation
Minimize tree removal, and mitigate indirect GHG emissions increases that occur due to vegetation removal, loss of sequestration, and soil disturbance	*Consistent.* In order to increase the net number of trees in the county, the Project will plant a minimum of 2,045 trees at build out within the project site as referenced within the Landscape Plan, which is equivalent to more than 4 trees per unit. Mitigation Measure GHG-1 requires the Project to purchase and retire carbon offsets in a quantity sufficient to offset 100 percent of the Project's GHG emissions that are associated with vegetation removal. Finally, the Specific Plan discusses the Project's use of vegetation that is drought-tolerant, native and regionally appropriate, criteria that complies with the guidelines set forth in the County's Water Conservation and Landscape Design Manual.
Utilize existing grid power for electric energy rather than operating temporary gasoline/diesel powered generators	*Consistent.* To the extent practicable and feasible, electricity will be used to power appropriate types and categories of construction equipment (e.g., hand tools). As a PDF, the applicant will develop and provide to all homeowners an informative brochure to educate homeowners regarding water conservation measures, recycling, location of the electric vehicle charging stations, location of outdoor electric outlets to promote using electrical lawn and garden equipment, and location of nearby resources such as dining and entertainment venues, small commercial centers, and civic uses to reduce vehicle miles traveled.
Increase use of electric and renewable fuel powered construction equipment and require renewable diesel fuel where commercially available	*Consistent.* To the extent practicable and feasible, electric and renewable fuel powered construction equipment will be utilized.
Require diesel equipment fleets to be lower emitting than any current emission standard	*Consistent.* To the extent practicable and feasible, diesel equipment fleets that exceed existing emissions standards will be utilized when commercially available in the San Diego region.
Operation	
Comply with lead agency's standards for mitigating transportation impacts under SB 743	*Not Applicable.* The Governor's Office of Planning and Research (OPR) has not yet adopted amendments to the State CEQA Guidelines pursuant to Senate Bill (SB) 743. Additionally, the

Mitigation Options	Project Evaluation
	County of San Diego has not adopted guidelines or guidance regarding the implementation of SB 743 at the jurisdictional level, and its obligation to do so will be triggered upon completion of OPR's amendment process to the State CEQA Guidelines.
Require on-site EV charging capabilities for parking spaces serving the project to meet jurisdiction-wide EV proliferation goals	*Consistent.* The Project would install a 2 dual-port Level 2EV charging station (serving 2 parking spaces) at the public community center.
Allow for new construction to install fewer on-site parking spaces than required by local municipal building code, if appropriate[1] [1] This is not to be confused with the Americans with Disabilities Act (ADA) requirements or other minimum parking requirements for dedicating space to clean air vehicles and/or EV charging infrastructure.	*Not Applicable.*
Dedicate on-site parking for shared vehicles	*Consistent*. As a matter of regulatory compliance, the Project would comply with Section 5.106.5.2 of the 2016 California Green Building Standards Code (CALGreen Code), which requires the provision of designated parking for shared vehicles.
Provide adequate, safe, convenient, and secure on-site bicycle parking and storage in multi-family residential projects and in non-residential projects	*Consistent*. As discussed in the Specific Plan, the Project would provide bicycle parking facilities and bicycle circulation improvements to encourage the use of bicycles (See also ***Improvement Plans***.)
Provide on- and off-site safety improvements for bike, pedestrian, and transit connections, and/or implement relevant improvements identified in an applicable bicycle and/or pedestrian master plan	*Consistent.* The Project would provide infrastructure (e.g., bike lanes and multi-purpose/multi-use trails) and related amenities for bicyclists and pedestrians that is intended to facilitate the creation of integrated, walkable neighborhood. Additionally, the Project site is located within 5 miles to public transit opportunities. The SPRINTER Nordahl Road Station with shuttle partnering through NCTD and the Palomar Medical Center and park and ride options provide multi-modal transportation options. There are no designated bicycle routes designated for this segment per the Mobility Element, however, Country Club Drive and other internal

Mitigation Options	Project Evaluation
	project roadways may be painted with "sharrows" to indicate that bicyclists do share the roadway with vehicles. Marked crosswalks connecting the east and west sides of Country Club Drive would be located from each of the Project entries to the future multi-use trail on the west side of the road to accommodate pedestrians/equestrians in crossing the road.
Require on-site renewable energy generation	*Consistent*. The Project will enhance efficiencies in the building envelopes and the utilization of on-site renewable energy sources (i.e., rooftop solar). Renewable energy would supply 100 percent of the Project's electricity needs through the required installation of rooftop solar PV panels (a photovoltaic solar system) on all residential units and the Center House within the Project site.
Prohibit wood-burning fireplaces in new development, and require replacement of wood-burning fireplaces for renovations over a certain size developments	*Consistent.* As discussed in the Specific Plan, all fireplaces installed in the Project's residential development areas must be natural gas or equivalent non-wood burning fireplaces.
Require cool roofs and "cool parking" that promotes cool surface treatment for new parking facilities as well as existing surface lots undergoing resurfacing	*Consistent*. The Project's parking facilities will be required to comply with the County's Parking Design Manual that requires parking areas to minimize the heat island effect that results from asphalt and/or large building block surfaces such as parking lots. The Project's parking facilities will achieve cooling benefits through the implementation of cool roof design with special roof tiles and radiant barrier insulation. Additionally, the Project's parking facilities will be required to comply the vegetation requirements of the Parking Design Manual, that are mindful of the need to provide shading and reduce the formation of urban heat islands. Building design includes roof overhangs that are sufficient to block the high summer sun, but not the lower winter sun, from penetrating south facing windows. Trees, other landscaping features and other buildings are sited in such a way as to maximize shade in the summer and maximize solar access to walls and windows in the winter.
Require solar-ready roofs	*Consistent*. As discussed above, the Project's residential development would utilize rooftop solar to achieve emission

Mitigation Options	Project Evaluation
	reductions.
Require organic collection in new developments	*Consistent*. The Project will work with the local waste collection services to provide areas for storage and collection of recyclables and yard waste for each residence
Require low-water landscaping in new developments. Require water efficient landscape maintenance to conserve water and reduce landscape waste.	*Consistent*. The Project's landscape and irrigation plans shall be submitted to the County of San Diego for review and approval prior to the start of construction. Such plans are required to comply with the County's Water Conservation Landscaping Ordinance, the Water Efficient Landscape Design Manual, and other enumerated requirements.
Achieve Zero Net Energy performance targets prior to dates required by CALGreen	*Consistent*. The project has incorporated design features that would increase building efficiencies beyond what the current building code requirements by applying a number of sustainable building design elements to the project. For example: High-Efficiency HVAC system, Sealed (tight) air ducts that minimize heating and cooling HVAC losses, tankless water heaters.
Require new construction, including municipal building construction, to achieve third-party green building certifications, such as the GreenPoint Rated program or the LEED rating system	*Consistent*. Many of the Project's design features are consistent with the types of green building strategies recommended by GreenPoint and LEED.
Require the design of bike lanes to connect to the regional bicycle network	*Consistent*. The Project would provide infrastructure (e.g., designated bike lanes and multi-purpose/multi-use trails) and related amenities for bicyclists and pedestrians that is intended to facilitate the creation of integrated, walkable neighborhood. There are no designated bicycle routes designated for this segment per the Mobility Element, however, Country Club Drive and other internal project roadways may be painted with "sharrows" to indicate that bicyclists do share the roadway with vehicles. Marked crosswalks connecting the east and west sides of Country Club Drive would be located at the Project entries to the future multi-use trail on the west side of the road to accommodate pedestrians/equestrians in crossing the road. Additionally, the Project site is located within distance to public transit opportunities.

Mitigation Options	Project Evaluation
	The SPRINTER Nordahl Road Station with shuttle partnering through NCTD and the Palomar Medical Center and park and ride options provide multi-modal transportation options.
Expand urban forestry and green infrastructure in new land development	*Consistent*. The proposed project will increase the amount of vegetation on the site through landscaping slopes and commons areas per the landscape plans. As discussed above, in order to increase the net number of trees in the county, the Project would include the installation of a minimum of 2,045 trees within the project site which is equivalent to more than 4 trees per unit. In addition, the Project will construct a public park and several private parks on site which will include landscaping and trees. A series of Integrated Management Practices will be utilized to capture, collect and treat project storm water as close to the source as practical. A 5-6-foot wide public pathway along the east side of Country Club Drive will be included in the Project. Additionally, a 10-foot wide (cleared) trail easement is located along the west side of Country Club Drive (for future construction of a public trail by others), consistent with the County's Community Trails Master Plan. This trail will cross over Country Club Drive at the southern entrance to HGVS and continue along the northwestern property boundary. It will provide connections to the subregional and regional trail system to the south. Additional rural trail connections are provided on the Project site between the Lake Hodges Trail and the primitive Elfin Forest Trail.
Require preferential parking spaces for park and ride to incentivize carpooling, vanpooling, commuter bus, electric vehicles, and rail service use	*Consistent*. As a matter of regulatory compliance, the Project would comply with Section 5.106.5.2 of the 2016 CALGreen Code, which requires the provision of designated parking for shared vehicles and clean air vehicles.
Require a transportation management plan for specific plans which establishes a numeric target for non-SOV travel and overall VMT	*Consistent. Not applicable*
Develop a rideshare program targeting commuters to major employment centers	*Consistent*. The HOA will work with SANDAG to provide informational materials on rideshare programs like icommute. As a PDF, the applicant will develop and provide to all homeowners

Mitigation Options	Project Evaluation
	an informative brochure to educate homeowners regarding water conservation measures, recycling, location of the electric vehicle charging stations, location of outdoor electric outlets to promote using electrical lawn and garden equipment, and location of nearby resources such as dining and entertainment venues, commercial centers, and civic uses to reduce VMT.
Require the design of bus stops/shelters/express lanes in new developments to promote the usage of mass-transit	*Not applicable. There is currently no bus route adjacent to or nearby the project site.*
Require gas outlets in residential backyards for use with outdoor cooking appliances such as gas barbeques if natural gas service is available	*Consistent*. The Project would provide natural gas outlets in all residential backyards and within the common areas of multi-family development areas.
Require the installation of electrical outlets on the exterior walls of both the front and back of residences to promote the use of electric landscape maintenance equipment	*Consistent*. The Project would provide electrical outlets in all residential backyards and within the common areas of multi-family development areas.
Require the design of the electric boxes in new residential unit garages to promote electric vehicle usage	*Consistent.* The Project would plumb for EV charging station for every residential unit.
Require electric vehicle charging station (Conductive/inductive) and signage for non-residential developments	*Consistent.* The Project would install a 2 dual-port EV Level 2 charging station (serving 2 parking spaces) at the Community Center with signage.
Provide electric outlets to promote the use of electric landscape maintenance equipment to the extent feasible on parks and public/quasi-public lands	*Consistent.* Not applicable.
Require each residential unit to be "solar ready," including installing the appropriate hardware and proper structural engineering	*Consistent*. As discussed above, the Project's residential development would utilize rooftop solar.
Require the installation of energy conserving appliances such as on-demand tank-less water heaters and whole-house fans	*Consistent.* The Project design features include a number of sustainable building design elements that includes tank-less water.
Require each residential and commercial building equip buildings with energy efficient AC units and heating systems with programmable thermostats/timers	*Consistent.* The Project design features include a number of sustainable building design elements that includes energy efficient AC units and heating systems with programmable

Mitigation Options	Project Evaluation
	thermostats/timers.
Require large-scale residential developments and commercial buildings to report energy use, and set specific targets for per-capita energy use	*Not Applicable*.
Require each residential and commercial building to utilize low flow water fixtures such as low flow toilets and faucets	*Consistent.* As a matter of regulatory compliance, the Project would install low flow water fixtures in the project.
Require the use of energy-efficient lighting for all street, parking, and area lighting	*Consistent.* As a matter of regulatory compliance, the Project would be required to use energy efficient fixtures and bulbs in all common outdoor areas.
Require the landscaping design for parking lots to utilize tree cover	*Consistent*. The Project's parking facilities will be required to comply with the County's Parking Design Manual that provides measures that require parking areas to minimize the heat island effect that results from asphalt and/or large building block surfaces such as parking lots. Additionally, the Project's parking facilities will be required to comply with the vegetation requirements of the Parking Design Manual, that also provide measures for shading to reduce the formation of urban heat islands.
Incorporate water retention in the design of parking lots and landscaping	*Consistent.* The Project would install stormwater detention basins, bio-retention areas, permeable pavers and other best management practices described in the Drainage Study (Preliminary CEQA Drainage Study, April 2017 by Project Design Consultants) and Major Stormwater Management Plan (Major Stormwater Quality Management Plan and Hydromodification Study (Major SWQMP) April 2017 by Project Design Consultants), which will contribute to the proposed project being hydrologically invisible. The project proposes and will be required to implement the site design measures and/or source control BMPs and/or treatment control BMPs to reduce potential pollutants to the maximum extent practicable from entering storm water runoff: Refer also to the County of San Diego Water Conservation in Landscaping Ordinance and the Water Efficient Landscape Design Manual for current information regarding irrigation requirements. Irrigation

Mitigation Options	Project Evaluation
	requirements are provided in Section 86.709 of the Water Conservation in Landscaping Ordinance and Section E of the Landscape Design Manual.
Require the development project to propose an off-site mitigation project which should generate carbon credits equivalent to the anticipated GHG emission reductions. This would be implemented via an approved protocol for carbon credits from California Air Pollution Control Officers Association (CAPCOA), the California Air Resources Board, or other similar entities determined acceptable by the local air district	*Consistent*: the Project would purchase and retire carbon offsets that reduce the Project's construction and operational emissions to zero. The carbon offsets would need to be issued by: (i) the Climate Action Reserve, the American Carbon Registry, and the Verified Carbon Standard, (ii) any registry approved by CARB to act as a registry under the State's cap-and-trade program, or (iii) if no registry is in existence as identified in options (i) and (ii), above, then any other reputable registry or entity that issues carbon offsets.
Require the project to purchase carbon credits from the CAPCOA GHG Reduction Exchange Program, American Carbon Registry (ACR), Climate Action Reserve (CAR) or other similar carbon credit registry determined to be acceptable by the local air district	*Consistent*: As discussed above, require the Project to purchase carbon offsets in a quantity that is sufficient to reduce the Project's GHG emissions to zero over a 30-year period.
Encourage the applicant to consider generating or purchasing local and California-only carbon credits as the preferred mechanism to implement its off-site mitigation measure for GHG emissions and that will facilitate the State's efforts in achieving the GHG emission reduction goal	*Consistent*: As discussed above, require the Project to purchase carbon offsets in a quantity that is sufficient to reduce the Project's GHG emissions to zero over a 30-year period. It is anticipated that the Project will utilize a portfolio of carbon offsets that secure reductions in GHG emissions within the State of California, United States and beyond.

PART II

GREENHOUSE GAS ANALYSES REPORT
APRIL 2017

HELIX Environmental Planning

Harmony Grove Village South Project

Greenhouse Gas Analyses Report

PDS2015-GPA-15-002; PDS2015-SP-15-002
PDS2015-TM-5600; PDS2015-REZ-15-003
PDS2015-MUP-15-008; PDS2015-ER-15-08-006

April 2017

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Harmony Grove Village South Project

Greenhouse Gas Analyses Report

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LIST OF TERMS AND ACRONYMS

AB	Assembly Bill
ADT	average daily trip
AEP	Association of Environmental Professionals
APN	Assessor's Parcel Number
BAU	business-as-usual
BMP	best management practice
CAA	Clean Air Act
CAFE	Corporate Average Fuel Economy
CALGreen	California Green Building
CalRecycle	California Department of Resources Recycling and Recovery
CAP	Climate Action Plan
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CAS	California Climate Adaptation Strategy
CAT	Climate Action Team
CBSC	California Building Standards Commission
CCR	California Code of Regulations
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CEUS	California Commercial End Use Survey
CF	chlorofluoride
CFC	chlorofluorocarbon
CGB	California Green Builder
CH_4	methane
CNRA	California Natural Resources Agency
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
County	County of San Diego
EO	Executive Order
EPIC	Energy Policy Initiative Center
F	Fahrenheit
GHG	greenhouse gas
gpd	gallons per day
GWP	global warming potential
HFC	hydrofluorocarbon
HVAC	heating, ventilation, and air conditioning

LIST OF TERMS AND ACRONYMS (cont.)

I-	Interstate
IPCC	Intergovernmental Panel on Climate Change
kBTU	kiloBritish Thermal Units
kWh	kilowatt-hours
LCFS	Low Carbon Fuel Standard
LEED	Leadership in Energy and Environmental Design
LLG	Linscott, Law & Greenspan Engineers
MMT	million metric tons
Montreal Protocol	Montreal Protocol on Substances That Deplete the Ozone Layer
mpg	miles per gallon
mph	miles per hour
MPO	Metropolitan Planning Organization
MT	metric ton
N_2O	nitrous oxide
NHTSA	National Highway Traffic Safety Administration
NO_2	nitrogen dioxide
NO_X	oxides of nitrogen
OAL	Office of Administrative Law
ODC	ozone-depleting substance
OPR	Office of Planning and Research
PDS	Planning & Development Services
PFC	perfluorocarbon
ppm	parts per million
PV	photovoltaic
RASS	Residential Appliance Saturation Survey
RPS	Renewable Portfolios Standard
RTP	Regional Transportation Plan
SANDAG	San Diego Association of Governments
SB	Senate Bill
SCAQMD	South Coast Air Quality Management District
SCS	Sustainable Communities Strategy
SDG&E	San Diego Gas and Electric
SF_6	hexafluoride
SP	service population
SR	State Route

LIST OF TERMS AND ACRONYMS (cont.)

TIA	Traffic Impact Analysis
UNEP	United Nations Environment Program
UNFCCC	United Nations Framework Convention on Climate Change
U.S.	United States
USEPA	U.S. Environmental Protection Agency
VMT	vehicle miles traveled
VOC	volatile organic compound
WTWRF	wastewater treatment and water reclamation facility

EXECUTIVE SUMMARY

This report evaluates the potential greenhouse gas (GHG) emission impacts associated with the Harmony Grove Village (HGV) South Project ("Project" or "Proposed Project"). An assessment was made to estimate the total GHG emissions that would be emitted as a result of construction and operation of the Proposed Project. Construction sources of GHG emissions include heavy construction equipment, worker vehicle miles traveled (VMT), and water use. Operational sources of GHG emissions sources include energy, area sources, water use, transportation, and solid waste.

Project buildout is anticipated to be in 2021; therefore, it would be required to comply with the 2016 Title 24 Energy Code; the 2016 CALGreen Building Code; the Assembly Bill (AB) 341 target for 75 percent diversion of operational waste; reduction of potable water use by 20 percent; low-flow water and bathroom fixtures; reduction of wastewater generation by 20 percent; weather-based irrigation systems; provide areas for storage and collection of recyclables and yard waste; roof anchors and pre-wiring to allow for the installation of photovoltaic (PV) systems; and preparation of a Construction and Demolition Debris Management Plan in compliance with Sections 68.508 through 68.518 of the County of San Diego Municipal Code that requires 90 percent of inerts and 70 percent of all other materials to be recycled.

In addition to the regulatory requirements listed above, the Project would incorporate several design features and best management practices (BMPs) to reduce construction and operational GHG emissions. The energy features would also be verified in the Title 24 Compliance Report submitted during the building permit process. These features include:

- Energy-efficient three-coat stucco exteriors;
- High-efficiency window glazing;
- Energy Star™ or equivalent appliances and energy-efficient lighting;
- Renewable energy would supply 100 percent of the Project's electricity needs, by requiring the installation of rooftop solar PV panels (a photovoltaic system) on all residential units, the Center House and WTWRF located within the Project site. As an alternative to the installation of PV panels on a particular building unit, enrollment in a renewables program similar to SDG&E's SunRate may be substituted if the program can be verified to supply 100 percent of the electricity needs from renewable sources for that building unit for the life of that unit. The applicant must provide the County of San Diego (County) with documentation that the program meets the requirements stated herein by supplying the building unit with its electricity needs from renewable sources over the lifetime of the building. With each building permit, the estimated number of units requiring the installation of solar panel will be provided to the County of San Diego to determine the overall remaining number of units needed to comply with this measure;
- Drought-tolerant landscaping plan;

- High efficiency drip irrigation systems;
- The use of reclaimed water for outdoor irrigation;
- Natural gas fireplaces in residences;
- Electrical outlets on the exterior walls of residences to promote the use of electric landscape maintenance equipment;
- Noticing for homebuyers of incentive and rebate programs available through San Diego Gas & Electric (SDG&E) or other providers that encourage the purchase of electric landscape maintenance equipment;
- An electric car re-charging station in the parking area for the Center House;
- Programmable thermostat timers; and
- High efficiency water heaters.

The Project-related construction activities are estimated to generate approximately 3,682 metric tons (MT) of carbon dioxide equivalent (CO_2e). Construction emissions are amortized over 20 years, such that the proposed construction activities would contribute an average of 184 MT per year of CO_2e emissions. The Project-related operational and amortized construction GHG emissions are estimated to generate approximately 5,272 MT CO_2e per year.

The impact significance determination is based upon an efficiency metric based on compliance with the California's target of reducing 2020 GHG emissions to 1990 levels, consistent with AB 32. The efficiency target for 2020 is 4.9 MT CO_2e per service population (SP) per year. The efficiency metric, adjusted for anticipated Project buildout in 2021, is 4.6 MT CO_2e/SP/year, in keeping with the 2030 emissions reduction goal of Executive Order (EO) B-30-15, codified by Senate Bill (SB) 32. The Project would result in emissions totaling 4.4 MT CO_2e/SP/year. As such, the Project would be consistent with AB 32, and is on the State's reduction trajectory at buildout for meeting the SB 32 and EO S-3-05's reduction targets. GHG emission impacts would be less than significant.

1.0 INTRODUCTION AND PROJECT DESCRIPTION

This report evaluates the significance of the Proposed Project's contribution of greenhouse gas (GHG) emissions to statewide GHG emissions and GHG emissions reduction targets. To evaluate the incremental effect of Project development on statewide and global climate change, it is important to have a basic understanding of the nature of the global climate change problem.

1.1 Understanding Global Climate Change

Global climate change is a change in the average weather of the earth, which can be measured by wind patterns, storms, precipitation, and temperature. The earth's climate is in a state of constant flux with periodic warming and cooling cycles. Extreme periods of cooling are termed "ice ages," which may then be followed by extended periods of warmth. For most of the earth's geologic history, these periods of warming and cooling have been the result of many complicated, interacting natural factors that include: volcanic eruptions which spew gases and particles (dust) into the atmosphere; the amount of water, vegetation, and ice covering the earth's surface; subtle changes in the earth's orbit; and the amount of energy released by the sun (sun cycles). However, since the beginning of the Industrial Revolution around 1750, the average temperature of the earth has been increasing at a rate that is faster than can be explained by natural climate cycles alone.

With the Industrial Revolution came an increase in the combustion of carbon-based fuels such as wood, coal, oil, natural gas, and biomass. Industrial processes have also created emissions of substances that are not found in nature. This in turn has led to a marked increase in the emissions of gases that have been shown to influence the world's climate. These gases, termed "greenhouse" gases, influence the amount of heat that is trapped in the earth's atmosphere. Because recently observed increased concentrations of GHGs in the atmosphere are related to increased emissions resulting from human activity, the current cycle of "global warming" is generally believed to be largely due to human activity. Of late, the issue of global warming or global climate change has arguably become the most important and widely debated environmental issue in the United States and the world. Because climate change is caused by the collective of human actions taking place throughout the world, it is quintessentially a global or cumulative issue.

1.2 Greenhouse Gases of Primary Concern

Global climate change refers to changes in Earth's temperature, wind patterns, precipitation, and storms. Global temperatures are moderated by naturally occurring atmospheric gases, including water vapor, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs, such as HFC-23), perfluorocarbons (PFCs; such as CF_4), and sulfur hexafluoride (SF_6), which are known as GHGs. The potential of a gas to trap heat and warm the atmosphere is measured by its global warming potential (GWP). GHGs either break down or are absorbed over time. Thus, the potential of a gas to contribute to global warming is limited by the time it is in the atmosphere, or its "atmospheric lifetime." To account for these effects, GWPs are calculated over a 100-year time horizon (U.S. Environmental Protection Agency [USEPA] 2010a). Because of its relative abundance in the atmosphere and its relatively long atmospheric lifetime, carbon

dioxide has been designated the reference gas for comparing GWPs. Thus, the 100-year GWP of CO_2 is equal to one (see Table 1, *Global Warming Potential and Atmospheric Lifetimes*).

Table 1
GLOBAL WARMING POTENTIAL AND ATMOSPHERIC LIFETIMES

Gas	Atmospheric Lifetime (Years)	100-year GWP[a]
Carbon Dioxide (CO_2)	50-200	1
Methane (CH_4)[b]	9-15	21
Nitrous oxide (N_2O)	120	310
HFC-23	264	11,700
HFC-125	32.6	2,800
HFC-134a	14.6	1,300
HFC-143a	48.3	3,800
HFC-152a	1.5	140
HFC-227ea	36.5	2,900
HFC-236fa	209	6,300
HFC-4310mee	17.1	1,300
CF_4	50,000	6,500
C_2F_6	10,000	9,200
C_4F_{10}	2,600	7,000
C_6F_{14}	3,200	7,400
SF_6	3,200	23,900

Source: USEPA 2010a.

[a] Global warming potentials (GWPs) used here are calculated over 100-year time horizon.

[b] The methane GWP includes the direct effects and those indirect effects due to the production of tropospheric ozone and stratospheric water vapor. The indirect effect due to the production of CO_2 is not included.

1.2.1 Types of GHGS

Water vapor is the most abundant and variable GHG in the atmosphere. It is not considered a pollutant; it maintains a climate necessary for life. The main source of water vapor is evaporation from the oceans (approximately 85 percent). Other sources include evaporation from other water bodies, sublimation (change from solid to gas) from ice and snow, and transpiration from plant leaves (Association of Environmental Professionals; [AEP] 2007).

CO_2 is an odorless, colorless GHG. Natural sources include decomposition of dead organic matter; respiration of bacteria, plants, animals, and fungus; evaporation from oceans; and volcanic outgassing. Anthropogenic (human-caused) sources of CO_2 include the burning of fuels such as coal, oil, natural gas, and wood. Concentrations are currently around 379 parts per million (ppm); some scientists say that concentrations may increase to 1,130 CO_2 equivalent (CO_2e) ppm by 2100 as a direct result of anthropogenic sources (Intergovernmental Panel on Climate Change; [IPCC] 2007). Some predict that this will result in an average global temperature rise of at least 7.2 degrees Fahrenheit (^oF) (IPCC 2007). The GWP of CO_2 is defined as one; the GWP of other GHGs is expressed as multiples of the GWP of CO_2.

CH_4 is a gas and is the main component of natural gas used in homes. It has a GWP of about 21, or 21 times the GWP of CO_2. A natural source of CH_4 is from the decay of organic matter. Geological deposits known as natural gas fields contain CH_4, which is extracted for fuel. Other sources are from decay of organic material in landfills, fermentation of manure, and cattle digestion.

N_2O, also known as laughing gas, is a colorless gas and has a GWP of about 310. N_2O is produced by microbial processes in soil and water, including reactions that occur in fertilizer containing nitrogen. In addition to agricultural sources, some industrial processes (e.g., nylon and nitric acid production) also emit N_2O. It is used in rocket engines, as an aerosol spray propellant, and in racecars. During combustion, NO_X (NO_X is a generic term for mono-nitrogen oxides, NO and NO_2) is produced as a criteria pollutant and is not the same as N_2O. Very small quantities of N_2O may be formed during fuel combustion by nitrogen and oxygen (American Petroleum Institute [API] 2004).

Fluorocarbons are gases formed synthetically by replacing all hydrogen atoms in CH_4 or ethane with chlorine and/or fluorine atoms. Chlorofluorocarbons (CFCs) are nontoxic, nonflammable, insoluble, and chemically nonreactive in the troposphere (the level of air at earth's surface). Chlorofluorocarbons were first synthesized in 1928 for use as refrigerants, aerosol propellants, and cleaning solvents. They destroy stratospheric ozone; therefore, their production was stopped by requirements of the Montreal Protocol (as described in Section 1.1.1). Fluorocarbons have a GWP of between 140 and 11,700, with the lower end being for HFC-152a and the higher end being for HFC-23.

SF_6 is an inorganic, odorless, colorless, nontoxic, nonflammable gas. It has the highest GWP of any gas (23,900). SF_6 is used for insulation in electric power transmission and distribution equipment, in the magnesium industry, in semiconductor manufacturing, and as a tracer gas for leak detection.

Ozone is a GHG, although unlike the other GHGs, it is relatively short-lived in the troposphere and, therefore, is not global in nature. According to the California Air Resources Board (CARB), it is difficult to make an accurate determination of the contribution of ozone precursors (NO_X and volatile organic compounds [VOCs]) to global warming (CARB 2006).

A summary of the most common naturally occurring and artificial GHGs is provided in Table 1.

Of the gases listed in Table 1, CO_2, CH_4 and N_2O, are produced by both natural and anthropogenic (human) sources. The remaining gases HFCs, chlorofluorides (CFs), and SF_6, are the result of solely human processes.

The increase in the earth's temperature is expected to have wide-ranging effects on the environment. Although global climate change is anticipated to affect all areas of the globe, there are numerous implications of direct importance to California. Statewide average temperatures are anticipated to increase by between 3 and 10.5°F by 2100. Some climate models indicate that this warming may be greater in the summer than in the winter. This could result in widespread adverse impacts to ecosystem health, agricultural production, water use and supply, and energy demand. Increased temperatures could reduce the Sierra Nevada snowpack and put additional

strain on the state's water supply. In addition, increased temperatures would be conducive to the formation of air pollutants, resulting in poor air quality.

It is also important to note that even if GHG emissions were to be eliminated or dramatically reduced, it is projected that the effect of those emissions would continue to affect global climate for centuries.

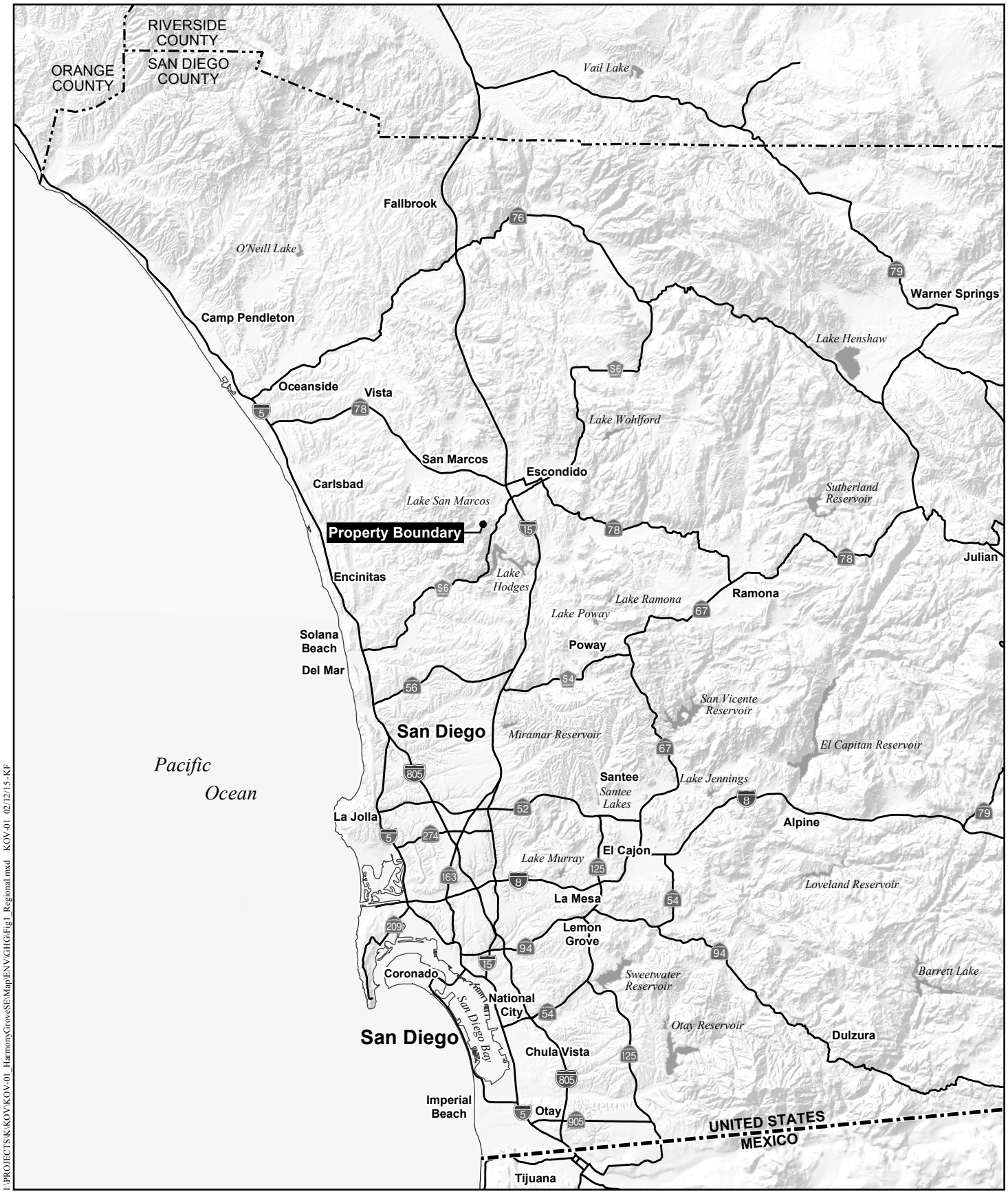
1.3 Project Location and Description

The Project includes an approximately 111-acre site in an unincorporated portion of San Diego County (County) in the community of Harmony Grove (see Figure 1, *Regional Location Map*). The Project contains parcels with the following Assessor's Parcel Numbers (APNs): 235-011-06-00, 238-021-08-00, 238-021-09-00, and 238-021-10-00. The Project site is located approximately 2.5 miles west of Interstate (I-) 15 and approximately 2.6 miles south of State Route (SR) 78. Escondido Creek flows east-west just north of the Project, and the City of Escondido is located to the east. The community of Elfin Forest is located to the west. County open-space parcels (the Del Dios Highland Preserve) abut the southern boundary of the Project. The western Project boundary abuts Country Club Drive. Primary access to the Project vicinity is provided by Harmony Grove Road and Country Club Drive (see Figure 2, *Project Vicinity Map*).

The Proposed Project would contain 453 residential units and a small community center with limited retail/commercial uses (the Center House). The total square footage of structures associated with the Center House use would be approximately 5,000 square feet, with a minimum of 1,500 square feet of commercial use. The residential units would be a mix of multi- and single-family units. The Project design includes an on-site wastewater treatment and water reclamation facility (WTWRF) located in the northwestern portion of the site.[1] This facility would provide treatment for all wastewater generated on site, and would produce reclaimed effluent per applicable regulatory standards for irrigation of on-site landscaping. Based on the loading and design criteria used in the 180,000 gallons per day (gpd) Harmony Grove plant design that serves 1,951 residents, a scaled-down version could be constructed to serve the Proposed Project.

Two Project entries would be provided from Country Club Drive south of the Escondido Creek Crossing. The first would be located approximately one-quarter mile south of the intersection with Harmony Grove Road and would provide direct access to Project's retail/commercial uses. A second entrance would be located approximately 200 feet north of Cordrey Drive and would provide direct access to the Projects' residential uses.

[1] As described in the Project EIR Chapter 4.0, Alternatives, alternative design scenarios were evaluated for the treatment of wastewater. Of the possible scenarios, the full on-site WTWRF proposed for the Project would result in the greatest emissions, and was therefore included in this analysis as a worst case.



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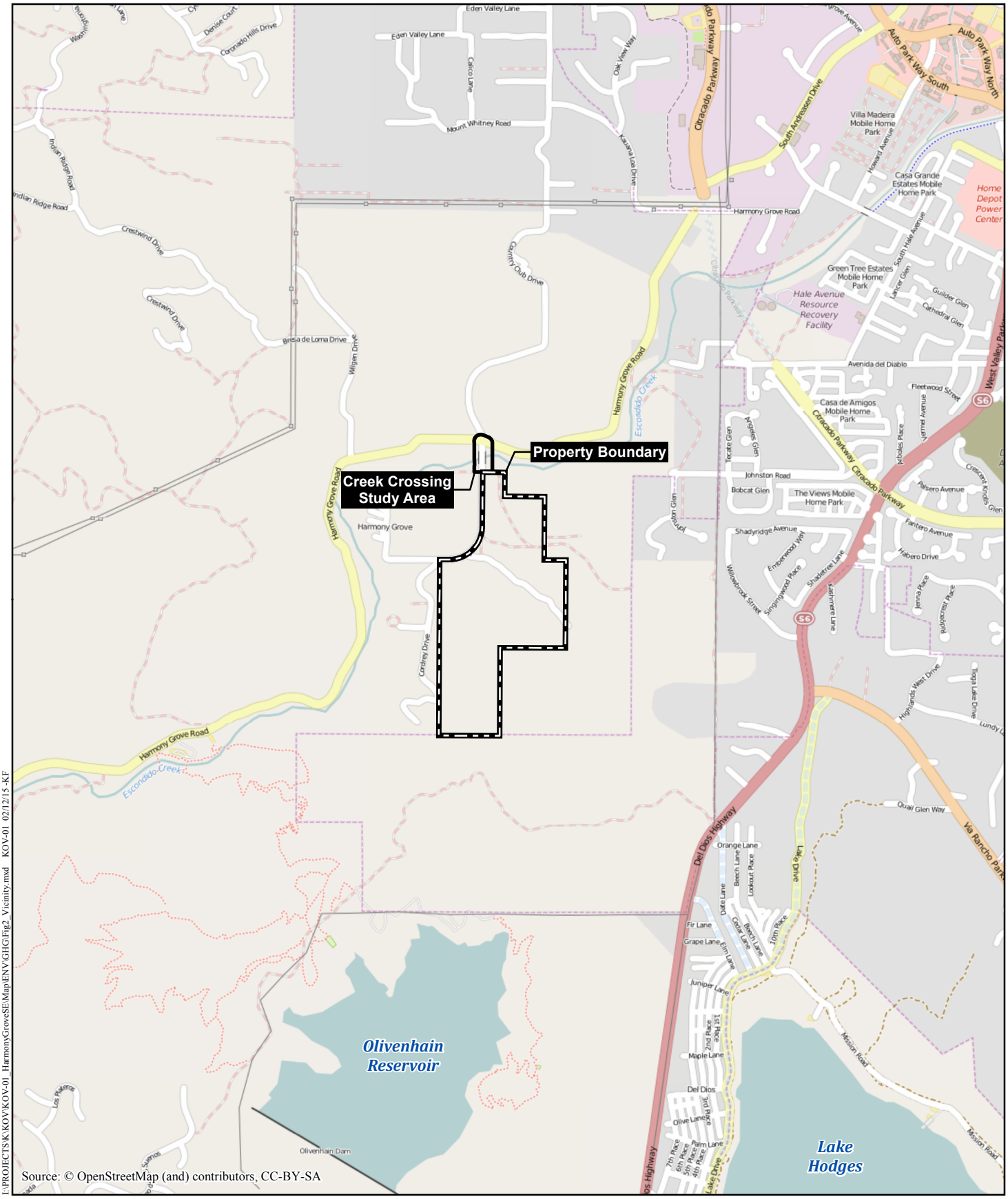
Regional Location Map

HARMONY GROVE VILLAGE SOUTH

HELIX Environmental Planning

N 0 8 Miles

Figure 1



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Source: © OpenStreetMap (and) contributors, CC-BY-SA

Project Vicinity Map

HARMONY GROVE VILLAGE SOUTH

HELIX Environmental Planning

N

0 2,000 Feet

Figure 2

1.4 Regulatory Requirements and Project Design Features that Reduce GHG Emissions

1.4.1 Regulatory Requirements

Energy Efficiencies

The Project will be designed to meet current Title 24 energy efficiency standards. In accordance with the requirements of 2016 Title 24, the Project will:

- Install enhanced ceiling, attic, and wall insulation,
- Install high efficiency window glazing,
- Install whole house fans,
- Have the installation of all heating, ventilation, and air conditioning (HVAC) units verified by a third party, and
- Include roof anchors and pre-wiring to allow for the installation of photovoltaic (PV) systems.

Water Conservation

In accordance with 2016 CALGreen mandatory measures, the Project will:

- Reduce potable water use by 20 percent,
- Install low-flow water fixtures,
- Reduce wastewater generation by 20 percent,
- Install low-flow bathroom fixtures, and
- Install weather-based smart irrigation control systems.

Solid Waste Reduction

- A Construction and Demolition Debris Management Plan will be developed to divert debris from construction and demolition away from landfills. In accordance with County Ordinance Sections 68.508 through 68.518, 90 percent of inerts and 70 percent of all other materials from the Project will be recycled.
- In accordance with 2016 CALGreen criteria, at least 50 percent of construction waste would be diverted from landfills through reuse and recycling.
- Provide areas for storage and collection of recyclables and yard waste in accordance with 2016 CALGreen for operational waste.

1.4.2 Project Design Features

The Project proposes sustainability and efficiency features which would reduce the operational GHG emissions associated with the Proposed Project. These design features have been incorporated into the Project and include Specific Plan policies and performance measures, Project conditions, as well as building permit conditions that will be verified prior to the issuance of final certificate of occupancy. These include, but are not limited to, the following:

Area Source Reductions

Only natural gas fireplaces are to be installed in residences.

Energy Efficiency

The Project would include several features that would improve energy efficiency to comply with 2016 Title 24 energy efficiency requirements, including:

- Renewable energy would supply 100 percent of the Project's electricity needs by requiring the installation of rooftop solar PV panels (a photovoltaic system) on all residential units, the Center House and WTWRF located within the Project site. As an alternative to the installation of PV panels on a particular building unit, enrollment in a renewables program similar to SDG&E's SunRate may be substituted if the program can be verified to supply 100 percent of the electricity needs from renewable sources for that building unit for the life of that unit. The applicant must provide the County with documentation that the program meets the requirements stated herein by supplying the building unit with its electricity needs from renewable sources over the lifetime of the building. With each building permit, the estimated number of units requiring the installation of solar panel will be provided to the County to determine the overall remaining number of units needed to comply with this measure;

- Installation of electrical outlets on the exterior walls of residences to promote the use of electric landscape maintenance equipment.

- Notices will be provided to homebuyers of incentive and rebate programs available through San Diego Gas & Electric (SDG&E) or other providers that encourage the purchase of electric landscape maintenance equipment.

- Provision of an electric car re-charging station in the parking area for the Center House.

- Installation of programmable thermostat timers.

- Installation of energy efficient appliances (Energy Star™ or equivalent).

- Installation of high efficiency water heaters.

- Use of energy-efficient three-coat stucco exteriors.

These energy features would undergo independent third-party inspection and diagnostics as part of the California Green Builder (CGB) verification and commissioning process. The energy features would also be verified in the Title 24 Compliance Report submitted during the building permit process.

Water Conservation

- Outdoor landscaping plan that minimizes turf and maximizes drought-tolerant plants.
- Incorporation of weather-based irrigation controllers, multi-programmable irrigation clocks, and high efficiency drip irrigation systems.
- Utilize reclaimed water for outdoor irrigation.

2.0 ENVIRONMENTAL SETTING

2.1 Worldwide GHG Inventory

The United Nations IPCC constructed several emission trajectories of GHGs needed to stabilize global temperatures and climate change impacts. The IPCC concluded that a stabilization of GHGs at 400 to 450 ppm CO_2e concentration is required to keep global mean warming below 3.6ºF, which is assumed to be necessary to avoid dangerous climate change (AEP 2007).

In the year 2012, total GHG emissions worldwide were estimated at 44,816 million metric tons (MMT) CO_2e (World Resources Institute 2017). The United States contributed the second largest portion of GHG emissions (behind China) at 14 percent of global emissions. Total GHG emissions from the United States were 6,673 MMT CO_2e in 2013 (USEPA 2015). On a national level, approximately 27 percent of GHG emissions were associated with transportation and about 31 percent were associated with electricity generation.

2.2 State and Regional GHG Inventories

CARB performs statewide GHG inventories. The inventory is divided into six broad sectors; agriculture and forestry, commercial, electricity generation, industrial, residential, and transportation. Emissions are quantified in MMT of CO_2e. Table 2, *California Greenhouse Gas Emissions by Sector*, shows the estimated statewide GHG emissions for the years 1990, 2000, 2010, and 2013.

Table 2
CALIFORNIA GREENHOUSE GAS EMISSIONS BY SECTOR
(MMT CO_2e)

Sector	1990	2000	2010	2013
Agriculture and Forestry	23.6 (5%)	32.1 (7%)	34.5 (8%)	36.2 (8%)
Commercial	14.4 (3%)	15.0 (3%)	21.6 (5%)	22.6 (5%)
Electricity Generation	110.6 (26%)	105.2 (22%)	90.5 (20%)	90.6 (20%)
Industrial	103.0 (24%)	105.4 (22%)	102.7 (23%)	104.2 (23%)
Residential	29.7 (7%)	31.8 (7%)	32.2 (7%)	32.3 (7%)
Transportation	150.7 (35%)	178.1 (38%)	173.7 (38%)	172.5 (38%)
Unspecified Remaining	1.3 (<1%)	1.2 (<1%)	0.8 (<1%)	0.8 (<1%)
TOTAL	**433.3**	**468.8**	**456.0**	**459.3**

Source: CARB 2007 and CARB 2015b

As shown in Table 2, statewide GHG source emissions totaled 433 MMT CO_2e in 1990, 469 MMT CO_2e in 2000, 456 MMT CO_2e in 2010, and 459 MMT CO_2e in 2013. According to data from the CARB, it appears that statewide GHG emissions peaked in 2004, and are now beginning to decrease (CARB 2010a). Transportation-related emissions consistently contribute the most GHG emissions, followed by electricity generation and industrial emissions.

A San Diego regional emissions inventory was prepared by the University of San Diego School of Law, Energy Policy Initiative Center (EPIC) that took into account the unique characteristics of the region. Their 2010 emissions inventory for San Diego is duplicated below in Table 3, *San Diego County GHG Emissions by Sector in 2010*. The sectors included in this inventory are somewhat different from those in the statewide inventory.

Table 3
SAN DIEGO COUNTY GREENHOUSE GAS EMISSIONS BY SECTOR IN 2010 (MMT CO_2e)

Sector	2010
On-road Transportation	14.4 (43%)
Electricity	8.3 (25%)
Natural Gas Consumption	2.9 (9%)
Off-Road Equipment and Vehicles	1.4 (4%)
Civil Aviation	1.9 (6%)
Waste	0.6 (2%)
Industrial	1.8 (5%)
Water-Borne Navigation	0.1 (<1%)
Rail	0.3 (1%)
Agriculture/Forestry/Land Use	0.5 (2%)
Other	1.6 (5%)
Sequestration	-0.7 (-2%)
TOTAL	**33.2**

Source: Energy Policy Initiatives Center 2013

According to the San Diego County GHG Inventory prepared by the EPIC in 2013, San Diego County emitted 33 MMT of CO_2e emissions in 2010. The largest contributor of GHGs in San Diego County was the on-road transportation category, which comprised 43 percent (14 MMT CO_2e) of the total amount. The second highest contributor was the electricity category, which contributed 8 MMT CO_2e, or 25 percent of the total. Together, the on-road transportation and electricity categories comprised 68 percent of the total GHG emissions for the County. The remaining amount was contributed by natural gas consumption, civil aviation, industrial processes, off-road equipment, waste, agriculture, rail, water-borne navigation, and other fuels. By 2020, regional GHG emissions are expected to be 43 MMT of CO_2e.

Similar to the statewide emissions, transportation-related GHG emissions contributed the most countywide, followed by emissions associated with energy use.

2.3 On-site GHG Inventory

The existing Project site is currently vacant. There are no current significant sources of on-site GHG emissions. Natural vegetation and soils temporarily store carbon as part of the terrestrial carbon cycle. Carbon is assimilated into plants as they grow and then dispersed back into the environment when they die. Soil carbon accumulates from inputs of plants, roots, and other living components of the soil ecosystem (i.e., bacteria, worms, etc.). Soil carbon is lost through biological respiration, erosion, and other forms of disturbance. The existing GHG emissions are likely to be negligible.

2.4 Consequences of Global Climate Change

The anticipated consequences of global climate change have the potential to result in adverse impacts. Any increase in statewide average temperatures could result in widespread adverse impacts to ecosystem health, agricultural production, water use and supply, and energy demand. Increased temperatures could also reduce the Sierra Nevada snowpack and put additional strain on the region's water supply. In addition, increased temperatures would be conducive to the formation of air pollutants resulting in poor air quality.

To effectively address the challenges that a changing climate will bring, the State of California strengthened its commitment to climate adaptation and mitigation (i.e., reducing state GHG emissions) policies when Governor Arnold Schwarzenegger signed Executive Order (EO) S-13-08 on November 14, 2008. The order called on state agencies to develop California's first ever strategy to identify and prepare for these expected climate impacts. The California Natural Resources Agency (CNRA) has taken the lead in developing this adaptation strategy, working through the Climate Action Team (CAT). Seven sector-specific working groups led by 12 state agencies, boards and commissions, and numerous stakeholders were convened for this effort. Adaptation is a relatively new concept in California policy. The 2009 California Climate Adaptation Strategy (CAS) report summarizes the best-known science on climate change impacts in the state to assess vulnerability and outline possible solutions that can be implemented within and across state agencies to promote resiliency (CNRA 2009). This is the first step in an ongoing, evolving process to reduce California's vulnerability to climate impacts.

Future residents of the Proposed Project site could be exposed to increased risk of dehydration, heat stroke, heat exhaustion, heart attack, stroke, and respiratory disease. These risks, however, would be no different from those experienced by the San Diego region as a whole under the described scenario. Increased temperatures would result in more frequent use of air conditioning that would increase energy costs to residents, and could put a strain on the area's energy supplies. Because the Proposed Project is located inland well above sea level, no impacts related to sea level rise are anticipated.

3.0 REGULATORY SETTING

All levels of government have some responsibility for the protection of air quality, and each level (international, federal, state, and regional/local) has specific responsibilities relating to air quality regulation. GHG emissions and the regulation of GHGs is a relatively new component of air quality.

3.1 Federal Greenhouse Gas Regulations

3.3.1 Federal Clean Air Act

The U.S. Supreme Court ruled on April 2, 2007, in *Massachusetts v. U.S. Environmental Protection Agency*, that CO_2 is an air pollutant, as defined under the Clean Air Act (CAA), and that the USEPA has the authority to regulate emissions of GHGs. The USEPA announced that GHGs (including CO_2, CH_4, N_2O, HFC, PFC, and SF_6) threaten the public health and welfare of the American people. This action was a prerequisite to finalizing the USEPA's GHG emissions standards for light-duty vehicles, which were jointly proposed by the USEPA and the United States Department of Transportation's National Highway Traffic Safety Administration (NHTSA). The standards were established on April 1, 2010 for 2012 through 2016 model year vehicles and on October 15, 2012 for 2017 through 2025 model year vehicles (USEPA 2011; USEPA and NHTSA 2012).

3.1.2 Corporate Average Fuel Economy Standards

The USEPA and the NHTSA have been working together on developing a national program of regulations to reduce GHG emissions and to improve fuel economy of light-duty vehicles. The USEPA is finalizing the first-ever national GHG emissions standards under the CAA, and the NHTSA is finalizing Corporate Average Fuel Economy (CAFE) standards under the Energy Policy and Conservation Act. On April 1, 2010, the USEPA and NHTSA announced a joint Final Rulemaking that established standards for 2012 through 2016 model year vehicles. This was followed up on October 15, 2012, when the agencies issued a Final Rulemaking with standards for model years 2017 through 2025. The rules require these vehicles to meet an estimated combined average emissions level of 250 grams per mile by 2016, decreasing to an average industry fleet-wide level of 163 grams per mile in model year 2025. The 2016 standard is equivalent to 35.5 miles per gallon (mpg), and the 2025 standard is equivalent to 54.5 mpg if the levels were achieved solely through improvements in fuel efficiency. The agencies expect, however, that a portion of these improvements will be made through improvements in air conditioning leakage and the use of alternative refrigerants that would not contribute to fuel

economy. These standards would cut GHG emissions by an estimated 2 billion metric tons (MT) and 4 billion barrels of oil over the lifetime of the vehicles sold under the program (model years 2017–2025). The combined USEPA GHG standards and NHTSA CAFE standards resolve previously conflicting requirements under both federal programs and the standards of the State of California and other states that have adopted the California standards (USEPA 2011; USEPA and NHTSA 2012).

3.2 California Greenhouse Gas Regulations

3.2.1 California Code of Regulations, Title 24, Part 6

California Code of Regulations (CCR) Title 24 Part 6: California's Energy Efficiency Standards for Residential and Nonresidential Buildings were first established in 1978 in response to a legislative mandate to reduce California's energy consumption. Energy-efficient buildings require less electricity, natural gas, and other fuels. Electricity production from fossil fuels and on-site fuel combustion (typically for water heating) results in GHG emissions.

The Title 24 standards are updated approximately every three years to allow consideration and possible incorporation of new energy efficiency technologies and methods. The latest update to the Title 24 standards occurred in 2016 and went into effect on January 1, 2017. The 2016 update to the Building Energy Efficiency Standards focuses on several key areas to improve the energy efficiency of newly constructed buildings and additions and alterations to existing buildings. The most significant efficiency improvements to the residential Standards include improvements for attics, walls, water heating, and lighting. The Standards are divided into three basic sets. First, there is a basic set of mandatory requirements that apply to all buildings. Second, there is a set of performance standards – the energy budgets – that vary by climate zone (of which there are 16 in California) and building type; thus the Standards are tailored to local conditions. Finally, the third set constitutes an alternative to the performance standards, which is a set of prescriptive packages that are basically a recipe or a checklist compliance approach.

3.2.2 California Code of Regulations, Title 24, Part 11, California Green Building Standards Code

The California Green Building Standards Code (CALGreen Code; 24 CCR, Part 11) is a code with mandatory requirements for new residential and nonresidential buildings (including buildings for retail, office, public schools, and hospitals) throughout California. The code is Part 11 of the California Building Standards Code in Title 24 of the CCR (CBSC 2016). The current 2016 Standards for new construction of, and additions and alterations to, residential and nonresidential buildings went into effect on January 1, 2017.

The development of the CALGreen Code is intended to (1) cause a reduction in GHG emissions from buildings; (2) promote environmentally responsible, cost-effective, healthier places to live and work; (3) reduce energy and water consumption; and (4) respond to the directives by the Governor. In short, the code is established to reduce construction waste; make buildings more efficient in the use of materials and energy; and reduce environmental impact during and after construction.

The CALGreen Code contains requirements for storm water control during construction; construction waste reduction; indoor water use reduction; material selection; natural resource conservation; site irrigation conservation; and more. The code provides for design options allowing the designer to determine how best to achieve compliance for a given site or building condition. The code also requires building commissioning, which is a process for the verification that all building systems, like heating and cooling equipment and lighting systems, are functioning at their maximum efficiency.

3.2.3 Executive Order S-3-05

On June 1, 2005, EO S-3-05 proclaimed that California is vulnerable to climate change impacts. It declared that increased temperatures could reduce snowpack in the Sierra Nevada, further exacerbate California's air quality problems, and potentially cause a rise in sea levels. In an effort to avoid or reduce climate change impacts, EO S-3-05 calls for a reduction in GHG emissions to the year 2000 level by 2010, to year 1990 levels by 2020, and to 80 percent below 1990 levels by 2050.

3.2.4 Assembly Bill 32 – Global Warming Solutions Act of 2006

The California Global Warming Solutions Act of 2006, widely known as AB 32, requires that the CARB develop and enforce regulations for the reporting and verification of statewide GHG emissions. CARB is directed to set a GHG emission limit, based on 1990 levels, to be achieved by 2020. The bill requires CARB to adopt rules and regulations in an open public process to achieve the maximum technologically feasible and cost-effective GHG reductions.

3.2.5 Executive Order B-30-15

On April 29, 2015, EO B-30-15 established a California GHG reduction target of 40 percent below 1990 levels by 2030. The EO aligns California's GHG reduction targets with those of leading international governments, including the 28-nation European Union. California is on track to meet or exceed the target of reducing GHG emissions to 1990 levels by 2020, as established in AB 32. California's new emission reduction target of 40 percent below 1990 levels by 2030 will make it possible to reach the ultimate goal established by EO S-3-05 of reducing emissions 80 percent under 1990 levels by 2050.

3.2.6 Senate Bill 32

As a follow up to AB 32 and in response to EO B-30-15, SB 32 was passed by the California legislature in August 2016 and signed by Governor Brown in September 2016 to codify the EO's California GHG reduction target of 40 percent below 1990 levels by 2030.

3.2.7 Assembly Bill 197

A condition of approval for SB 32 was the passage of AB 197. AB 197 requires that CARB consider the social costs of GHG emissions and prioritize direct reductions in GHG emissions at mobile sources and large stationary sources. AB 197 also gives the California legislature more oversight over CARB through the addition of two legislatively appointed members to CARB and

the establishment a legislative committee to make recommendations about CARB programs to the legislature.

3.2.8 Assembly Bill 1493 – Vehicular Emissions of Greenhouse Gases

AB 1493 (Pavley) requires that CARB develop and adopt regulations that achieve "the maximum feasible reduction of GHGs emitted by passenger vehicles and light-duty truck and other vehicles determined by CARB to be vehicles whose primary use is noncommercial personal transportation in the State." On September 24, 2009, CARB adopted amendments to the Pavley regulations that intend to reduce GHG emissions in new passenger vehicles from 2009 through 2016. The amendments bind California's enforcement of AB 1493 (starting in 2009), while providing vehicle manufacturers with new compliance flexibility. The amendments also prepare California to merge its rules with the federal CAFE rules for passenger vehicles (CARB 2013). In January 2012, CARB approved a new emissions-control program for model years 2017 through 2025. The program combines the control of smog, soot, and global warming gases and requirements for greater numbers of zero-emission vehicles into a single packet of standards called Advanced Clean Cars (CARB 2013).

3.2.9 Assembly Bill 75

AB 75 was passed in 1999 and mandates state agencies to develop and implement an integrated waste management plan to reduce GHG emissions related to solid waste disposal and diversion (recycling). In addition, the bill mandates that community service districts providing solid waste services report the disposal and diversion information to the appropriate city, county, or regional jurisdiction. Since 2004, the bill requires diversion of at least 50 percent of the solid waste from landfills and transformation facilities, and submission to the California Integrated Waste Management Board of an annual report describing the diversion rates.

3.2.10 Assembly Bill 341

The state legislature enacted AB 341 (California Public Resource Code Section 42649.2), increasing the diversion target to 75 percent statewide. AB 341 requires all businesses and public entities that generate 4 cubic yards or more of waste per week to have a recycling program in place. In addition, multi-family apartments with five or more units are also required to implement a recycling program. The final regulation was approved by the Office of Administrative Law (OAL) on May 7, 2012, and went into effect on July 1, 2012.

3.2.11 Executive Order S-01-07

This EO, signed by Governor Schwarzenegger on January 18, 2007, directs that a statewide goal be established to reduce the carbon intensity of California's transportation fuels by at least 10 percent by the year 2020. It orders that a Low Carbon Fuel Standard (LCFS) for transportation fuels be established for California and directs the CARB to determine whether a LCFS can be adopted as a discrete early action measure pursuant to AB 32. CARB approved the LCFS as a discrete early action item with a regulation adopted and implemented in April 2010. Although challenged in 2011, the Ninth Circuit reversed the District Court's opinion and rejected arguments that implementing LCFS violates the interstate commerce clause in September 2013. CARB is therefore continuing to implement the LCFS statewide.

3.2.12 Senate Bill 97 – CEQA: Greenhouse Gas Emissions

SB 97 required the OPR to prepare, develop, and transmit to the Resources Agency guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions, as required by CEQA, including but not limited to, effects associated with transportation or energy consumption. The Resources Agency certified and adopted the guidelines on December 31, 2009. The CEQA guidelines provide the lead agency with broad discretion in determining what methodology is used in assessing the impacts of GHG emissions in the context of a particular project. The OPR guidance also states that the lead agency can rely on qualitative or other performance based standards for estimating the significance of GHG emissions, although the CEQA Guidelines did not establish a threshold of significance.

3.2.13 Senate Bill 375

Senate Bill (SB) 375 aligns regional transportation planning efforts, regional GHG reduction targets, and affordable housing allocations. Metropolitan Planning Organizations (MPOs) are required to adopt a Sustainable Communities Strategy (SCS), which allocates land uses in the MPO's Regional Transportation Plan (RTP). Qualified projects consistent with an approved SCS or Alternative Planning Strategy categorized as "transit priority projects" would receive incentives to streamline CEQA processing.

3.3 California Greenhouse Gas Programs and Plans

3.3.1 California Air Resources Board: Scoping Plan

On December 11, 2008, the CARB adopted the Scoping Plan (CARB 2008b) as directed by AB 32. The Scoping Plan proposes a set of actions designed to reduce overall GHG emissions in California to the levels required by AB 32. Measures applicable to development projects include those related to energy-efficiency building and appliance standards, the use of renewable sources for electricity generation, regional transportation targets, and green building strategy. Relative to transportation, the Scoping Plan includes nine measures or recommended actions related to reducing vehicle miles traveled and vehicle GHGs through fuel and efficiency measures. These measures would be implemented statewide rather than on a project-by-project basis.

The CARB released the First Update to the Climate Change Scoping Plan in May 2014 to provide information on the development of measure-specific regulations and to adjust projections in consideration of the economic recession (CARB 2014a). To determine the amount of GHG emission reductions needed to achieve the goal of AB 32 (i.e., 1990 levels by 2020) CARB developed a forecast of the AB 32 Baseline 2020 emissions, which is an estimate of the emissions expected to occur in the year 2020 if none of the foreseeable measures included in the Scoping Plan were implemented. CARB estimated the AB 32 Baseline 2020 to be 509 MMT CO_2e. The Scoping Plan's current estimate of the necessary GHG emission reductions is 78 MMT CO_2e (CARB 2014b). This represents an approximately 15.32 percent reduction. The CARB is forecasting that this would be achieved through the following reductions by sector: 25 MMT CO_2e for energy; 23 MMT CO_2e for transportation; 5 MMT CO_2e for high-GWP GHGs, and 2 MMT CO_2e for waste. The remaining 23 MMT CO_2e would be achieved through Cap-and-Trade Program reductions. This reduction is flexible; if CARB receives new

information and changes the other sectors' reductions to be less than expected, the agency can increase the Cap-and-Trade reduction (and vice versa).

In response to EO B-30-15 and SB 32, all state agencies with jurisdiction over sources of GHG emissions were directed to implement measures to achieve reductions of GHG emissions to meet the 2030 and 2050 targets. CARB was directed to update the Scoping Plan to reflect the 2030 target, and therefore, is moving forward with the update process. The mid-term target is critical to help frame the suite of policy measures, regulations, planning efforts, and investments in clean technologies and infrastructure needed to continue driving down emissions. CARB is moving forward with a second update to the Scoping Plan to reflect the 2030 target set by Executive Order B-30-15 and codified by SB 32. The 2017 Climate Change Scoping Plan Update, Proposed Strategy for Achieving California's 2030 Greenhouse Gas Target, was released in draft form on January 20, 2017. The Second Update to the Scoping Plan is scheduled to be finalized in June 2017.

3.4 Local Policies and Plans: County of San Diego

3.4.1 County of San Diego General Plan

The County General Plan, as updated in 2011, includes a plan to balance population growth and development with infrastructure needs and resource protection. The current General Plan is based on smart growth and land planning principles that will reduce vehicle miles traveled (VMT) and, thus, result in a reduction of GHGs. This will be accomplished by locating future development within and near existing infrastructure. The General Plan includes a number of policies in the Conservation Element that encourage the design of new buildings that incorporate principles of sustainability and reduce vehicle and utility usage.

3.4.2 San Diego County Green Building Incentive Program

The County has a Green Building Incentive Program designed to promote the use of resource efficient construction materials, water conservation, and energy efficiency in new and remodeled residential and commercial buildings. The program offers incentives of reduced plan check turnaround time and a 7.5 percent reduction in plan check and building permit fees for projects meeting minimum program requirements, which include options for natural resource conservation, water conservation, and energy conservation.

3.4.3 County of San Diego Construction and Demolition Recycling Ordinance

The County has a construction and demolition recycling ordinance that is designed to divert debris from construction and demolition projects away from landfill disposal in the unincorporated County of San Diego. The ordinance requires that 90 percent of inerts and 70 percent of all other construction materials from a project be recycled. In order to comply with the ordinance, applicants must submit a Construction and Demolition Debris Management Plan and a fully refundable Performance Guarantee prior to building permit issuance.

3.4.4 San Diego Association of Governments: San Diego Forward: The Regional Plan

The Regional Plan (San Diego Association of Governments [SANDAG] 2015) is the long-range planning document developed to address the region's housing, economic, transportation, environmental, and overall quality-of-life needs. The Regional Plan establishes a planning framework and implementation actions that increase the region's sustainability and encourage "smart growth while preserving natural resources and limiting urban sprawl." The Regional Plan encourages the regions and the County to increase residential and employment concentrations in areas with the best existing and future transit connections, and to preserve important open spaces. The focus is on implementation of basic smart growth principles designed to strengthen the integration of land use and transportation.

4.0 GUIDELINES FOR DETERMINING SIGNIFICANCE

The assessment of climate change impacts is by its nature a cumulative impact, as no individual project has the ability to affect the climate on a global scale. Based on Appendix G.VII of the State CEQA Guidelines, a project would have a significant environmental impact if it would:

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

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

The County General Plan requires that the County adopt a Climate Action Plan (CAP) and thereafter GHG guidelines. At this time, the development of the CAP is being processed by the County under the supervision of a court pursuant to a judgment voiding a prior CAP. The County General Plan does not contain policies prohibiting the County from adopting a non-CAP-based threshold prior to adoption of a court-approved CAP. At this time, the County has not adopted GHG guidelines for general use as part of its environmental review process via an ordinance, resolution, rule or regulation developed through public review process (see CEQA Guidelines section 15064.7 [b]).

Accordingly, the determination of significance is governed by CEQA Guidelines 15064.4, entitled "Determining the Significance of Impacts from Greenhouse Gas Emissions." CEQA Guidelines 15064.4(a) states:

> [t]he determination of the significance of greenhouse gas emissions calls for *a careful judgment by the lead agency consistent with the provisions in section 15064*. A lead agency should make a good-faith effort, based to the extent possible on scientific and factual data, to describe, calculate or estimate the amount of greenhouse gas emissions resulting from a project. A lead agency shall have discretion to determine, *in the context of a particular project*, whether to … [use a quantitative model or qualitative model] (emphasis added).

The analysis contained herein relies upon an efficiency metric not based on the future County CAP and not based upon guidelines adopted by a public hearing process. It is, rather, a metric based on the exercise of careful judgment about the setting of the Project, believed to be appropriate in the context of this particular Project.

The California Supreme Court in *Center for Biological Diversity v. California Department of Fish and Wildlife* (November 30, 2015, Case No. 217763, hereafter referred to as the Newhall Ranch decision), suggested several approaches for determining significance of GHG emissions that would be appropriate, but did not foreclose other methodologies that may be used by lead agencies. Some of the Court's suggested approaches were explored as described below in the context of its applicability to the proposed Project.

Performance-Based Reduction – BAU Approach

Performance-based approaches are based on a percentage reduction from a projected future condition. For example, reducing future business-as-usual (BAU) emissions by the AB 32 target of 29 percent (below 2020 BAU levels) through a combination of State measures, project design features (e.g., renewable energy), or mitigation is a performance-based approach. The performance-based approach is based on the project's reduction in emissions from an unmitigated condition. Based upon the Newhall Ranch decision, relating a given project to the achievement of State reduction would likely require adjustments to ARB's statewide BAU model not only to isolate new development emissions but also to consider unique geographic conditions that would be required to use the BAU performance-based methodology for a specific project. To date, this type of adjustment to the statewide BAU target has not been formulated and, therefore, is not appropriate for the Proposed Project's analysis.

Compliance with a Qualified GHG Reduction Plan

Under this approach, a qualified plan may be used in the cumulative impact analysis for later projects when the analysis "identifies those requirements specified in the plan that apply to the project." For a GHG reduction plan to be considered a qualified plan, it must meet certain criteria established under State CEQA Guidelines Sections 15183.5 (b) and 15064.4, also specified above. Consequently, if a project is consistent with a local CAP that was created to meet AB 32's GHG targets, then the project would be considered consistent with statewide GHG reduction goals for 2020. As discussed above, the San Diego County Superior Court set aside the approval of the County CAP and the County has not completed a new CAP that would set forth GHG reduction targets and reduction measures. Therefore, pending approval of the County's CAP, this approach was determined not to be appropriate for the Project's analysis.

Numerical Bright-Line

The screening level published by the California Air Pollution Control Officers Association (CAPCOA) was used for determining the need for additional analysis and mitigation for GHG-related impacts under CEQA. The CAPCOA white paper, *CEQA and Climate Change*, recommends a 900 MT CO_2e/year screening level to determine the size of projects that would be likely to have a less than considerable contribution to the cumulative impact of climate change. Projects exceeding this level would require further analysis and mitigation, as necessary

(CAPCOA 2008). As the proposed Project's emissions would exceed this screening level, further analysis is required.

Efficiency Metric (Per Service Population)

Another type of quantitative analysis approach is an efficiency-based metric. Efficiency metrics represent the GHG efficiency needed for development to achieve California's GHG emissions target established under AB 32. The intent of AB 32 is to accommodate a population and economic growth in California, but in a way that achieves a lower rate of GHG emissions statewide. Typical efficiency-based metrics are based on the land use sector (residential and commercial uses) and only account for land use-related emissions and residential population and employment. While the Newhall Ranch decision did not specifically recommend the efficiency-based approach, the ruling did note that efficiency metric approaches may be appropriate for determining significance of GHG emissions under particular circumstances.

An efficiency metric assesses the GHG efficiency of a project on a "service population (SP)" basis. The metric represents the rate of emissions needed to achieve a fair share of the State's emissions mandate embodied in AB 32. One method for determining a fair share contribution quantitatively is to determine if a project's per service person (i.e., residents and employees of the project) GHG efficiency level is more or less than the GHG efficiency level that would be needed for a jurisdiction to achieve the goals mandated by AB 32 and SB 32.

Based on this analysis, which included an examination of the limitations of each of these alternate approaches, it was determined that the efficiency metric is the most responsive to this Project given that these are the best emissions data available at this time. Furthermore, the efficiency metric approach is one of the methods for analyzing GHG emissions discussed in the Biological Diversity v. California Department of Fish and Wildlife (2015) 224 Cal.App.4th 1105 (Newhall Ranch case). Specifically, the Supreme Court noted that numeric approaches may be appropriate for determining significance of GHG emissions, and emphasized the consideration of GHG efficiency (62 Cal.4th at 220, 230). Therefore, the validity of using the efficiency metric approach is supported by the Supreme Court ruling in the Newhall Ranch case.

Efficiency metric analysis has also been recommended for land use sector projects by agencies such as the Bay Area Air Quality Management District (AQMD), the San Luis Obispo County Air Pollution Control District (APCD), and the South Coast AQMD. These agencies widely use this methodology, but consistent with the County, have not officially adopted it.

AEP's White Paper also specifically suggested the efficiency metric as one possible methodology for analyzing a project's GHG impacts post-Newhall Ranch: "Efficiency thresholds have been developed for land use sector projects based on AB 32 targets and are in common use by certain lead agencies." (Table 1: CEQA Project Significance Threshold Concepts in Light of the Newhall Ranch Ruling and Post-2020 Concerns, Page 8).

Three sources of GHG inventories were evaluated as the basis of developing an efficiency metric to use for the Project analysis. The first two sources are based on localized data for San Diego County and the third consists of data adjusted from the CARB's 2008 Scoping Plan. The comparison of GHG inventory sources provides evidence about the relationship between Project

emissions and assumptions made in the state's Scoping Plan to achieve statewide GHG reduction targets within AB 32 and SB 32.

As part of the San Diego County General Plan Update Environmental Impact Report (EIR) in 2011 (County 2011), a Greenhouse Gas Inventory was prepared by the County (County 2009). The GHG inventory report primarily used the (then current) 2008 University of San Diego's Energy Policy Initiatives Center (EPIC) GHG inventory for San Diego County as the source for the GHG emission estimates for 1990 and 2006, with emission projections to 2020 (Anders et al. 2008). Not all of the 14 categories in the EPIC study were included in the County's community inventory. Those that were not typically included in community inventories or were considered of limited relevance to the unincorporated area were not used. The land use sectors that were used included electricity (including water usage), natural gas, on-road transportation, off-road vehicles and equipment, waste, other fuels, wildfire, and livestock (County 2009). The GHG emissions inventory from County government facilities and operations was calculated using the Clean Air & Climate Protection model and separated from the community inventory. The County followed a basic approach for the community-wide emissions using a per capita method to calculate the portion of the County inventory allocated to the unincorporated County using SANDAG population estimates for a given analysis year. The 2009 GHG Inventory Report concluded that total community-wide emissions in the unincorporated County of San Diego in 1990 comprised approximately 5,139,821 MT of CO_2e (not including County government facility-related emissions). Thus, the total community-wide 2020 GHG emission target for the County in 2020 pursuant to EO S-3-05 would be 5,139,821 MT CO_2e/year. According to SANDAG, the unincorporated County of San Diego is estimated to have a total 2020 population of 545,451 with approximately 114,338 jobs. Thus, the 2020 service population for the County would be 659,789 (SANDAG 2016). In order to achieve the County emission level of 5,139,821 MT of CO2e, in accordance with the County's General Plan, the efficiency target in 2020 would be approximately 7.8 MT CO_2e/SP/year.

To provide a more accurate estimate of community-wide GHG emissions than was reported in the General Plan Update EIR, the County updated its existing community-wide inventories for the 2012 Draft CAP using the methodologies described in the CARB Local Government Operations Protocol (LGOP) (CARB 2010b). Because the substantial data required for this protocol were not available for 1990 emissions, the County followed the CARB-recommended practice of reducing (then current) baseline emissions (2006 for government operations, 2005 for community-wide) by 15 percent to estimate 1990 emissions. The land use sectors included in the 2012 CAP included transportation, residential energy, commercial/industrial energy, agriculture, solid waste, wastewater, potable water, and other (construction, light commercial, industrial, lawn and gardening, and off-road vehicles) emissions. The 2012 CAP concluded that total emissions in the County of San Diego in 2005 (not including County government facility-related operations) comprised approximately 4,512,580 MT of CO_2e (County 2012). Accordingly, a 15 percent reduction from the baseline year GHG emissions in the County of San Diego would have totaled approximately 3,835,693 MT CO_2e/year. Thus, the total 2020 GHG emission target for the County pursuant to EO S-3-05 would be 3,835,693 MT CO_2e/year. Applying SANDAG's County 2020 service population of 659,789, the efficiency target in 2020 in accordance with the County's 2012 Draft CAP would be approximately 5.8 MT CO_2e/year.

To develop the efficiency metric for 2020 based on CARB's Scoping Plan, non-land use-related sectors in CARB's 1990 GHG inventory were removed to adjust the inventory to account specifically for land use projects. This process segregates out those emission sources that would not be applicable to land use projects. The land-use-driven sector inventory for 1990 was divided by the service population projections for California in 2020 (total of 59,130,546 service population). Data used to develop this metric are shown in Table 4, *2020 Efficiency Metric*, below. Based on these data, the 2020 efficiency metric would be 4.9 MT CO_2e/SP/year.

Table 4
2020 EFFICIENCY METRIC

CARB's 1990 California GHG Inventory	
1990 Total Emissions (MMT CO_2e)	431
1990 Non-land Use Emissions (MMT CO_2e)	(144.3)
1990 Land Use Emissions (MMT CO_2e)	**286.7**
California 2020 Service Population	
2020 Population Projection*	40,619,346
2020 Employment Projection**	+ 18,511,200
2020 Service Population	**59,130,546**
Efficiency Metric	
1990 Land Use Emissions (MT CO_2e)	286,700,000
2020 Service Population	59,130,546
2020 Efficiency Metric (MT CO_2e/SP/year)	**4.9**

Sources:
*California Department of Finance, Demographic Research Unit Report P-2, State and County Population Projections by Race/Ethnicity and Age (5-year groups) 2010 through 2060 (as of July 1); December 15, 2014.
**California Department of Finance, Employment Development Department Industry Employment Projections, Labor Market Information Division, 2010-2020; May 23, 2012.

Of the three GHG inventory sources, the 2020 efficiency metric derived from the adjusted CARB inventory data provide the most conservative limit for project-related GHG emissions, and is thus used in this analysis.

The Project is anticipated to be fully built out and operational in 2021. The post-2020 emissions target is based on SB 32, which mandates a statewide GHG emissions target of 40 percent below 1990 levels by 2030. CARB has indicated that an average statewide GHG reduction of 5.2 percent per year from 1990 emissions levels is necessary to achieve the 2030 emissions reduction goal identified in SB 32 (CARB 2015a). This metric is estimated by applying a uniform reduction from CARB's 1990 emissions inventory and dividing the resultant value by the projected statewide service population in 2021. Therefore, applying a 5.2 percent reduction to each year after 2020, the Project would need to achieve an efficiency metric of approximately 4.6 MT CO_2e/SP/year for the year 2021 to be consistent with the 2030 emissions reduction goal of SB 32.

Project emissions take into account applicable standards and regulations that the Project would need to comply with for buildout in 2021. These include effects on vehicle emissions due to Pavley I, Pavley II, LCFS, effects on energy emissions due to energy code enforcements and the Renewable Portfolios Standard (RPS) (to 33 percent), and applicable County policies.

5.0 IMPACT ANALYSIS

Emission estimates were calculated for the three GHGs of primary concern (CO_2, CH_4, and N_2O) that would be emitted from Project construction and from the Project's sources of operational emissions including on-road vehicular traffic, electricity generation, natural gas consumption, water usage, area sources, and solid waste disposal.

5.1 Methodology and Assumptions

Emissions calculations started with the following conservative land use assumption: The 111-acre Project would include the construction of 453 residential dwelling units; park and recreational uses; and an on-site WTWRF. The Project may also implement a bridge crossing of Escondido Creek. For purposes of conservative (worst-case) impact assessment, this activity has been incorporated into construction activities carried out by the Project. The first construction phase focuses on overall site grading, the second phase includes infrastructure installation (utility pipelines and roadways), and the third phase addresses "vertical" development of the Project (residential building and WTWRF construction, asphalt paving, and architectural coating). The potential bridge construction noted above would be accomplished within this phasing. Table 5, *Project Component Assumptions*, presents a summary of the land use designation, sizes and other metrics used for the California Emission Estimator Model (CalEEMod) (South Coast Air Quality Management District [SCAQMD] 2013).

Table 5
PROJECT COMPONENT ASSUMPTIONS

Land Use Type	Land Use Subtype	Size	Metric
Residential	Single Family Housing	193	Dwelling Unit
Residential	Multi-Family Housing	260	Dwelling Unit
Retail	Strip Mall	5	1,000 square feet
Roadway	New Road Construction	2.2	Miles
Parking	Center House Parking Lot	46	Spaces
Recreational	City Park	1.5	Acres

5.1.1 Vehicle Emission Assumptions

CalEEMod is a computer model developed by a SCAQMD consultant with the input of several air quality management and pollution control districts to estimate criteria air pollutant emissions from various urban land uses (SCAQMD 2013). CalEEMod has the ability to calculate both mobile (i.e., vehicular) and some area source or stationary sources of emissions. It incorporates the two CARB off-road and on-road emissions models in its mobile emissions component and regional trip length and vehicle trip generation data from the participating air districts. CalEEMod and Roadway Model output data are provided in Appendix A.

The modeling assumes that the operational year of the Project is 2021 and uses emission factors based on that year. As allowed by the County, a reduction of 2.3 percent for Pavley II was applied to the CalEEMod results. CalEEMod already takes into account Pavley I and LCFS. See Appendix B for emission reduction adjustments.

5.1.2 Building Use Assumptions

GHG emissions resulting from electricity generation were estimated using the CalEEMod default values for the SDG&E region. The electricity energy use is in kilowatt-hours per size metric for each land use subtype and natural gas use is in kiloBritish Thermal Units (kBTU) per size metric for each land use subtype. The CalEEMod model default values are based on the CEC-sponsored California Commercial End Use Survey (CEUS) and Residential Appliance Saturation Survey (RASS) studies (SCAQMD 2013).

The Project is anticipated to be operational in 2021; therefore it would be required to comply with the 2016 Title 24 Energy Code. Title 24 2016 includes standards to achieve a minimum 46 percent greater energy efficiency to Title 24 regulated sources than Title 24 2008.[2] CalEEMod assumes compliance with Title 24 2008; therefore, in this analysis, estimates of Title 24 regulated energy emissions from the Project incorporates a 46 percent improvement in energy use rates over 2008 energy code standards.

5.1.3 WTWRF Assumptions

As described previously in Section 1.3, *Project Location and Description*, the Project design includes a new stand-alone on-site Aeromod WTWRF that would provide treatment for all wastewater generated on site, and would produce reclaimed effluent per applicable regulatory standards for irrigation of on-site landscaping. Based on the loading and design criteria used in the 180,000-gpd HGV plant design, new treatment processes with similar tank sizes would be constructed at HGV South.

Diesel-powered emergency generators would be used at the WTWRF for backup power during electric power failures. Generator emissions were estimated using CalEEMod. Emissions were calculated based on the annual testing frequency and duration and the power output of the engines. For the purposes of this analysis it was assumed that two 84 horsepower generators would operate for 8 hours per day, 260 days per year.

5.1.4 Construction Assumptions

CalEEMod and the Roadway Construction Emissions Model (Roadway Model) incorporate CARB's EMFAC2011 model for on-road vehicle emissions and the OFFROAD2011 model for off-road vehicle emissions (CARB 2012 and 2011). CalEEMod is designed to model construction emissions for land development projects while the Roadway Model is designed to model construction emissions for new or expanded roadway projects. Both models allow for the input of project-specific information, such as the number of equipment, hours of operations, duration of construction activities, and selection of emission control measures. The analysis assessed maximum daily emissions from individual construction activities, including site

[2] Based on CEC's FAQs for the 2013 update, "The 2013 Standards will use 25% less energy for lighting, heating, cooling, ventilation, and water heating than the 2008 Standards" (CEC 2012). Based on the CEC's FAQs for the 2016 update, "Single family homes built to the 2016 standards will use about 28 percent less energy for lighting, heating, cooling, ventilation, and water heating than those built to the 2013 standards" (CEC 2016).
(1-25%) x (1-28%) = 54%: (1-54%) = 46%

preparation, grading, backbone infrastructure, building construction, paving, and architectural coating.

Construction would require heavy equipment during mass grading, utility installations, building construction and paving, as well as potential bridge construction. Construction equipment estimates are based on default values in the Roadway Model and CalEEMod, as well as typical equipment used for the backbone infrastructure phase. Table 6, *Construction Equipment Assumptions*, presents a summary of the assumed equipment that would be involved in each stage of construction.

Table 6
CONSTRUCTION EQUIPMENT ASSUMPTIONS

Construction Phase	Equipment	Number
Site Prep and Blasting	Rubber Tired Dozers	3
	Tractors/Loaders/Backhoes	4
	Crushing/Proc. Equipment	1
Backbone Infrastructure	Forklift	1
	Off-Highway Truck	2
	Other Material Handling Equipment	1
	Tractors/Loaders/Backhoes	1
	Trenchers	1
Road Construction	Crawler Tractor	1
	Excavators	3
	Grader	1
	Roller	2
	Rubber Tired Loaders	1
	Scrapers	2
	Signal Boards	4
	Tractors/Loaders/Backhoes	2
Grading	Excavators	2
	Graders	1
	Rubber Tired Dozers	1
	Scrapers	2
	Tractors/Loaders/Backhoes	2
Bridge Construction	Cranes	2
	Forklift	1
	Tractors/Loaders/Backhoes	3
	Pumps	1
	Generators	2

Table 6 (cont.)
CONSTRUCTION EQUIPMENT ASSUMPTIONS

Construction Phase	Equipment	Number
Building Construction	Cranes	1
	Forklifts	3
	Generator sets	1
	Tractors/Loaders/Backhoes	3
	Welders	1
Parking Lot Paving	Pavers	2
	Paving Equipment	2
	Rollers	2
Architectural Coating	Air Compressors	1

Source: CalEEMod and Roadway Model (output data, including equipment horsepower, are provided in Appendix A).
Note: All equipment was assumed to operate 8 hours a day, with the exception of cranes and tractors/loaders/backhoes (7 hours per day) and air compressors (6 hours per day).

The construction schedule was determined by using CalEEMod defaults, input from the Project Applicant, and standard assumptions for similarly sized projects, taking into consideration the size of the Project in order to estimate necessary construction activities and length of days per construction activity. For example, a backbone infrastructure phase was added to the model to account for necessary Project trenching and utility installation. Roadway construction would occur during backbone infrastructure activity. As shown in Table 7, *Modeled Construction Schedule*, Project construction is assumed to start in July 2018 and is projected to be complete and operational in September 2021.

The quantity, duration, and the intensity of construction activity have an effect on the amount of construction emissions and their related pollutant concentrations that occur at any one time. As such, the emission forecasts provided herein reflect a specific set of conservative assumptions based on the expected construction scenario wherein a relatively large amount of construction is occurring in a relatively intensive manner. Because of this conservative assumption, actual emissions could be less than those forecasted. If construction is delayed or occurs over a longer time period, emissions could be reduced because of (1) a more modern and cleaner-burning construction equipment fleet mix than incorporated in the CalEEMod, and/or (2) a less intensive buildout schedule (i.e., fewer daily emissions occurring over a longer time interval). A complete listing of the assumptions used in the analysis and model output is provided in Appendix A of this report.

Table 7 MODELED CONSTRUCTION SCHEDULE			
Construction Activity	**Construction Period**		
	Start	**End**	**Number of Working Days**
Site Preparation and Blasting	07/01/2018	09/30/2018	65
Backbone Infrastructure	10/01/2018	03/31/2019	130
Road Construction	10/01/2018	03/31/2019	130
Grading	04/01/2019	06/30/2019	65
Bridge Construction	04/01/2019	03/31/2020	260
Building Construction	07/01/2019	09/30/2021	588
Parking Lot Paving	05/01/2021	09/30/2021	109
Architectural Coating	05/01/2021	09/30/2021	109

Source: CalEEMod and Roadway Model (output data are provided in Appendix A)

Blasting may be required at the site during initial site preparation and grading activity. Blasting operations would be conducted through the use of drilling and blasting to fracture rocks. At this time the exact amount of blasting has not been determined, however, it is assumed that approximately two to three blasting events may occur each week, with no more than one blast to occur per day. A single drill rig would be used to drill a pattern of bore holes to be loaded with carefully metered explosives.

Following blasting, the rock resource would be fractured and can be moved with conventional earthmoving equipment. A front-end loader will be used to spread the fractured rocks around the site for balanced cut/fill grading.

The Project would utilize ammonium nitrate/fuel oil (ANFO) explosives to conduct blasting on site. Uncontrolled CO_2, CH_4, and N_2O emissions are calculated using the emission factors of 73.96 kg/MM British thermal unit (Btu), $3x10^{-3}$ kg/MMBtu, and $6x10^{-4}$ kg/MMBtu, respectively, from 40 CFR 98, Tables C-1 and C-2 for distillate fuel oil No. 2. A diesel fuel oil to ammonium nitrate ratio of 9 percent and a diesel heating value of 19,300 Btu/pound of diesel fuel were used to express the CO_2, CH_4, and N_2O emission factors in terms of lbs/ton of ANFO.

5.2 Construction Emissions

Construction activities emit GHGs primarily though the combustion of fuels (mostly diesel) in the engines of off-road construction equipment and through the combustion of diesel and gasoline in the on-road construction vehicles and in the commute vehicles of the construction workers. Smaller amounts of GHGs are also emitted through the energy use embodied in any water use (for fugitive dust control) and lighting for the construction activity. Every phase of the construction process, including grading, building, and paving emits GHG emissions, in volumes proportional to the quantity and type of construction equipment used. The heavier equipment typically emits more GHGs per hour of use than the lighter equipment because of their greater fuel consumption and engine design.

Emissions of GHGs related to the construction of the Project would be temporary. As shown in Table 8, *Estimated Construction Emissions*, total GHG emissions associated with construction are estimated at 3,682 metric tons of CO_2e (MT CO_2e) for the duration of construction. For construction emissions, the County guidance recommends that the emissions be amortized over 20 years and added to the annual operational emissions. Amortized over 20 years, construction equipment would contribute 184 MT CO_2e per year to the Project's annual operational GHG emissions

Table 8
ESTIMATED CONSTRUCTION EMISSIONS

Source	Emissions (MT CO_2e)
Site Preparation and Blasting	213
Backbone Infrastructure	242
Road Construction	407
Grading	186
Bridge Construction	874
Building Construction	1,613
Parking Lot Paving	113
Architectural Coating	34
TOTAL	**3,682**
Amortized Construction Emissions [1]	184

Model output data are provided in Appendix A
Note: Totals may not add up exactly due to rounding.
[1] Construction emissions are amortized over 20 years in accordance with County guidance.

5.3 Project Emissions

Operational sources of GHG emissions include: (1) vehicle use; (2) energy use (electricity and natural gas) and area sources (landscaping equipment; (3) solid waste generation; and (4) water conveyance and treatment. As noted earlier, the Project is assumed to be fully operational in 2021.

5.3.1 Vehicle Emissions

The Project would generate approximately 4,500 average daily trips (ADT) (Linscott, Law & Greenspan Engineers [LLG] 2017). CalEEMod estimated that the Project would result in an annual total of 11.08 million miles traveled each year. This total annual VMT was based on the average trip length calculated for this Project which was 7.88 miles per trip (LLG 2016; see Appendix C). Trip rates were based on the Traffic Impact Analysis (TIA), which estimated 9.93 daily trips per dwelling unit. The Project would result in vehicle-related emissions of 4,072 MT CO_2e annually.

5.3.2 Area Source Emissions

Area sources included emissions from residential fireplaces (i.e., natural gas hearths), landscaping equipment, architectural coatings, and household consumer products. GHG emissions associated with area sources were estimated using the CalEEMod default values for

the Proposed Project. The annual GHG emissions from area sources are estimated to be 329 MT CO_2e per year.

5.3.3 Energy Emissions

Buildings use electricity for lighting, heating and cooling. Electricity generation entails the combustion of fossil fuels, including natural gas and coal, which are then stored and transported to end users. A building's electricity use is thus associated with the off-site or indirect emission of GHGs at the source of electricity generation (power plant).

The Proposed Project would comply with the 2016 California Title 24 Energy Code (which went into effect on January 1, 2017). The following energy efficient items are planned for the housing development: improved HVAC systems; enhanced ceiling, attic and wall insulation; whole house fan installation; high-efficiency water heaters; energy-efficient three-coat stucco exteriors; programmable thermostat timers; roof anchors and pre-wiring to allow for the installation of PV systems; and high-efficiency window glazing.

Electric Vehicle Charging Station. The Center House parking area would include an electric car re-charging station.

Renewable Energy. The Project would also include the use of renewable energy which would provide 100 percent of Project's electricity needs (including residential uses, Center House, and WTWRF). Renewable energy would be provided through renewable sources to include, but not be limited to, rooftop solar and/or enrollment in SDG&E's SunRate, or equivalent, renewables program provided that the program can be verified to supply the electricity needs for the Project from renewable sources on a continuous basis. Using renewable energy displaces electricity demand which would ordinarily be supplied by the local utility. Since zero GHG emissions are associated with renewable energy, the GHG emissions reductions from this measure are equivalent to the emissions that would have been produced had electricity been supplied by the local utility.

With the implementation of energy-reducing project design features, the Project would result in the indirect emission of 306 MT CO_2e annually from energy usage (natural gas usage).

5.3.4 Water Use and Wastewater Treatment Emissions

Water-related GHG emissions are from the conveyance of potable water and treatment of wastewater. The California Energy Commission's 2006 Refining Estimates of Water-Related Energy Use in California defines average energy values for water in Southern California. These values are used in CalEEMod to establish default water-related emission factors.

As described in Section 1.4.2, *Project Design Features*, the Project includes several water conservation measures including the 2016 CALGreen mandate to reduce water consumption by 20 percent, the installation of the low flow water features, and the use of drought-tolerant landscape. These measures result in water-related GHG emissions of 193 MT CO_2e per year.

5.3.5 Solid Waste Emissions

Solid waste generated by the Project would also contribute to GHG emissions. Treatment and disposal of solid waste produces significant amounts of methane. Solid waste emissions were estimated using CalEEMod defaults, which are based on statewide average waste disposal rates obtained from the California Department of Resources Recycling and Recovery (CalRecycle) 1999 Statewide Waste Characterization Study. Through compliance with AB 341, the Project would achieve an average 75 percent diversion of waste during operations. This 75 percent reduction would result in solid waste-related emissions of 40 MT CO_2e per year.

5.3.6 Emissions Associated with Off-road Equipment

Diesel-powered emergency generators would be used at the WTWRF for backup power during electric power failures. Generator emissions were estimated using CalEEMod based on the annual testing frequency and duration and the power output of the engines. Stationary source emissions were estimated to be 147 MT CO_2e per year.

5.3.7 Summary

Table 9, *Estimated Operational Emissions with Project Design Features and State and Federal Mandates*, includes the annual emissions for the Project (including the WTWRF). The emissions include the amortized annual construction emissions anticipated for the Project. Appendix A contains the CalEEMod output files for the Proposed Project. As shown in Table 9, the Project would result in GHG emissions of 5,272 MT CO_2e per year in 2021.

Table 9
ESTIMATED OPERATIONAL EMISSIONS WITH PROJECT DESIGN FEATURES AND STATE AND FEDERAL MANDATES

Source	Emissions (MT CO_2e)
Area	329
Energy	306
Mobile	4,072
Solid Waste	40
Water (including wastewater treatment)	193
WTWRF Generators	147
Operational Subtotal	**5,088**
Amortized Construction (Table 8)	**184**
TOTAL PROJECT	**5,272**

Source: HELIX 2016 – CalEEMod results are provided in Appendix A
Note: Emissions for the following sources were adjusted to include state-mandated reductions (as described above and in Appendix B of this report): energy, mobile, and water.

5.4 Significance of Impacts

OPR's Technical Advisory on CEQA and Climate Change (OPR 2008) states:

> As with any environmental impact, lead agencies must determine what constitutes a significant impact. In the absence of regulatory standards for GHG emissions or other scientific data to clearly define what constitutes a "significant impact," individual lead agencies may undertake a project-by-project analysis, consistent with available guidance and current CEQA practice.

As detailed in Section 5.1.4, Project buildout is anticipated to occur in 2021. For projects that anticipate a buildout date after 2020, CARB has indicated that an average statewide GHG reduction of 5.2 percent per year is necessary to achieve the 2030 emissions reduction goal of EO B-30-15 (CARB 2015a). This metric is estimated by applying a uniform reduction from CARB's 1990 emissions inventory and dividing the resultant value by the projected service population in the buildout year.

Therefore, the impact significance determination in this report relies upon an efficiency metric based on compliance with the California's target of reducing 2030 GHG emissions to 40 percent below 1990 levels, consistent with SB 32. As noted above, the efficiency metric for 2021 is, therefore, 4.6 MT CO_2e/SP/year.

Based on SANDAG forecast data for the Project's census tract (census tract 203.07), on average, 2.63 residents are expected to reside in each dwelling unit and 18 jobs are anticipated to be generated per developed employment acre (SANDAG 2016). Therefore, the Project's 453 dwelling units would result in 1,191 residents and the 5,000 square feet of commercial development would result in 2 employees, for a total service population of 1,193 persons. As shown in Table 10, *GHG Emissions Significance Determination*, at full buildout the Proposed Project would result in emissions of 4.4 MT/SP/year. This is consistent with the stated 2021 efficiency metric, and therefore, the Project would result in less than significant GHG impacts.

Table 10
GHG EMISSIONS SIGNIFICANCE DETERMINATION

Category	Value
Total Project Emissions (MT CO_2e)	5,272
Project Service Population (residents)	1,193
Project Emissions per Service Population (MT CO_2e/SP/year)	**4.4**
2021 Efficiency Metric (MT CO_2e/SP/year)	4.6
Significant Impact?	**No**

Source: CalEEMod (output data are provided in Appendix A)

6.0 PROJECT CONSISTENCY WITH ADOPTED PLANS, POLICIES, AND REGULATIONS

The regulatory plans and policies discussed extensively in Section 3.0 above aim to reduce national, state, and local GHG emissions by primarily targeting the largest emitters of GHGs: the transportation and energy sectors. Plan goals and regulatory standards are thus largely focused on the automobile industry and public utilities. For the transportation sector, the reduction strategy is generally three-pronged: to reduce GHG emissions from vehicles by improving engine design; to reduce the carbon content of transportation fuels through research, funding, and incentives to fuel suppliers; and to reduce the miles these vehicles travel through land use change and infrastructure investments.

For the energy sector, the reduction strategies aim to reduce energy demand; impose emission caps on energy providers; establish minimum building energy and green building standards; transition to renewable non-fossil fuels; incentivize homeowners and builders; fully recover landfill gas for energy; expand research and development; and so forth.

6.1 State Plans

SB 32 and EO S-3-05 established GHG emission reduction targets for the state, and AB 32 launched the Climate Change Scoping Plan that outlined the reduction measures needed to reach these targets. The Project would emit 4.4 MT CO_2e/SP/year in 2021, which is lower than the 4.9 MT CO_2e/SP/year efficiency metric considered consistent with the AB 32's 2020 reduction target, and is also lower than the 4.6 MT CO_2e/SP/year efficiency metric that is considered on the State's reduction trajectory at buildout for meeting SB 32 and EO S-3-05's reduction targets.

6.2 Local Plans

As discussed above in Section 1.4, the Project would achieve some GHG reductions through green building design that includes improved energy efficiency, water conservation, sustainable materials use, and waste reduction. Verification and commissioning of these features would occur through independent third-party inspection and diagnostics.

As a condition of building permit approval, however, the Proposed Project is required to comply with 2016 Title 24 standards, reduce indoor water consumption by up to 20 percent, and have 100 percent of electricity generated by renewable sources. Verification of increased water and energy efficiencies will be demonstrated based on a performance approach, using a CEC-approved water and energy compliance software program, in the Title 24 Compliance Reports provided by the Project applicant to the County prior to issuance of the building permit.

The Project would result in 4.4 MT CO_2e/SP/year, which would be consistent with statewide GHG reduction targets established by AB 32 and SB 32. The Project's consistency with specific General Plan Conservation Element policies is analyzed in Table 11, *County General Plan Policies*.

Table 11
COUNTY GENERAL PLAN POLICIES

Policy	Project Consistency
COS14.3 Sustainable Development. Require design of residential subdivisions and nonresidential development through "green" and sustainable land development practices to conserve energy, water, open space, and natural resources.	*Consistent*. As discussed in Section 1.4 of this report, the Project includes many design features to reduce energy and water use.
COS15.1 Design and Construction of New Buildings. Require that new buildings be designed and constructed in accordance with "green building" programs that incorporate techniques and materials that maximize energy efficiency, incorporate the use of sustainable resources and recycled materials, and reduce emissions of GHGs and toxic air contaminants.	*Consistent*. The Project proposes sustainability and efficiency features consistent with the CALGreen Building Code. The Project proposes to supply 100 percent of the Project's electricity needs through renewable sources. The Project proposes implementing energy efficiency features that would achieve 2016 Title 24 requirements.
COS15.4 Title 24 Energy Standards. Require development to minimize energy impacts from new buildings in accordance with or exceeding Title 24 energy standards.	*Consistent*. The Project proposes implementing energy efficiency features that would meet 2016 Title 24 standards, which is more efficient than the 2008 Title 24 requirements that were current when the General Plan was adopted, and will be eligible for the County's Green Building Incentive Program.
COS17.2 Construction and Demolition Waste. Require recycling, reduction and reuse of construction and demolition debris.	*Consistent*. The Project would prepare a Construction Debris Management Plan that complies with Section 68.508-68.518 of the County Municipal Code, and would divert 90 percent of inert construction materials and 70 percent of all other construction materials from landfills through reuse and recycling.
COS17.6 Recycling Containers. Require that all new land development projects include space for recycling containers.	*Consistent*. The Project would provide areas for storage and collection of recyclables and yard waste.
COS19.1 Sustainable Development Practices. Require land development, building design, landscaping, and operational practices that minimize water consumption.	*Consistent*. The Project proposes implementing water conservation strategies to reduce water usage by installing low-flow water features.

7.0 RESIDUAL IMPACTS AND CONCLUSIONS

As summarized in Table 10, implementation of the Project would result in GHG emissions of 4.4 MT CO_2e/SP/year. This meets the 2021 efficiency metric being applied to this analysis (4.6 MT CO_2e/SP/year). The Project would be consistent with the policies within the General Plan intended for the reduction of GHGs. Therefore, the Proposed Project GHG emission impacts would be less than significant.

8.0 HORIZON YEAR (2030 AND 2050) ANALYSIS

8.1 Post-2020 Targets

SB 32 was recently adopted by the Legislature to codify the interim target goal of reducing GHG emissions to 40 percent below 1990 levels by 2030. The interim target was established to ensure California would effectively continue its trajectory toward meeting or exceeding the long-term emission reduction statewide goal of reducing GHG emissions to 80 percent below 1990 levels by 2050 as set forth in EO S-3-05. There has been no legislative action to adopt the 2050 GHG reduction targets. Although SB 32 was recently adopted by the Legislature, there is no currently adopted statewide GHG reduction plan or framework that extends beyond 2020. Also, no agency with subject matter expertise has adopted regulations to achieve these statewide goals at the project-level. Meeting these post 2020 targets will require substantial effort at the state, regional, and local levels. Although a local government's land use decisions plays a role in assisting the state in meeting the long-term GHG emissions targets, ultimately AB 32 and SB 32 require that the State meet the long-term GHG emissions targets, not an individual projects.

The State and CARB are working toward adopting regulatory programs and frameworks designed to support meeting statewide post-2020 reduction goals. For example, the Scoping Plan First Update includes some post-2020 concepts (reduction measures) that are currently underway. CARB is also moving forward with a second update to the Scoping Plan to reflect the 2030 target set by Executive Order B-30-15 and codified by SB 32. The 2017 Climate Change Scoping Plan Update, Proposed Strategy for Achieving California's 2030 Greenhouse Gas Target, was released in draft form on January 20, 2017. As stated above, while there has been activity at the legislative, executive, and judicial levels, there are currently no adopted plans or measures that specifically prescribe how the post-2020 targets will be met.

CEQA Guidelines 15064.4(a) permits both quantitative and qualitative analysis. Therefore, this analysis assesses whether or not a project is overall consistent with, meaning not interfering with, programs CARB identified in its First Update as capable of assisting the state in meeting its long-term GHG emissions targets. The data point for this qualitative analysis is the substantial evidence CARB relied upon in its First Update to the Scoping Plan to conclude that California was on track to meet the 2030 and 2050 state GHG targets and analyzes in a qualitative manner whether the Project interferes with the programs CARB identified in the First Update as providing a means for the state to achieve these long- term state targets.

CARB has expressed optimism with regard to both the 2030 and 2050 goals. It states in the First Update to the Climate Change Scoping Plan that "California is on track to meet the near-term 2020 greenhouse gas limit and is well positioned to maintain and continue reductions beyond 2020 as required by AB 32" (CARB 2014a). With regard to the 2050 target for reducing GHG emissions to 80 percent below 1990 levels, the First Update to the Climate Change Scoping Plan states:

> *This level of reduction is achievable in California. In fact, if California realizes the expected benefits of existing policy goals (such as 12,000 megawatts [MW] of renewable distributed generation by 2020, net zero energy homes after 2020, existing building retrofits under AB 758, and others) it could reduce emissions by*

> *2030 to levels squarely in line with those needed in the developed world and to stay on track to reduce emissions to 80 percent below 1990 levels by 2050. Additional measures, including locally driven measures and those necessary to meet federal air quality standards in 2032, could lead to even greater emission reductions.*

In other words, the experts at CARB attest the state is on a trajectory to meet the 2020, 2030, and 2050 GHG reduction targets set forth in AB 32, SB 32, and EO S-3-05.

The Scoping Plan First Update discusses a number of strategies currently underway that have led to significant emission reductions and provides a summary of recommended actions the state could take to meet long-term reduction goals. The draft 2017 Climate Change Scoping Plan Update includes a detailed roadmap by accelerating the focus on continued investment in renewables, greater use of low carbon fuels including electricity and hydrogen, stronger efforts to reduce emissions of short-lived climate pollutants (methane, black carbon, and fluorinated gases), and further efforts to create walkable communities with expanded mass transit and other alternatives to traveling by car. Strengthening of the LCFS and expansion of the zero emissions vehicles program will likely result in further reductions to mobile source emissions. Additionally, the RPS would likely continue beyond the 2020 goal of 33 percent. Continuing the cap-and-trade program and ensuring that natural lands become carbon sinks provide additional emissions reductions and flexibility in meeting the target (CARB 2014a).

This level of reduction is achievable in California. In fact, if California realizes the expected benefits of existing policy goals (such as 12,000 megawatts [MW] of renewable distributed generation by 2020, net zero energy homes after 2020, existing building retrofits under AB 758, and others) it could reduce emissions by 2030 to levels squarely in line with those needed in the developed world and to stay on track to reduce emissions to 80 percent below 1990 levels by 2050. Additional measures, including locally driven measures and those necessary to meet federal air quality standards in 2032, could lead to even greater emission reductions.

This discussion evaluates whether the Project's post-buildout GHG emissions trajectory would impede the attainment of the 2030 and 2050 GHG reduction goals identified in SB 32 and EO S-3-05. As noted above, in qualitatively evaluating the Project's emissions for consistency with SB 32 and EO B-30-15, it is important to note that some of these broad-scale shifts in how energy is produced and used are outside of the control of the Project. The changes necessitated by the State of California's long-term climate policy will require additional policy and regulatory changes, which are unknown at this time. As a consequence, the extent to which the Project's emissions and resulting impacts would be mitigated through implementation of such changes is not known. Furthermore, implementation of such additional policy and regulatory changes is in the jurisdiction of state-level agencies (e.g., CARB), not the County or the Project. Nonetheless, this analysis renders a determination as to whether the Proposed Project would conflict with or impede substantial progress towards the statewide reduction goals established by SB 32 for 2030 and by EO S-3-05 for 2050.

The following discussion evaluates whether the Proposed Project would interfere with the four main programs CARB identified to support is conclusions that the state is on a trajectory to meet the 2030 and 2050 GHG targets: (1) initiative to install 12,000 megawatts [MW] of renewable

distributed energy by 2020; (2) CBC mandate to construct net zero energy homes after 2020; (3) existing building retrofits under AB 758; and (4) California's Cap-and-Trade Regulations.

8.2 State's Goal to Install 12,000 MW of Renewable Distributed Generation Systems by 2020

The Project does not interfere with the state's goal to install 12,000 MW of renewable distributed generation systems by 2020. The Project includes a Project Design Feature to supply 100 percent of the Project's electricity needs through renewable sources. Therefore, the Project would not interfere or conflict with the state's goal of 12,000 MW of renewable distributed generation by 2020.

8.3 Non-interference with Construction of Net-Zero Energy Homes After 2020

The Project does not interfere with the ability of the California Building Commission to mandate constructing net-zero energy homes after 2020. The Proposed Project is anticipated to start construction in 2018 with full buildout expected by 2021. The Project would be required to construct homes in conformance with the current California Building Commission mandates because the County does not issue occupancy permits for projects that do not comply with the California Building Code in effect at that time.

8.4 Non-interference with AB 758's Existing Buildings Energy Efficiency Action Plan

The Project would not interfere with the state's implementation of building retrofits to further energy efficiency for existing buildings under AB 758 or SB 350. The CEC is tasked with developing and implementing a comprehensive program to increase energy efficiency in existing residential and nonresidential buildings that "fall significantly below the current standards in Title 24" (Pub. Resources Code, section 25943[a][1]). The Project would be constructed in compliance with the applicable Title 24 standards and therefore would not interfere with CEC or other initiatives implemented to increase energy efficiency and reduce GHG emissions associated with buildings that do not adhere to Title 24 standards.

8.5 Other State Programs – Cap-and-Trade

Cap-and-trade was initially identified in the 2008 Scoping Plan, and carried forward in the draft 2017 Climate Change Scoping Plan Update, as a strategy for helping California reduce its GHG emissions (CARB 2008b). A cap-and-trade program sets the total amount of GHG emissions allowable for facilities under the cap and allows covered sources, including producers and consumers of energy, to determine the least expensive strategies to comply. AB 32 required CARB to adopt the cap-and-trade regulation by January 1, 2011, and the program itself began in November 2012. The Cap-and-Trade Regulation is being implemented in two stages. Electric generating utilities, electricity importers, and large industrial facilities became subject to the program beginning in 2013, and fuel distributors were brought under the cap in 2015. The Project does not interfere with the state's implementation of this GHG reducing program because it is not an electric generating utility, electricity importer, large industrial facility, or fuel distributor. Rather, the Project, like all consumers of energy and fuel from the sources regulated by Cap-and-Trade will have the related GHG emissions reduced from these resources as the generators must invest heavily in GHG reducing technologies in order to comply with the ever

decreasing cap. In this sense, similar to all consumers paying for the use of fuel and electricity resources, the Project and its residents would contribute financially toward these GHG reducing technologies.

Based on the foregoing, the Project does not conflict with nor interfere with the state's implementation of SB 32's target of reducing statewide GHG emissions to 40 percent below 1990 levels by 2030 or EO S-3-05's target of reducing statewide GHG emission to 80 percent below 1990 levels by 2050 because it would not interfere with the state's implementation of GHG emission reduction measures described in CARB's First Update to the Scoping Plan, including the state providing for 12,000 MW of renewable distributed generation by 2020, CARB's draft 2017 Climate Change Scoping Plan Second Update, the California Building Commission mandating new zero energy homes in the building code after 2020, existing building retrofits under AB 758, and Cap-and-Trade Regulations. CARB identified these programs to reduce emissions by 2030 to levels squarely in line with those needed in the developed world and to stay on track to reduce emissions to 80 percent below 1990 levels by 2050.

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10.0 LIST OF PREPARERS AND PERSONS AND ORGANIZATIONS CONTACTED

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Appendix A

CALEEMOD AND ROADWAY MODEL OUTPUT DATA

Harmony Grove Village South

San Diego County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	46.00	Space	0.41	18,400.00	0
City Park	1.50	Acre	1.50	65,340.00	0
Condo/Townhouse	260.00	Dwelling Unit	16.25	260,000.00	744
Single Family Housing	193.00	Dwelling Unit	62.66	347,400.00	552
Strip Mall	5.00	1000sqft	0.11	5,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	40
Climate Zone	13			**Operational Year**	2021
Utility Company	San Diego Gas & Electric				
CO2 Intensity (lb/MWhr)	720.49	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Based on input from Kovach (dated 02-27-2017)

Off-road Equipment -

Off-road Equipment - typical equipment used for the backbone infrastructure phase

Off-road Equipment - Based on input from Moffatt & Nichol

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Off-road Equipment - Crusher added to process Blasing debris

Trips and VMT -

Grading -

Architectural Coating - Low-VOC coatings per design feature

Vehicle Trips - Trip generation based on LLG2014; trip length based on LLG2016.

Construction Off-road Equipment Mitigation -

Area Mitigation - Natural Gas hearths and low-VOC coatings per design features

Energy Mitigation - CalEEMod default is 2008 T24. 2013 is 25% improved over 2008. 2016 is 28% improved over 2013. (1-.25)*(1-.28)=54% - 46% improvement

Water Mitigation -

Waste Mitigation -

Operational Off-Road Equipment - WTWRF generator sets

Vechicle Emission Factors -

Vechicle Emission Factors -

Vechicle Emission Factors -

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	250.00	100.00
tblArchitecturalCoating	EF_Nonresidential_Interior	250.00	100.00
tblArchitecturalCoating	EF_Residential_Exterior	250.00	100.00

tblArchitecturalCoating	EF_Residential_Interior	250.00	50.00
tblAreaMitigation	UseLowVOCPaintNonresidentialExteriorValue	250	100
tblAreaMitigation	UseLowVOCPaintNonresidentialInteriorValue	250	100
tblAreaMitigation	UseLowVOCPaintResidentialExteriorValue	250	100
tblAreaMitigation	UseLowVOCPaintResidentialInteriorValue	250	50
tblConstructionPhase	NumDays	110.00	109.00
tblConstructionPhase	NumDays	1,550.00	262.00
tblConstructionPhase	NumDays	1,550.00	589.00
tblConstructionPhase	NumDays	155.00	65.00
tblConstructionPhase	NumDays	110.00	109.00
tblConstructionPhase	NumDays	60.00	65.00
tblConstructionPhase	PhaseEndDate	3/2/2022	9/30/2021
tblConstructionPhase	PhaseEndDate	6/30/2020	3/31/2020
tblConstructionPhase	PhaseEndDate	7/4/2022	9/30/2021
tblConstructionPhase	PhaseEndDate	6/28/2019	6/30/2019
tblConstructionPhase	PhaseEndDate	3/2/2022	9/30/2021
tblConstructionPhase	PhaseEndDate	9/28/2018	9/30/2018
tblConstructionPhase	PhaseEndDate	3/29/2019	3/31/2019
tblConstructionPhase	PhaseStartDate	10/1/2021	5/1/2021
tblConstructionPhase	PhaseStartDate	7/1/2019	4/1/2019
tblConstructionPhase	PhaseStartDate	4/1/2020	7/1/2019
tblConstructionPhase	PhaseStartDate	10/1/2021	5/1/2021
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	2.00

tblProjectCharacteristics	OperationalYear	2014	2021
tblVehicleTrips	CW_TL	9.50	7.88
tblVehicleTrips	CW_TL	9.50	7.88
tblVehicleTrips	CW_TL	9.50	7.88
tblVehicleTrips	HW_TL	10.80	7.88
tblVehicleTrips	HW_TL	10.80	7.88
tblVehicleTrips	ST_TR	1.59	0.00
tblVehicleTrips	ST_TR	7.16	9.93
tblVehicleTrips	ST_TR	10.08	9.93
tblVehicleTrips	ST_TR	42.04	0.00
tblVehicleTrips	SU_TR	1.59	0.00
tblVehicleTrips	SU_TR	6.07	9.93
tblVehicleTrips	SU_TR	8.77	9.93
tblVehicleTrips	SU_TR	20.43	0.00
tblVehicleTrips	WD_TR	1.59	0.00
tblVehicleTrips	WD_TR	6.59	9.93
tblVehicleTrips	WD_TR	9.57	9.93
tblVehicleTrips	WD_TR	44.32	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2018	0.2571	2.5760	1.9592	2.9200e-003	0.5963	0.1344	0.7307	0.3252	0.1245	0.4497	0.0000	263.4093	263.4093	0.0756	0.0000	264.9973
2019	0.9145	7.7422	8.0294	0.0162	0.7449	0.3819	1.1268	0.2413	0.3585	0.5998	0.0000	1,330.0340	1,330.0340	0.2136	0.0000	1,334.5198
2020	0.5716	4.1474	5.5395	0.0119	0.4512	0.2049	0.6560	0.1213	0.1930	0.3143	0.0000	925.7016	925.7016	0.1109	0.0000	928.0311
2021	3.0949	2.8710	4.1013	8.6600e-003	0.3014	0.1418	0.4431	0.0809	0.1327	0.2136	0.0000	673.4264	673.4264	0.1001	0.0000	675.5289
Total	**4.8381**	**17.3365**	**19.6294**	**0.0398**	**2.0937**	**0.8629**	**2.9567**	**0.7686**	**0.8088**	**1.5774**	**0.0000**	**3,192.5712**	**3,192.5712**	**0.5003**	**0.0000**	**3,203.0771**

2.1 Overall Construction

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					
2018	0.2571	2.5760	1.9592	2.9200e-003	0.2734	0.1344	0.4078	0.1477	0.1245	0.2722	0.0000	263.4090	263.4090	0.0756	0.0000	264.9970
2019	0.9145	7.7422	8.0294	0.0162	0.5898	0.3819	0.9717	0.1770	0.3585	0.5355	0.0000	1,330.0330	1,330.0330	0.2136	0.0000	1,334.5189
2020	0.5716	4.1474	5.5395	0.0119	0.4512	0.2049	0.6560	0.1213	0.1930	0.3143	0.0000	925.7011	925.7011	0.1109	0.0000	928.0306
2021	3.0949	2.8710	4.1013	8.6600e-003	0.3014	0.1418	0.4431	0.0809	0.1327	0.2136	0.0000	673.4259	673.4259	0.1001	0.0000	675.5285
Total	**4.8381**	**17.3365**	**19.6294**	**0.0398**	**1.6158**	**0.8629**	**2.4787**	**0.5268**	**0.8088**	**1.3356**	**0.0000**	**3,192.5690**	**3,192.5690**	**0.5003**	**0.0000**	**3,203.0749**

	ROG	NOx	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**	**22.83**	**0.00**	**16.17**	**31.46**	**0.00**	**15.33**	**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	32.2773	0.4246	38.3867	0.0139		4.9380	4.9380		4.9379	4.9379	467.9298	201.7382	669.6681	0.4372	0.0368	690.2581
Energy	0.0482	0.4117	0.1754	2.6300e-003		0.0333	0.0333		0.0333	0.0333	0.0000	1,322.6341	1,322.6341	0.0432	0.0158	1,328.4343
Mobile	2.2319	4.3212	21.8268	0.0609	4.1659	0.0685	4.2343	1.1141	0.0632	1.1773	0.0000	4,168.4474	4,168.4474	0.1580	0.0000	4,171.7657
Offroad	0.0929	0.8232	0.9580	1.7100e-003		0.0436	0.0436		0.0436	0.0436	0.0000	146.9539	146.9539	7.5000e-003	0.0000	147.1114
Waste						0.0000	0.0000		0.0000	0.0000	71.3107	0.0000	71.3107	4.2143	0.0000	159.8119
Water						0.0000	0.0000		0.0000	0.0000	9.4812	202.0455	211.5267	0.9819	0.0247	239.7970
Total	**34.6503**	**5.9807**	**61.3470**	**0.0791**	**4.1659**	**5.0834**	**9.2492**	**1.1141**	**5.0780**	**6.1921**	**548.7217**	**6,041.8192**	**6,590.5409**	**5.8421**	**0.0773**	**6,737.1785**

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	3.1238	0.0389	3.3731	1.8000e-004		0.0410	0.0410		0.0408	0.0408	0.0000	326.6201	326.6201	0.0115	5.8900e-003	328.6863
Energy	0.0308	0.2628	0.1120	1.6800e-003		0.0212	0.0212		0.0212	0.0212	0.0000	304.3124	304.3124	5.8300e-003	5.5800e-003	306.1644
Mobile	2.2319	4.3212	21.8268	0.0609	4.1659	0.0685	4.2343	1.1141	0.0632	1.1773	0.0000	4,168.4474	4,168.4474	0.1580	0.0000	4,171.7657
Offroad	0.0929	0.8232	0.9580	1.7100e-003		0.0436	0.0436		0.0436	0.0436	0.0000	146.9539	146.9539	7.5000e-003	0.0000	147.1114
Waste						0.0000	0.0000		0.0000	0.0000	17.8277	0.0000	17.8277	1.0536	0.0000	39.9530
Water						0.0000	0.0000		0.0000	0.0000	7.5849	163.2919	170.8768	0.7855	0.0197	193.4867
Total	**5.4793**	**5.4462**	**26.2699**	**0.0644**	**4.1659**	**0.1743**	**4.3402**	**1.1141**	**0.1688**	**1.2830**	**25.4126**	**5,109.6257**	**5,135.0383**	**2.0219**	**0.0312**	**5,187.1675**

	ROG	NOx	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	**84.45**	**22.70**	**58.74**	**20.66**	**0.00**	**97.43**	**53.55**	**0.00**	**97.53**	**79.99**	**95.37**	**17.86**	**24.31**	**65.52**	**59.62**	**25.19**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	7/1/2018	9/30/2018	5	65	
2	Backbone Infrastructure	Trenching	10/1/2018	3/31/2019	5	130	
3	Grading	Grading	4/1/2019	6/30/2019	5	65	
4	Bridge Construction	Building Construction	4/1/2019	3/31/2020	5	262	
5	Building Construction	Building Construction	7/1/2019	9/30/2021	5	589	
6	Paving	Paving	5/1/2021	9/30/2021	5	109	
7	Architectural Coating	Architectural Coating	5/1/2021	9/30/2021	5	109	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 162.5

Acres of Paving: 0

Residential Indoor: 1,229,985; Residential Outdoor: 409,995; Non-Residential Indoor: 106,338; Non-Residential Outdoor: 35,446 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Crushing/Proc. Equipment	1	8.00	85	0.78
Site Preparation	Rubber Tired Dozers	3	8.00	255	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Backbone Infrastructure	Forklifts	1	8.00	89	0.20
Backbone Infrastructure	Off-Highway Trucks	2	8.00	400	0.38
Backbone Infrastructure	Other Material Handling Equipment	1	8.00	167	0.40
Backbone Infrastructure	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Backbone Infrastructure	Trenchers	1	8.00	80	0.50
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
Bridge Construction	Cranes	2	7.00	226	0.29
Bridge Construction	Forklifts	1	8.00	89	0.20
Bridge Construction	Generator Sets	2	8.00	84	0.74
Bridge Construction	Pumps	1	8.00	84	0.74
Bridge Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Bridge Construction	Welders	0	8.00	46	0.45
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
Site Preparation	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Backbone Infrastructure	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Bridge Construction	9	293.00	63.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	293.00	63.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	59.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Site Preparation - 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					
Fugitive Dust					0.5872	0.0000	0.5872	0.3228	0.0000	0.3228	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1615	1.6298	1.3206	1.5000e-003		0.0877	0.0877		0.0815	0.0815	0.0000	135.7510	135.7510	0.0380	0.0000	136.5480
Total	**0.1615**	**1.6298**	**1.3206**	**1.5000e-003**	**0.5872**	**0.0877**	**0.6748**	**0.3228**	**0.0815**	**0.4043**	**0.0000**	**135.7510**	**135.7510**	**0.0380**	**0.0000**	**136.5480**

3.2 Site Preparation - 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	1.8400e-003	2.4400e-003	0.0229	6.0000e-005	5.2100e-003	4.0000e-005	5.2500e-003	1.3900e-003	4.0000e-005	1.4200e-003	0.0000	4.4945	4.4945	2.2000e-004	0.0000	4.4991
Total	**1.8400e-003**	**2.4400e-003**	**0.0229**	**6.0000e-005**	**5.2100e-003**	**4.0000e-005**	**5.2500e-003**	**1.3900e-003**	**4.0000e-005**	**1.4200e-003**	**0.0000**	**4.4945**	**4.4945**	**2.2000e-004**	**0.0000**	**4.4991**

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					0.2642	0.0000	0.2642	0.1452	0.0000	0.1452	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1615	1.6298	1.3206	1.5000e-003		0.0877	0.0877		0.0815	0.0815	0.0000	135.7508	135.7508	0.0380	0.0000	136.5479
Total	**0.1615**	**1.6298**	**1.3206**	**1.5000e-003**	**0.2642**	**0.0877**	**0.3519**	**0.1452**	**0.0815**	**0.2268**	**0.0000**	**135.7508**	**135.7508**	**0.0380**	**0.0000**	**136.5479**

3.2 Site Preparation - 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	1.8400e-003	2.4400e-003	0.0229	6.0000e-005	5.2100e-003	4.0000e-005	5.2500e-003	1.3900e-003	4.0000e-005	1.4200e-003	0.0000	4.4945	4.4945	2.2000e-004	0.0000	4.4991
Total	**1.8400e-003**	**2.4400e-003**	**0.0229**	**6.0000e-005**	**5.2100e-003**	**4.0000e-005**	**5.2500e-003**	**1.3900e-003**	**4.0000e-005**	**1.4200e-003**	**0.0000**	**4.4945**	**4.4945**	**2.2000e-004**	**0.0000**	**4.4991**

3.3 Backbone Infrastructure - 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	0.0924	0.9419	0.5982	1.3100e-003		0.0467	0.0467		0.0429	0.0429	0.0000	119.7411	119.7411	0.0373	0.0000	120.5239
Total	**0.0924**	**0.9419**	**0.5982**	**1.3100e-003**		**0.0467**	**0.0467**		**0.0429**	**0.0429**	**0.0000**	**119.7411**	**119.7411**	**0.0373**	**0.0000**	**120.5239**

3.3 Backbone Infrastructure - 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	1.4000e-003	1.8600e-003	0.0174	5.0000e-005	3.9700e-003	3.0000e-005	4.0000e-003	1.0500e-003	3.0000e-005	1.0800e-003	0.0000	3.4227	3.4227	1.7000e-004	0.0000	3.4263
Total	**1.4000e-003**	**1.8600e-003**	**0.0174**	**5.0000e-005**	**3.9700e-003**	**3.0000e-005**	**4.0000e-003**	**1.0500e-003**	**3.0000e-005**	**1.0800e-003**	**0.0000**	**3.4227**	**3.4227**	**1.7000e-004**	**0.0000**	**3.4263**

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	0.0924	0.9419	0.5982	1.3100e-003		0.0467	0.0467		0.0429	0.0429	0.0000	119.7409	119.7409	0.0373	0.0000	120.5237
Total	**0.0924**	**0.9419**	**0.5982**	**1.3100e-003**		**0.0467**	**0.0467**		**0.0429**	**0.0429**	**0.0000**	**119.7409**	**119.7409**	**0.0373**	**0.0000**	**120.5237**

3.3 Backbone Infrastructure - 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	1.4000e-003	1.8600e-003	0.0174	5.0000e-005	3.9700e-003	3.0000e-005	4.0000e-003	1.0500e-003	3.0000e-005	1.0800e-003	0.0000	3.4227	3.4227	1.7000e-004	0.0000	3.4263
Total	**1.4000e-003**	**1.8600e-003**	**0.0174**	**5.0000e-005**	**3.9700e-003**	**3.0000e-005**	**4.0000e-003**	**1.0500e-003**	**3.0000e-005**	**1.0800e-003**	**0.0000**	**3.4227**	**3.4227**	**1.7000e-004**	**0.0000**	**3.4263**

3.3 Backbone Infrastructure - 2019

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	0.0816	0.8021	0.5639	1.2700e-003		0.0395	0.0395		0.0364	0.0364	0.0000	114.2035	114.2035	0.0361	0.0000	114.9623
Total	**0.0816**	**0.8021**	**0.5639**	**1.2700e-003**		**0.0395**	**0.0395**		**0.0364**	**0.0364**	**0.0000**	**114.2035**	**114.2035**	**0.0361**	**0.0000**	**114.9623**

3.3 Backbone Infrastructure - 2019

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	1.2600e-003	1.6700e-003	0.0156	5.0000e-005	3.8500e-003	3.0000e-005	3.8800e-003	1.0200e-003	3.0000e-005	1.0500e-003	0.0000	3.1989	3.1989	1.5000e-004	0.0000	3.2022
Total	**1.2600e-003**	**1.6700e-003**	**0.0156**	**5.0000e-005**	**3.8500e-003**	**3.0000e-005**	**3.8800e-003**	**1.0200e-003**	**3.0000e-005**	**1.0500e-003**	**0.0000**	**3.1989**	**3.1989**	**1.5000e-004**	**0.0000**	**3.2022**

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	0.0816	0.8021	0.5639	1.2700e-003		0.0395	0.0395		0.0364	0.0364	0.0000	114.2033	114.2033	0.0361	0.0000	114.9621
Total	**0.0816**	**0.8021**	**0.5639**	**1.2700e-003**		**0.0395**	**0.0395**		**0.0364**	**0.0364**	**0.0000**	**114.2033**	**114.2033**	**0.0361**	**0.0000**	**114.9621**

3.3 Backbone Infrastructure - 2019

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	1.2600e-003	1.6700e-003	0.0156	5.0000e-005	3.8500e-003	3.0000e-005	3.8800e-003	1.0200e-003	3.0000e-005	1.0500e-003	0.0000	3.1989	3.1989	1.5000e-004	0.0000	3.2022
Total	**1.2600e-003**	**1.6700e-003**	**0.0156**	**5.0000e-005**	**3.8500e-003**	**3.0000e-005**	**3.8800e-003**	**1.0200e-003**	**3.0000e-005**	**1.0500e-003**	**0.0000**	**3.1989**	**3.1989**	**1.5000e-004**	**0.0000**	**3.2022**

3.4 Grading - 2019

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					0.2819	0.0000	0.2819	0.1169	0.0000	0.1169	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1590	1.7614	1.3094	2.0100e-003		0.0814	0.0814		0.0749	0.0749	0.0000	180.1829	180.1829	0.0570	0.0000	181.3801
Total	**0.1590**	**1.7614**	**1.3094**	**2.0100e-003**	**0.2819**	**0.0814**	**0.3633**	**0.1169**	**0.0749**	**0.1918**	**0.0000**	**180.1829**	**180.1829**	**0.0570**	**0.0000**	**181.3801**

3.4 Grading - 2019

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	1.7000e-003	2.2600e-003	0.0211	6.0000e-005	5.2100e-003	4.0000e-005	5.2500e-003	1.3900e-003	4.0000e-005	1.4200e-003	0.0000	4.3319	4.3319	2.1000e-004	0.0000	4.3362
Total	**1.7000e-003**	**2.2600e-003**	**0.0211**	**6.0000e-005**	**5.2100e-003**	**4.0000e-005**	**5.2500e-003**	**1.3900e-003**	**4.0000e-005**	**1.4200e-003**	**0.0000**	**4.3319**	**4.3319**	**2.1000e-004**	**0.0000**	**4.3362**

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					0.1269	0.0000	0.1269	0.0526	0.0000	0.0526	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1590	1.7614	1.3094	2.0100e-003		0.0814	0.0814		0.0749	0.0749	0.0000	180.1827	180.1827	0.0570	0.0000	181.3799
Total	**0.1590**	**1.7614**	**1.3094**	**2.0100e-003**	**0.1269**	**0.0814**	**0.2083**	**0.0526**	**0.0749**	**0.1275**	**0.0000**	**180.1827**	**180.1827**	**0.0570**	**0.0000**	**181.3799**

3.4 Grading - 2019

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	1.7000e-003	2.2600e-003	0.0211	6.0000e-005	5.2100e-003	4.0000e-005	5.2500e-003	1.3900e-003	4.0000e-005	1.4200e-003	0.0000	4.3319	4.3319	2.1000e-004	0.0000	4.3362
Total	**1.7000e-003**	**2.2600e-003**	**0.0211**	**6.0000e-005**	**5.2100e-003**	**4.0000e-005**	**5.2500e-003**	**1.3900e-003**	**4.0000e-005**	**1.4200e-003**	**0.0000**	**4.3319**	**4.3319**	**2.1000e-004**	**0.0000**	**4.3362**

3.5 Bridge Construction - 2019

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	0.2948	2.8800	2.2056	3.8700e-003		0.1621	0.1621		0.1546	0.1546	0.0000	340.0689	340.0689	0.0655	0.0000	341.4450
Total	**0.2948**	**2.8800**	**2.2056**	**3.8700e-003**		**0.1621**	**0.1621**		**0.1546**	**0.1546**	**0.0000**	**340.0689**	**340.0689**	**0.0655**	**0.0000**	**341.4450**

3.5 Bridge Construction - 2019

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	0.0567	0.4453	0.7322	1.4700e-003	0.0404	6.6900e-003	0.0471	0.0116	6.1600e-003	0.0177	0.0000	127.1286	127.1286	9.5000e-004	0.0000	127.1485
Worker	0.0756	0.1002	0.9348	2.8500e-003	0.2314	1.6800e-003	0.2331	0.0615	1.5600e-003	0.0631	0.0000	192.3389	192.3389	9.2200e-003	0.0000	192.5326
Total	**0.1323**	**0.5455**	**1.6670**	**4.3200e-003**	**0.2718**	**8.3700e-003**	**0.2802**	**0.0731**	**7.7200e-003**	**0.0808**	**0.0000**	**319.4675**	**319.4675**	**0.0102**	**0.0000**	**319.6811**

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	0.2948	2.8800	2.2056	3.8700e-003		0.1621	0.1621		0.1546	0.1546	0.0000	340.0685	340.0685	0.0655	0.0000	341.4445
Total	**0.2948**	**2.8800**	**2.2056**	**3.8700e-003**		**0.1621**	**0.1621**		**0.1546**	**0.1546**	**0.0000**	**340.0685**	**340.0685**	**0.0655**	**0.0000**	**341.4445**

3.5 Bridge Construction - 2019

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	0.0567	0.4453	0.7322	1.4700e-003	0.0404	6.6900e-003	0.0471	0.0116	6.1600e-003	0.0177	0.0000	127.1286	127.1286	9.5000e-004	0.0000	127.1485
Worker	0.0756	0.1002	0.9348	2.8500e-003	0.2314	1.6800e-003	0.2331	0.0615	1.5600e-003	0.0631	0.0000	192.3389	192.3389	9.2200e-003	0.0000	192.5326
Total	**0.1323**	**0.5455**	**1.6670**	**4.3200e-003**	**0.2718**	**8.3700e-003**	**0.2802**	**0.0731**	**7.7200e-003**	**0.0808**	**0.0000**	**319.4675**	**319.4675**	**0.0102**	**0.0000**	**319.6811**

3.5 Bridge Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0875	0.8626	0.7137	1.2800e-003		0.0464	0.0464		0.0442	0.0442	0.0000	110.9573	110.9573	0.0212	0.0000	111.4031
Total	**0.0875**	**0.8626**	**0.7137**	**1.2800e-003**		**0.0464**	**0.0464**		**0.0442**	**0.0442**	**0.0000**	**110.9573**	**110.9573**	**0.0212**	**0.0000**	**111.4031**

3.5 Bridge Construction - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0177	0.1251	0.2333	4.8000e-004	0.0133	1.9800e-003	0.0153	3.8100e-003	1.8200e-003	5.6300e-003	0.0000	40.9868	40.9868	3.0000e-004	0.0000	40.9931
Worker	0.0236	0.0309	0.2883	9.4000e-004	0.0764	5.5000e-004	0.0769	0.0203	5.1000e-004	0.0208	0.0000	60.9048	60.9048	2.8900e-003	0.0000	60.9656
Total	**0.0413**	**0.1560**	**0.5216**	**1.4200e-003**	**0.0897**	**2.5300e-003**	**0.0922**	**0.0241**	**2.3300e-003**	**0.0264**	**0.0000**	**101.8916**	**101.8916**	**3.1900e-003**	**0.0000**	**101.9587**

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	0.0875	0.8626	0.7137	1.2800e-003		0.0464	0.0464		0.0442	0.0442	0.0000	110.9571	110.9571	0.0212	0.0000	111.4030
Total	**0.0875**	**0.8626**	**0.7137**	**1.2800e-003**		**0.0464**	**0.0464**		**0.0442**	**0.0442**	**0.0000**	**110.9571**	**110.9571**	**0.0212**	**0.0000**	**111.4030**

3.5 Bridge Construction - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0177	0.1251	0.2333	4.8000e-004	0.0133	1.9800e-003	0.0153	3.8100e-003	1.8200e-003	5.6300e-003	0.0000	40.9868	40.9868	3.0000e-004	0.0000	40.9931
Worker	0.0236	0.0309	0.2883	9.4000e-004	0.0764	5.5000e-004	0.0769	0.0203	5.1000e-004	0.0208	0.0000	60.9048	60.9048	2.8900e-003	0.0000	60.9656
Total	**0.0413**	**0.1560**	**0.5216**	**1.4200e-003**	**0.0897**	**2.5300e-003**	**0.0922**	**0.0241**	**2.3300e-003**	**0.0264**	**0.0000**	**101.8916**	**101.8916**	**3.1900e-003**	**0.0000**	**101.9587**

3.6 Building Construction - 2019

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	0.1552	1.3837	1.1299	1.7700e-003		0.0848	0.0848		0.0798	0.0798	0.0000	154.5210	154.5210	0.0376	0.0000	155.3105
Total	**0.1552**	**1.3837**	**1.1299**	**1.7700e-003**		**0.0848**	**0.0848**		**0.0798**	**0.0798**	**0.0000**	**154.5210**	**154.5210**	**0.0376**	**0.0000**	**155.3105**

3.6 Building Construction - 2019

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	0.0380	0.2984	0.4906	9.8000e-004	0.0270	4.4800e-003	0.0315	7.7400e-003	4.1200e-003	0.0119	0.0000	85.1826	85.1826	6.4000e-004	0.0000	85.1960
Worker	0.0507	0.0671	0.6264	1.9100e-003	0.1551	1.1300e-003	0.1562	0.0412	1.0400e-003	0.0423	0.0000	128.8768	128.8768	6.1800e-003	0.0000	129.0066
Total	**0.0887**	**0.3655**	**1.1170**	**2.8900e-003**	**0.1821**	**5.6100e-003**	**0.1877**	**0.0490**	**5.1600e-003**	**0.0541**	**0.0000**	**214.0594**	**214.0594**	**6.8200e-003**	**0.0000**	**214.2026**

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	0.1552	1.3837	1.1299	1.7700e-003		0.0848	0.0848		0.0798	0.0798	0.0000	154.5208	154.5208	0.0376	0.0000	155.3104
Total	**0.1552**	**1.3837**	**1.1299**	**1.7700e-003**		**0.0848**	**0.0848**		**0.0798**	**0.0798**	**0.0000**	**154.5208**	**154.5208**	**0.0376**	**0.0000**	**155.3104**

3.6 Building Construction - 2019

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	0.0380	0.2984	0.4906	9.8000e-004	0.0270	4.4800e-003	0.0315	7.7400e-003	4.1200e-003	0.0119	0.0000	85.1826	85.1826	6.4000e-004	0.0000	85.1960
Worker	0.0507	0.0671	0.6264	1.9100e-003	0.1551	1.1300e-003	0.1562	0.0412	1.0400e-003	0.0423	0.0000	128.8768	128.8768	6.1800e-003	0.0000	129.0066
Total	**0.0887**	**0.3655**	**1.1170**	**2.8900e-003**	**0.1821**	**5.6100e-003**	**0.1877**	**0.0490**	**5.1600e-003**	**0.0541**	**0.0000**	**214.0594**	**214.0594**	**6.8200e-003**	**0.0000**	**214.2026**

3.6 Building Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2766	2.5000	2.2019	3.5100e-003		0.1458	0.1458		0.1371	0.1371	0.0000	302.1514	302.1514	0.0736	0.0000	303.6973
Total	**0.2766**	**2.5000**	**2.2019**	**3.5100e-003**		**0.1458**	**0.1458**		**0.1371**	**0.1371**	**0.0000**	**302.1514**	**302.1514**	**0.0736**	**0.0000**	**303.6973**

3.6 Building Construction - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0712	0.5043	0.9404	1.9500e-003	0.0537	7.9800e-003	0.0617	0.0154	7.3400e-003	0.0227	0.0000	165.2082	165.2082	1.2200e-003	0.0000	165.2339
Worker	0.0951	0.1245	1.1619	3.7900e-003	0.3078	2.2400e-003	0.3100	0.0818	2.0700e-003	0.0839	0.0000	245.4932	245.4932	0.0117	0.0000	245.7381
Total	**0.1663**	**0.6289**	**2.1024**	**5.7400e-003**	**0.3615**	**0.0102**	**0.3717**	**0.0971**	**9.4100e-003**	**0.1066**	**0.0000**	**410.7014**	**410.7014**	**0.0129**	**0.0000**	**410.9720**

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	0.2766	2.5000	2.2019	3.5100e-003		0.1458	0.1458		0.1371	0.1371	0.0000	302.1510	302.1510	0.0736	0.0000	303.6969
Total	**0.2766**	**2.5000**	**2.2019**	**3.5100e-003**		**0.1458**	**0.1458**		**0.1371**	**0.1371**	**0.0000**	**302.1510**	**302.1510**	**0.0736**	**0.0000**	**303.6969**

3.6 Building Construction - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0712	0.5043	0.9404	1.9500e-003	0.0537	7.9800e-003	0.0617	0.0154	7.3400e-003	0.0227	0.0000	165.2082	165.2082	1.2200e-003	0.0000	165.2339
Worker	0.0951	0.1245	1.1619	3.7900e-003	0.3078	2.2400e-003	0.3100	0.0818	2.0700e-003	0.0839	0.0000	245.4932	245.4932	0.0117	0.0000	245.7381
Total	**0.1663**	**0.6289**	**2.1024**	**5.7400e-003**	**0.3615**	**0.0102**	**0.3717**	**0.0971**	**9.4100e-003**	**0.1066**	**0.0000**	**410.7014**	**410.7014**	**0.0129**	**0.0000**	**410.9720**

3.6 Building Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1846	1.6907	1.6124	2.6100e-003		0.0931	0.0931		0.0875	0.0875	0.0000	224.9104	224.9104	0.0542	0.0000	226.0482
Total	**0.1846**	**1.6907**	**1.6124**	**2.6100e-003**		**0.0931**	**0.0931**		**0.0875**	**0.0875**	**0.0000**	**224.9104**	**224.9104**	**0.0542**	**0.0000**	**226.0482**

3.6 Building Construction - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0499	0.3078	0.6720	1.4500e-003	0.0400	5.3400e-003	0.0453	0.0114	4.9200e-003	0.0164	0.0000	122.7641	122.7641	9.1000e-004	0.0000	122.7831
Worker	0.0674	0.0870	0.8199	2.8200e-003	0.2291	1.6900e-003	0.2308	0.0609	1.5700e-003	0.0624	0.0000	179.6661	179.6661	8.3500e-003	0.0000	179.8416
Total	**0.1173**	**0.3948**	**1.4918**	**4.2700e-003**	**0.2690**	**7.0300e-003**	**0.2761**	**0.0723**	**6.4900e-003**	**0.0788**	**0.0000**	**302.4302**	**302.4302**	**9.2600e-003**	**0.0000**	**302.6247**

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	0.1846	1.6907	1.6124	2.6100e-003		0.0931	0.0931		0.0875	0.0875	0.0000	224.9101	224.9101	0.0542	0.0000	226.0479
Total	**0.1846**	**1.6907**	**1.6124**	**2.6100e-003**		**0.0931**	**0.0931**		**0.0875**	**0.0875**	**0.0000**	**224.9101**	**224.9101**	**0.0542**	**0.0000**	**226.0479**

3.6 Building Construction - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0499	0.3078	0.6720	1.4500e-003	0.0400	5.3400e-003	0.0453	0.0114	4.9200e-003	0.0164	0.0000	122.7641	122.7641	9.1000e-004	0.0000	122.7831
Worker	0.0674	0.0870	0.8199	2.8200e-003	0.2291	1.6900e-003	0.2308	0.0609	1.5700e-003	0.0624	0.0000	179.6661	179.6661	8.3500e-003	0.0000	179.8416
Total	**0.1173**	**0.3948**	**1.4918**	**4.2700e-003**	**0.2690**	**7.0300e-003**	**0.2761**	**0.0723**	**6.4900e-003**	**0.0788**	**0.0000**	**302.4302**	**302.4302**	**9.2600e-003**	**0.0000**	**302.6247**

3.7 Paving - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0671	0.6900	0.7822	1.2200e-003		0.0363	0.0363		0.0334	0.0334	0.0000	106.8063	106.8063	0.0345	0.0000	107.5317
Paving	5.4000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0676**	**0.6900**	**0.7822**	**1.2200e-003**		**0.0363**	**0.0363**		**0.0334**	**0.0334**	**0.0000**	**106.8063**	**106.8063**	**0.0345**	**0.0000**	**107.5317**

3.7 Paving - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.9300e-003	2.4900e-003	0.0235	8.0000e-005	6.5600e-003	5.0000e-005	6.6000e-003	1.7400e-003	4.0000e-005	1.7900e-003	0.0000	5.1414	5.1414	2.4000e-004	0.0000	5.1464
Total	**1.9300e-003**	**2.4900e-003**	**0.0235**	**8.0000e-005**	**6.5600e-003**	**5.0000e-005**	**6.6000e-003**	**1.7400e-003**	**4.0000e-005**	**1.7900e-003**	**0.0000**	**5.1414**	**5.1414**	**2.4000e-004**	**0.0000**	**5.1464**

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	0.0671	0.6900	0.7822	1.2200e-003		0.0363	0.0363		0.0334	0.0334	0.0000	106.8062	106.8062	0.0345	0.0000	107.5316
Paving	5.4000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0676**	**0.6900**	**0.7822**	**1.2200e-003**		**0.0363**	**0.0363**		**0.0334**	**0.0334**	**0.0000**	**106.8062**	**106.8062**	**0.0345**	**0.0000**	**107.5316**

3.7 Paving - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.9300e-003	2.4900e-003	0.0235	8.0000e-005	6.5600e-003	5.0000e-005	6.6000e-003	1.7400e-003	4.0000e-005	1.7900e-003	0.0000	5.1414	5.1414	2.4000e-004	0.0000	5.1464
Total	**1.9300e-003**	**2.4900e-003**	**0.0235**	**8.0000e-005**	**6.5600e-003**	**5.0000e-005**	**6.6000e-003**	**1.7400e-003**	**4.0000e-005**	**1.7900e-003**	**0.0000**	**5.1414**	**5.1414**	**2.4000e-004**	**0.0000**	**5.1464**

3.8 Architectural Coating - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	2.7040					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0119	0.0832	0.0991	1.6000e-004		5.1300e-003	5.1300e-003		5.1300e-003	5.1300e-003	0.0000	13.9152	13.9152	9.5000e-004	0.0000	13.9353
Total	**2.7159**	**0.0832**	**0.0991**	**1.6000e-004**		**5.1300e-003**	**5.1300e-003**		**5.1300e-003**	**5.1300e-003**	**0.0000**	**13.9152**	**13.9152**	**9.5000e-004**	**0.0000**	**13.9353**

3.8 Architectural Coating - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.5900e-003	9.7900e-003	0.0923	3.2000e-004	0.0258	1.9000e-004	0.0260	6.8500e-003	1.8000e-004	7.0300e-003	0.0000	20.2229	20.2229	9.4000e-004	0.0000	20.2426
Total	**7.5900e-003**	**9.7900e-003**	**0.0923**	**3.2000e-004**	**0.0258**	**1.9000e-004**	**0.0260**	**6.8500e-003**	**1.8000e-004**	**7.0300e-003**	**0.0000**	**20.2229**	**20.2229**	**9.4000e-004**	**0.0000**	**20.2426**

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	2.7040					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0119	0.0832	0.0991	1.6000e-004		5.1300e-003	5.1300e-003		5.1300e-003	5.1300e-003	0.0000	13.9152	13.9152	9.5000e-004	0.0000	13.9353
Total	**2.7159**	**0.0832**	**0.0991**	**1.6000e-004**		**5.1300e-003**	**5.1300e-003**		**5.1300e-003**	**5.1300e-003**	**0.0000**	**13.9152**	**13.9152**	**9.5000e-004**	**0.0000**	**13.9353**

3.8 Architectural Coating - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.5900e-003	9.7900e-003	0.0923	3.2000e-004	0.0258	1.9000e-004	0.0260	6.8500e-003	1.8000e-004	7.0300e-003	0.0000	20.2229	20.2229	9.4000e-004	0.0000	20.2426
Total	**7.5900e-003**	**9.7900e-003**	**0.0923**	**3.2000e-004**	**0.0258**	**1.9000e-004**	**0.0260**	**6.8500e-003**	**1.8000e-004**	**7.0300e-003**	**0.0000**	**20.2229**	**20.2229**	**9.4000e-004**	**0.0000**	**20.2426**

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	2.2319	4.3212	21.8268	0.0609	4.1659	0.0685	4.2343	1.1141	0.0632	1.1773	0.0000	4,168.4474	4,168.4474	0.1580	0.0000	4,171.7657
Unmitigated	2.2319	4.3212	21.8268	0.0609	4.1659	0.0685	4.2343	1.1141	0.0632	1.1773	0.0000	4,168.4474	4,168.4474	0.1580	0.0000	4,171.7657

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	0.00	0.00	0.00		
Condo/Townhouse	2,581.80	2,581.80	2581.80	6,358,684	6,358,684
Parking Lot	0.00	0.00	0.00		
Single Family Housing	1,916.49	1,916.49	1916.49	4,720,100	4,720,100
Strip Mall	0.00	0.00	0.00		
Total	4,498.29	4,498.29	4,498.29	11,078,785	11,078,785

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
City Park	7.88	7.30	7.30	33.00	48.00	19.00	66	28	6
Condo/Townhouse	7.88	7.30	7.50	41.60	18.80	39.60	86	11	3
Parking Lot	7.88	7.30	7.30	0.00	0.00	0.00	0	0	0
Single Family Housing	7.88	7.30	7.50	41.60	18.80	39.60	86	11	3
Strip Mall	7.88	7.30	7.30	16.60	64.40	19.00	45	40	15

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.512811	0.073496	0.191363	0.130940	0.036084	0.005147	0.012550	0.023118	0.001871	0.002053	0.006546	0.000576	0.003444

4.4 Fleet Mix

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

Percent of Electricity Use Generated with Renewable Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	845.8687	845.8687	0.0341	7.0400e-003	848.7674
NaturalGas Mitigated	0.0308	0.2628	0.1120	1.6800e-003		0.0212	0.0212		0.0212	0.0212	0.0000	304.3124	304.3124	5.8300e-003	5.5800e-003	306.1644
NaturalGas Unmitigated	0.0482	0.4117	0.1754	2.6300e-003		0.0333	0.0333		0.0333	0.0333	0.0000	476.7654	476.7654	9.1400e-003	8.7400e-003	479.6669

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					
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	5.33712e+006	0.0288	0.2459	0.1047	1.5700e-003		0.0199	0.0199		0.0199	0.0199	0.0000	284.8092	284.8092	5.4600e-003	5.2200e-003	286.5425
Strip Mall	11450	6.0000e-005	5.6000e-004	4.7000e-004	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.6110	0.6110	1.0000e-005	1.0000e-005	0.6147
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Condo/Townhouse	3.58567e+006	0.0193	0.1652	0.0703	1.0500e-003		0.0134	0.0134		0.0134	0.0134	0.0000	191.3452	191.3452	3.6700e-003	3.5100e-003	192.5097
Total		**0.0482**	**0.4117**	**0.1754**	**2.6200e-003**		**0.0333**	**0.0333**		**0.0333**	**0.0333**	**0.0000**	**476.7654**	**476.7654**	**9.1400e-003**	**8.7400e-003**	**479.6669**

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					
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	3.39866e+006	0.0183	0.1566	0.0666	1.0000e-003		0.0127	0.0127		0.0127	0.0127	0.0000	181.3653	181.3653	3.4800e-003	3.3300e-003	182.4691
Strip Mall	8690	5.0000e-005	4.3000e-004	3.6000e-004	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005	0.0000	0.4637	0.4637	1.0000e-005	1.0000e-005	0.4666
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Condo/Townhouse	2.29525e+006	0.0124	0.1058	0.0450	6.8000e-004		8.5500e-003	8.5500e-003		8.5500e-003	8.5500e-003	0.0000	122.4833	122.4833	2.3500e-003	2.2500e-003	123.2288
Total		**0.0308**	**0.2628**	**0.1120**	**1.6800e-003**		**0.0212**	**0.0212**		**0.0212**	**0.0212**	**0.0000**	**304.3124**	**304.3124**	**5.8400e-003**	**5.5900e-003**	**306.1644**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
Condo/Townhouse	1.12689e+006	368.2782	0.0148	3.0700e-003	369.5402
Parking Lot	16192	5.2917	2.1000e-004	4.0000e-005	5.3098
Single Family Housing	1.37498e+006	449.3569	0.0181	3.7400e-003	450.8967
Strip Mall	70200	22.9420	9.2000e-004	1.9000e-004	23.0206
Total		**845.8687**	**0.0340**	**7.0400e-003**	**848.7674**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
Condo/Townhouse	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	0	0.0000	0.0000	0.0000	0.0000
Strip Mall	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Residential Interior

Use Low VOC Paint - Residential Exterior

Use Low VOC Paint - Non-Residential Interior

Use Low VOC Paint - Non-Residential Exterior

Use only Natural Gas Hearths

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	3.1238	0.0389	3.3731	1.8000e-004		0.0410	0.0410		0.0408	0.0408	0.0000	326.6201	326.6201	0.0115	5.8900e-003	328.6863
Unmitigated	32.2773	0.4246	38.3867	0.0139		4.9380	4.9380		4.9379	4.9379	467.9298	201.7382	669.6681	0.4372	0.0368	690.2581

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	1.0323					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	2.7188					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	28.4240	0.3856	35.0154	0.0137		4.9194	4.9194		4.9193	4.9193	467.9298	196.2430	664.1728	0.4318	0.0368	684.6510
Landscaping	0.1022	0.0389	3.3714	1.8000e-004		0.0186	0.0186		0.0186	0.0186	0.0000	5.4953	5.4953	5.3300e-003	0.0000	5.6072
Total	**32.2773**	**0.4246**	**38.3867**	**0.0139**		**4.9380**	**4.9380**		**4.9379**	**4.9379**	**467.9298**	**201.7382**	**669.6681**	**0.4372**	**0.0368**	**690.2581**

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	0.2704					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	2.7188					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0325	0.0000	1.7700e-003	0.0000		0.0224	0.0224		0.0222	0.0222	0.0000	321.1248	321.1248	6.1500e-003	5.8900e-003	323.0791
Landscaping	0.1022	0.0389	3.3714	1.8000e-004		0.0186	0.0186		0.0186	0.0186	0.0000	5.4953	5.4953	5.3300e-003	0.0000	5.6072
Total	**3.1238**	**0.0389**	**3.3731**	**1.8000e-004**		**0.0410**	**0.0410**		**0.0408**	**0.0408**	**0.0000**	**326.6201**	**326.6201**	**0.0115**	**5.8900e-003**	**328.6863**

7.0 Water Detail

7.1 Mitigation Measures Water

Use Reclaimed Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

Use Water Efficient Irrigation System

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	170.8768	0.7855	0.0197	193.4867
Unmitigated	211.5267	0.9819	0.0247	239.7970

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 1.78722	6.4891	2.6000e-004	5.0000e-005	6.5114
Condo/Townhouse	16.94 / 10.6796	116.2365	0.5565	0.0140	132.2487
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	12.5747 / 7.92755	86.2833	0.4131	0.0104	98.1692
Strip Mall	0.370363 / 0.226996	2.5177	0.0122	3.0000e-004	2.8677
Total		**211.5267**	**0.9819**	**0.0247**	**239.7970**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 1.46929	5.3348	2.1000e-004	4.0000e-005	5.3531
Condo/Townhouse	13.552 / 8.77981	93.8466	0.4451	0.0112	106.6524
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	10.0598 / 6.51732	69.6631	0.3304	8.2800e-003	79.1689
Strip Mall	0.29629 / 0.186616	2.0324	9.7300e-003	2.4000e-004	2.3123
Total		**170.8768**	**0.7855**	**0.0197**	**193.4867**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	17.8277	1.0536	0.0000	39.9530
Unmitigated	71.3107	4.2143	0.0000	159.8119

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	0.13	0.0264	1.5600e-003	0.0000	0.0591
Condo/Townhouse	119.6	24.2777	1.4348	0.0000	54.4079
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	226.32	45.9409	2.7150	0.0000	102.9566
Strip Mall	5.25	1.0657	0.0630	0.0000	2.3883
Total		**71.3107**	**4.2143**	**0.0000**	**159.8119**

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	0.0325	6.6000e-003	3.9000e-004	0.0000	0.0148
Condo/Townhouse	29.9	6.0694	0.3587	0.0000	13.6020
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	56.58	11.4852	0.6788	0.0000	25.7391
Strip Mall	1.3125	0.2664	0.0158	0.0000	0.5971
Total		**17.8277**	**1.0536**	**0.0000**	**39.9530**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
Generator Sets	2	8.00	260	84	0.74	Diesel

UnMitigated/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
Equipment Type	tons/yr										MT/yr					
Generator Sets	0.0929	0.8232	0.9580	1.7100e-003		0.0436	0.0436		0.0436	0.0436	0.0000	146.9539	146.9539	7.5000e-003	0.0000	147.1114
Total	**0.0929**	**0.8232**	**0.9580**	**1.7100e-003**		**0.0436**	**0.0436**		**0.0436**	**0.0436**	**0.0000**	**146.9539**	**146.9539**	**7.5000e-003**	**0.0000**	**147.1114**

10.0 Vegetation

Road Construction Emissions Model, Version 8.1.0

Daily Emission Estimates for -> HGVS

Project Phases (Pounds)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	Total PM10 (lbs/day)	Exhaust PM10 (lbs/day)	Fugitive Dust PM10 (lbs/day)	Total PM2.5 (lbs/day)	Exhaust PM2.5 (lbs/day)	Fugitive Dust PM2.5 (lbs/day)	SOx (lbs/day)	CO2 (lbs/day)	CH4 (lbs/day)	N2O (lbs/day)	CO2e (lbs/day)
Grubbing/Land Clearing	1.22	8.27	13.22	10.57	0.57	10.00	2.59	0.51	2.08	0.02	1,929.94	0.44	0.02	1,947.53
Grading/Excavation	6.50	48.98	71.74	13.40	3.40	10.00	5.17	3.09	2.08	0.09	8,846.84	2.47	0.09	8,934.21
Drainage/Utilities/Sub-Grade	5.64	42.89	56.71	12.93	2.93	10.00	4.80	2.72	2.08	0.07	7,241.41	1.61	0.07	7,302.26
Paving	2.22	19.03	20.79	1.32	1.32	0.00	1.19	1.19	0.00	0.03	3,128.22	0.75	0.03	3,157.24
Maximum (pounds/day)	6.50	48.98	71.74	13.40	3.40	10.00	5.17	3.09	2.08	0.09	8,846.84	2.47	0.09	8,934.21
Total (tons/construction project)	0.33	2.53	3.50	0.74	0.17	0.56	0.28	0.16	0.12	0.00	444.54	0.11	0.00	448.66

Notes:

Project Start Year ->	2018
Project Length (months) ->	6
Total Project Area (acres) ->	13
Maximum Area Disturbed/Day (acres) ->	1
Water Truck Used? ->	Yes

	Total Material Imported/Exported Volume (yd^3/day)		Daily VMT (miles/day)			
Phase	Soil	Asphalt	Soil Hauling	Asphalt Hauling	Worker Commute	Water Truck
Grubbing/Land Clearing	0	0	0	0	320	40
Grading/Excavation	0	0	0	0	800	40
Drainage/Utilities/Sub-Grade	0	0	0	0	720	40
Paving	0	0	0	0	560	40

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

Total Emission Estimates by Phase for -> HGVS

Project Phases (Tons for all except CO2e. Metric tonnes for CO2e)	ROG (tons/phase)	CO (tons/phase)	NOx (tons/phase)	Total PM10 (tons/phase)	Exhaust PM10 (tons/phase)	Fugitive Dust PM10 (tons/phase)	Total PM2.5 (tons/phase)	Exhaust PM2.5 (tons/phase)	Fugitive Dust PM2.5 (tons/phase)	SOx (tons/phase)	CO2 (tons/phase)	CH4 (tons/phase)	N2O (tons/phase)	CO2e (MT/phase)
Grubbing/Land Clearing	0.01	0.05	0.09	0.07	0.00	0.07	0.02	0.00	0.01	0.00	12.74	0.00	0.00	11.66
Grading/Excavation	0.17	1.29	1.89	0.35	0.09	0.26	0.14	0.08	0.05	0.00	233.56	0.07	0.00	213.97
Drainage/Utilities/Sub-Grade	0.13	0.99	1.31	0.30	0.07	0.23	0.11	0.06	0.05	0.00	167.28	0.04	0.00	153.03
Paving	0.02	0.19	0.21	0.01	0.01	0.00	0.01	0.01	0.00	0.00	30.97	0.01	0.00	28.36
Maximum (tons/phase)	0.17	1.29	1.89	0.35	0.09	0.26	0.14	0.08	0.05	0.00	233.56	0.07	0.00	213.97
Total (tons/construction project)	0.33	2.53	3.50	0.74	0.17	0.56	0.28	0.16	0.12	0.00	444.54	0.11	0.00	407.02

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

The CO2e emissions are reported as metric tons per phase.

Road Construction Emissions Model
Data Entry Worksheet

Version 8.1.0

Note: Required data input sections have a yellow background.
Optional data input sections have a blue background. Only areas with a yellow or blue background can be modified. Program defaults have a white background.
The user is required to enter information in cells D10 through D24, E28 through G35, and D38 through D41 for all project types.
Please use "Clear Data Input & User Overrides" button first before changing the Project Type or begin a new project.

To begin a new project, click this button to clear data previously entered. This button will only work if you opted not to disable macros when loading this spreadsheet.

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

Input Type

Project Name	HGVS	
Construction Start Year	2018	Enter a Year between 2014 and 2025 (inclusive)
Project Type	1	1) New Road Construction : Project to build a roadway from bare ground, which generally requires more site preparation than widening an existing roadway 2) Road Widening : Project to add a new lane to an existing roadway 3) Bridge/Overpass Construction : Project to build an elevated roadway, which generally requires some different equipment than a new roadway, such as a crane 4) Other Linear Project Type: Non-roadway project such as a pipeline, transmission line, or levee construction
Project Construction Time	6.00	months
Working Days per Month	22.00	days (assume 22 if unknown)
Predominant Soil/Site Type: Enter 1, 2, or 3 (for project within "Sacramento County", follow soil type selection instructions in cells E18 to E20 otherwise see instructions provided in cells J18 to J22)	1	1) Sand Gravel : Use for quaternary deposits (Delta/West County) 2) Weathered Rock-Earth : Use for Laguna formation (Jackson Highway area) or the lone formation (Scott Road, Rancho Murieta) 3) Blasted Rock : Use for Salt Springs Slate or Copper Hill Volcanics (Folsom South of Highway 50, Rancho Murieta)
Project Length	1.80	miles
Total Project Area	13.00	acres
Maximum Area Disturbed/Day	1.00	acre
Water Trucks Used?	1	1. Yes 2. No

Please note that the soil type instructions provided in cells E18 to E20 are specific to Sacramento County. Maps available from the California Geologic Survey (see weblink below) can be used to determine soil type outside Sacramento County.

http://www.conservation.ca.gov/cgs/information/geologic_mapping/Pages/googlemaps.aspx#regionalseries

Material Hauling Quantity Input

Material Type	Phase	Haul Truck Capacity (yd^3) (assume 20 if unknown)	Import Volume (yd^3/day)	Export Volume (yd^3/day)
Soil	Grubbing/Land Clearing			
	Grading/Excavation			
	Drainage/Utilities/Sub-Grade			
	Paving			
Asphalt	Grubbing/Land Clearing			
	Grading/Excavation			
	Drainage/Utilities/Sub-Grade			
	Paving			

Mitigation Options

On-road Fleet Emissions Mitigation		Select "2010 and Newer On-road Vehicles Fleet" option when the on-road heavy-duty truck fleet for the project will be limited to vehicles of model year 2010 or newer
Off-road Equipment Emissions Mitigation		Select "20% NOx and 45% Exhaust PM reduction" option if the project will be required to use a lower emitting off-road construction fleet. The SMAQMD Construction Mitigation Calculator can be used to confirm compliance with this mitigation measure (http://www.airquality.org/ceqa/mitigation.shtml). Select "Tier 4 Equipment" option if some or all off-road equipment used for the project meets CARB Tier 4 Standard

The remaining sections of this sheet contain areas that can be modified by the user, although those modifications are optional.

Note: The program's estimates of construction period phase length can be overridden in cells D50 through D53, and F50 through F53.

Construction Periods	User Override of Construction Months	Program Calculated Months	User Override of Phase Starting Date	Program Default Phase Starting Date
Grubbing/Land Clearing		0.60		1/1/2018
Grading/Excavation		2.40		1/20/2018
Drainage/Utilities/Sub-Grade		2.10		4/3/2018
Paving		0.90		6/6/2018
Totals (Months)	6			

Note: Soil Hauling emission default values can be overridden in cells D61 through D64, and F61 through F64.

Soil Hauling Emissions User Input	User Override of Miles/Round Trip	Program Estimate of Miles/Round Trip	User Override of Truck Round Trips/Day	Default Values Round Trips/Day	Calculated Daily VMT
Miles/round trip: Grubbing/Land Clearing		30.00		0	0.00
Miles/round trip: Grading/Excavation		30.00		0	0.00
Miles/round trip: Drainage/Utilities/Sub-Grade		30.00		0	0.00
Miles/round trip: Paving		30.00		0	0.00

Emission Rates	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Grubbing/Land Clearing (grams/mile)	0.07	0.36	1.51	0.10	0.04	0.02	1,590.26	0.00	0.05	1,605.93
Grading/Excavation (grams/mile)	0.07	0.36	1.51	0.10	0.04	0.02	1,590.26	0.00	0.05	1,605.93
Draining/Utilities/Sub-Grade (grams/mile)	0.07	0.36	1.51	0.10	0.04	0.02	1,590.26	0.00	0.05	1,605.93
Paving (grams/mile)	0.07	0.36	1.51	0.10	0.04	0.02	1,590.26	0.00	0.05	1,605.93
Hauling Emissions	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Pounds per day - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Drainage/Utilities/Sub-Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Drainage/Utilities/Sub-Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons per construction project	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Note: Asphalt Hauling emission default values can be overridden in cells D87 through D90, and F87 through F90.

Asphalt Hauling Emissions User Input	User Override of Miles/Round Trip	Program Estimate of Miles/Round Trip	User Override of Truck Round Trips/Day	Default Values Round Trips/Day	Calculated Daily VMT
Miles/round trip: Grubbing/Land Clearing		30.00		0	0.00
Miles/round trip: Grading/Excavation		30.00		0	0.00
Miles/round trip: Drainage/Utilities/Sub-Grade		30.00		0	0.00
Miles/round trip: Paving		30.00		0	0.00

Emission Rates	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Grubbing/Land Clearing (grams/mile)	0.07	0.36	1.51	0.10	0.04	0.02	1,590.26	0.00	0.05	1,605.93
Grading/Excavation (grams/mile)	0.07	0.36	1.51	0.10	0.04	0.02	1,590.26	0.00	0.05	1,605.93
Draining/Utilities/Sub-Grade (grams/mile)	0.07	0.36	1.51	0.10	0.04	0.02	1,590.26	0.00	0.05	1,605.93
Paving (grams/mile)	0.07	0.36	1.51	0.10	0.04	0.02	1,590.26	0.00	0.05	1,605.93
Emissions	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Pounds per day - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Drainage/Utilities/Sub-Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Drainage/Utilities/Sub-Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons per construction project	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Note: Worker commute default values can be overridden in cells D113 through D118.

Worker Commute Emissions	User Override of Worker Commute Default Values	Default Values		
User Input				
Miles/ one-way trip		20	Calculated Daily Trips	Calculated Daily VMT
One-way trips/day		2		
No. of employees: Grubbing/Land Clearing		8	16	320.00
No. of employees: Grading/Excavation		20	40	800.00
No. of employees: Drainage/Utilities/Sub-Grade		18	36	720.00
No. of employees: Paving		14	28	560.00

Emission Rates	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Grubbing/Land Clearing (grams/mile)	0.03	1.33	0.15	0.05	0.02	0.00	393.83	0.01	0.01	395.91
Grading/Excavation (grams/mile)	0.03	1.33	0.15	0.05	0.02	0.00	393.83	0.01	0.01	395.91
Draining/Utilities/Sub-Grade (grams/mile)	0.03	1.33	0.15	0.05	0.02	0.00	393.83	0.01	0.01	395.91
Paving (grams/mile)	0.03	1.33	0.15	0.05	0.02	0.00	393.83	0.01	0.01	395.91
Grubbing/Land Clearing (grams/trip)	1.17	3.21	0.26	0.00	0.00	0.00	87.83	0.02	0.01	91.49
Grading/Excavation (grams/trip)	1.17	3.21	0.26	0.00	0.00	0.00	87.83	0.02	0.01	91.49
Draining/Utilities/Sub-Grade (grams/trip)	1.17	3.21	0.26	0.00	0.00	0.00	87.83	0.02	0.01	91.49
Paving (grams/trip)	1.17	3.21	0.26	0.00	0.00	0.00	87.83	0.02	0.01	91.49
Emissions	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Pounds per day - Grubbing/Land Clearing	0.06	1.05	0.11	0.03	0.01	0.00	280.94	0.01	0.00	282.53
Tons per const. Period - Grubbing/Land Clearing	0.00	0.01	0.00	0.00	0.00	0.00	1.85	0.00	0.00	1.86
Pounds per day - Grading/Excavation	0.15	2.62	0.28	0.08	0.03	0.01	702.34	0.02	0.01	706.33
Tons per const. Period - Grading/Excavation	0.00	0.07	0.01	0.00	0.00	0.00	18.54	0.00	0.00	18.65
Pounds per day - Drainage/Utilities/Sub-Grade	0.14	2.36	0.25	0.07	0.03	0.01	632.11	0.02	0.01	635.69
Tons per const. Period - Drainage/Utilities/Sub-Grade	0.00	0.05	0.01	0.00	0.00	0.00	14.60	0.00	0.00	14.68
Pounds per day - Paving	0.11	1.84	0.20	0.06	0.02	0.00	491.64	0.01	0.01	494.43
Tons per const. Period - Paving	0.00	0.02	0.00	0.00	0.00	0.00	4.87	0.00	0.00	4.89
Total tons per construction project	0.01	0.15	0.02	0.00	0.00	0.00	39.86	0.00	0.00	40.09

Note: Water Truck default values can be overridden in cells D145 through D148, and F145 through F148.

Water Truck Emissions	User Override of Default # Water Trucks	Program Estimate of Number of Water Trucks	User Override of Truck Miles Traveled/Vehicle/Day	Default Values Miles Traveled/Vehicle/Day	Calculated Daily VMT
User Input					
Grubbing/Land Clearing - Exhaust		1		40.00	40.00
Grading/Excavation - Exhaust		1		40.00	40.00
Drainage/Utilities/Subgrade		1		40.00	40.00
Paving		1		40.00	40.00

Emission Rates	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Grubbing/Land Clearing (grams/mile)	0.07	0.36	1.51	0.10	0.04	0.02	1,590.26	0.00	0.05	1,605.93
Grading/Excavation (grams/mile)	0.07	0.36	1.51	0.10	0.04	0.02	1,590.26	0.00	0.05	1,605.93
Draining/Utilities/Sub-Grade (grams/mile)	0.07	0.36	1.51	0.10	0.04	0.02	1,590.26	0.00	0.05	1,605.93
Paving (grams/mile)	0.07	0.36	1.51	0.10	0.04	0.02	1,590.26	0.00	0.05	1,605.93
Emissions	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Pounds per day - Grubbing/Land Clearing	0.01	0.03	0.13	0.01	0.00	0.00	140.24	0.00	0.00	141.62
Tons per const. Period - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.93	0.00	0.00	0.93
Pounds per day - Grading/Excavation	0.01	0.03	0.13	0.01	0.00	0.00	140.24	0.00	0.00	141.62
Tons per const. Period - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00	3.70	0.00	0.00	3.74
Pounds per day - Drainage/Utilities/Sub-Grade	0.01	0.03	0.13	0.01	0.00	0.00	140.24	0.00	0.00	141.62
Tons per const. Period - Drainage/Utilities/Sub-Grade	0.00	0.00	0.00	0.00	0.00	0.00	3.24	0.00	0.00	3.27
Pounds per day - Paving	0.01	0.03	0.13	0.01	0.00	0.00	140.24	0.00	0.00	141.62
Tons per const. Period - Paving	0.00	0.00	0.00	0.00	0.00	0.00	1.39	0.00	0.00	1.40
Total tons per construction project	0.00	0.00	0.01	0.00	0.00	0.00	9.26	0.00	0.00	9.35

Note: Fugitive dust default values can be overridden in cells D171 through D173.

Fugitive Dust	User Override of Max Acreage Disturbed/Day	Default Maximum Acreage/Day	PM10 pounds/day	PM10 tons/per period	PM2.5 pounds/day	PM2.5 tons/per period
Fugitive Dust - Grubbing/Land Clearing		1.00	10.00	0.07	2.08	0.01
Fugitive Dust - Grading/Excavation		1.00	10.00	0.26	2.08	0.05
Fugitive Dust - Drainage/Utilities/Subgrade		1.00	10.00	0.23	2.08	0.05

Off-Road Equipment Emissions

Grubbing/Land Clearing Override of Default Number of Vehicles	Default Number of Vehicles *Program-estimate*	Mitigation Option Override of Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Default Equipment Tier	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day	N2O pounds/day	CO2e pounds/day
			Model Default Tier	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cranes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		Model Default Tier	Crawler Tractors	0.63	2.61	8.34	0.32	0.29	0.01	775.49	0.24	0.01	783.53
			Model Default Tier	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		Model Default Tier	Excavators	0.30	3.38	3.19	0.15	0.14	0.01	536.03	0.17	0.00	541.59
			Model Default Tier	Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Graders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pavers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pumps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rollers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4		Model Default Tier	Signal Boards	0.23	1.20	1.44	0.06	0.06	0.00	197.25	0.02	0.00	198.26
			Model Default Tier	Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Welders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

User-Defined Off-road Equipment If non-default vehicles are used, please provide information in 'Non-default Off-road Equipment' tab

Number of Vehicles	Equipment Tier	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day	N2O pounds/day	CO2e pounds/day
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

		ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Grubbing/Land Clearing	pounds per day	1.16	7.19	12.98	0.53	0.49	0.02	1,508.77	0.43	0.01	1,523.38
Grubbing/Land Clearing	tons per phase	0.01	0.05	0.09	0.00	0.00	0.00	9.96	0.00	0.00	10.05

Grading/Excavation Override of Default Number of Vehicles	Default Number of Vehicles *Program-estimate*	Mitigation Option Override of Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Default Equipment Tier	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day	N2O pounds/day	CO2e pounds/day
			Model Default Tier	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0		Model Default Tier	Cranes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		Model Default Tier	Crawler Tractors	0.63	2.61	8.34	0.32	0.29	0.01	775.49	0.24	0.01	783.53
			Model Default Tier	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3		Model Default Tier	Excavators	0.90	10.14	9.58	0.46	0.43	0.02	1,608.08	0.50	0.01	1,624.78
			Model Default Tier	Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		Model Default Tier	Graders	0.84	4.69	8.36	0.47	0.43	0.01	629.41	0.20	0.01	635.92
			Model Default Tier	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pavers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pumps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2		Model Default Tier	Rollers	0.52	3.92	5.05	0.35	0.32	0.01	534.41	0.17	0.00	539.95
			Model Default Tier	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		Model Default Tier	Rubber Tired Loaders	0.42	1.71	5.25	0.18	0.16	0.01	619.57	0.19	0.01	626.01
	2		Model Default Tier	Scrapers	2.26	17.33	28.00	1.10	1.01	0.03	3,008.05	0.94	0.03	3,039.27
	4		Model Default Tier	Signal Boards	0.23	1.20	1.44	0.06	0.06	0.00	197.25	0.02	0.00	198.26
			Model Default Tier	Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2		Model Default Tier	Tractors/Loaders/Backhoes	0.54	4.72	5.31	0.38	0.35	0.01	632.00	0.20	0.01	638.55
			Model Default Tier	Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Welders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

User-Defined Off-road Equipment If non-default vehicles are used, please provide information in 'Non-default Off-road Equipment' tab

Number of Vehicles	Equipment Tier	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day	N2O pounds/day	CO2e pounds/day
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

		ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Grading/Excavation	pounds per day	6.34	46.33	71.33	3.31	3.05	0.08	8,004.27	2.45	0.07	8,086.26
Grading/Excavation	tons per phase	0.17	1.22	1.88	0.09	0.08	0.00	211.31	0.06	0.00	213.48

Drainage/Utilities/Subgrade Override of Default Number of Vehicles	Default Number of Vehicles *Program-estimate*	Mitigation Option Override of Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Default Equipment Tier		ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day	N2O pounds/day	CO2e pounds/day
			Model Default Tier	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		Model Default Tier	Air Compressors	0.40	2.47	2.67	0.20	0.20	0.00	375.27	0.04	0.00	377.00
			Model Default Tier	Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cranes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Excavators	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		Model Default Tier	Generator Sets	0.51	3.75	4.11	0.26	0.26	0.01	623.04	0.04	0.00	625.56
	1		Model Default Tier	Graders	0.84	4.69	8.36	0.47	0.43	0.01	629.41	0.20	0.01	635.92
			Model Default Tier	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pavers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		Model Default Tier	Plate Compactors	0.04	0.21	0.25	0.01	0.01	0.00	34.48	0.00	0.00	34.65
			Model Default Tier	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		Model Default Tier	Pumps	0.53	3.81	4.17	0.28	0.28	0.01	623.04	0.05	0.00	625.61
			Model Default Tier	Rollers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		Model Default Tier	Rough Terrain Forklifts	0.16	2.31	2.01	0.10	0.09	0.00	346.54	0.11	0.00	350.13
			Model Default Tier	Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2		Model Default Tier	Scrapers	2.26	17.33	28.00	1.10	1.01	0.03	3,008.05	0.94	0.03	3,039.27
	4		Model Default Tier	Signal Boards	0.23	1.20	1.44	0.06	0.06	0.00	197.25	0.02	0.00	198.26
			Model Default Tier	Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2		Model Default Tier	Tractors/Loaders/Backhoes	0.54	4.72	5.31	0.38	0.35	0.01	632.00	0.20	0.01	638.55
			Model Default Tier	Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Welders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

User-Defined Off-road Equipment If non-default vehicles are used, please provide information in 'Non-default Off-road Equipment' tab

Number of Vehicles	Equipment Tier	Type		ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day	N2O pounds/day	CO2e pounds/day
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

		ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Drainage/Utilities/Sub-Grade	pounds per day	5.50	40.50	56.33	2.85	2.69	0.07	6,469.07	1.59	0.05	6,524.95
Drainage/Utilities/Sub-Grade	tons per phase	0.13	0.94	1.30	0.07	0.06	0.00	149.44	0.04	0.00	150.73

Paving Override of Default Number of Vehicles	Default Number of Vehicles *Program-estimate*	Mitigation Option Override of Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Default Equipment Tier	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day	N2O pounds/day	CO2e pounds/day
			Model Default Tier	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cranes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Excavators	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Graders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		Model Default Tier	Pavers	0.32	2.84	3.50	0.17	0.16	0.00	458.58	0.14	0.00	463.33
	1		Model Default Tier	Paving Equipment	0.24	2.52	2.64	0.13	0.12	0.00	406.90	0.13	0.00	411.13
			Model Default Tier	Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pumps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3		Model Default Tier	Rollers	0.78	5.88	7.57	0.52	0.48	0.01	801.62	0.25	0.01	809.93
			Model Default Tier	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4		Model Default Tier	Signal Boards	0.23	1.20	1.44	0.06	0.06	0.00	197.25	0.02	0.00	198.26
			Model Default Tier	Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2		Model Default Tier	Tractors/Loaders/Backhoes	0.54	4.72	5.31	0.38	0.35	0.01	632.00	0.20	0.01	638.55
			Model Default Tier	Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Welders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

User-Defined Off-road Equipment If non-default vehicles are used, please provide information in 'Non-default Off-road Equipment' tab

Number of Vehicles	Equipment Tier	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day	N2O pounds/day	CO2e pounds/day
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

			ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
	Paving	pounds per day	2.10	17.16	20.46	1.25	1.16	0.03	2,496.35	0.74	0.02	2,521.19
	Paving	tons per phase	0.02	0.17	0.20	0.01	0.01	0.00	24.71	0.01	0.00	24.96
Total Emissions all Phases (tons per construction period) =>			0.32	2.38	3.47	0.17	0.16	0.00	395.42	0.11	0.00	399.22

Equipment default values for horsepower and hours/day can be overridden in cells D391 through D424 and F391 through F424.

Equipment	User Override of Horsepower	Default Values Horsepower	User Override of Hours/day	Default Values Hours/day
Aerial Lifts		63		8
Air Compressors		78		8
Bore/Drill Rigs		206		8
Cement and Mortar Mixers		9		8
Concrete/Industrial Saws		81		8
Cranes		226		8
Crawler Tractors		208		8
Crushing/Proc. Equipment		85		8
Excavators		163		8
Forklifts		89		8
Generator Sets		84		8
Graders		175		8
Off-Highway Tractors		123		8
Off-Highway Trucks		400		8
Other Construction Equipment		172		8
Other General Industrial Equipment		88		8
Other Material Handling Equipment		167		8
Pavers		126		8
Paving Equipment		131		8
Plate Compactors		8		8
Pressure Washers		13		8
Pumps		84		8
Rollers		81		8
Rough Terrain Forklifts		100		8
Rubber Tired Dozers		255		8
Rubber Tired Loaders		200		8
Scrapers		362		8
Signal Boards		6		8
Skid Steer Loaders		65		8
Surfacing Equipment		254		8
Sweepers/Scrubbers		64		8
Tractors/Loaders/Backhoes		98		8
Trenchers		81		8
Welders		46		8

END OF DATA ENTRY SHEET

Drilling and Blasting

			Blast Frequency			
ID	Source	holes/blast	blasts/day	blasts/month	blasts/ year	Tons ANFO/ Blast
B-1	Blasting Activity	100	1	12	36	1.25

Blasting Gases - ANFO Emission Factors

ID	Source	CO EF lb/ton	NOX EF lb/ton	SOx EF lb/ton	CO2 EF lb/ton	CH4 EF lb/ton	N2O EF lb/ton
B-1	Blasting Activity	67	17	2	566	0.02	0.005

Blasting Gases - ANFO Emission Rates Greenhouse Gases

ID	Emissions	CO2 (lb/hr)	CO2 (lb/day)	CO2 (TPY)	CH4 (lb/hr)	CH4 (lb/day)	CH4 (TPY)	N2O (lb/hr)	N2O (lb/day)	N2O (TPY)	Source Type
B-1	Blasting Activity	707.50	707.50	12.74	0.03	0.03	0.0005	0.0063	0.0063	0.2250	Area

Notes:

1. Emission Factor Source: AP-42 5th Edition, Section 13.3, Table 13.3-1, February 1980, ND = no data.

Uncontrolled CO2, CH4, and N2O emissions are calculated using the emission factors of 73.96 kg/MMBtu, $3*10^{-3}$ kg/MMBtu, and $6*10^{-4}$ kg/MMBtu, respectively, from 40 CFR 98, Tables C-1 and C-2 for distillate fuel oil No. 2. A diesel fuel oil to ammonium nitrate ratio of 9% and a diesel heating value of 19,300 Btu/pound of diesel fuel were used to express the CO2, CH4, and N2O emission factors in terms of lb/ton of ANFO.

Appendix B

EMISSION REDUCTION ADJUSTMENTS

Appendix B

EMISSION REDUCTION ADJUSTMENTS FOR HARMONY GROVE VILLAGE SOUTH PROJECT

Methodology for Calculating Reduction Credits for the Project with Design Features

Transportation-related emissions reductions would be achieved through mandatory regulations applicable to all vehicle emissions within the state and are not attributable to specific GHG reduction features of the Project. Energy-related emissions reductions would be achieved partly through state regulations, goals, and policies.

As summarized in Table B-1, reduction credits are based on the CARB Scoping Plan reductions for sector-specific activity. For example, Pavley II reductions counted towards the 2020 target is 4 MMT CO_2e and projected 2020 unmitigated transportation-related emissions is 168.2 MMT CO_2e, therefore the reduction is 2.38 percent (4 MMT CO_2e/168.2 MMT CO_2e). This percentage reduction can be applied to the Project's transportation emissions.

Table B-1
SCOPING PLAN GHG EMISSION REDUCTIONS
(ANNUAL MMTCO_2e)

Statewide Land Use-Adjusted 2020 GHG Emissions Inventory[1]		AB 32 Scoping Plan GHG Emission Reductions[2]		Percent Reduction
Sector	**Emissions**	**Measure**	**Emissions Reduction**	
Transportation	168.2	Pavley II	4.0	2.38

Source: CARB 2014
[1] From CARB's 2020 BAU Forecast
[2] From CARB's Greenhouse Gas Reductions from Ongoing, Adopted and Foreseeable Scoping Plan Measures

Methodology for Calculating Unmitigated and Mitigated Mobile Emissions

The County of San Diego allows the Project to apply GHG reduction credits for Pavley II towards the Project. Therefore, adjustments were made to the CalEEMod model outputs to account for the allowable reduction as shown in Table E-2.

Table B-2
UNCORRECTED AND CORRECTED CALEEMOD OUTPUTS FOR PROJECT EMISSIONS - MOBILE
(ANNUAL MT CO_2e)

Source	Project Emissions (uncorrected)	Project Emissions (corrected)[1]
Mobile Emissions	4,171.77	4,072.48

Notes:
All model results include built in emission reductions for Pavley I regulations (model default).
[1] Includes reduction of 2.38% for Pavely II regulations

Appendix C

AVERAGE TRIP LENGTH ANALYSIS

MEMORANDUM

To:	David Kovach Kovach Companies	Date:	June 8, 2016
From:	Cara Hilgesen LLG, Engineers	LLG Ref:	3-14-2314
Subject:	Harmony Grove Village South Traffic Study – Average Trip Length		

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Linscott, Law & Greenspan, Engineers (LLG) has prepared this memorandum for the Harmony Grove Village South Draft EIR. The Project proposes to develop 453 DU on 111 acres. The average trip length (ATL) in miles per dwelling unit is requested for the environmental Greenhouse Gas Report for compliance with the County's May 2016 recommendations for assessing greenhouse gas emission impacts in the interim period before the revised Climate Action Plan is approved.

The *SANDAG (Not So) Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region*, April 2002 provides standard ATLs for various land use types. The standard residential trip length is documented at 7.9 miles. This number represents an estimated average of all residential types (single-family, multi-family, etc.) that was computed from several data sources, some of which were in urban areas and some in rural areas ultimately arriving at an industry average for this land use type. However, the underlying source for SANDAG's 7.9 mile trip length is unknown.

The Project is located within close proximity to an abundant amount of employment opportunities in Escondido and San Marcos, is close to retail shopping areas, and has schools nearby. Because of its proximity to these amenities, a Project-specific analysis was conducted to determine the ATL for the Project site.

In order to arrive at the Project-specific ATL, LLG worked with SANDAG to utilize the SANDAG 2050 Regional Transportation Plan Series 12 Forecast Model. The model assumed existing land use and network conditions (i.e. no Citracado Parkway extension from Andreasen Drive to Harmony Grove Village Parkway). The Project area Traffic Analysis Zone (TAZ) was updated to include the 453 residential units.

Once the model assumptions were validated, a site-specific SANDAG model run was conducted for the Project TAZ. The results of model run are based on Project access locations, characteristics of the roadway system, and the location of residential and employment opportunities in the surrounding area. The reviewed model run provided data disaggregated into two categories: 1) *Vehicle Miles Traveled* and 2) *Average Daily Project Traffic Volumes*. A review of the data output was completed and professional engineering adjustments were made. These two data categories were then used together to calculate ATL.

The total VMT was divided by the Project ADT to arrive at a rate of **7.88 miles per vehicle trip**.

LINSCOTT LAW & GREENSPAN engineers

The data from the model runs are included as ***Attachment A*** to this memo.

Please call us if you have any questions. Thank you.

cc: File
Attachments: A. SANDAG Series 12 Traffic Model Data

ATTACHMENT A
SANDAG SERIES 12 TRAFFIC MODEL DATA

Q1	ADJUSTED VMT1	PCT	
3549	955	100%	
1952	1153		55%
1952	84		55%
1562	281		44%
1562	266		44%
1562	131		44%
1384	585		39%
1278	181		36%
1242	83		35%
1207	520		34%
1207	325		34%
1207	68		34%
1207	327		34%
1207	66		34%
1207	392		34%
1207	131		34%
1207	322		34%
1207	180		34%
1171	72		33%
1171	91		33%
1171	32		33%
1171	17		33%
923	193		26%
212	352	6%	
212	83	6%	
192	153	5%	
192	69	5%	
182	249	5%	
172	146	5%	
172	36	5%	
172	22	5%	
605	36	17%	
605	17	17%	
603	270		17%
603	44		17%
603	20		17%
603	58		17%
568	58		16%
460	14	13%	
460	7	13%	
568	133		16%
568	60		16%
121	66	3%	
121	22	3%	
121	18	3%	

Q1	ADJUSTED VMT1	PCT	
443	6	12%	
428	104	12%	
428	48	12%	
428	24	12%	
428	18	12%	
423	71	12%	
423	42	12%	
497	76		14%
497	37		14%
497	210		14%
532	107		15%
532	37		15%
121	50	3%	
389	55	11%	
388	62	11%	
497	19		14%
426	84		12%
357	37	10%	
357	29	10%	
355	89	10%	
349	66	10%	
349	27	10%	
341	31	10%	
339	38	10%	
339	37	10%	
319	36	9%	
319	11	9%	
91	17	3%	
81	14	2%	
294	106	8%	
294	60	8%	
294	40	8%	
294	28	8%	
294	26	8%	
81	5	2%	
294	17	8%	
293	39	8%	
285	106	8%	
285	81	8%	
285	52	8%	
285	20	8%	
285	13	8%	
284	22	8%	
281	209	8%	
281	23	8%	
280	72	8%	

Q1	ADJUSTED VMT1	PCT
280	36	8%
279	33	8%
278	85	8%
278	53	8%
275	27	8%
247	15	7%
71	4	2%
71	11	2%
71	5	2%
71	11	2%
71	5	2%
224	35	6%
224	29	6%
224	16	6%
224	12	6%
224	3	6%
223	32	6%
223	28	6%
223	12	6%
223	5	6%
221	84	6%
221	33	6%
221	20	6%
221	20	6%
221	11	6%
219	42	6%
219	12	6%
61	11	2%
217	24	6%
61	6	2%
61	5	2%
61	5	2%
212	28	6%
211	113	6%
211	82	6%
211	71	6%
211	27	6%
209	66	6%
209	11	6%
200	67	6%
200	42	6%
195	41	6%
195	25	6%
190	24	5%
189	54	5%
189	24	5%

Q1	ADJUSTED VMT1	PCT
188	118	5%
186	125	5%
186	111	5%
186	98	5%
186	83	5%
186	57	5%
180	40	5%
178	76	5%
175	11	5%
170	169	5%
170	72	5%
170	51	5%
170	46	5%
170	40	5%
170	29	5%
170	24	5%
168	9	5%
165	45	5%
162	49	5%
161	59	5%
160	192	5%
160	48	5%
160	30	5%
159	87	4%
159	48	4%
159	13	4%
156	75	4%
156	72	4%
155	72	4%
154	50	4%
154	37	4%
154	26	4%
153	25	4%
151	23	4%
150	141	4%
150	114	4%
150	49	4%
150	24	4%
150	15	4%
146	49	4%
146	31	4%
146	28	4%
146	20	4%
146	16	4%
146	15	4%
145	45	4%

Q1	ADJUSTED VMT1	PCT
145	27	4%
144	77	4%
144	56	4%
142	181	4%
142	72	4%
141	35	4%
141	27	4%
141	21	4%
141	20	4%
140	53	4%
140	32	4%
140	31	4%
140	13	4%
139	18	4%
139	9	4%
139	8	4%
136	51	4%
136	42	4%
136	18	4%
136	7	4%
132	35	4%
132	22	4%
131	65	4%
131	37	4%
131	30	4%
130	72	4%
130	67	4%
130	64	4%
130	59	4%
128	9	4%
127	26	4%
127	24	4%
126	41	4%
126	14	4%
126	10	4%
126	9	4%
126	7	4%
124	42	4%
124	30	4%
124	27	4%
124	19	4%
124	12	4%
122	69	3%
121	106	3%
121	5	3%
120	29	3%

Q1	ADJUSTED VMT1	PCT
120	9	3%
120	5	3%
117	85	3%
116	89	3%
116	54	3%
116	21	3%
115	7	3%
114	70	3%
114	58	3%
114	15	3%
114	11	3%
113	45	3%
111	37	3%
111	18	3%
111	13	3%
111	13	3%
111	10	3%
111	8	3%
111	6	3%
110	28	3%
110	16	3%
109	39	3%
109	36	3%
109	36	3%
109	34	3%
109	14	3%
108	57	3%
108	53	3%
108	4	3%
108	3	3%
107	47	3%
106	23	3%
106	22	3%
106	14	3%
106	13	3%
105	5	3%
103	47	3%
103	42	3%
103	41	3%
102	23	3%
102	20	3%
101	5	3%
100	11	3%
99	173	3%
99	56	3%
99	43	3%

Q1	ADJUSTED VMT1	PCT
99	28	3%
99	19	3%
98	23	3%
98	16	3%
97	71	3%
97	55	3%
97	38	3%
97	31	3%
97	31	3%
97	30	3%
97	27	3%
97	22	3%
97	21	3%
97	20	3%
97	20	3%
97	16	3%
97	14	3%
97	10	3%
97	7	3%
97	6	3%
96	40	3%
96	4	3%
95	59	3%
95	31	3%
95	30	3%
95	29	3%
95	26	3%
95	19	3%
95	17	3%
95	7	3%
95	5	3%
95	4	3%
94	73	3%
94	48	3%
92	66	3%
92	24	3%
92	20	3%
89	35	3%
86	30	2%
86	28	2%
85	7	2%
84	77	2%
84	41	2%
84	8	2%
83	37	2%
83	37	2%

Q1	ADJUSTED VMT1	PCT
83	24	2%
83	20	2%
83	18	2%
83	10	2%
82	48	2%
81	10	2%
80	36	2%
80	36	2%
80	14	2%
79	73	2%
79	35	2%
79	5	2%
79	4	2%
78	32	2%
78	32	2%
78	30	2%
78	28	2%
78	20	2%
77	43	2%
77	32	2%
77	25	2%
75	18	2%
75	10	2%
74	47	2%
74	43	2%
73	36	2%
73	7	2%
73	6	2%
73	6	2%
73	4	2%
73	4	2%
72	33	2%
72	12	2%
72	11	2%
72	6	2%
72	2	2%
71	34	2%
71	13	2%
70	26	2%
70	24	2%
70	21	2%
70	15	2%
70	6	2%
20	1	1%
69	8	2%
69	6	2%

Q1	ADJUSTED VMT1	PCT
68	10	2%
68	3	2%
67	26	2%
67	19	2%
67	9	2%
67	9	2%
67	8	2%
67	6	2%
67	5	2%
67	5	2%
67	4	2%
67	3	2%
67	3	2%
67	3	2%
67	2	2%
66	15	2%
66	3	2%
65	44	2%
65	6	2%
63	178	2%
63	28	2%
63	8	2%
63	8	2%
63	7	2%
63	5	2%
62	31	2%
62	19	2%
62	8	2%
62	8	2%
62	5	2%
61	25	2%
61	21	2%
61	14	2%
61	13	2%
61	12	2%
61	11	2%
61	10	2%
61	8	2%
61	4	2%
60	12	2%
60	7	2%
58	61	2%
58	49	2%
58	44	2%
58	21	2%
58	18	2%

Q1	ADJUSTED VMT1	PCT
58	18	2%
58	14	2%
58	11	2%
58	10	2%
58	8	2%
58	6	2%
57	25	2%
57	15	2%
57	10	2%
57	8	2%
56	19	2%
56	5	2%
56	4	2%
56	1	2%
55	21	2%
55	11	2%
55	9	2%
55	7	2%
55	5	2%
55	4	2%
55	3	2%
55	3	2%
54	51	2%
54	28	2%
54	2	2%
54	2	2%
54	1	2%
53	54	1%
53	9	1%
52	15	1%
52	14	1%
52	8	1%
52	5	1%
52	3	1%
51	9	1%
51	5	1%
50	8	1%
50	5	1%
49	43	1%
49	24	1%
49	19	1%
49	16	1%
49	11	1%
49	3	1%
48	19	1%
48	7	1%

Q1	ADJUSTED VMT1	PCT
48	6	1%
48	5	1%
48	4	1%
48	2	1%
48	1	1%
47	23	1%
47	20	1%
47	20	1%
47	5	1%
47	4	1%
47	4	1%
46	56	1%
46	49	1%
46	44	1%
46	34	1%
46	25	1%
46	23	1%
46	22	1%
46	21	1%
46	19	1%
46	14	1%
46	9	1%
46	7	1%
45	55	1%
45	50	1%
45	38	1%
45	35	1%
45	21	1%
45	20	1%
45	12	1%
45	10	1%
45	10	1%
45	8	1%
45	6	1%
45	3	1%
45	3	1%
45	2	1%
45	2	1%
45	1	1%
45	1	1%
44	32	1%
44	31	1%
44	30	1%
44	24	1%
44	23	1%
44	17	1%

Q1	ADJUSTED VMT1	PCT
44	15	1%
44	14	1%
44	11	1%
44	11	1%
44	10	1%
44	10	1%
44	9	1%
44	8	1%
44	7	1%
44	7	1%
44	7	1%
44	7	1%
44	4	1%
44	3	1%
44	2	1%
44	1	1%
44	1	1%
43	149	1%
43	30	1%
43	15	1%
43	11	1%
43	8	1%
43	6	1%
43	1	1%
42	144	1%
42	64	1%
42	55	1%
42	29	1%
42	24	1%
42	13	1%
42	9	1%
42	8	1%
42	4	1%
42	4	1%
42	3	1%
42	2	1%
42	2	1%
42	0	1%
41	78	1%
41	73	1%
41	53	1%
41	30	1%
41	28	1%
41	19	1%
41	13	1%
41	9	1%

Q1	ADJUSTED VMT1	PCT
41	8	1%
41	6	1%
41	6	1%
41	4	1%
41	4	1%
41	4	1%
41	4	1%
41	4	1%
41	3	1%
40	28	1%
40	24	1%
40	20	1%
40	20	1%
40	10	1%
40	4	1%
40	4	1%
40	4	1%
40	4	1%
40	2	1%
40	2	1%
40	2	1%
39	91	1%
39	66	1%
39	35	1%
39	27	1%
39	26	1%
39	16	1%
39	13	1%
39	10	1%
39	10	1%
39	7	1%
39	7	1%
39	7	1%
39	6	1%
39	4	1%
39	4	1%
39	4	1%
39	1	1%
38	97	1%
38	24	1%
38	21	1%
38	19	1%
38	16	1%
38	16	1%
38	16	1%
38	13	1%

Q1	ADJUSTED VMT1	PCT
38	13	1%
38	12	1%
38	11	1%
38	10	1%
38	8	1%
38	8	1%
38	7	1%
38	7	1%
38	7	1%
38	7	1%
38	3	1%
38	3	1%
38	2	1%
38	2	1%
38	1	1%
37	31	1%
37	27	1%
37	20	1%
37	20	1%
37	13	1%
37	10	1%
37	9	1%
37	7	1%
37	7	1%
37	7	1%
37	5	1%
37	4	1%
37	4	1%
37	3	1%
36	38	1%
36	32	1%
36	28	1%
36	16	1%
36	6	1%
36	4	1%
36	3	1%
36	2	1%
36	2	1%
36	2	1%
35	22	1%
35	11	1%
35	11	1%
35	10	1%
35	8	1%
35	8	1%
35	7	1%

Q1	ADJUSTED VMT1	PCT
35	6	1%
35	5	1%
35	5	1%
35	4	1%
35	4	1%
35	4	1%
35	3	1%
35	3	1%
35	3	1%
35	3	1%
35	3	1%
35	1	1%
34	62	1%
34	44	1%
34	34	1%
34	34	1%
34	21	1%
34	17	1%
34	17	1%
34	13	1%
34	13	1%
34	11	1%
34	11	1%
34	9	1%
33	88	1%
33	77	1%
33	35	1%
33	32	1%
33	24	1%
33	24	1%
33	22	1%
33	22	1%
33	21	1%
33	21	1%
33	18	1%
33	17	1%
33	13	1%
33	12	1%
33	8	1%
33	8	1%
33	7	1%
33	7	1%
33	7	1%
33	7	1%
33	5	1%
33	5	1%

Q1	ADJUSTED VMT1	PCT
33	4	1%
33	4	1%
33	3	1%
33	3	1%
33	3	1%
33	3	1%
33	2	1%
33	1	1%
32	71	1%
32	60	1%
32	41	1%
32	21	1%
32	18	1%
32	17	1%
32	16	1%
32	15	1%
32	14	1%
32	13	1%
32	12	1%
32	11	1%
32	11	1%
32	10	1%
32	10	1%
32	8	1%
32	7	1%
32	7	1%
32	7	1%
32	7	1%
32	6	1%
32	6	1%
32	5	1%
32	5	1%
32	4	1%
32	3	1%
32	3	1%
32	3	1%
32	1	1%
32	1	1%
31	52	1%
31	42	1%
31	24	1%
31	10	1%
31	10	1%
31	7	1%
31	6	1%
31	3	1%

Q1	ADJUSTED VMT1	PCT
31	2	1%
30	82	1%
30	20	1%
30	20	1%
30	19	1%
30	17	1%
30	13	1%
30	11	1%
30	9	1%
30	9	1%
30	4	1%
30	4	1%
30	4	1%
30	3	1%
30	3	1%
30	3	1%
30	3	1%
30	2	1%
30	2	1%
30	2	1%
30	2	1%
30	1	1%
29	51	1%
29	39	1%
29	14	1%
29	14	1%
29	14	1%
29	12	1%
29	10	1%
29	10	1%
29	7	1%
29	7	1%
29	6	1%
29	5	1%
29	5	1%
29	4	1%
29	3	1%
29	3	1%
29	1	1%
29	1	1%
28	30	1%
28	15	1%
28	12	1%
28	8	1%
28	8	1%
28	7	1%

Q1	ADJUSTED VMT1	PCT
28	6	1%
28	6	1%
28	5	1%
28	4	1%
28	3	1%
28	3	1%
28	2	1%
28	2	1%
28	2	1%
28	2	1%
28	2	1%
28	2	1%
28	2	1%
28	2	1%
28	1	1%
28	1	1%
28	1	1%
27	23	1%
27	16	1%
27	14	1%
27	13	1%
27	9	1%
27	8	1%
27	8	1%
27	6	1%
27	6	1%
27	6	1%
27	4	1%
27	4	1%
27	4	1%
27	3	1%
27	3	1%
27	2	1%
27	2	1%
27	2	1%
27	2	1%
26	49	1%
26	23	1%
26	16	1%
26	12	1%
26	11	1%
26	9	1%
26	9	1%
26	9	1%
26	7	1%
26	7	1%
26	4	1%

Q1	ADJUSTED VMT1	PCT
26	4	1%
26	1	1%
26	1	1%
25	19	1%
25	13	1%
25	9	1%
25	8	1%
25	7	1%
25	5	1%
25	3	1%
25	3	1%
25	2	1%
25	2	1%
25	1	1%
25	1	1%
24	36	1%
24	26	1%
24	15	1%
24	14	1%
24	11	1%
24	9	1%
24	9	1%
24	9	1%
24	8	1%
24	7	1%
24	7	1%
24	7	1%
24	6	1%
24	6	1%
24	6	1%
24	6	1%
24	6	1%
24	5	1%
24	5	1%
24	5	1%
24	5	1%
24	5	1%
24	4	1%
24	4	1%
24	3	1%
24	3	1%
24	3	1%
24	2	1%
24	2	1%
24	2	1%
24	2	1%

Q1	ADJUSTED VMT1	PCT
24	2	1%
24	2	1%
24	1	1%
24	1	1%
24	1	1%
23	24	1%
23	8	1%
23	8	1%
23	8	1%
23	6	1%
23	6	1%
23	6	1%
23	6	1%
23	6	1%
23	6	1%
23	6	1%
23	6	1%
23	6	1%
23	6	1%
23	3	1%
23	3	1%
23	2	1%
23	2	1%
23	2	1%
23	2	1%
23	2	1%
23	2	1%
23	1	1%
23	1	1%
23	1	1%
22	12	1%
22	9	1%
22	8	1%
22	7	1%
22	6	1%
22	6	1%
22	5	1%
22	5	1%
22	5	1%
22	5	1%
22	5	1%
22	5	1%
22	3	1%
22	3	1%
22	2	1%
22	2	1%
22	2	1%
22	2	1%

Q1	ADJUSTED VMT1	PCT
22	2	1%
22	1	1%
22	1	1%
22	1	1%
22	1	1%
21	35	1%
21	8	1%
21	6	1%
21	6	1%
21	5	1%
21	5	1%
21	5	1%
21	4	1%
21	3	1%
21	3	1%
21	3	1%
21	3	1%
21	3	1%
21	2	1%
21	2	1%
21	2	1%
21	1	1%
21	1	1%
21	1	1%
20	31	1%
20	17	1%
20	9	1%
20	7	1%
20	7	1%
20	5	1%
20	4	1%
20	4	1%
20	3	1%
20	3	1%
20	3	1%
20	3	1%
20	3	1%
20	3	1%
20	3	1%
20	2	1%
20	2	1%
20	2	1%
20	2	1%
20	2	1%
20	2	1%
20	2	1%
20	2	1%
20	2	1%

Q1	ADJUSTED VMT1	PCT
20	2	1%
20	2	1%
20	1	1%
20	1	1%
20	1	1%
20	0	1%
19	6	1%
19	5	1%
19	5	1%
19	4	1%
19	4	1%
19	4	1%
19	4	1%
19	4	1%
19	3	1%
19	3	1%
19	3	1%
19	3	1%
19	3	1%
19	3	1%
19	2	1%
19	2	1%
19	2	1%
19	2	1%
19	2	1%
19	2	1%
19	2	1%
19	2	1%
19	1	1%
19	1	1%
19	1	1%
19	1	1%
19	1	1%
19	0	1%
19	0	1%
18	7	1%
18	5	1%
18	5	1%
18	4	1%
18	4	1%
18	4	1%
18	4	1%
18	3	1%
18	3	1%
18	3	1%
18	3	1%
18	3	1%

Q1	ADJUSTED VMT1	PCT
18	3	1%
18	3	1%
18	3	1%
18	2	1%
18	2	1%
18	2	1%
18	2	1%
18	2	1%
18	2	1%
18	2	1%
18	2	1%
18	2	1%
18	1	1%
18	1	1%
18	1	1%
18	1	1%
18	1	1%
18	1	1%
18	1	1%
18	1	1%
18	1	1%
18	1	1%
18	1	1%

VMT	27975
ADT	3549
ATL	**7.88**

Appendix D

EFFICIENCY METRIC CALCULATIONS

California Greenhouse Gas Inventory for 1990 — by Sector and Activity (Land Use-driven sectors only)
million metric tons of CO2 equivalent - (based upon IPCC Second Assessment Report's Global Warming Potentials)

	1990
Transportation	
On Road	
Passenger Cars	63.77
Light Duty Trucks	44.75
Motorcycles	0.43
Heavy Duty Trucks	29.03
Freight	0.02
Electricity Generation In-State)	
CHP: Commercial	***0.70***
Merchant Owned	***2.33***
Transmission and Distribution	***1.56***
Utility Owned	***29.92***
Electricity Generation In-State)	
Specified Imports	***29.61***
Transmission and Distribution	***1.02***
Unspecified Imports	***30.96***
Commercial	
CHP: Commercial	***0.40***
Communication	***0.07***
Domestic Utilities	***0.34***
Education	***1.42***
Food Services	***1.89***
Healthcare	***1.32***
Hotels	***0.67***
Not Specified Commercial	***5.58***
Offices	***1.46***
Retail & Wholesale	***0.68***
Transportation Services	***0.03***
Residential	
Household Use	***29.66***
Industrial	
Landfills	***6.26***
Wastewater Treatment	
Domestic Wastewater	2.83
Total Emissions	**286.70**

Service Population Threshold - 2020 and 2021

	2020	2021
Population	40,619,346	40,965,875
Employment	18,511,200	18,609,900
Service Population	59,130,546	59,575,775
Emissions (MMT)	286.70	272.08
MT/SP	4.9	4.6

2021 Emissions based on an annual 5.2% reduction from 2020 (ARB 2015)

Notes:
MMT = million metric tons; MT = metric tons; SP = service population

Source:
California Department of Finance
Demographic Research Unit
Report P-2
State and County Population Projections by Race/Ethnicity and Age (5-year groups)
2010 through 2060 (as of July 1)
Published 12/15/2014
California Department of Finance Employment Development Department
Industry Employment Projections Labor Market Information Division 2010-2020
Published 5/23/2012
Industry Employment Projections Labor Market Information Division 2012-2022
Published 9/19/2014
Employment data for interim years is estimated based on proportionality with population trends based on historical data.
2030 Target Scoping Plan Workshop Slides. (October 1, 2015).
Available: http://www.arb.ca.gov/cc/scopingplan/meetings/10_1_15slides/2015slides.pdf

California Greenhouse Gas Inventory for 1990 — by Sector and Activity

million metric tons of CO2 equivalent - (based upon IPCC Second Assessment Report's Global Warming Potentials)

	1990
Transportation	
On Road	***137.99***
Passenger Cars	63.77
Light Duty Trucks	44.75
Motorcycles	0.43
Heavy Duty Trucks	29.03
Freight	0.02
Ships & Commercial Boats	***2.21***
Aviation (Intrastate)	***5.13***
Rail	***2.33***
Unspecified	***3.01***
Electricity Generation In-State)	
CHP: Commercial	***0.7***
CHP: Industrial	***14.54***
Merchant Owned	***2.33***
Transmission and Distribution	***1.56***
Utility Owned	***29.92***
Electricity Generation In-State)	
Specified Imports	***29.61***
Transmission and Distribution	***1.02***
Unspecified Imports	***30.96***
Commercial	
CHP: Commercial	***0.401***
Communication	0.07
Domestic Utilities	0.339
Education	***1.417***
Food Services	1.893
Healthcare	1.323
Hotels	***0.671***
National Security	***0.564***
Not Specified Commercial	5.577
Offices	1.456
Retail & Wholesale	0.683
Transportation Services	0.034
Residential	
Household Use	***29.657***
Industrial	
CHP: Industrial	***9.7***
Flaring	***0.15***
Landfills	***6.256***
Manufacturing	***31.98***
Mining	***0.03***
Not Specified Industrial	***2.63***
Oil & Gas Extraction	***14.65***
Petroleum Marketing	***0.02***
Petroleum Refining	***32.82***
Pipelines	***1.63***
Wastewater Treatment	
Domestic Wastewater	***2.833***
Industrial Wastewater	0.333
Agriculture & Forestry	
Ag Energy Use	***4.505***
Ag Residue Burning	0.124
Ag Soil Management	6.54
Enteric Fermentation	***6.668***
Forest and Range Management	0.19
Histosol Cultivation	0.181
Manure Management	5
Net CO2 Flux	***-6.69***
Rice Cultivation	0.41
Not Specified	
Not Specified	***1.267***
Total Emissions	

= Included in land use inventory

= Excluded from land use inventory