

**GREENHOUSE GAS EMISSIONS ASSESSMENT
661 BEAR VALLEY TENTATIVE SUBDIVISION MAP
ESCONDIDO, CA**

Submitted to:

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INTRODUCTION AND DEFINITIONS

Existing Site Characterization

The proposed 661 Bear Valley Tentative Subdivision Map (APN's 237-131-01, 02) consists of approximately 40.9 gross acres, located in the City of Escondido, as shown in Figure 1 on the following page. Regional access to the site is obtained from Bear Valley Parkway as shown in Figure 2 on Page 3 of this report. Surrounding land uses consist of single-family residential lots, limited commercial uses, and undeveloped open space. These features, as well as the proposed site plan configuration, can be seen in Figure 3 on Page 4 of this report.

The project site resides as a fully disturbed land use (i.e., a past extractive/mining use), and currently has one single-family residential structure onsite. Elevations across the property range from approximately 530 feet to 675 feet above mean sea level (MSL).

Project Description

The 661 Bear Valley Tentative Subdivision Map would construct fifty five (55) single family residential lots as shown in Figure 4 on Page 5 of this report. The project would also include necessary roadway and drainage improvements as well as the dedication of approximately 1.2 acres for improvements to Bear Valley Parkway.

Greenhouse Gases and Global Warming Potential

Greenhouse gases are defined by the Intergovernmental Panel on Climate Change (IPCC) as those naturally occurring and anthropogenic chemical compounds within the atmosphere that absorb and reflect infrared radiation emitted by the Earth's surface.¹ A numerical metric known as the '*Global Warming Potential*' (denoted as CO_{2e}) is a measure of how much a given mass of greenhouse gas is estimated to contribute to global warming relative to an equivalent amount of carbon dioxide (whose CO_{2e} is defined as 1.0). Examples of the more prevalent greenhouse gases are:

- **Carbon dioxide (CO₂):** CO₂ is a naturally occurring gas and is part of the *carbon cycle*, whereby carbon is cycled between the atmosphere, ocean, terrestrial life, and mineral reserves. The predominant source of anthropogenic carbon dioxide emissions is from the combustion of fossil fuels and hydrocarbons. Without CO₂, all life on Earth would cease to exist. Carbon dioxide is the reference gas against which all other greenhouse gases are compared. It makes up approximately 3.6 percent of the global warming gases in the atmosphere today.

¹ The basic mechanism can be summarized as follows: 1) solar radiation heats the planet primarily through ultraviolet transmission, 2) Earth warms and is offset by temperature levels in the oceans, 3) Earth emits black-body radiation in the lower infrared portion of the electromagnetic spectrum, 4) most of the infrared radiation escapes the planet, 5) a small portion of the energy is captured through molecular motion changes within the atmospheric greenhouse gases, and 6) this captured energy re-radiates back toward Earth producing a secondary heating effect. However, despite its name, this is not the same mechanism by which a greenhouse operates.

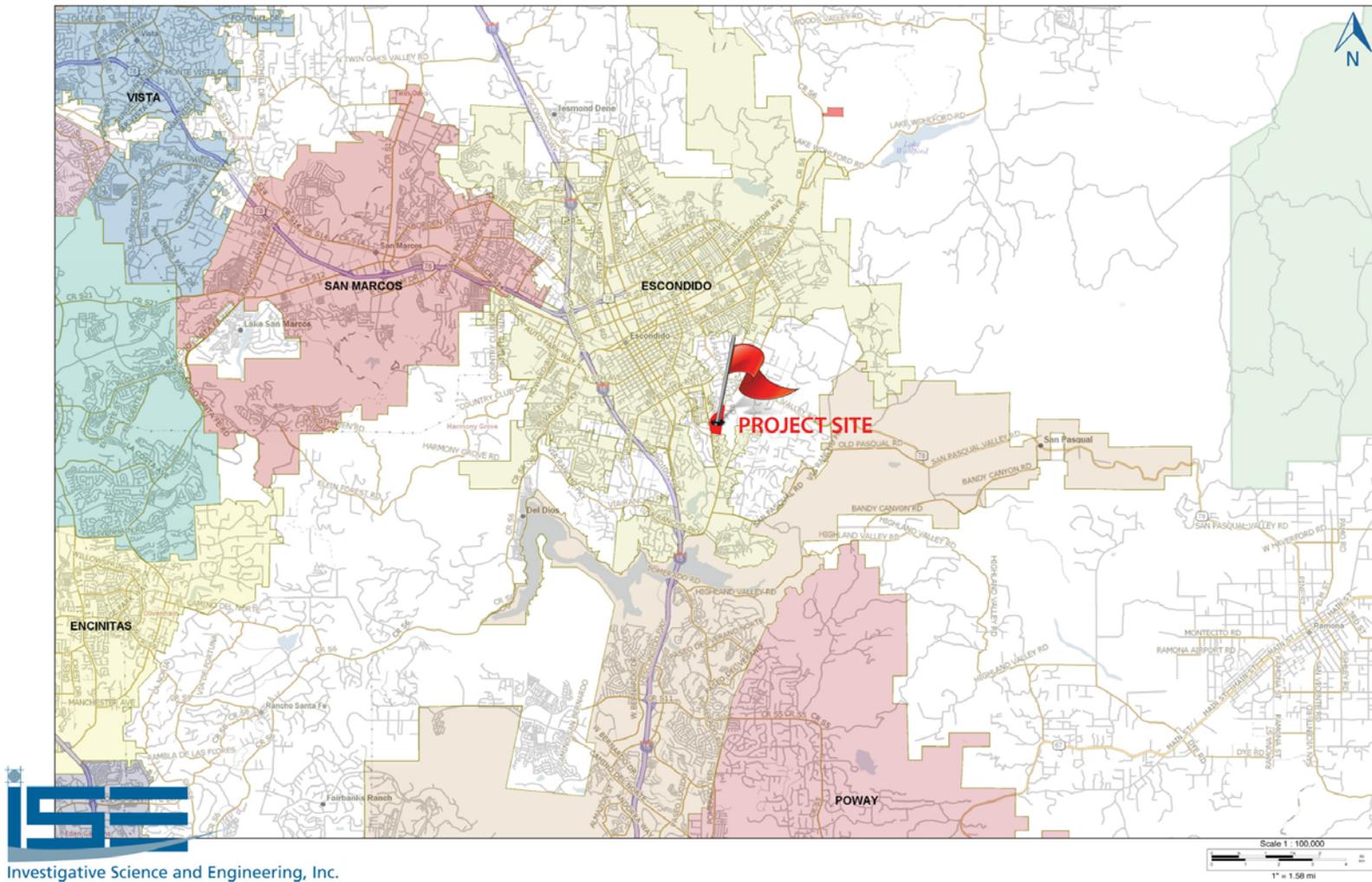


FIGURE 1: Project Study Area Vicinity Map (ISE 12/14)



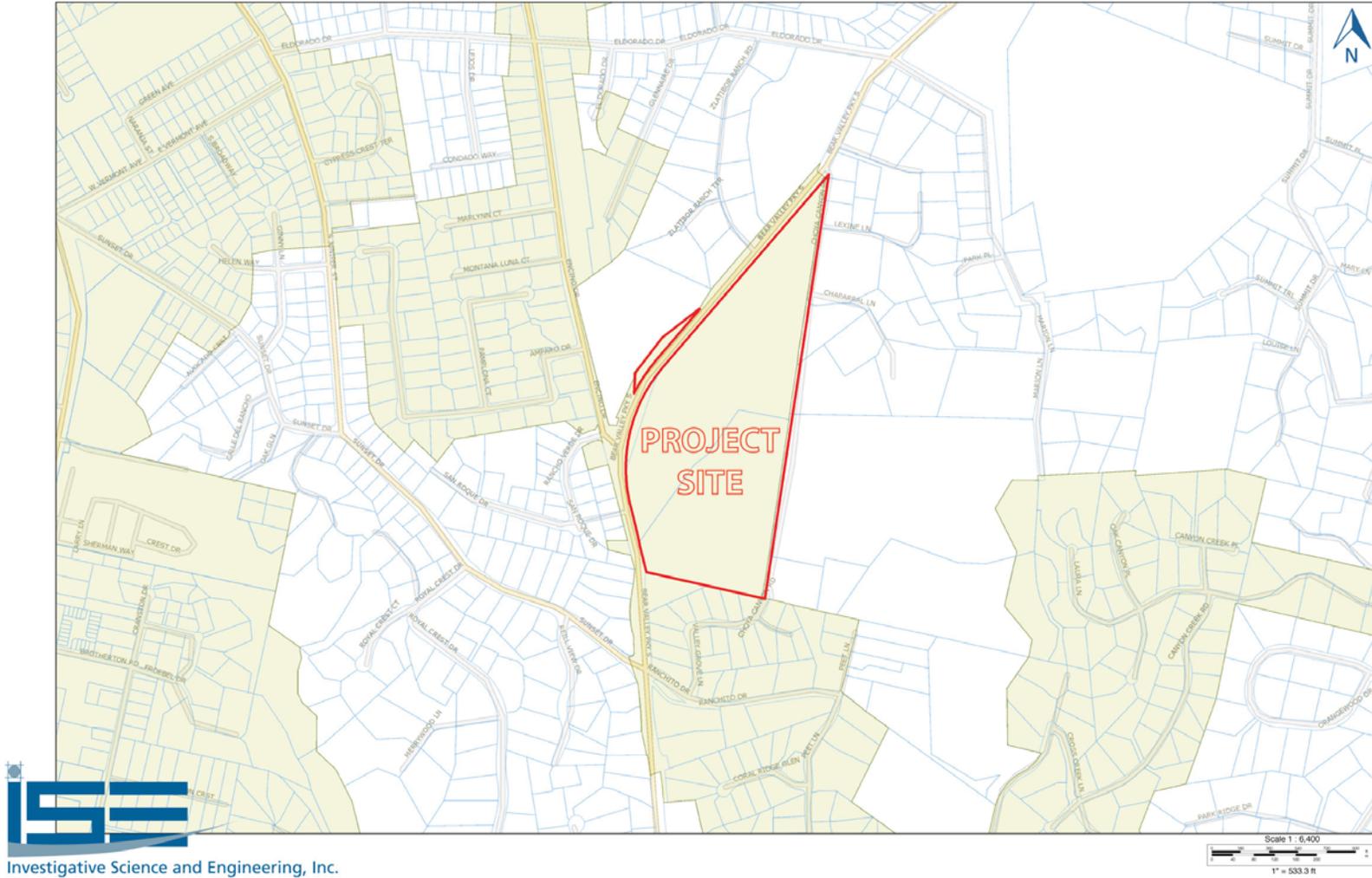


FIGURE 2: Project Study Area Parcel Map (ISE 12/14)





FIGURE 3: Aerial Image Showing 661 Bear Valley Development and Surrounding Uses (ISE 12/14)



FIGURE 4: Proposed 661 Bear Valley Site Development Map (Hunsaker & Associates 12/14)



- **Carbon dioxide (CO₂):** CO₂ is a naturally occurring gas and is part of the *carbon cycle*, whereby carbon is cycled between the atmosphere, ocean, terrestrial life, and mineral reserves. The predominant source of anthropogenic carbon dioxide emissions is from the combustion of fossil fuels and hydrocarbons. Without CO₂, all life on Earth would cease to exist. Carbon dioxide is the reference gas against which all other greenhouse gases are compared. It makes up approximately 3.6 percent of the global warming gases in the atmosphere today.
- **Water Vapor (H₂O):** Water is a chemical compound that is essential to all known forms of life. Water vapor is the gaseous form of water comprising roughly 0.001% of all water on the planet. Without H₂O, all life on Earth would cease to exist. Water vapor captures roughly 10 times as much infrared energy as CO₂.² Water vapor makes up approximately 95 percent of the global warming gases in the atmosphere today.
- **Methane (CH₄):** CH₄ is a greenhouse gas with both natural and anthropogenic sources and is believed to have been the primary atmospheric constituent of primordial Earth. Methane is naturally produced by the anaerobic decomposition of organic matter. Methane is also emitted during the production and distribution of natural gas and petroleum, and is released as a by-product of incomplete {low-temperature} fossil fuel combustion. Methane constitutes approximately 0.36 percent of the global warming gases in the atmosphere today.
- **Nitrous Oxide (N₂O):** Primarily, N₂O is naturally produced by bacterial action within the soil, and anthropogenically by high temperature combustion. The result is more-or-less the production of photochemical smog. Lesser sources, such as manufacturing, wastewater treatment, and biomass burning, also produce trace amounts of this substance. N₂O constitutes approximately 0.95 percent of the global warming gases in the atmosphere today.
- **Halocarbons (CFC's) / Perfluorocarbons (PFC's)** are carbon compounds that contain fluorine, chlorine, bromine or iodine. Anthropogenic sources are the primary generator of these substances. These gases constitute roughly 0.072 percent of the global warming gases in the atmosphere today.

A complete listing of known greenhouse gases and their associated GWP is shown in Table 1 on the following page.

² The IPCC scientific panel states that about half of the projected global temperature increase from CO₂ is due to what is referred to as the *water vapor feedback effect*. Water vapor feedback is caused by the radiative efficiency of H₂O in vaporous form (i.e., its GWP). The UN IPCC report does not currently show this value.

TABLE 1: Known Greenhouse Gases and Global Warming Potential³

Greenhouse Gas Name	Chemical Formula	GWP CO _{2e} Relative to CO ₂ (100 year horizon)
Carbon Dioxide	CO ₂	1
Dibromomethane	CH ₂ Br ₂	1
R-1311 (Trifluoriodomethane)	FIC-131 ₁	1
R-E170 (Dimethyl ether)	CH ₃ OCH ₃	1
Methyl Bromide	CH ₃ Br	5
Dichloromethane	CH ₂ Cl ₂	10
R-161 (HFC-161, Fluoroethane)	HFC-161	12
R-40 (Methyl Chloride)	CH ₃ Cl	16
Methane	CH ₄	23
Chloroform	CHCl ₃	30
2,2,3,3,3-Pentafluoro-1-propanol	CF ₃ CF ₂ CH ₂ OH	40
R-152 (HFC-152, 1,1-Difluoroethane)	HFC-152	43
2,2,2-Trifluoro-ethanol	(CF ₃)CH ₂ OH	57
R-41 (HFC-41, Methyl fluoride)	HFC-41	97
R-123 (HCFC-123, Dichlorotrifluoroethane)	HCFC-123	120
R-152a (HFC-152a, 1,1-Difluoroethane)	HFC-152a	120
1,1,1-Trichloroethane	CH ₃ CCl ₃	140
1,1,1,3,3,3-Hexafluoro-2-Propanol	(CF ₃) ₂ CHOH	190
R-21 (Dichlorofluoromethane)	HCFC-21	210
Nitrous Oxide	N ₂ O	296
HFC-143, 1,1,2-Trifluoroethane	HFC-143	330
Methyl perfluoroisopropyl ether	(CF ₃) ₂ CFOCH ₃	330
Bromodifluoromethane	CHBrF ₂	470
R-32 (HFC-32, Difluoromethane)	HFC-32	550
R-124 (HCFC-124, 2-Chloro-1,1,1,2-Tetrafluoroethane)	HCFC-124	620
R-141b (HCFC-141b, 1,1-Dichloro-1-fluoroethane)	HCFC-141b	700
HFE-143a	HFE-143a	750
HFC-134, 1,1,2,2-Tetrafluoroethane	HFC-134	1,100
R-12B1 (Difluorochlorobromomethane, Halo 1211)	Halon-1211	1,300
R-134a (HFC-134a, 1,1,1,2-Tetrafluoroethane)	HFC-134a	1,300
R-22 (Chlorodifluoromethane)	HCFC-22	1,700

³ Source: *Climate Change 2001: The Scientific Basis*. Contribution of Working Group I to the Third Assessment Report of the Intergovernmental Panel on Climate Change, IPCC 2001.



TABLE 1 (cont.): Known Greenhouse Gases and Global Warming Potential⁴

Greenhouse Gas Name	Chemical Formula	GWP CO _{2e} Relative to CO ₂ (100 year horizon)
Carbon Tetrachloride	CCl ₄	1,800
R-142b (HCFC-142b, 1-Chloro-1,1-difluoroethane)	HCFC-142b	2,400
R-143a (HFC-143a, 1,1,1-Trifluoroethane)	HFC-143a	4,300
R-11 (Trichlorofluoromethane)	CFC-11	4,600
R-14 (Carbon Tetrafluoride)	CF ₄	5,700
R-113 (1,1,2-Trichloro-1,2,2-Trifluoroethane)	CFC-113	6,000
R-E134 (HFE-134, 1,1,1',1'-Tetrafluorodimethyl ether)	HFE-134	6,100
R-13B1 (Trifluorobromomethane, Halo 1301)	CBrF ₃	6,900
R-115 (Chloropentafluoroethane)	CFC-115	7,200
C ₃ F ₈ (Perfluoropropane)	C ₃ F ₈	8,600
C ₄ F ₁₀ (Perfluoro-n-Butane)	C ₄ F ₁₀	8,600
C ₅ F ₁₂ (Perfluoropentane)	C ₅ F ₁₂	8,900
C ₆ F ₁₄ (Perfluorohexane)	C ₆ F ₁₄	9,000
R-114 (Freon 114, 1,2-Dichlorotetrafluoroethane)	CFC-114	9,800
R-C318 (Freon 318, Octafluorocyclobutane)	C-C ₄ F ₈	10,000
R-12 (Freon 12, Dichlorodifluoromethane)	CFC-12	10,600
Nitrogen Trifluoride; Trifluoramine	NF ₃	10,800
R-116 (Perfluoroethane; Hexafluoroethane)	C ₂ F ₆	11,900
R-23 (HFC-23, Trifluoromethane)	HFC-23	12,000
R-13 (Chlorotrifluoromethane)	CFC-13	14,000
R-E125 (HFE-125, Pentafluorodimethyl ether)	HFE-125	14,900
Sulfur Hexafluoride	SF ₆	22,200

Source: IPCC, 2001

⁴ Ibid., IPCC 2001.





THRESHOLDS OF SIGNIFICANCE

California Environmental Quality Act (CEQA) Thresholds

Section 15382 of the California Environmental Quality Act (CEQA) guidelines defines a significant impact as,

“... a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance.”

Senate Bill 97 (2007) set a January 1, 2010, deadline for new CEQA guidelines related to greenhouse gas emissions analysis and mitigation.⁵ The new guidelines will require GHG emissions and their effects to be analyzed based on scientific and factual data.⁶ The new guidelines do not require CEQA to establish fixed thresholds of significance; rather they serve to update the procedural language of Section 15064(a) leaving individual significance criteria to local agencies.

The California Global Warming Solutions Act (AB 32)

The California State Legislature, operating under the assumption that anthropogenic global warming is a genuine phenomenon, and that atmospheric carbon dioxide is the most significant contributor to this phenomenon, passed the *California Global Warming Solutions Act of 2006* (AB 32). AB 32 requires the California Air Resources Board (CARB) to develop regulations and market mechanisms that will ultimately reduce California's greenhouse gas emissions by 25 percent, by 2020. Mandatory caps began in 2012 for significant sources, and will incrementally become stricter to meet the 2020 goals.

Specifically, AB 32 requires CARB to:

- Establish a statewide greenhouse gas emissions cap for 2020, based on 1990 emissions, by January 1, 2008.
- Adopt mandatory reporting rules for significant sources of greenhouse gases by January 1, 2009.
- Adopt a plan by January 1, 2009 indicating how emission reductions will be achieved from significant greenhouse gas sources via regulations, market mechanisms and

⁵ An act to add Section 21083.05 to, and to repeal Section 21097 of, the Public Resources Code, relating to the California Environmental Quality Act.

⁶ This means that the global warming potential of a project must be determined analytically and can no longer rely on abstract or incorrect policy comparisons or unsubstantiated claims.

other actions.

- Adopt regulations by January 1, 2011 to achieve the maximum technologically feasible and cost-effective reductions in greenhouse gas, including provisions for using both market mechanisms and alternative compliance mechanisms.
- Convene an Environmental Justice Advisory Committee and an Economic and Technology Advancement Advisory Committee to advise CARB.
- Ensure public notice and opportunity for comment for all CARB actions.
- Prior to imposing any mandates or authorizing market mechanisms, CARB must evaluate several factors, including but not limited to, impacts on California's economy, the environment and public health; equity between regulated entities; electricity reliability; conformance with other environmental laws; and that the rules do not disproportionately impact low-income communities.

For the purposes of analysis within this report (and to be consistent with AB 32), it will be sought to quantify the aggregate greenhouse gas emissions due to the proposed project action, as defined under CEQA.

CAPCOA Recommended CO_{2e} Screening Levels

The California Air Pollution Control Officers Association (CAPCOA) and CARB currently publish CO_{2e} screening levels for use in CEQA reporting. This screening level, set at 900 metric tons (i.e., 900 MT or 900,000 kilograms or 1,984,160 pounds) of CO_{2e} per year is 'recommended' for all new projects within the State of California for compliance with the intent of AB 32, as compared to 'business as usual'.⁷ The CAPCOA screening criteria is being used by the City of Escondido as a conservative criterion for determining the size of projects that would require further analysis and mitigation with regard to climate change.⁸ If a proposed project does not exceed 900 MT CO_{2e} per year, it is presumed that there would be a less-than-cumulatively considerable impact.

A proposed project would have a cumulatively considerable contribution to climate change impacts if it would result in a net increase of construction and operational greenhouse gas emissions, either directly or indirectly, and if the project would incorporate mitigation that achieves less than a 16-percent total reduction compared to unmitigated (Business as Usual, or BAU) emissions under a year 2020 scenario.

⁷ The CAPCOA whitepaper entitled, "CEQA & Climate Change – Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act, January 2008" is very clear in its prefacing disclaimer that the proposed 900 MT screening level is not to be used for CEQA impact determination purposes. As stated in the document, "...This paper is intended as a resource, not a guidance document. It is not intended, and should not be interpreted, to dictate the manner in which an air district or lead agency chooses to address greenhouse gas emissions in the context of its review of projects under CEQA." It should further be noted that the CAPCOA isn't based upon any scientific analysis or rule-of-thumb, it is simply a screening level agreed to by various agencies within the State.

⁸ Recommended Approach to Addressing Climate Change in CEQA Documents, County of San Diego Planning & Development Services (PDS), 1/21/15.





ANALYSIS METHODOLOGY

Diesel Vehicle (Compression Ignition) CO_{2e} Contribution

Greenhouse gas emissions associated with diesel engine combustion from mass grading and site preparation construction equipment will be assumed to occur for engines running at the correct fuel-to-air ratios.⁹ Of principal interest are the emission factors for CO₂ and NO_x¹⁰. For a four-stroke diesel-cycle engine, the combustion byproducts are approximately 1.5-percent-by-volume O₂, 0.5-percent-by-volume CO, and 13.5-percent-by-volume CO₂.¹¹

Thus, the ratio of CO₂ to CO production in a properly mixed diesel stroke would be 13.5/0.5, or 27:1.

Gasoline Vehicle (Spark Ignition) CO_{2e} Contribution

CARB estimates on-road motor vehicle emissions by using a series of models called the *Motor Vehicle Emission Inventory (MVEI) Models*. The four computer models, which form the MVEI, are *CALIMFAC*, *WEIGHT*, *EMFAC*, and *BURDEN*.¹² For the current analysis, the *EMFAC 2011* of the MVEI¹³ was run using input conditions specific to the San Diego air basin to predict operational vehicle emissions from the project, based upon a project completion scenario year of 2020.¹⁴ Of principal interest are the emission factors for CO₂ and NO_x. A mix ratio consistent with the 2010 Caltrans ITS Transportation Project-Level Carbon Monoxide Protocol was used.¹⁵

Small Engine, Natural Gas, Electrical, Waste and Water CO_{2e} Contributions

Finally, secondary operational greenhouse gas sources under the CEQA analysis context within this report would consist entirely of small gasoline engines used with landscaping equipment, emissive sources from natural gas powered appliances

⁹ The ratio whereby complete combustion of the diesel fuel occurs.

¹⁰ It will be assumed that the project would generate trace, if not negligible, levels of methane (CH₄), ozone (O₃), fluorine (F₂), chlorine (Cl₂), bromine (Br₂) and/or constituent compounds. NO_x emissions are stoichiometrically composed of roughly 30-percent nitrous oxide (N₂O) by volume and 70-percent nitric oxide (NO), which is the free radical form that immediately combines with ozone (O₃) to form nitrogen dioxide (NO₂) more commonly known as *smog*.

¹¹ Source: Holtz, J.C., Elliott, M.A., *The Significance of Diesel-Exhaust-Gas Analysis, Transactions of the ASME, Vol. 63, February 1941*.

¹² CALIMFAC produces base emission rates for each model year when a vehicle is new, and as it accumulates mileage and the emission controls deteriorate. WEIGHT calculates the relative weighting each model year should be given in the total inventory, and each model year's accumulated mileage. EMFAC uses these pieces of information, along with the correction factors and other data, to produce fleet composite emission factors. BURDEN combines the emission factors with county-specific activity data to produce the emission inventories.

¹³ This is the most current CARB vehicle emissions model approved for use within the State of California. Any subsidiary program (such as the previously discussed *URBEMIS* program) uses this model to determine the applicable vehicle emission factors.

¹⁴ This is a worst-case assumption, since implementation of cleaner vehicle controls ultimately reduces emissions under future year conditions. By applying near-term emission factors to the complete project, an upper bound on project-related emissions is obtained.

¹⁵ This consisted of the following air standard Otto-Cycle engine vehicle distribution percentages: Light Duty Auto (LDA) = 69.0%, Light Duty Truck (LDT1) = 19.4%, Medium Duty Truck (LHD1) = 6.4%, Heavy Duty Truck Gasoline (MH GAS) = 1.2%, Heavy Duty Truck Diesel (MH DSL) = 3.6%, Motorcycle (MCY) = 0.4%.

(such as hot water heaters, stoves, etc.), electrical consumption at the project site, solid waste trash generation, and water consumption.^{16,17,18} An aggregate greenhouse gas tabulation of these sources, consistent with the *SCAQMD CEQA Handbook* and current EPA protocols, will be provided.^{19,20}



FINDINGS AND CONCLUSIONS

Diesel Vehicle (Compression Ignition) CO_{2e} Emissions

The proposed 661 Bear Valley Tentative Subdivision Map would be cleared and graded over the course of approximately eight months (180 days) without any deleterious air quality conformity impacts requiring mitigation, per SDAPCD guidelines.^{21,22}

Since N₂O has a GWP of 296 with respect to CO₂, this result can be expressed as an *equivalent* CO₂ level (CO_{2e}) of 2,935,254.4 pounds (1,331.4 MT). Thus, the final equivalent construction CO₂ GHG load due to the project would be the summation of this value and the direct CO₂ production (including any water usage), shown in Table 2, or 3,291,693.3 pounds (1,493.1 MT) CO_{2e}, during all construction activities.

The City of Escondido suggests in their GHG guidance document that construction emissions be distributed over a time period of 20 years, and aggregated into a project's operational emissions for the purposes of determining a cumulatively considerable contribution under CEQA. Thus, the yearly contribution to GHG from the aggregate of construction at the 661 Bear Valley Tentative Subdivision Map would be 74.7 MT/year.

¹⁶ The electrical consumption required to produce one-million-gallons (MG) of potable water in Southern California is 13,021 KWh/MG. Using the CARB RPS standards, the baseline CO_{2e} generation rate is 641.86 pounds per Megawatt-hour (MWh). Simple unit conversion provides for a direct conversion value of 0.008357 lbs-CO_{2e}/gallon-H₂O. The conversion value for the mitigated RPS rate of 537.6 pounds per Megawatt-hour (MWh) would consequently be 0.006999 lbs-CO_{2e}/gallon-H₂O.

¹⁷ Source: Refining Estimates of Water-Related Energy Use in California, California Energy Commission (CEC) Public Interest Energy Research Program, 12/06.

¹⁸ Landfill CO_{2e} generation due to trash equates to approximately 0.1450 kilograms (or 0.3196 pounds) per pound of trash per year, IPCC 2001.

¹⁹ The analysis presented herein uses the same methodology identified in the CARB *URBEMIS* model, although providing a greater level of detail. The technical details are provided in the SCAQMD CEQA Handbook Tables A9-12 et. seq. as well as the EPA's AP-42 emission generation document previously referenced.

²⁰ Source: CalEEMod User Guide Appendix D, Table 9.1.

²¹ The analysis of GHG emissions, unlike air quality conformity, which is a 'per day' threshold, is an aggregate quantity requiring summation over the total estimated number of work days (i.e., the total number of days that any construction grading vehicle would have an engine running).

²² Source: Air Quality Conformity Assessment, 661 Bear Valley Tentative Subdivision Map Escondido, CA, ISE Project #14-023, 8/25/15 (Revised).

TABLE 2: Construction Vehicle GHG Emissions – 661 Bear Valley Tentative Subdivision Map

Equipment Type Model	Selected EPA Tier Level	Daily CO in Pounds from AQIA	Daily NO _x in Pounds from AQIA	Duration (days)	Aggregate CO in Pounds (MT)	Aggregate NO _x in Pounds (MT)	Direct Stoichiometric Gas Emissions	
							CO ₂ = 27×CO in Pounds (MT)	N ₂ O = 0.3×NO _x in Pounds (MT)
Push Dozer D10T	3	21.3	56.5	180	3,829.9 (1.7)	10,164.0 (4.6)	103,407.1 (46.9)	3,049.2 (1.4)
Dozer D9R	3	9.4	24.9	180	1,692.1 (0.8)	4,490.6 (2.0)	45,686.3 (20.7)	1,347.2 (0.6)
Dozer D6T LGP	3	3.7	9.7	180	660.3 (0.3)	1,752.4 (0.8)	17,828.8 (8.1)	525.7 (0.2)
Scraper- 657G Tractor	3	14.4	38.3	180	2,600.0 (1.2)	6,900.2 (3.1)	70,201.0 (31.8)	2,070.0 (0.9)
Motor Grader 120K	3	8.2	15.2	180	1,468.3 (0.7)	2,738.2 (1.2)	39,643.5 (18.0)	821.4 (0.4)
Water Truck	3	3.7	9.7	180	660.3 (0.3)	1,752.4 (0.8)	17,828.8 (8.1)	525.7 (0.2)
Hydraulic Excavator 349EL	3	11.0	29.2	180	1,981.0 (0.9)	5,257.3 (2.4)	53,486.4 (24.3)	1,577.2 (0.7)
Total (Σ):		71.6	183.6		12,891.9 (5.8)	33,055.1 (15.0)	348,081.9 (157.9)	9,916.4 (4.5)
							CO_{2e} from CO:	348,081.9 (157.9)
							CO_{2e} from N₂O:	2,935,254.4 (1,331.4)
							Direct CO₂ from Wet Suppression Water Usage:²³	8,357.0 (3.8)
							CO_{2e} Total Over Construction Period:	3,291,693.3 (1,493.1)

Rounding margin of error ± 0.1 MT (220.5 pounds)

²³ Water usage based upon an assumed wet suppression level of 1,000,000 gallons over the course of construction.



Gasoline Vehicle (Spark Ignition) CO_{2e} Emissions

Motor vehicles are the primary source of long-term greenhouse gas emissions associated with the proposed project. The proposed 661 Bear Valley Tentative Subdivision Map is expected to have a cumulative worst-case trip generation level of 550 ADT as previously analyzed within the project's Air Quality Impact Assessment (AQIA).^{24,25} The average vehicle trip length would be 20 miles, with a median running speed of 45 MPH.²⁶ Given this, the aggregate project trip emission levels are shown in Table 3, below.

TABLE 3: Operational Vehicle GHG Levels – Baseline Pavley I Scenario

Vehicle Classification	Trip ADT	Total Emissions in Pounds per Day (MT per Day)		
		Direct CO ₂	Direct N ₂ O	CO _{2e}
Light Duty Auto (LDA)	380	3,582.3 (1.6)	0.4 (0.0)	3,712.8 (1.7)
Light Duty Truck (LDT1)	107	1,228.6 (0.6)	0.2 (0.0)	1,292.3 (0.6)
Medium Duty Truck (LHD1)	35	694.6 (0.3)	0.2 (0.0)	748.7 (0.3)
Heavy Duty Truck Gasoline (MH GAS)	7	130.2 (0.1)	0.0 (0.0)	144.5 (0.1)
Heavy Duty Truck Diesel (MH DSL)	20	925.4 (0.4)	1.5 (0.0)	1,373.5 (0.6)
Motorcycle (MCY)	2	13.3 (0.0)	0.0 (0.0)	23.4 (0.0)
Total (Σ):	550	6,574.4 (3.0)	2.4 (0.0)	7,295.2 (3.3)
			CO_{2e} from CO:	6,574.4 (3.0)
			CO_{2e} from N₂O:	720.8 (0.3)
			CO_{2e} Operational Total Per Day:	7,295.2 (3.3)

Rounding margin of error ± 0.1 MT (220.5 pounds)
 Values rounded to closest whole integer vehicle
 Uses CARB recommended Pavley I baseline emission factors

Again, since N₂O has a GWP of 296 with respect to CO₂, the *equivalent* CO_{2e} level would be 720.8 pounds (0.3 MT) for N₂O. The final equivalent daily CO_{2e} load due to vehicular traffic would be 7,295.2 pounds (3.3 MT).

²⁴ Ibid. ISE, 8/25/15.

²⁵ Source: CARB EMFAC 2011, California Air Resources Board, 2015.

²⁶ Source: Traffic Impact Analysis: 661 Bear Valley – Escondido, CA, Linscott, Law & Greenspan, Engineers, 12/17/14.



Small Engine, Natural Gas, Electrical, Waste and Water CO_{2e} Emissions

Small Engine GHG Emissions

Landscaping equipment utilized in the course of maintenance of the 661 Bear Valley Tentative Subdivision Map typically would consist of five-horsepower, four-stroke lawnmowers, and small weed trimmers having two-stroke engines with an approximate 30 to 50 cubic-centimeter displacement. Assuming the ultimate user purchases cleaner burning engines new from the store, the emissions rates specified by CARB²⁷ are shown in Table 4, below.

TABLE 4: GHG Emission Rates for Small Engine Equipment

Pollutant	Single-Family Emissions Pounds per DU/Day (MT per DU/Day)	Multi-Family/Commercial Emissions Pounds per DU/Day (MT per DU/Day)
CO ₂	0.70938 (<0.1)	33.99111 (<0.1)
N ₂ O	0.00004 (<0.1)	0.00150 (<0.1)

CO₂ emissions rate based upon stoichiometric ratio with CO for a typical small Otto-cycle engine.

DU = Dwelling unit for single- and multifamily projects, commercial space unit for retail uses.

For the purposes of analysis, the project site will be treated as a {CARB-classified} single-family residential development site consisting of an aggregate of 55 dwelling units. This equates to the following direct emission levels in pounds per day for the totality of the proposed project development plan:

Retail Use Space Small Engine Emissions	CO ₂ = 39.0 pounds/day = <0.1 MT/day	N ₂ O = 0.0 pounds/day = <0.1 MT/day
--	--	--

The N₂O *equivalent* CO_{2e} level for this activity would be 0.7 pounds per day (<0.1 MT per day). Thus, the final equivalent CO_{2e} GHG load, due to the above cited onsite uses, would be roughly 39.7 pounds per day (still less than 0.1 MT per day). This total equates to 6.6 MT per year CO_{2e} for this activity.

²⁷ These are hybrids of the emission factors utilized by the CARB URBEMIS model.



Natural Gas Combustion GHG Emissions

Similarly, natural gas consumption (typically due to usage of water heaters, stoves, and central heating units for this type of proposed use) would produce the following approximate total pounds of combustion emissions:

$$GHG_{combustion} = ER \times \left[\frac{NU \times UR}{30} \right] \times 10^{-6}$$

Where, **GHG** = The greenhouse gas under examination (i.e., CO₂ or N₂O), **ER** = Emissions rate of criteria pollutant per million-cubic-feet of natural gas consumed (e.g., CO₂ = 116,765 pounds/MM Cubic-feet, N₂O = 28.2 pounds/MM Cubic-feet), **NU** = Total number of units per land use type (i.e., residential/commercial), and **UR** = Specific natural gas usage rate per development type (Single-Family = 6,665 ft³/month, Multi-family = 4,011.5 ft³/month, Retail Space = 2.9 ft³/SF/month).²⁸

For the aforementioned project plan, this would equate to the following natural gas fired emission levels in pounds per day:

Retail Use Space Natural Gas (CH ₄) Emissions	CO ₂ = 1,426.8 pounds/day = 0.6 MT/day	N ₂ O = 0.3 pounds/day = <0.1 MT/day
---	--	--

The N₂O *equivalent* CO_{2e} level for this activity would be 102.0 pounds per day (<0.1 MT per day). Thus, the final equivalent CO_{2e} GHG load, due to the above cited onsite uses, would be roughly 1,528.8 pounds per day (slightly less than 0.7 MT per day). This total equates to 253.1 MT per year CO_{2e} for this activity.

Electrical Consumption GHG Emissions

The 661 Bear Valley Tentative Subdivision Map would require an average yearly energy consumption of 6,600,000 KWh/year.²⁹ This value is consistent with published values for typical residential uses in the San Diego region.³⁰ Utilizing the SDG&E CO₂ intensity factor consistent for a 20% *Renewable Portfolio Standard* (RPS), gives an annual equivalent CO_{2e} GHG load for the 661 Bear Valley Tentative Subdivision Map due to electrical usage of 1,921.5 MT/year.³¹

²⁸ The free and complete burning of natural gas, which is primarily composed of methane (CH₄), is CH₄ + 2O₂ ⇒ 2H₂O + CO₂ + heat↑. From a mass balance standpoint one pound of CH₄ can produce 2.75 pounds of CO₂ by the above chemical equation. Since, one cubic-foot of CH₄ weighs 0.04246 pounds, the amount of CO₂ produced per cubic-foot of natural gas burned would therefore be 0.1167 pounds. N₂O generation will be assumed to be a fractional component of total NO_x generation as previously discussed (i.e., N₂O = 0.3NO_x).

²⁹ This equates to a monthly demand of 10,000 KWh per home.

³⁰ U.S. Energy Information Administration (EIA), U.S. Department of Energy, 2015.

³¹ The intensity conversion factor is 641.86 lb-CO₂/MWh for the baseline case. This is derived by scaling the SDG&E 2009 CO₂ intensity



Solid Waste Generation GHG Emissions

The 661 Bear Valley Tentative Subdivision Map would have an onsite solid trash waste storage capacity of 12 cubic yards (cu-yd), with an average weight of 200 pounds per cubic-yard. Assuming one trash pickup per week, in accordance with residential site requirements, the aggregate total solid waste removed from the site would be 124,800.0 lbs/year (or 62.4 short tons).

According to the IPCC, landfill CO_{2e} generation due to trash is approximately 0.3196 pounds per pound of trash per year.³² Thus, for the estimated 124,800.0 pounds of trash per year generated by the site, the direct landfill CO_{2e} contribution level would be 18.1 MT/yr.

Water Consumption GHG Emissions

The 661 Bear Valley Tentative Subdivision Map would produce the following direct CO_{2e} emissions as a result of onsite water consumption, as shown in Table 5 on the following page.³³ The aggregate of these emissions was found to produce 48,826.6 pounds of CO_{2e} per year, or roughly 22.1 MT/yr.

Project Greenhouse Gas Emissions Summary

The projected greenhouse gas emission budget for the proposed project would be the summation of the individual sources previously identified, as shown in Table 6 on Page 19. The baseline emissions due to the proposed project action (i.e., traffic generation, onsite uses including maintenance, natural gas and electricity consumption, waste generation and water consumption, and the aforementioned pseudo-operational construction emissions) would equate to 3,503.9 MT of CO_{2e} per year. This corresponds to approximately 389.3% percent of the City's recommended screening level of 900 MT.

To avoid the project having a cumulatively considerable contribution to climate change impacts, the following measures starting on Page 19, are proposed to provide a minimum 16% reduction in GHG emissions (i.e., 560.6 MT/year), compared to unmitigated Business as Usual (BAU) emissions under a year 2020 scenario.

factor, currently at 10.2% RPS, to account for a state required 20% RPS.

³² Ibid., IPCC 2001.

³³ Ibid., CalEEMod Table 9.1.



TABLE 5: Project CO_{2e} Generation Due to Water Consumption

Proposed Use	Project Quantity Generation	Per Use Metric	Indoor Water Use (gal/yr)	Outdoor Water Use (gal/yr)	Total Water Use (gal/yr)	CO _{2e} Generation (lb/yr)	CO _{2e} Generation (MT/yr)
Single Family Housing	55.00	Dwelling Unit	3,583,470.0	2,259,125.0	5,842,595.0	48,826.6	22.1
Water Consumption CO_{2e} Generation (MT/yr):							22.1

Source: CalEEMod User Guide Appendix D, Table 9.1.

Rounding margin of error ± 0.1 MT (220.5 pounds)



TABLE 6: Summary of Significant Project-Related GHG Emissions

Project Phase / Operation	Total CO _{2e} Emissions in MT/year
Construction (All Phases Aggregated)	74.7
Operational Vehicular Emissions	1,207.8
Small Engine Usage	6.6
Natural Gas Usage	253.1
Electrical Consumption	1,921.5
Solid Waste Generation	18.1
Water Consumption	22.1
Total GHG Emissions per Year	3,503.9

Rounding margin of error ± 0.1 MT (220.5 pounds)

Proposed BAU Reduction Strategies

BAU Reduction Strategy #1: Pavley II + LCFS Implementation (CO₂ Running Emissions)

The 661 Bear Valley Tentative Subdivision Map would be eligible to take credit for the State of California implementation of the Pavley II Clean Car Standards (AB 1493 et. seq.). These standards, also known as LEV III standards, and applied only to automobile and light truck classes for model years 2017 through 2025, would reduce overall vehicle emissions by an additional 3.0 percent above the 2009 Pavley I standards. Additionally, the project would also be eligible for credit, due to the CARB proposed Low Carbon Fuel Standard (LCFS), pursuant to the California Assembly Bill AB 32 and the Governor's Executive Order S-01-07.³⁴

Table 7 on the following page shows the effect of Pavley II and LCFS implementation on proposed vehicle emissions. As a result, the total vehicular CO_{2e} emission levels can be reduced from 1,207.8 MT/yr to 1,084.0MT/year (or roughly 10.3% for this project component). This would reduce the aggregate emissions from 3,503.9 MT/yr to 3,380.1 MT/year, for an overall project reduction of 3.5% of BAU. The revised mitigated project emissions under this scenario are summarized in Table 8.

³⁴ These adjusted emission factors are obtained from the CARB EMFAC 2011 model.



TABLE 7: Operational Vehicle GHG Levels – Mitigated Pavley II Scenario

Vehicle Classification	Trip ADT	Total Emissions in Pounds per Day (MT per Day)		
		Direct CO ₂	Direct N ₂ O	CO _{2e}
Light Duty Auto (LDA)	380	3,158.9 (1.4)	0.4 (0.0)	3,289.4 (1.5)
Light Duty Truck (LDT1)	107	1,083.4 (0.5)	0.2 (0.0)	1,147.1 (0.5)
Medium Duty Truck (LHD1)	35	612.5 (0.3)	0.2 (0.0)	666.6 (0.3)
Heavy Duty Truck Gasoline (MH GAS)	7	118.4 (0.1)	0.0 (0.0)	132.7 (0.1)
Heavy Duty Truck Diesel (MH DSL)	20	841.3 (0.4)	1.5 (0.0)	1,289.4 (0.6)
Motorcycle (MCY)	2	12.1 (0.0)	0.0 (0.0)	22.2 (0.0)
Total (Σ):	550	5,826.6 (2.6)	2.4 (0.0)	6,547.4 (3.0)
			CO_{2e} from CO:	5,826.6 (2.6)
			CO_{2e} from N₂O:	720.8 (0.3)
			CO_{2e} Operational Total Per Day:	6,547.4 (3.0)

Rounding margin of error ± 0.1 MT (220.5 pounds)
 Values rounded to closest whole integer vehicle
 Uses CARB recommended Pavley II mitigated emission factors

TABLE 8: Revised Operational GHG Emissions – BAU Reduction Strategy #1

Project Phase Emissions	BAU Change	Total CO _{2e} Emissions vis. BAU (MT/year)
Construction (All Phases)	No	74.7
Operational Vehicular Traffic	Yes	1,084.0
Small Engine Usage	No	6.6
Natural Gas Usage	No	253.1
Electrical Usage	No	1,921.5
Solid Waste Generation	No	18.1
Water Consumption	No	22.1
Total GHG Emissions per Year under Strategy #1:		3,380.1

Rounding margin of error ± 0.1 MT (220.5 pounds)



BAU Reduction Strategy #2: Previous Strategy + Energy Sector 33% RPS Standard

The 661 Bear Valley Tentative Subdivision Map would be eligible to take credit for the ultimate 33% *Renewable Portfolio Standard* (RPS) mandated by the State of California for year 2020.³⁵

As previously stated, the 661 Bear Valley Tentative Subdivision Map would have a yearly energy consumption of 6,600,000 KWh/year; thus, using the 33% RPS brings the effective CO_{2e} reduction to 83.8% of unmitigated levels, or an annual equivalent CO_{2e} GHG load for the 661 Bear Valley Tentative Subdivision Map, due to electrical usage, of 1,609.3 MT/year (compared to the unmitigated level of 1,921.5 MT/yr).

This produces a revised CO_{2e} emissions budget for the project site of 3,064.3 MT/yr under the combination of BAU Reduction Strategies #1 and #2 (compared to the unmitigated level of 3,503.9 MT of CO_{2e} per year). The overall combined BAU reduction obtained by the above strategies would be 12.5%. The revised mitigated project emissions under the previous two scenarios are summarized in Table 9 below.

TABLE 9: Revised Operational GHG Emissions – BAU Reduction Strategy #2

Project Phase / Operation	BAU Change	Total CO _{2e} Emissions vis. BAU (MT/year)
Construction (All Phases)	No	74.7
Operational Vehicular Traffic	Yes	1,084.0
Small Engine Usage	No	6.6
Natural Gas Usage	No	253.1
Electrical Usage	Yes	1,609.3
Solid Waste Generation	No	18.1
Water Consumption	Yes	18.5
Total GHG Emissions per Year under Strategy #2:		3,064.3

Rounding margin of error ± 0.1 MT (220.5 pounds)

BAU Reduction Strategy #3: All Previous Strategies + 2013 CCR Title 24 Efficiency

Finally, the 661 Bear Valley Tentative Subdivision Map would be eligible to take credit for utilizing the latest energy efficiency reductions available through implementation of the 2013 CCR Title 24 standards. These reductions are in addition to the previously mentioned RPS reductions, as they would be implemented by the

³⁵ The intensity conversion factor is 537.56 lb-CO₂/MWh for the baseline case. This is derived by scaling the unmitigated 20% RPS CO₂ intensity factor to account for a state required 33% RPS by year 2020.



applicant at the project level. Currently the 2013 CCR Title 24 provides improved electrical energy reductions of 21.8%, and improved natural gas efficiencies of 16.8%.³⁶

Given this, the final mitigated CO_{2e} for electrical consumption at the project site under the 2013 CCR Title 24 standards would be 1,258.5 MT/year (compared to the RPS level of 1,609.3 MT/yr), while the mitigated natural gas consumption would be 210.6 MT/year (compared to the baseline value of 253.1 MT/yr). The revised aggregate CO_{2e} level for all activities at the project site would be 2,670.9 MT/year. The combined BAU reduction obtained by all three of the above strategies would be 23.8% and is summarized in Table 10 below.

TABLE 10: Revised Operational GHG Emissions – BAU Reduction Strategy #3

Project Phase / Operation	BAU Change	Total CO _{2e} Emissions vis. BAU (MT/year)
Construction (All Phases)	No	74.7
Operational Vehicular Traffic	Yes	1,084.0
Small Engine Usage	No	6.6
Natural Gas Usage	Yes	210.6
Electrical Usage	Enhanced	1,258.5
Solid Waste Generation	No	18.1
Water Consumption	Yes	18.5
Total GHG Emissions per Year under Strategy #3:		2,670.9

Rounding margin of error ± 0.1 MT (220.5 pounds)

Compliance with Future Reduction CO₂ Targets

Application of the above three BAU reduction strategies was found to produce an effective 23.8% reduction (833.0 MT/year) in GHG emissions due to the proposed project action. These findings are therefore consistent with the desired minimum goal of a 16% reduction (560.6 MT/year) in GHG emissions, compared to Business as Usual under a year 2020 scenario.

As a result, no long-term GHG impacts from the project are expected, and the project would be classified in compliance with the intent of both AB 32, and Executive Order S-3-05.

³⁶ Impact Analysis Report, California's 2013 Building Energy Efficiency Standards, California Energy Commission, 2013.





CERTIFICATION OF ACCURACY AND QUALIFICATIONS

This report was prepared by Investigative Science and Engineering, Inc. (ISE), located at 1134 D Street, Ramona, CA 92065. The members of its professional staff contributing to the report are listed below:

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ISE affirms to the best of its knowledge and belief that the statements and information contained herein are in all respects true and correct as of the date of this report. Should the reader have any questions regarding the findings and conclusions presented in this report, please do not hesitate to contact ISE at (760) 787-0016.

Content and information contained within this report is intended only for the subject project and is protected under 17 U.S.C. §§ 101 through 810.

Approved as to Form and Content:

Rick Tavares, Ph.D.
Project Principal
Investigative Science and Engineering, Inc. (ISE)





APPENDICIES AND SUPPLEMENTAL INFORMATION

EMFAC 2011 EMISSION FACTOR TABULATIONS – SCENARIO YEAR 2020

EMFAC2011 Emission Rates
 Region Type: County
 Region: San Diego
 Calendar Year: 2020
 Season: Annual
 Vehicle Classification: EMFAC2011 Categories

Region	CalYr	Season	Veh_Class	Fuel	MdYr	Speed (miles/hr)	VMT (miles/day)	ROG_RUNEX (gms/mile)	TOG_RUNEX (gms/mile)	CO_RUNEX (gms/mile)	NOX_RUNEX (gms/mile)	CO2_RUNEX (gms/mile)	CO2_RUNEX (Pavley) (gms/mile)	I+LCFS) (gms/mile)	PM10_RUNEX (gms/mile)	PM2_5_RUNEX (gms/mile)
San Diego	2020	Annual	LDA	GAS	Aggregated	45	2242464.381	0.01800885	0.025991442	0.7986615	0.08782155	283.227013	194.62056	0.00117556	0.00117556	0.00117556
San Diego	2020	Annual	LDA	DSL	Aggregated	45	9838.147339	0.01573353	0.017911578	0.105103646	0.325845762	297.0356277	210.027084	0.010881138	0.010010647	0.010010647
San Diego	2020	Annual	LDT1	GAS	Aggregated	45	322328.281	0.02655532	0.039937004	1.47168894	0.15242977	327.75106	237.40794	0.00212512	0.001970814	0.001970814
San Diego	2020	Annual	LDT1	DSL	Aggregated	45	395.3592352	0.028245423	0.032155538	0.143171582	0.37188977	301.7745459	208.1108466	0.022104445	0.02033609	0.02033609
San Diego	2020	Annual	LDT2	GAS	Aggregated	45	838126.6583	0.013177188	0.022497407	0.905772897	0.101977931	385.6305209	290.7469134	0.001247809	0.001247809	0.001247809
San Diego	2020	Annual	LDT2	DSL	Aggregated	45	363.5267772	0.019196041	0.021853415	0.119984215	0.391812714	298.9794062	223.0104307	0.013076192	0.012030102	0.012030102
San Diego	2020	Annual	LHD1	GAS	Aggregated	45	38908.19589	0.03897162	0.048331048	0.78990108	0.39245016	452.055847	406.85026	0.00067839	0.00067839	0.00067839
San Diego	2020	Annual	LHD1	DSL	Aggregated	45	44121.07623	0.111091742	0.126470564	0.560391725	2.606862687	521.200403	469.8003627	0.024710919	0.022734047	0.022734047
San Diego	2020	Annual	LHD2	GAS	Aggregated	45	3218.236203	0.01898113	0.025698977	0.42556526	0.297729368	452.0558068	406.8502261	0.000469757	0.000469757	0.000469757
San Diego	2020	Annual	LHD2	DSL	Aggregated	45	11310.33045	0.101947139	0.116060039	0.536482048	2.420907045	521.2157497	469.0941748	0.023506878	0.021626329	0.021626329
San Diego	2020	Annual	MCY	GAS	Aggregated	45	28802.32646	2.03328051	2.217487704	17.789901	1.16787867	138.859592	124.97363	0.00026983	0.00026983	0.00026983
San Diego	2020	Annual	MDV	GAS	Aggregated	45	573432.1342	0.032021219	0.048593237	1.599921091	0.205190013	492.0704299	390.3938572	0.001449769	0.001387431	0.001387431
San Diego	2020	Annual	MDV	DSL	Aggregated	45	633.2175404	0.019479433	0.022176038	0.115337298	0.319248347	297.5623732	233.6758465	0.015085251	0.013878431	0.013878431
San Diego	2020	Annual	MH	GAS	Aggregated	45	27371.31064	0.04404313	0.056990031	1.48338751	0.55198233	452.055858	406.85027	0.00079062	0.00079062	0.00079062
San Diego	2020	Annual	MH	DSL	Aggregated	45	3680.803695	0.10878148	0.123840481	0.50298745	0.78100093	1070.66408	963.59767	0.12465464	0.114682275	0.114682275
San Diego	2020	Annual	Motor Coach	DSL	Aggregated	45	7985.095821	0.15703997	0.178778052	0.834478884	3.138282148	1624.513043	1462.061739	0.065009578	0.059808812	0.059808812
San Diego	2020	Annual	OBUS	GAS	Aggregated	45	6804.404885	0.072015507	0.08657315	1.536022561	0.850358956	452.0558271	406.8502444	0.000328518	0.000304494	0.000304494
San Diego	2020	Annual	SBUS	GAS	Aggregated	45	878.6398845	0.442762318	0.489092346	8.484772469	2.231064373	452.0558158	406.8502366	0.002306706	0.002095706	0.002095706
San Diego	2020	Annual	SBUS	DSL	Aggregated	45	2276.91643	0.072041767	0.082014057	0.333878476	7.748496101	1073.967436	965.5706926	0.041981697	0.038623161	0.038623161
San Diego	2020	Annual	T6 Ag	DSL	Aggregated	45	538.4805779	0.14236689	0.162073867	0.627616773	2.910517913	1054.347088	948.912379	0.097019827	0.089258241	0.089258241
San Diego	2020	Annual	T6 Public	DSL	Aggregated	45	3409.904163	0.051741473	0.058903729	0.243540937	2.469711818	1056.005237	950.4047137	0.027473686	0.025275791	0.025275791
San Diego	2020	Annual	T6 CAIRP heavy	DSL	Aggregated	45	59.69256382	0.068097095	0.077523359	0.321950143	1.726291417	1050.023396	945.0210567	0.035710913	0.03285404	0.03285404
San Diego	2020	Annual	T6 CAIRP small	DSL	Aggregated	45	204.1592338	0.070761999	0.080557149	0.334750841	0.94725344	1045.931635	941.3384718	0.03799426	0.034954719	0.034954719
San Diego	2020	Annual	T6 OOS heavy	DSL	Aggregated	45	34.22299142	0.068097095	0.077523359	0.321950143	1.726291415	1050.023396	945.0210567	0.035710913	0.03285404	0.03285404
San Diego	2020	Annual	T6 OOS small	DSL	Aggregated	45	117.0487455	0.070761999	0.080557149	0.334750841	0.94725344	1045.931635	941.3384718	0.03799426	0.034954719	0.034954719
San Diego	2020	Annual	tate construction	DSL	Aggregated	45	3647.965062	0.071390036	0.081272121	0.337220996	2.978218782	1056.264609	950.6381477	0.041341491	0.038034172	0.038034172
San Diego	2020	Annual	tate construction	DSL	Aggregated	45	9928.102112	0.082181974	0.093557921	0.388774838	1.262302074	1047.806302	943.026712	0.050341205	0.046313909	0.046313909
San Diego	2020	Annual	T6 instate heavy	DSL	Aggregated	45	16711.92297	0.071247284	0.08110961	0.33663855	2.682795273	1054.879309	949.3913781	0.040452002	0.037215842	0.037215842
San Diego	2020	Annual	T6 instate small	DSL	Aggregated	45	47609.69556	0.079649614	0.090675022	0.376795109	1.189093728	1047.321584	942.5894258	0.047547703	0.043743887	0.043743887
San Diego	2020	Annual	T6 utility	DSL	Aggregated	45	399.9860169	0.052862786	0.060180258	0.250018935	1.565358189	1052.487807	947.2390264	0.026432401	0.024317809	0.024317809
San Diego	2020	Annual	T6TS	GAS	Aggregated	45	18147.57132	0.077482961	0.091832662	1.62625623	0.763625073	452.0558631	406.8502768	0.000443173	0.000409173	0.000409173
San Diego	2020	Annual	T7 Ag	DSL	Aggregated	45	2436.24535	0.235106843	0.267651244	1.279313014	5.263193311	1632.200553	1468.980498	0.135971057	0.125093372	0.125093372
San Diego	2020	Annual	T7 CAIRP	DSL	Aggregated	45	55275.3491	0.173364836	0.19736267	0.923002748	2.292113748	1617.644548	1455.880093	0.069945392	0.064349761	0.064349761
San Diego	2020	Annual	CAIRP construct	DSL	Aggregated	45	4663.871851	0.173347807	0.197343283	0.922887885	2.331678434	1617.883124	1456.094812	0.069944363	0.064348814	0.064348814
San Diego	2020	Annual	T7 NNOOS	DSL	Aggregated	45	62182.70159	0.147621371	0.168055694	0.785748024	1.544245477	1615.130787	1453.617708	0.056661235	0.052128336	0.052128336
San Diego	2020	Annual	T7 NOOS	DSL	Aggregated	45	20129.87755	0.173285773	0.197272662	0.922577028	2.296076295	1617.651523	1455.886371	0.069920511	0.06432687	0.06432687
San Diego	2020	Annual	T7 other port	DSL	Aggregated	45	13112.69884	0.390150283	0.444156398	2.070463268	6.950142658	1666.491631	1499.842468	0.10839064	0.099719388	0.099719388
San Diego	2020	Annual	T7 POAK	DSL	Aggregated	45	0	0	0	0	0	0	0	0	0	0
San Diego	2020	Annual	T7 POLA	DSL	Aggregated	45	6990.380511	0.385313493	0.438650082	2.044795226	6.820262486	1664.806438	1498.325794	0.108292779	0.099629357	0.099629357
San Diego	2020	Annual	T7 Public	DSL	Aggregated	45	2813.335539	0.088506172	0.100757539	0.480395992	7.514561495	1650.005438	1485.0004894	0.048882748	0.044921219	0.044921219
San Diego	2020	Annual	T7 Single	DSL	Aggregated	45	29620.85184	0.124895788	0.142184347	0.662753026	3.962537945	1630.680087	1467.612078	0.053059876	0.048815086	0.048815086
San Diego	2020	Annual	single construct	DSL	Aggregated	45	12064.82284	0.124768238	0.142039016	0.662019851	4.107216905	1631.501795	1468.351616	0.053403728	0.049131429	0.049131429
San Diego	2020	Annual	T7 SWICV	DSL	Aggregated	45	8203.10902	0.093146698	0.106040425	0.489898617	7.400986083	1640.422869	1476.300582	0.045111126	0.042422236	0.042422236
San Diego	2020	Annual	T7 tractor	DSL	Aggregated	45	81660.41384	0.170999486	0.194669877	0.908669319	3.823461779	1626.178907	1463.561016	0.072371705	0.066581968	0.066581968
San Diego	2020	Annual	tractor construct	DSL	Aggregated	45	8995.217136	0.169711373	0.19320348	0.901537144	4.199918533	1627.956865	1465.161179	0.072863281	0.067034219	0.067034219
San Diego	2020	Annual	T7 utility	DSL	Aggregated	45	426.4867188	0.094546059	0.107633491	0.501668244	3.704094409	1632.120114	1468.908102	0.039991319	0.036792014	0.036792014
San Diego	2020	Annual	T7IS	GAS	Aggregated	45	3419.591346	0.437511938	0.525019232	22.53766349	4.8975608	452.0558544	406.850269	0.00825599	0.00762306	0.00762306
San Diego	2020	Annual	UBUS	GAS	Aggregated	45	1734.367182	0.298716401	0.326007237	3.613929472	2.201846498	452.0558754	406.8502879	0.000427296	0.000396461	0.000396461
San Diego	2020	Annual	UBUS	DSL	Aggregated	45	8477.237764	0.346767768	0.394772026	1.802938026	11.32342637	2499.936313	2249.942682	0.139671499	0.12849778	0.12849778
San Diego	2020	Annual	All Other Buses	DSL	Aggregated	45	4370.003165	0.077736952	0.088497603	0.367213193	2.680642702	1053.39159	948.0524307	0.043497025	0.040017263	0.040017263





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