# OTAY CROSSINGS COMMERCE PARK

APPENDIX E

GLOBAL CLIMATE CHANGE EVALUATION

to the

DRAFT SUPPLEMENTAL
ENVIRONMENTAL IMPACT REPORT

EIR 93-19-006Q, TM 5405RPL[7]
SCH No. 2006041039

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# Global Climate Change Evaluation

**for the**

# Otay Crossings Commerce Park
## DPLU Project No. TM 5405RPL7, Log No. 93-19-006Q

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**List of Acronyms**

| | |
|---|---|
| APCD | Air Pollution Control District |
| AB | Assembly Bill |
| AB 32 | Assembly Bill 32, Global Warming Solutions Act of 2006 |
| AG | Attorney General |
| ARB | Air Resources Board |
| ASTM | American Society of Testing and Materials |
| CAPCOA | California Air Pollution Control Officers Association |
| CAT | Climate Action Team |
| CCAP | Center for Clean Air Policy |
| CCAR | California Climate Action Registry |
| CEC | California Energy Commission |
| CEQA | California Environmental Quality Act |
| CF | Connectivity Factor |
| $CH_4$ | Methane |
| CO | Carbon Monoxide |
| $CO_2$ | Carbon Dioxide |
| $CO_2e$ | Carbon Dioxide Equivalent |
| CNG | Compressed Natural Gas |
| CPUC | California Public Utilities Commission |
| CUFR | California Urban Forestry |
| DGS | Department of General Services |
| DOE | U.S. Department of Energy |
| DOF | Department of Finance |
| DPF | Diesel Particulate Filter |
| DWR | Department of Water Resources |
| E85 | 85% Ethanol |
| EEA | Massachusetts Executive Office of Energy and Environmental Affairs |
| EERE | Energy Efficiency and Renewable Energy |
| EIR | Environmental Impact Report |
| EPA | U.S. Environmental Protection Agency |
| EV | Electric Vehicles |
| FAR | Floor Area Ratio |
| GCC | Global Climate Change |
| GHG | Greenhouse Gas |
| GGEP | Greenhouse Gas Emissions Policy |
| GGRP | Greenhouse Gas Reduction Plan |
| GP | General Plan |
| GWP | Global Warming Potential |
| HFCs | Hydrofluorocarbons |
| IPCC | Intergovernmental Panel on Climate Change |
| IT | Information Technology |
| ITE | Institute of Transportation Engineers |
| LEED | Leadership in Energy and Environmental Design |
| LNG | Liquified Natural Gas |

| | |
|---|---|
| MMT | Million Metric Tons |
| MW | Megawatts |
| $N_2O$ | Nitrous Oxide |
| NOx | Oxides of Nitrogen |
| NREL | National Renewable Energy Laboratory |
| OPR | State Office of Planning and Research |
| PFCs | Perfluorocarbons |
| PM | Particulate Matter |
| ROG | Reactive Organic Gas |
| RPS | Renewable Portfolio Standards |
| RTP | Regional Transportation Plan |
| S-3-05 | Executive Order S-3-05 |
| SB | Senate Bill |
| SDCGHGI | San Diego County Greenhouse Gas Inventory |
| SOx | Oxides of Sulfur |
| SP | Service Population |
| SRI | Solar Reflective Index |
| SWP | State Water Project |
| TAC | Toxic Air Contaminant |
| THC | Total Hydrocarbon |
| ULEV | Ultra Low Emission Vehicle |
| UNFCCC | United Nations Framework Convention on Climate Change |
| URBEMIS | Urban Emissions Model |
| USBGC | U.S. Green Building Council |
| VMT | Vehicle Miles Traveled |

**Executive Summary**

This report presents an assessment of potential greenhouse gas emissions impacts on global climate change associated with the proposed Otay Crossings Commerce Park in the southwestern portion of the unincorporated County of San Diego contained within Subarea 2 of the East Otay Mesa Specific Plan Area. Development of the Specific Plan Area, including the project site, was programmatically evaluated in the East Otay Mesa Specific Plan Final EIR (SCH No. 92101099) prepared by the County of San Diego in 1994.

The Otay Crossings Commerce Park project is a Tentative Map (TM) and Preliminary Grading Plan (Tract 5405) for 311.5 acres of land designated for Mixed Industrial, Rural Residential and State Route (i.e., SR-11). The proposed project would subdivide the 311.5-acre property into 56 industrial lots and three open space lots ranging in size from 0.9 net acre to 59.1 net acres. About three quarters of the lots would be less than 4 acres in size, and all but three lots would have an area of less than 7 acres. The 59 lots would be divided and recorded in five separate units. Approximately 285.5 acres would be placed in lots (including FHWA/Caltrans/GSA ROW), while 20.4 acres would contain internal on-site public streets, and the construction of half-widths up to the center lines of Otay Mesa Road, Alta Road and Airway Road immediately adjacent to the site would occupy 5.6 acres. An additional 23.5 to 25.4 acres would consist of off-site roadway and utility improvements. Traffic improvements required for project mitigation would result in additional 12.2 acres of grading offsite in addition to the 23.5 to 25.4 acres for offsite roadway and utility improvements proposed by the applicant. Of the area placed in lots, 47.1 acres would be contained in open space easements (in the three northeast corners of the project site and along its southern boundary by placing them in separate open space lots. Although the ultimate route and POE location are still being determined by FHWA/Caltrans/GSA, the preliminary ROW for SR-11 and the potential location for the POE has been mapped on three of the 59 proposed lots, covering approximately 84.0 acres of the site. The proposed project is consistent with the land use plan in the EOMSP.

This report presents an assessment of potential impacts on global climate associated with the Project. GHG emissions have been calculated for "business as usual" conditions and for

conditions with implementation of GHG emission reduction measures proposed by the Project applicant. A summary of the emission calculations is provided in Table ES-1. GHG emission reduction measures are summarized in Tables ES-2 and ES-3. As shown in Table ES-1, with implementation of GHG emission reduction measures, the project would meet the goals of AB 32 and would not result in a significant impact (or change) to global climate.

**Table ES-1**
**SUMMARY OF ESTIMATED GREENHOUSE GAS EMISSIONS WITH GHG REDUCTION MEASURES**

| **Emission Source** | **Annual Emissions (Metric tons/year)** | | |
|---|---|---|---|
| | **$CO_2$** | **$CH_4$** | **$N_2O$** |
| **Emissions** | | | |
| Electricity Use Emissions | 10,370 | 0.079 | 0.044 |
| Natural Gas Use Emissions | 1,231 | 0.014 | 0.002 |
| Water Consumption Emissions | 421 | 0.0032 | 0.0018 |
| Vehicle Emissions | 14,669 | 1.21 | 2.63 |
| Amortized Construction Emissions | 75 | - | - |
| **Total** | 26,766 | 1.306 | 2.68 |
| Global Warming Potential Factor | **1** | **21** | **310** |
| $CO_2$ Equivalent Emissions | 26,766 | 27 | 831 |
| **TOTAL $CO_2$ Equivalent Emissions** | **27,624** | | |
| **Percent Reduction from Business As Usual** | **25%** | | |

**Table ES-2**
**Proposed Construction Mitigation Measures to Reduce GHG Emissions**

| **Strategy to Reduce GHG Emissions** | **Construction Mitigation Measures** | **Emission Reduction** | **Basis for Emission Reduction** |
|---|---|---|---|
| Tier 2 and 3 Equipment | Contractor will utilize ARB-Certified construction equipment (Tier 2 and 3) which will reduce emissions of NOx based on Tier 2 and 3 emission requirements. Reduction of NOx emissions will reduce emissions of $N_2O$. No information was available from ARB to indicate other reductions in GHG emissions from the use of Tier 2 and 3 certified equipment. | Unknown | CAPCOA White Paper, Appendix B |
| Recycling of Waste Materials | Contractor will recycle all waste construction materials. | Unknown | CAPCOA White Paper, Appendix B |

## Table ES-3
## Feasible Project Design Features to Reduce GHG Emissions

| GHG Emission Reduction Measure | CAPCOA Appendix B Reference | Emission Reduction | Basis for Emission Reduction |
|---|---|---|---|
| Nonresidential projects provide plentiful short- and long- term bicycle parking facilities to meet peak season maximum demand (e.g., one bike rack space per 20 vehicle/employee parking spaces). | **MM T-1** | **1-5%** | CAPCOA White Paper |
| Nonresidential projects provide "end-of-trip" facilities including showers, lockers, and changing space (e.g., four clothes lockers and one shower provided for every 80 employee parking spaces, separate facilities for each gender for projects with 160 or more employee parking spaces). | **MM T-2** | **1-5%** | CAPCOA White Paper |
| Provide minimum amount of parking required. Once land uses are determined, the trip reduction factor associated with this measure can be determined by utilizing the ITE parking generation publication. The reduction in trips can be computed as shown below by the ratio of the difference of minimum parking required by code and ITE peak parking demand to ITE peak parking demand for the land uses multiplied by 50%. Percent Trip Reduction = 50 * [(min parking required by code – ITE peak parking demand)/(ITE peak parking demand)] | **MM T-10** | **1-30%** | CAPCOA White Paper |
| Provide a parking lot design that includes clearly marked and shaded pedestrian pathways between transit facilities and building entrances. | **MM T-12** | **1-4%** | CAPCOA White Paper |
| Provide parking lot areas with 50% tree cover within 10 years of construction, in particular low emitting, low maintenance, native drought resistant trees. Reduces urban heat island effect and requirement for air conditioning, effective when combined with other measures (e.g., electrical maintenance equipment and reflective paving material). | **MM T-14** | **Unknown** | CAPCOA White Paper |
| Have at least three of the following on site and/or offsite within one-quarter mile: Residential Development, Retail Development, Park, Open Space, or Office. | **MM D-10** | **3%** | CAPCOA White Paper |
| Provide infrastructure/education that promotes the avoidance of products with excessive packaging, recycle, buying of refills, separating of food and yard waste for composting, and using rechargeable batteries. | **MM D-14** | **Unknown** | CAPCOA White Paper |
| LEED Certification: LEED promotes a wholebuilding approach to sustainability by recognizing performance in five key areas of human and environmental health: sustainable site development, water savings, energy efficiency, materials selection, and indoor environmental quality. | **MM D-15** | **Unknown** | CAPCOA White Paper |

## Table ES-3 (continued)
## Feasible Project Design Features to Reduce GHG Emissions

| GHG Emission Reduction Measure | CAPCOA Appendix B Reference | Emission Reduction | Basis for Emission Reduction |
|---|---|---|---|
| Project shall use drought resistant native trees, trees with low emissions and high carbon sequestration potential. Evergreen trees on the north and west sides afford the best protection from the setting summer sun and cold winter winds. | **MM D-17** | **Unknown** | CAPCOA White Paper |
| Project shall use high-efficiency pumps. | **MM E-1** | **Unknown** | CAPCOA White Paper |
| Project installs Energy Star labeled roof materials. | **MM E-4** | **0.5-1%** | CAPCOA White Paper |
| Project exceeds Title 24 requirements. | **MM E-6** | **1%** | CAPCOA White Paper |
| Project orients 75% or more of homes and/or buildings to face either north or south (within 30° of N/S). 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. | **MM E-7** | **0.5%** | CAPCOA White Paper |
| Project provides light-colored paving (e.g., increased albedo pavement). | **MM E-12** | **Unknown** | CAPCOA White Paper |
| Project provides cool roofs. Highly reflective, highly emissive roofing materials that stay 50-60°F cooler than a normal roof under a hot summer sun. CA's Cool Savings Program provided rebates to building owners for installing roofing materials with high solar reflectance and thermal emittance. The highest rebate went to roofs on air conditioned buildings, while buildings with rooftop ducts and other nonresidential buildings were eligible for slightly less. The program aimed to reduce peak summer electricity demand and was administered by the CEC. | **MM E-13** | **Unknown** | CAPCOA White Paper |
| Project provides solar water heaters. | **MM E-14** | **20-70% (cooling energy needs)** | CAPCOA White Paper |
| Project provides electrical outlets at building exterior areas. | **MM E-15** | **Unknown** | CAPCOA White Paper |

**Table ES-3 (continued)**
**Feasible Project Design Features to Reduce GHG Emissions**

| GHG Emission Reduction Measure | CAPCOA Appendix B Reference | Emission Reduction | Basis for Emission Reduction |
|---|---|---|---|
| Project uses energy efficient appliances (e.g., Energy Star). | **MM E-16** | **Unknown** | CAPCOA White Paper |
| Project uses materials which are resource efficient, recycled, with long life cycles and manufactured in an environmentally friendly way. | **MM E-17** | **Unknown** | CAPCOA White Paper |
| Install energy-reducing shading mechanisms for windows, porch, patio and walkway overhangs. | **MM E-18** | **Unknown** | CAPCOA White Paper |
| Install energy-reducing programmable thermostats that automatically adjust temperature settings. | **MM E-20** | **Unknown** | CAPCOA White Paper |
| Install energy-reducing passive heating and cooling systems (e.g., insulation and ventilation). | **MM E-21** | **Unknown** | CAPCOA White Paper |
| Install energy-reducing day lighting systems (e.g., skylights, light shelves and interior transom windows). | **MM E-22** | **Unknown** | CAPCOA White Paper |
| Optimized Lighting - Use premium T8 lamps for indoor lighting/optimized lighting design | **NA** | **Unknown** | Standard energy efficiency measure |
| Wall Insulation – Increase exterior wall insulation | **NA** | **Unknown** | Standard energy efficiency measure |
| Roof Insulation – Increase roof insulation | **NA** | **Unknown** | Standard energy efficiency measure |
| Install low energy traffic signals & energy efficient (sodium) street lighting | **NA** | **Unknown** | Standard energy efficiency measure |
| Buildings to be designed utilizing double-paned windows | **NA** | **Unknown** | Standard energy efficiency measure |
| Buildings to be designed utilizing door sweeps and weather stripping | **NA** | **Unknown** | Standard energy efficiency measure |
| Buildings to be designed utilizing electric light dimming controls where feasible | **NA** | **Unknown** | Standard energy efficiency measure |

**Table ES-3 (continued)**
**Feasible Project Design Features to Reduce GHG Emissions**

| GHG Emission Reduction Measure | CAPCOA Appendix B Reference | Emission Reduction | Basis for Emission Reduction |
|---|---|---|---|
| Buildings to be designed utilizing double-paned windows | **NA** | **Unknown** | Standard energy efficiency measure |
| Buildings to be designed to utilize high efficiency heating & cooling systems | **NA** | **Unknown** | Standard energy efficiency measure |
| Install water-saving irrigation systems | **NA** | **Unknown** | Standard energy efficiency measure |
| Install drought resistant plants in lieu of turf where feasible and appropriate | **NA** | **Unknown** | Standard energy efficiency measure |
| Use recycled water for irrigation where available | **NA** | **Unknown** | Standard energy efficiency measure |
| Use plug-ins for transport refrigeration units (TRUs) as opposed to diesel power | **NA** | **100% of emissions associated with TRUs** | Specific measure to reduce GHG emissions from distribution uses |

## 1.0 INTRODUCTION

This report presents an assessment of potential greenhouse gas emissions impacts on global climate change associated with the proposed Otay Crossings Commerce Park in the southwestern portion of the unincorporated County of San Diego contained within Subarea 2 of the East Otay Mesa Specific Plan Area. Development of the Specific Plan Area, including the project site, was programmatically evaluated in the East Otay Mesa Specific Plan Final EIR (SCH No. 92101099) prepared by the County of San Diego in 1994.

The Otay Crossings Commerce Park project is a Tentative Map (TM) and Preliminary Grading Plan (Tract 5405) for 311.49 acres of land designated for Mixed Industrial, Rural Residential and State Route (i.e., SR-11). The future route for SR-11 traverses the site and the future (third) U.S. Port-of-Entry is situated on the south portion of the site. The proposed project would subdivide the 311.5-acre property into 56 industrial lots and three open space lots ranging in size from 0.9 net acre to 59.1 net acres. About three quarters of the lots would be less than 4 acres in size, and all but three lots would have an area of less than 7 acres. The 59 lots would be divided and recorded in five separate units. Approximately 285.5 acres would be placed in lots (including FHWA/Caltrans/GSA ROW), while 20.4 acres would contain internal on-site public streets, and the construction of half-widths up to the center lines of Otay Mesa Road, Alta Road and Airway Road immediately adjacent to the site would occupy 5.6 acres. An additional 23.5 to 25.4 acres would consist of off-site roadway and utility improvements. Traffic improvements required for project mitigation would result in additional 12.2 acres of grading offsite in addition to the 23.5 to 25.4 acres for offsite roadway and utility improvements proposed by the applicant. Of the area placed in lots, 47.1 acres would be contained in open space easements (in the three northeast corners of the project site and along its southern boundary by placing them in separate open space lots. Although the ultimate route and POE location are still being determined by FHWA/Caltrans/GSA, the preliminary ROW for SR-11 and the potential location for the POE has been mapped on three of the 59 proposed lots, covering approximately 84.0 acres of the site.

These planned uses will be implemented through various discretionary permits as described in Sections 1.5 and 3.0 of the East Otay Mesa Specific Plan. The original air quality analysis for the East Otay Mesa Specific Plan area was prepared in 1993 prior to the passage of California Assembly Bill (AB) 32, the Global Warming Solutions Act of 2006. This analysis therefore provides an evaluation of the potential for adverse environmental impacts that the proposed Project may have on global climate change (GCC).

## 1.1 General Principles and Existing Conditions

GCC refers to changes in average climatic conditions on Earth as a whole, including temperature, wind patterns, precipitation and storms. Global temperatures are moderated by naturally occurring atmospheric gases, including water vapor, carbon dioxide ($CO_2$), methane ($CH_4$) and nitrous oxide ($N_2O$), which are known as greenhouse gases (GHGs). These gases allow solar radiation (sunlight) into the Earth's atmosphere, but prevent radiative heat from escaping, thus warming the Earth's atmosphere. Gases that trap heat in the atmosphere are often called greenhouse gases, analogous to a greenhouse. GHGs are emitted by both natural processes and human activities. The accumulation of GHGs in the atmosphere regulates the Earth's temperature. Without these natural GHGs, the Earth's temperature would be about 61º Fahrenheit cooler (California Environmental Protection Agency 2006). Emissions from human activities, such as electricity production and vehicle use, have elevated the concentration of these gases in the atmosphere.

GHGs have been at the center of a widely contested political, economic, and scientific debate surrounding GCC. Although the conceptual existence of GCC is generally accepted, the extent to which GHGs contribute to it remains a source of debate. The State of California has been at the forefront of developing solutions to address GCC. GCC refers to any significant change in measures of climate, such as average temperature, precipitation, or wind patterns over a period of time. GCC may result from natural factors, natural processes, and/or human activities that change the composition of the atmosphere and alter the surface and features of land.

Global climate change attributable to anthropogenic (human) emissions of GHGs (mainly $CO_2$, $CH_4$ and $N_2O$) is currently one of the most important and widely debated scientific, economic and political issues in the United States. Historical records indicate that global climate changes have occurred in the past due to natural phenomena (such as during previous ice ages). Some data indicate that the current global conditions differ from past climate changes in rate and magnitude.

The United Nations Intergovernmental Panel (Panel) on Climate Change constructed several emission trajectories of GHGs needed to stabilize global temperatures and climate change impacts. The Panel concluded that a stabilization of GHGs at 400 to 450 ppm $CO_2$ equivalent concentration is required to keep global mean warming below 35.6º Fahrenheit (2º Celsius), which is assumed to be necessary to avoid dangerous climate change (Association of Environmental Professionals 2007).

State law defines greenhouse gases as any of the following compounds: carbon dioxide ($CO_2$), methane ($CH_4$), nitrous oxide ($N_2O$), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulfur hexafluoride ($SF_6$) (California Health and Safety Code Section 38505(g).) $CO_2$, followed by $CH_4$ and $N_2O$, are the most common GHGs that result from human activity.

## 1.2 Sources and Global Warming Potentials of GHG

The State of California GHG Inventory performed by the California Air Resources Board (ARB), compiled statewide anthropogenic GHG emissions and sinks. It includes estimates for $CO_2$, $CH_4$, $N_2O$, $SF_6$, HFCs, and PFCs. The current inventory covers the years 1990 to 2004, and is summarized in Table 1. Data sources used to calculate this GHG inventory include California and federal agencies, international organizations, and industry associations. The calculation methodologies are consistent with guidance from the Intergovernmental Panel on Climate Change (IPCC). The 1990 emissions level is the sum total of sources and sinks from all sectors and categories in the inventory. The inventory is divided into seven broad sectors and categories in the inventory. These sectors include: Agriculture; Commercial; Electricity Generation; Forestry; Industrial; Residential; and Transportation.

**Table 1**
**State of California GHG Emissions by Sector**

| Sector | Total 1990 Emissions ($MMTCO_2e$) | Percent of Total 1990 Emissions | Total 2004 Emissions ($MMTCO_2e$) | Percent of Total 2004 Emissions |
|---|---|---|---|---|
| Agriculture | 23.4 | 5% | 27.9 | 6% |
| Commercial | 14.4 | 3% | 12.8 | 3% |
| Electricity Generation | 110.6 | 26% | 119.8 | 25% |
| Forestry (excluding sinks) | 0.2 | <1% | 0.2 | <1% |
| Industrial | 103.0 | 24% | 96.2 | 20% |
| Residential | 29.7 | 7% | 29.1 | 6% |
| Transportation | 150.7 | 35% | 182.4 | 38% |
| Forestry Sinks | (6.7) | | (4.7) | |

When accounting for GHGs, all types of GHG emissions are expressed in terms of $CO_2$ equivalents ($CO_2e$) and are typically quantified in metric tons (MT) or millions of metric tons (MMT).

GHGs have varying global warming potential (GWP). The GWP is the potential of a gas or aerosol to trap heat in the atmosphere; it is the "cumulative radiative forcing effect of a gas over a specified time horizon resulting from the emission of a unit mass of gas relative to a reference gas" (USEPA 2006). The reference gas for GWP is $CO_2$; therefore, $CO_2$ has a GWP of 1. The other main greenhouse gases that have been attributed to human activity include $CH_4$, which has a GWP of 21, and $N_2O$, which has a GWP of 310. Table 2 presents the GWP and atmospheric lifetimes of common GHGs.

**Table 2**
**Global Warming Potentials and Atmospheric Lifetimes of GHGs**

| GHG | Formula | 100-Year Global Warming Potential | Atmospheric Lifetime (Years) |
|---|---|---|---|
| Carbon Dioxide | $CO_2$ | 1 | Variable |
| Methane | $CH_4$ | 21 | 12 ± 3 |
| Nitrous Oxide | $N_2O$ | 310 | 120 |
| Sulfur Hexafluoride | $SF_6$ | 23,900 | 3,200 |

Human-caused sources of $CO_2$ include combustion of fossil fuels (coal, oil, natural gas, gasoline and wood). Data from ice cores indicate that $CO_2$ concentrations remained steady prior to the current period for approximately 10,000 years. Concentrations of $CO_2$ have increased in the atmosphere since the industrial revolution.

$CH_4$ is the main component of natural gas and also arises naturally from anaerobic decay of organic matter. Human-caused sources of natural gas include landfills, fermentation of manure and cattle farming. Human-caused sources of $N_2O$ include combustion of fossil fuels and industrial processes such as nylon production and production of nitric acid.

Other GHGs are present in trace amounts in the atmosphere and are generated from various industrial or other uses.

In addition to the State of California GHG Inventory, a more specific regional GHG inventory was prepared by the University of San Diego School of Law Energy Policy Initiative Center (University of San Diego 2008). This San Diego County Greenhouse Gas Inventory (SDCGHGI) is a detailed inventory that takes into account the unique characteristics of the region in calculating emissions. The SDCGHGI calculated GHG emissions for 1990, 2006, and projected 2020 emissions. Based on this inventory and the emission projections for the region, the study found that emissions of GHGs must be reduced by 33 percent below business as usual in order for San Diego County to achieve 1990 emission levels by the year 2020. "Business as usual", or forecasted emissions, is defined as the emissions that would occur in the absence of

AB 32's mandated reductions. Construction of buildings using Title 24 building standards or the County's 2006 building code would create "business as usual" emissions.

Areas where feasible reductions can occur and the strategies for achieving those reductions are outlined in the SDCGHGI. A summary of the various sectors that contribute GHG emissions in San Diego County for the year 2006 is provided in Table 3. Total GHGs in San Diego County are estimated at 34 $MMTCO_2e$.

**Table 3**
**San Diego County 2006 GHG Emissions by Category**

| Sector | Total Emissions ($MMTCO_2e$) | Percent of Total Emissions |
|---|---|---|
| On-Road Transportation | 16 | 46% |
| Electricity | 9 | 25% |
| Natural Gas Consumption | 3 | 9% |
| Civil Aviation | 1.7 | 5% |
| Industrial Processes & Products | 1.6 | 5% |
| Other Fuels/Other | 1.1 | 4% |
| Off-Road Equipment & Vehicles | 1.3 | 4% |
| Waste | 0.7 | 2% |
| Agriculture/Forestry/Land Use | 0.7 | 2% |
| Rail | 0.3 | 1% |
| Water-Born Navigation | 0.13 | 0.4% |

The sources of GHG emissions, GWP, and atmospheric lifetime of GHGs are all important variables to be considered in the process of calculating $CO_2e$ for discretionary land use projects that require a climate change analysis.

## 1.3 Regulatory Framework

All levels of government have some responsibility for the protection of air quality, and each level (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.

### 1.3.1 National and International Efforts

International and Federal legislation have been enacted to deal with GCC issues. In 1988, the

United Nations and the World Meteorological Organization established the IPCC to assess the scientific, technical, and socioeconomic information relevant to understanding the scientific basis for human-induced climate change, its potential impacts, and options for adaptation and mitigation. The most recent reports of the IPCC have emphasized the scientific consensus that real and measurable changes to the climate are occurring, that they are caused by human activity, and that significant adverse impacts on the environment, the economy, and human health and welfare are unavoidable.

In October 1993, President Clinton announced his Climate Change Action Plan (CCAP), which had a goal of returning GHG emissions to 1990 levels by the year 2000. This was to be accomplished through 50 initiatives that relied on innovative voluntary partnerships between the private sector and government aimed at producing cost-effective reductions in GHG emissions. On March 21, 1994, the United States joined a number of countries around the world in signing the United Nations Framework Convention on Climate Change (UNFCCC). Under the Convention, governments agreed to gather and share information on GHG emissions, national policies, and best practices; launch national strategies for addressing GHG emissions and adapting to expected impacts, including the provision of financial and technological support to developing countries; and cooperate in preparing for adaptation to the impacts of GCC. Recently, the United States Supreme Court declared in the court case of Massachusetts et al. vs. the Environmental Protection Agency et al., 549 C.S. 497 (2007) that the EPA does have the ability to regulate GHG emissions. In addition to the national and international efforts described above, many local jurisdictions have adopted climate change policies and programs.

**Endangerment Finding.** On April 17, 2009, EPA issued its proposed endangerment finding for GHG emissions. On December 7, 2009, the EPA Administrator signed two distinct findings regarding greenhouse gases under section 202(a) of the Clean Air Act:

> **Endangerment Finding:** The Administrator finds that the current and projected concentrations of the six key well-mixed greenhouse gases--carbon dioxide ($CO_2$), methane ($CH_4$), nitrous oxide ($N_2O$), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride ($SF_6$)--in the atmosphere threaten the public health and welfare of current and future generations.

**Cause or Contribute Finding:** The Administrator finds that the combined emissions of these well-mixed greenhouse gases from new motor vehicles and new motor vehicle engines contribute to the greenhouse gas pollution which threatens public health and welfare.

The endangerment findings do not themselves impose any requirements on industry or other entities. However, this action is a prerequisite to finalizing the EPA's proposed greenhouse gas emission standards for light-duty vehicles, which were jointly proposed by EPA and the Department of Transportation's National Highway Safety Administration on September 15, 2009.

**Proposed Mandatory GHG Reporting Rule.** On March 10, 2009, in response to the FY2008 Consolidated Appropriations Act (H.R. 2764; Public Law 110–161), EPA proposed a rule that requires mandatory reporting of greenhouse gas (GHG) emissions from large sources in the United States. The proposed rule would collect accurate and comprehensive emissions data to inform future policy decisions.

EPA is proposing that suppliers of fossil fuels or industrial greenhouse gases, manufacturers of vehicles and engines, and facilities that emit 25,000 metric tons or more per year of GHG emissions submit annual reports to EPA. The gases covered by the proposed rule are carbon dioxide ($CO_2$), methane ($CH_4$), nitrous oxide ($N_2O$), hydrofluorocarbons (HFC), perfluorocarbons (PFC), sulfur hexafluoride ($SF_6$), and other fluorinated gases including nitrogen trifluoride ($NF_3$) and hydrofluorinated ethers (HFE).

**Corporate Average Fuel Economy Standards.** The federal Corporate Average Fuel Economy (CAFE) standard determines the fuel efficiency of certain vehicle classes in the United States. In 2007, as part of the Energy and Security Act of 2007, CAFE standards were increased for new light-duty vehicles to 35 miles per gallon by 2020. In May 2009, President Obama announced plans to increase CAFE standards to require light-duty vehicles to meet an average fuel economy of 35.5 miles per gallon by 2016.

### 1.3.2 State Regulations and Standards

The following subsections describe regulations and standards that have been adopted by the State of California to address GCC issues.

**Assembly Bill 32, the California Global Warming Solutions Act of 2006.** In September 2006, Governor Schwartzenegger signed California AB 32, the global warming bill, into law. AB 32 directs the ARB to do the following:

- Make publicly available a list of discrete early action GHG emission reduction measures that can be implemented prior to the adoption of the statewide GHG limit and the measures required to achieve compliance with the statewide limit.
- Make publicly available a GHG inventory for the year 1990 and determine target levels for 2020.
- On or before January 1, 2010, adopt regulations to implement the early action GHG emission reduction measures.
- On or before January 1, 2011, adopt quantifiable, verifiable, and enforceable emission reduction measures by regulation that will achieve the statewide GHG emissions limit by 2020, to become operative on January 1, 2012, at the latest. The emission reduction measures may include direct emission reduction measures, alternative compliance mechanisms, and potential monetary and non-monetary incentives that reduce GHG emissions from any sources or categories of sources that ARB finds necessary to achieve the statewide GHG emissions limit.
- Monitor compliance with and enforce any emission reduction measure adopted pursuant to AB 32.

AB 32 required that by January 1, 2008, ARB determine what the statewide GHG emissions level was in 1990, and approve a statewide GHG emissions limit that is equivalent to that level, to be achieved by 2020. ARB adopted its Scoping Plan in December 2008, which provided estimates of the 1990 GHG emissions level and identified sectors for the reduction of GHG emissions. The ARB has estimated that the 1990 GHG emissions level was 427 MMT net $CO_2e$ (ARB 2007b). The ARB estimates that a reduction of 173 MMT net $CO_2e$ emissions below

business-as-usual would be required by 2020 to meet the 1990 levels (ARB 2007b). This amounts to a 15 percent reduction from today's levels, and a 30 percent reduction from projected business-as-usual levels in 2020 (ARB 2008a).

**Senate Bill 97.** Senate Bill 97, enacted in 2007, amends the CEQA statute to clearly establish that GHG emissions and the effects of GHG emissions are appropriate subjects for CEQA analysis. It directs OPR to develop draft CEQA guidelines "for the mitigation of greenhouse gas emissions or the effects of greenhouse gas emissions" by July 1, 2009 and directs the Resources Agency to certify and adopt the CEQA guidelines by January 1, 2010.

The Governor's Office of Planning and Research (OPR) published a technical advisory on CEQA and Climate Change on June 19, 2008. The guidance did not include a suggested threshold, but stated that the OPR has asked CARB to, "recommend a method for setting thresholds which will encourage consistency and uniformity in the CEQA analysis of greenhouse gas emissions throughout the state." The OPR does recommend that CEQA analyses include the following components:

- Identify greenhouse gas emissions
- Determine Significance
- Mitigate Impacts

In April, the OPR published its proposed revisions to CEQA to address GHG emissions. The amendments to CEQA indicate the following:

- Climate action plans and other greenhouse gas reduction plans can be used to determine whether a project has significant impacts, based upon its compliance with the plan.
- Local governments are encouraged to quantify the greenhouse gas emissions of proposed projects, noting that they have the freedom to select the models and methodologies that best meet their needs and circumstances. The section also recommends consideration of several qualitative factors that may be used in the determination of significance, such as the extent to which the given project complies with state, regional, or local GHG

reduction plans and policies. OPR does not set or dictate specific thresholds of significance. Consistent with existing CEQA Guidelines, OPR encourages local governments to develop and publish their own thresholds of significance for GHG impacts assessment.

- When creating their own thresholds of significance, local governments may consider the thresholds of significance adopted or recommended by other public agencies, or recommended by experts.
- New amendments include guidelines for determining methods to mitigate the effects of greenhouse gas emissions in Appendix F of the CEQA Guidelines.
- OPR is clear to state that "to qualify as mitigation, specific measures from an existing plan must be identified and incorporated into the project; general compliance with a plan, by itself, is not mitigation."
- OPR's emphasizes the advantages of analyzing GHG impacts on an institutional, programmatic level. OPR therefore approves tiering of environmental analyses and highlights some benefits of such an approach.
- Environmental impact reports (EIRs) must specifically consider a project's energy use and energy efficiency potential.

On July 3, the California Natural Resources Agency published proposed amendment of regulations based on OPR's proposed revisions to CEQA to address GHG emissions. On that date, the Natural Resources Agency commenced the Administrative Procedure Act rulemaking process for certifying and adopting these amendments pursuant to Public Resources Code section 21083.05. Having reviewed and considered all comments received, on December 30, 2009, the Natural Resources Agency adopted the proposed amendments to the state CEQA guidelines in the California Code of Regulations. The Amendments became effective on March 18, 2010.

**Executive Order S-3-05.** Executive Order S-3-05, signed by Governor Schwartzenegger on June 1, 2005, calls for a reduction in GHG emissions to 1990 levels by 2020 and for an 80 percent reduction in GHG emissions by 2050. Executive Order S-3-05 also calls for the California EPA (CalEPA) to prepare biennial science reports on the potential impact of

continued GCC on certain sectors of the California economy. The first of these reports, "Our Changing Climate: Assessing Risks to California", and its supporting document "Scenarios of Climate Change in California: An Overview" were published by the California Climate Change Center in 2006.

**California Code of Regulations Title 24.** Although not originally intended to reduce greenhouse gas emissions, California Code of Regulations 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. The standards are updated periodically to allow consideration and possible incorporation of new energy efficiency technologies and methods. The GHG emission inventory was based on Title 24 standards as of October 2005; however, Title 24 has been updated as of 2008 and standards are being phased in. 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 greenhouse gas emissions. Therefore, increased energy efficiency results in decreased greenhouse gas emissions.

**State Standards Addressing Vehicular Emissions.** California Assembly Bill 1493 (Pavley) enacted on July 22, 2002, required the ARB to develop and adopt regulations that reduce greenhouse gases emitted by passenger vehicles and light duty trucks. Regulations adopted by ARB would apply to 2009 and later model year vehicles. ARB estimated that the regulation would reduce climate change emissions from light duty passenger vehicle fleet by an estimated 18% in 2020 and by 27% in 2030 (AEP 2007). Once implemented, emissions from new light-duty vehicles are expected to be reduced in San Diego County by 21 percent by 2020. The ARB has adopted amendments to the "Pavley" regulations that reduce greenhouse gas (GHG) emissions in new passenger vehicles from 2009 through 2016.
The amendments, approved by the Board on September 24, 2009, are part of California's commitment toward a nation-wide program to reduce new passenger vehicle GHGs from 2012 through 2016. ARB's September amendments will cement California's enforcement of the Pavley rule starting in 2009 while providing vehicle manufacturers with new compliance

flexibility. The amendments will also prepare California to harmonize its rules with the federal rules for passenger vehicles.

Executive Order S-01-07 was enacted by the Governor on January 18, 2007. Essentially, the order mandates the following: 1) that a statewide goal be established to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020; and 2) that a Low Carbon Fuel Standard ("LCFS") for transportation fuels be established for California. It is assumed that the effects of the LCFS would be a 10% reduction in GHG emissions from fuel use by 2020. On April 23, 2009, ARB adopted regulations to implement the LCFS.

**Senate Bill 375.** Senate Bill 375 requires that regions within the state which have a metropolitan planning organization must adopt a sustainable communities strategy as part of their regional transportation plans. The strategy must be designed to achieve certain goals for the reduction of GHG emissions. The bill finds that GHG from autos and light trucks can be substantially reduced by new vehicle technology, but even so "it will be necessary to achieve significant additional greenhouse gas reductions from changed land use patterns and improved transportation. Without improved land use and transportation policy, California will not be able to achieve the goals of AB 32." SB 375 provides that new CEQA provisions be enacted to "encourage developers to submit applications and local governments to make land use decisions that will help the state achieve its goals under AB 32," and that "current planning models and analytical techniques used for making transportation infrastructure decisions and for air quality planning should be able to assess the effects of policy choices, such as residential development patterns, expanded transit service and accessibility, the walkability of communities, and the use of economic incentives and disincentives."

### 1.3.2 Local Regulations and Standards

The County is working to develop a comprehensive strategy that will enhance the sustainability of County business operations and communities, building on the many energy efficient and environmentally sound practices already in place in County departments. Additionally, the County is working on the General Plan Update. The Update includes smart growth and land planning principles that will reduce Vehicle Miles Traveled (VMT) and thus result in a reduction

in GHG emissions. The General Plan Update will result in development of an implementation plan for GHG reduction measures which will include the following actions:

- Prepare a climate change action plan with a baseline inventory and emissions reduction targets for greenhouse gas emissions from all sources.
- Develop regulations and procedures to encourage the design and construction of new buildings in accordance with "green building" programs.
- Develop regulations that encourage the use of energy recovery, as well as photovoltaic and wind energy in appropriate areas.

The County has also implemented a number of outreach programs such as the Green Building Program, lawn mower trade-in program, and reduction of solid waste by recycling to reduce air quality impacts as well as GHG emissions.

## 2.0 POTENTIAL CLIMATE CHANGE IMPACTS TO PROJECT SITE

### 2.1 Existing Conditions

The site is currently undeveloped and includes disturbed areas and little native vegetation consisting mainly of scrub. Natural vegetation and soils temporarily store carbon as part of the terrestrial carbon cycle. Carbon is assimilated into plants and animals as they grow and then dispersed back into the environment when the die. There are two existing sources of carbon storage at the Project site: natural vegetation and soils.

It is difficult to assess net changes in carbon storage associated with the Otay Crossings Commerce Park Project. The key issue is the balance between the loss of natural vegetation and future carbon storage associated with landscaping. The situation is further complicated by changes in fire regime. Carbon in natural vegetation is likely to be released into the atmosphere through wildfire every 20 to 150 years. Carbon in landscaped areas will be protected from wildfire. The balance between these factors will influence the long-term carbon budget on the site.

The majority of carbon within the site is stored in the soil. Soil carbon accumulates from inputs of plant and animal matter, roots, and other living components of the soil ecosystem (e.g., bacteria, worms, etc.). Soil carbon is lost through biological respiration, erosion, and other forms of disturbance. Overall, soil carbon moves more slowly through the carbon cycle, and it offers greater potential for long-term carbon storage. Field observations suggest that urban soils can sequester relatively large amounts of carbon. Observations from across the United States suggest that warmer and drier climates (such as southern California) may have slightly higher soil organic matter levels when compared to equivalent areas before development.

**Carbon Capture.** The project will remove existing vegetation from the site that temporarily stores carbon as part of the terrestrial carbon cycle. Over time, landscaping and soils may increase carbon storage compared to predevelopment conditions; however, these gains may be offset by vegetation and soil storage lost to more extensive impervious surface areas, such as

buildings and pavement. It is difficult to predict the net change, but carbon sequestration rates for native vegetation in the San Diego region are relatively low in comparison to heavily vegetated ares such as forests. For example, according to the U.S. EPA (http://www.epa.gov/sequestration/rates.html), riparian areas are estimated to sequester from 0.1 to 0.3 metric tons of $CO_2e$ per acre per year in comparison to forests, which are estimated to sequester 0.6 to 2.6 metric tons of $CO_2e$ per acre per year. Native vegetation in the Otay Mesa region, which consists mainly of scrub, would be expected to provide a low level of carbon sequestration.

## 2.2 Typical Adverse Effects

The Climate Scenarios Report (CCCC 2006), uses a range of emissions scenarios developed by the IPCC to project a series of potential warming ranges (i.e., temperature increases) that may occur in California during the 21st century. Three warming ranges were identified: Lower warming range (3.0 to 5.5 degrees Fahrenheit (ºF)); medium warming range (5.5 to 8.0 ºF); and higher warming range (8.0 to 10.5 ºF). The Climate Scenarios report then presents an analysis of the future projected climate changes in California under each warming range scenario.

According to the report, substantial temperature increases would result in a variety of impacts to the people, economy, and environment of California. These impacts would result from a projected increase in extreme conditions, with the severity of the impacts depending upon actual future emissions of GHGs and associated warming. These impacts are described below.

**Public Health.** Higher temperatures are expected to increase the frequency, duration, and intensity of conditions conducive to air pollution formation. For example, days with weather conducive to $O_3$ formation are projected to increase by 25 to 35 percent under the lower warming range and 75 to 85 percent under the medium warming range. In addition, if global background $O_3$ levels increase as is predicted in some scenarios, it may become impossible to meet local air quality standards. An increase in wildfires could also occur, and the corresponding increase in the release of pollutants including $PM_{2.5}$ could further compromise air quality. The Climate Scenarios report indicates that large wildfires could become up to 55 percent more frequent of GHG emissions are not significantly reduced.

Potential health effects from global climate change may arise from temperature increases, climate-sensitive diseases, extreme events, and air quality. There may be direct temperature effects through increases in average temperature leading to more extreme heat waves and less extreme cold spells. Those living in warmer climates are likely to experience more stress and heat-related problems (e.g., heat rash and heat stroke). In addition, climate sensitive diseases (such as malaria, dengue fever, yellow fever, and encephalitis) may increase, such as those spread by mosquitoes and other disease-carrying insects.

**Water Resources.** A vast network of reservoirs and aqueducts capture and transport water throughout the State from northern California rivers and the Colorado River. The current distribution system relies on Sierra Nevada mountain snowpack to supply water during the dry spring and summer months. Rising temperatures, potentially compounded by decreases in precipitation, could severely reduce spring snowpack, increasing the risk of summer water shortages. In addition, if temperatures continue to rise more precipitation would fall as rain instead of snow, further reducing the Sierra Nevada spring snowpack by as much as 70 to 90 percent. The State's water resources are also at risk from rising sea levels. An influx of seawater would degrade California's estuaries, wetlands, and groundwater aquifers.

**Agriculture.** Increased GHG and associated increases in temperature are expected to cause widespread changes to the agricultural industry, reducing the quantity and quality of agricultural products statewide. Significant reductions in available water supply to support agriculture would also impact production. Crop growth and development will change as will the intensity and frequency of pests and diseases.

**Ecosystems/Habitats.** Continued global warming will likely shift the ranges of existing invasive plants and weeds, thus alternating competition patterns with native plants. Range expansion is expected in many species while range contractions are less likely in rapidly evolving species with significant populations already established. Continued global warming is also likely to increase the populations of and types of pests. Continued global warming would also affect natural ecosystems and biological habitats throughout the State.

**Wildland Fires.** Global warming is expected to increase the risk of wildfire and alter the distribution and character of natural vegetation. If temperatures rise into the medium warming range, the risk of large wildfires in California could increase by as much as 55 percent, which is almost twice the increase expected if temperatures stay in the lower warming range. However, since wildfire risk is determined by a combination of factors including precipitation, winds, temperature, and landscape and vegetation conditions, future risks will not be uniform throughout the State.

**Rising Sea Levels.** Rising sea levels, more intense coastal storms, and warmer water temperatures will increasing threaten the State's coastal regions. Under the high warming scenario, sea level is anticipated to rise 22 to 35 inches by 2100. A sea level risk of this magnitude would inundate coastal areas with salt water, accelerate coastal erosion, threaten levees and inland water systems, and disrupt wetlands and natural habitats.

## 3.0 CLIMATE CHANGE SIGNIFICANCE CRITERIA

The County of San Diego Department of Planning and Land Use (DPLU) has developed its draft *Interim Approach to Addressing Climate Change in CEQA Documents* (DPLU 2009) that presents the DPLU's initial draft for addressing GCC in CEQA documents. The guidelines provide initial screening criteria for GCC analyses, as well as draft guidance for the determination of significance.

The DPLU has indicated that project sizes that are estimated to emit more than 900 metric tons of GHGs would be required to conduct a GHG analysis. The 900 metric ton screening threshold for determining when a GHG analysis is required was chosen based on available guidance from CAPCOA's *CEQA and Climate Change: Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act* (CAPCOA 2008). This White Paper references a 900 metric ton guideline as a conservative threshold for requiring further analysis and mitigation.

The DPLU's draft guideline for determining significance has been developed from the requirements of AB 32. The guideline addresses the potential cumulative impacts that a project's GHG emissions could have on GCC. Since GCC is a global phenomenon, no direct impact would be identified for an individual land development project. The following criterion is considered to establish a significance threshold for GCC impacts:

- The project cannot demonstrate a reduction in the project's operational and construction emissions to 25% below Business As Usual (BAU). This guideline is consistent with the goals and strategies of AB 32 to reduce GHGs to 1990 levels by 2020.

Projects that meet the criteria for conducting a climate change analysis are required to conduct a GHG inventory and disclose GHG emissions associated with project implementation and operation under "business as usual" conditions. "Business as usual" is defined as the emissions that would have occurred in the absence of reductions mandated under AB 32. Based on the

latest guidelines and baseline emission calculations, for energy efficiency, "business as usual" is considered to be the equivalent of as energy efficient as Title 24 requires as of 2006.

For projects to demonstrate that they do not conflict with the goals and policies of AB 32, the DPLU has indicated in the draft guidelines that construction, operation, and vehicular emissions associated with the project will be reduced by 25 percent from business as usual emission levels. According to the SDCGHGI, a majority of the region's emissions are attributable to on-road transportation, with the next largest source of GHG emissions attributable to electricity generation. Similarly, a majority of the emissions resulting from land development projects will be attributable to on-road transportation emissions. According to the SDCGHGI study, the emission reductions for on-road transportation will be achieved in a variety of ways, including through regulations aimed at increasing fuel efficiency standards and decreasing vehicle emissions. These regulations are outside the control of project applicants.

Similar to on-road emissions, the SDCGHGI indicated that the necessary emission reductions for electricity generation will be achieved in a variety of ways, including through implementation of the renewable portfolio standard (RPS), cleaner electricity purchases by San Diego Gas & Electric, replacement of the Boardman Contract (which allows the purchase of electricity from coal-fired power plants), and implementation of 400 MW of photovoltaics. These measures are also outside the control of project applicants. The SDCGHGI indicates that reduction in electricity consumption of 10 percent would contribute to the required reduction in GHG emissions required to reduce emissions to 1990 levels by 2020.

## 4.0 GREENHOUSE GAS INVENTORY

GHG emissions associated with the Otay Crossings Commerce Park were estimated separately for four categories of emissions: (1) construction; (2) energy use, including electricity and natural gas usage; (3) water consumption; and (4) transportation. The analysis includes a baseline estimate assuming Title 24-compliant buildings, which is considered business as usual for the Project. Emissions were estimated based on emission factors from the California Climate Action Registry General Reporting Protocol (CCAP 2007).

The complete emissions inventory is summarized below and included in the Appendix.

### 4.1 Construction Greenhouse Gas Emissions

Construction GHG emissions associated with the Project were estimated using the same approaches as criteria pollutants, using the EMFAC2007 and OFFROAD models. A variety of state programs are in place to address transportation emissions as discussed below.

**Construction Emissions.** Construction emissions for criteria pollutants are analyzed in detail in Section 3.0 of this Air Quality Technical Report. $N_2O$ emissions were considered negligible as the OFFROAD and EMFAC2007 models do not provide emission factors for $N_2O$. Total greenhouse gases associated with construction are summarized in Table 4.

**Table 4**
**Greenhouse Gas Emissions - Construction**

| Construction Phase | $CO_2$ Emissions, metric tons | $CH_4$ Emissions, metric tons |
|---|---|---|
| Phase 1 | 1,585 | 0.15 |
| Phase 2 | 795 | 0.07 |

The total emissions (Phase 1 plus Phase 2) are estimated at 2,380 metric tons of $CO_2$ equivalents total for the duration of construction. Amortizing the construction emissions over a 30-year period would indicate that emissions associated with construction would contribute 79.3 metric tons/year.

## 4.2 Operational Greenhouse Gas Emissions

As discussed above, operational GHG emissions include indirect emissions from energy use (electricity), direct emissions from energy use (natural gas), indirect emissions from water usage, and emissions associated with project-generated traffic. The project involves developing the site through the grading phase and does not involve the construction of buildings or operation of industrial uses. Specific uses are not known at this time, nor are specific square footages that will be developed at the site. It is anticipated, however, that the total development will include from 2.3 to 2.5 million square feet. Based on the Grubb and Ellis evaluation of current uses at the Otay Mesa Industrial Park (Grubb and Ellis 2009) provided in Appendix B, it is anticipated that the project development will involve 80% distribution, 10% retail uses, and 10% light industrial uses. This development scenario was used to evaluate potential GHG emissions associated with operations.

**Energy Use Emissions.** As discussed above, energy use generates GHG through emissions from power plants that generate electricity as well as emissions from natural gas usage at the facility itself.

Business as usual electricity use was estimated based on the assumption that future site plans and development at the Otay Crossings Commerce Park would meet the requirements of Title 24 as of 2005, because the baseline GHG emission inventory developed by the ARB was developed for 2006. Emissions were calculated based on emission factors in the California Climate Action Registry General Reporting Protocol, Version 3.0 (CCAR 2008). Natural gas use was also estimated based on assuming the Otay Crossings Commerce Park would meet the requirements of Title 24 as of 2005. Emissions were calculated based on emission factors in the California Climate Action Registry General Reporting Protocol, Version 3.0 (CCAR 2008).

Electricity usage rates from the distribution and light industrial development space were projected based on estimated annual rates of 12.95 kilowatt-hours (kWh) per square foot for office space (default value) (SCAQMD 1993). Electricity usage rates from the retail space were projected based on estimated annual rates of 13.55 kilowatt-hours (kWh) per square foot for

retail space (default value) (SCAQMD 1993). Emissions of GHG were then calculated using emission factors from the California Climate Action Registry General Reporting Protocol (CCAP 2008), which provide an estimate of pounds of emissions for a given amount of annual electricity usage. Likewise, natural gas usage was estimated based on estimated annual natural gas consumption of 2.0 cubic feet of gas per square foot per month for the distribution and light industrial space, and 2.9 cubic feet of gas per square foot per month for the retail space (SCAQMD 1993).

**Water.** Water use and energy use are often closely linked. The provision of potable water to commercial users consumes large amounts of energy associated with five stages: source and conveyance, treatment, distribution, end use, and wastewater treatment. This inventory estimated that delivered water for the project will have an embodied energy of 3,519 kWh/acre foot or 0.0108 kWh/gallon (Wilkinson and Wolfe 2005).

Water usage was estimated from the landscape design as well as for building water use. Business as usual water usage, without water management strategies implemented, is estimated at 0.264 million gallons per day (mgd). GHG emissions were then estimated based on the embodied energy of water, using the emission factors from the California Climate Action Registry General Reporting Protocol (CCAP 2008). Approximately 0.034 mgd of recycled water would also be used on-site. As a conservative estimate, it was assumed the recycled water would have the same embodied energy as potable water.

**Transportation.** As discussed in Section 1.2, on-road vehicle emissions account for 46% of existing GHG emissions in San Diego County. Traffic estimates have been made based on anticipated development based on acres of developable area. Emissions from vehicles under "business as usual" conditions were calculated using the EMFAC2007 model. The EMFAC2007 model does not take into account any of the GHG reduction measures proposed by the state or federal government.

The results of the inventory for operational emissions for business as usual are presented in Table 5. These include GHG emissions associated with buildings (natural gas, purchased

electricity) and water consumption (energy embodied in potable water). Table 5 summarizes projected emissions using the methodologies noted above, under business as usual conditions.

**Table 5**
**SUMMARY OF ESTIMATED OPERATIONAL GREENHOUSE GAS EMISSIONS**
**BUSINESS AS USUAL SCENARIO**

| **Emission Source** | **Annual Emissions (Metric tons/year)** | | |
|---|---|---|---|
| | **$CO_2$** | **$CH_4$** | **$N_2O$** |
| **Operational Emissions** | | | |
| Electricity Use Emissions | 12,963 | 0.099 | 0.055 |
| Natural Gas Use Emissions | 1,539 | 0.017 | 0.003 |
| Water Usage | 469 | 0.0032 | 0.0020 |
| Vehicle Emissions | 20,660 | 1.71 | 3.70 |
| Amortized Construction Emissions | 79 | - | - |
| **Total** | 35,710 | 1.83 | 3.76 |
| Global Warming Potential Factor | **1** | **21** | **310** |
| $CO_2$ Equivalent Emissions | 35,710 | 38 | 1,166 |
| **TOTAL $CO_2$ Equivalent Emissions** | **36,914** | | |

# 5.0 SUMMARY OF PROJECT DESIGN FEATURES, IMPACTS, AND MITIGATION MEASURES

## 5.1 Construction Mitigation Measures and Greenhouse Gas Inventory

The Otay Crossings Commerce Park has agreed to implement mitigation measures to reduce construction emissions. According to the CAPCOA White Paper, emission reductions associated with these measures are not quantifiable; however, to estimate emission reductions associated with construction mitigation measures, it was assumed that construction emissions would be reduced by 5 percent through implementation of these measures. A summary of the mitigation measures proposed for the construction phase of the project is presented in Table 6.

**Table 6**
**Proposed Construction Mitigation Measures to Reduce GHG Emissions**

| Strategy to Reduce GHG Emissions | Construction Mitigation Measures | Emission Reduction | Basis for Emission Reduction |
|---|---|---|---|
| Tier 2 and 3 Equipment | Contractor will utilize ARB-Certified construction equipment (Tier 2 and 3) which will reduce emissions of NOx based on Tier 2 and 3 emission requirements. Reduction of NOx emissions will reduce emissions of $N_2O$. No information was available from ARB to indicate other reductions in GHG emissions from the use of Tier 2 and 3 certified equipment. | Unknown | CAPCOA White Paper, Appendix B |
| Recycling of Waste Materials | Contractor will recycle all waste construction materials. | Unknown | CAPCOA White Paper, Appendix B |

## 5.2 Operational Mitigation Measures and Greenhouse Gas Inventory

To avoid significant impacts, individual projects must demonstrate that they will reduce GHG emissions by 25% below businss as usual. As specific land uses and tenants are not currently known for the Otay Crossings Commerce Park, the purpose of this analysis is to demonstrate that reducing emissions of GHG by 25% is technically feasible. To this end, a list of measures is provided that will serve as a listing of potentially feasible mitigation measures that may be used to reduce emissions of GHGs below business as usual levels when site plans are submitted to the County for the specific land uses and tenants. Individual applicants will be required to demonstrate that, for their development, the applicant will implement appropriate mitigation measures that will reduce emissions of GHGs such that the development will comply with the requirements of AB 32.

Feasible mitigation measures, along with their anticipated emission reductions (where known), are listed in Table 7.

**Table 7**
**Feasible Project Design Features to Reduce GHG Emissions[1]**

| GHG Emission Reduction Measure | CAPCOA Appendix B Reference | Emission Reduction | Basis for Emission Reduction | Enforceable? | Map or Site Plan Level? |
|---|---|---|---|---|---|
| Nonresidential projects provide plentiful short- and long- term bicycle parking facilities to meet peak season maximum demand (e.g., one bike rack space per 20 vehicle/employee parking spaces). | **MM T-1** | **1-5%** | CAPCOA White Paper | Yes | Site Plan |
| Nonresidential projects provide "end-of-trip" facilities including showers, lockers, and changing space (e.g., four clothes lockers and one shower provided for every 80 employee parking spaces, separate facilities for each gender for projects with 160 or more employee parking spaces). | **MM T-2** | **1-5%** | CAPCOA White Paper | Yes | Site Plan |

## Table 7
## Feasible Project Design Features to Reduce GHG Emissions[1]

| GHG Emission Reduction Measure | CAPCOA Appendix B Reference | Emission Reduction | Basis for Emission Reduction | Enforceable? | Map or Site Plan Level? |
|---|---|---|---|---|---|
| Provide minimum amount of parking required. Once land uses are determined, the trip reduction factor associated with this measure can be determined by utilizing the ITE parking generation publication. The reduction in trips can be computed as shown below by the ratio of the difference of minimum parking required by code and ITE peak parking demand to ITE peak parking demand for the land uses multiplied by 50%. Percent Trip Reduction = 50 * [(min parking required by code – ITE peak parking demand)/(ITE peak parking demand)] | **MM T-10** | **1-30%** | CAPCOA White Paper | Yes | Site Plan |
| Provide a parking lot design that includes clearly marked and shaded pedestrian pathways between transit facilities and building entrances. | **MM T-12** | **1-4%** | CAPCOA White Paper | Yes | Site Plan |
| Provide parking lot areas with 50% tree cover within 10 years of construction, in particular low emitting, low maintenance, native drought resistant trees. Reduces urban heat island effect and requirement for air conditioning, effective when combined with other measures (e.g., electrical maintenance equipment and reflective paving material). | **MM T-14** | **Unknown** | CAPCOA White Paper | Yes | Site Plan |
| Have at least three of the following on site and/or offsite within one-quarter mile: Residential Development, Retail Development, Park, Open Space, or Office. | **MM D-10** | **3%** | CAPCOA White Paper | No | Map |
| Provide infrastructure/education that promotes the avoidance of products with excessive packaging, recycle, buying of refills, separating of food and yard waste for composting, and using rechargeable batteries. | **MM D-14** | **Unknown** | CAPCOA White Paper | Yes | Site Plan |
| LEED Certification: LEED promotes a wholebuilding approach to sustainability by recognizing performance in five key areas of human and environmental health: sustainable site development, water savings, energy efficiency, materials selection, and indoor environmental quality. | **MM D-15** | **Unknown** | CAPCOA White Paper | Yes | Site Plan |

## Table 7 (continued)
## Feasible Project Design Features to Reduce GHG Emissions

| GHG Emission Reduction Measure | CAPCOA Appendix B Reference | Emission Reduction | Basis for Emission Reduction | Enforceable? | Map or Site Plan Level? |
|---|---|---|---|---|---|
| Project shall use drought resistant native trees, trees with low emissions and high carbon sequestration potential. Evergreen trees on the north and west sides afford the best protection from the setting summer sun and cold winter winds. Additional considerations include the use of deciduous trees on the south side of the house that will admit summer sun; evergreen plantings on the north side will slow cold winter winds; constructing a natural planted channel to funnel summer cooling breezes into the house. Neighborhood CCR's not requiring that front and side yards of single family homes be planted with turf grass. Vegetable gardens, bunch grass, and low-water landscaping shall also be permitted, or even encouraged. | **MM D-17** | **Unknown** | CAPCOA White Paper | Yes | Site Plan |
| Project installs Energy Star labeled roof materials. | **MM E-4** | **0.5-1%** | CAPCOA White Paper | Yes | Site Plan |
| Project exceeds title 24 requirements. | **MM E-6** | **1%** | CAPCOA White Paper | Yes | Site Plan |
| Project orients 75% or more of homes and/or buildings to face either north or south (within 30° of N/S). 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. | **MM E-7** | **0.5%** | CAPCOA White Paper | No | Site Plan |
| Project provides light-colored paving (e.g., increased albedo pavement). | **MM E-12** | **Unknown** | CAPCOA White Paper | Yes | Site Plan |

**Table 7 (continued)**
**Feasible Project Design Features to Reduce GHG Emissions**

| GHG Emission Reduction Measure | CAPCOA Appendix B Reference | Emission Reduction | Basis for Emission Reduction | Enforceable? | Map or Site Plan Level? |
|---|---|---|---|---|---|
| Project provides cool roofs. Highly reflective, highly emissive roofing materials that stay 50-60°F cooler than a normal roof under a hot summer sun. CA's Cool Savings Program provided rebates to building owners for installing roofing materials with high solar reflectance and thermal emittance. The highest rebate went to roofs on air conditioned buildings, while buildings with rooftop ducts and other nonresidential buildings were eligible for slightly less. The program aimed to reduce peak summer electricity demand and was administered by the CEC. | **MM E-13** | **Unknown** | CAPCOA White Paper | Yes | Site Plan |
| Project provides solar water heaters. | **MM E-14** | **20-70% (cooling energy needs)** | CAPCOA White Paper | Yes | Site Plan |
| Project provides electrical outlets at building exterior areas. | **MM E-15** | **Unknown** | CAPCOA White Paper | Yes | Site Plan |
| Project uses energy efficient appliances (e.g., Energy Star). | **MM E-16** | **Unknown** | CAPCOA White Paper | No | Site Plan |
| Project uses materials which are resource efficient, recycled, with long life cycles and manufactured in an environmentally friendly way. | **MM E-17** | **Unknown** | CAPCOA White Paper | No | Site Plan |
| Install energy-reducing shading mechanisms for windows, porch, patio and walkway overhangs. | **MM E-18** | **Unknown** | CAPCOA White Paper | No | Site Plan |
| Install energy-reducing programmable thermostats that automatically adjust temperature settings. | **MM E-20** | **Unknown** | CAPCOA White Paper | Yes | Site Plan |
| Install energy-reducing passive heating and cooling systems (e.g., insulation and ventilation). | **MM E-21** | **Unknown** | CAPCOA White Paper | Yes | Site Plan |
| Install energy-reducing day lighting systems (e.g., skylights, light shelves and interior transom windows). | **MM E-22** | **Unknown** | CAPCOA White Paper | Yes | Site Plan |
| Optimized Lighting – Use premium T8 lamps for indoor lighting/optimized lighting design | **NA** | **Unknown** | Standard energy efficiency measure | Yes | Site Plan |
| Wall Insulation – Increase exterior wall insulation | **NA** | **Unknown** | Standard energy efficiency measure | Yes | Site Plan |

**Table 7 (continued)**
**Feasible Project Design Features to Reduce GHG Emissions**

| GHG Emission Reduction Measure | CAPCOA Appendix B Reference | Emission Reduction | Basis for Emission Reduction | Enforceable? | Map or Site Plan Level? |
|---|---|---|---|---|---|
| Roof Insulation – Increase roof insulation | **NA** | **Unknown** | Standard energy efficiency measure | Yes | Site Plan |
| Install low energy traffic signals & energy efficient (sodium) street lighting | **NA** | **Unknown** | Standard energy efficiency measure | Yes | Map |
| Buildings to be designed utilizing double-paned windows | **NA** | **Unknown** | Standard energy efficiency measure | Yes | Site Plan |
| Buildings to be designed utilizing door sweeps and weather stripping | **NA** | **Unknown** | Standard energy efficiency measure | Yes | Site Plan |
| Buildings to be designed utilizing electric light dimming controls where feasible | **NA** | **Unknown** | Standard energy efficiency measure | Yes | Site Plan |
| Buildings to be designed utilizing double-paned windows | **NA** | **Unknown** | Standard energy efficiency measure | Yes | Site Plan |
| Buildings to be designed to utilize high efficiency heating & cooling systems | **NA** | **Unknown** | Standard energy efficiency measure | Yes | Site Plan |
| Install water-saving irrigation systems | **NA** | **Unknown** | Standard energy efficiency measure | Yes | Map and Site Plan |
| Install drought resistant plants in lieu of turf where feasible and appropriate | **NA** | **Unknown** | Standard energy efficiency measure | Yes | Map and Site Plan |
| Use recycled water for irrigation where available | **NA** | **Unknown** | Standard energy efficiency measure | Yes | Map and Site Plan |

**Table 7 (continued)**
**Feasible Project Design Features to Reduce GHG Emissions**

| GHG Emission Reduction Measure | CAPCOA Appendix B Reference | Emission Reduction | Basis for Emission Reduction | Enforceable? | Map or Site Plan Level? |
|---|---|---|---|---|---|
| Use plug-ins for transport refrigeration units (TRUs) as opposed to diesel power | **NA** | **100% of emissions associated with TRUs** | Specific measure to reduce GHG emissions from distribution uses | Yes | Site Plan |

[1]Not all measures are applicable or required for every site plan. When site plans are developed, applicants will identify those measures that will be adopted to meet the requirements of AB 32 to reduce GHG emissions by 25% below business as usual levels.

The measures identified in Table 7 provide a basis for individual developments in the Otay Crossings Commerce Park to identify feasible mitigation measures that would reduce emissions of GHGs for operations. To estimate the effectiveness of implementing some of the mitigation measures, the following scenario was assumed:

- Project applicant will exceed Title 24 energy efficiency standards (as of 2005) by 15% (assumed reduction in electricity and natural gas emissions of 15%).
- Project will be built to meet LEED certification standards where applicable (assumed reduction in electricity and natural gas emissions of 5%).
- Project will include a mix of industrial, retail, and open space uses (assumed reduction in vehicular emissions of 3%).
- Project will install water-saving irrigation systems, use drought-resistant plants, and use recycled water where feasible (assumed reduction in water usage of 10%).

These measures provide an example of how a specific project would reduce emissions to comply with the provisions of AB 32. Each applicant will be required to develop enforceable site-specific measures to demonstrate that they will reduce GHG emissions by 25% below business as usual.

According to the CEC (CEC 2006), transportation accounts for approximately 41 percent of California's 2004 greenhouse gas emissions. Growth in California has resulted in vehicle miles traveled by California residents increasing three-fold during the period from 1975 to 2004. As shown in Table 5, the main source of operational greenhouse gas emissions associated with the Otay Crossings Commerce Park project would be vehicular emissions. As discussed above, the Governor of California has signed Executive Order S-01-07, calling for a reduction in carbon content in fuels in California, the goal of which is to carbon intensity in fuels by 10 percent by the year 2020. The U.S. Congress has recently adopted legislation to require Corporate Average Fuel Economy (CAFE) standards to reach 35 miles per gallon (mpg) by the year 2020; the default EMFAC2007 average miles per gallon for vehicles traveling at 45 miles per hour is 27 miles per gallon; other speeds are less efficient and miles per gallon decreases. Thus the new CAFE standards would lead to approximately 23 percent greater fuel efficiency, which would lower GHG emissions. The SDCGHGI assumed a 26% reduction in vehicle emissions due to implementation of the CAFE standards and the LCFS, not including reductions that would be realized through other programs such as the Pavley emission standards and vehicle hybridization.

In addition to the reduction in vehicular emissions associated with federal and state GHG reduction programs, Otay Crossings Commerce Park would provide plug-ins for transport refrigeration units (TRUs), which operate on diesel fuel. This measure would also reduce emissions of GHGs from trucks utilizing the development.

In addition to the measures identified in Table 7, indirect emissions from electricity use would be further reduced due to implementation of the renewable portfolio standard and replacement of the Boardman Contract, which would disallow purchases of electricity from coal-fired power plants. Based on the SDCGHGI, these measures would reduce GHG emissions from electricity use by 13 percent and 0.3 percent, respectively. While these measures would be implemented by San Diego Gas and Electric to reduce power plant emissions within San Diego County, they were not counted as part of the Project's emission reduction measures.

The results of the GHG inventory for emissions with implementation of GHG reduction measures are presented in Table 8. As shown in Table 8, project operational GHG emissions will

meet the DPLU's guideline to reduce operational emissions by more than 25%. The Project would therefore be consistent with the goals of AB 32 within San Diego County, and would not result in a significant impact on global climate.

**Table 8**
**SUMMARY OF ESTIMATED GREENHOUSE GAS EMISSIONS WITH GHG REDUCTION MEASURES**

| Emission Source | Annual Emissions (Metric tons/year) | | |
|---|---|---|---|
| | **$CO_2$** | **$CH_4$** | **$N_2O$** |
| **Emissions** | | | |
| Electricity Use Emissions | 10,370 | 0.079 | 0.044 |
| Natural Gas Use Emissions | 1,231 | 0.014 | 0.002 |
| Water Consumption Emissions | 421 | 0.0032 | 0.0018 |
| Vehicle Emissions | 14,669 | 1.21 | 2.63 |
| Amortized Construction Emissions | 75 | - | - |
| **Total** | 26,766 | 1.306 | 2.68 |
| Global Warming Potential Factor | **1** | **21** | **310** |
| $CO_2$ Equivalent Emissions | 26,766 | 27 | 831 |
| **TOTAL $CO_2$ Equivalent Emissions** | **27,624** | | |
| **Percent Reduction from Business As Usual** | **25%** | | |

Measures that are not quantifiable, as shown in Table 7, will also reduce emissions of GHG; emission reductions cannot be estimated at this time. Therefore it is anticipated that the Otay Crossings Commerce Park will, at a minimum, reduce emissions of GHG by 25% and thus will be consistent with the goals of AB 32.

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## 7.0 LIST OF PREPARERS, PERSONS AND ORGANIZATIONS CONTACTED

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# Appendix A

# Greenhouse Gas Emission Calculations

Table A-1
Operational Greenhouse Emissions Summary
Otay Crossings Commerce Park

**Business As Usual**

| Emission Source | $CO_2E$[f] (Metric Tons) |
|---|---|
| **Project** | |
| Mobile Sources[a] | 21,843 |
| Electricity[b] | 12,983 |
| Natural gas[c] | 1,544 |
| Water Usage[d] | 469 |
| Amortized Construction Emissions | 795 |
| **Total** | **37,633** |
| Total | 37633 |
| 2004 Statewide Total[e] | 364,000,000 |
| **Net Increase as Percentage of 2004 Statewide Inventory** | **0.01034%** |

[a] *Mobile source values were derived using EMFAC2007 in addition to the California Climate Action Registry General Reporting Protocol; Version 3.0, 2008.*

[b] *Electricity Usage Rates from Table A9-11-A, CEQA Air Quality Handbook, SCAQMD, 1993.*

[c] *Natural Gas Usage Rates from Table A9-12-A, CEQA Air Quality Handbook, SCAQMD, 1993.*

[d] *Water Usage Rates based on project information.*

[e] *Statewide totals from California Energy Commission, CEC-600-2006-013.*

[f] *All CO2E factors were derived using the California Climate Action Registry General Reporting Protocol; Version 3.0, 2008*

**With GHG Reduction Measures**

| Emission Source | $CO_2E$[f] (Metric Tons) |
|---|---|
| **Project** | |
| Mobile Sources[a] | 15,510 |
| Electricity[b] | 10,386 |
| Natural gas[c] | 1,235 |
| Water Usage[d] | 422 |
| Amortized Construction Emissions | 755 |
| **Total** | **28,308** |
| Total | 28308 |
| 2004 Statewide Total[e] | 364,000,000 |
| **Net Increase as Percentage of 2004 Statewide Inventory** | **0.00778%** |

[a] *Mobile source values were derived using EMFAC2007 in addition to the California Climate Action Registry General Reporting Protocol; Version 3.0, 2008.*

[b] *Electricity Usage Rates from Table A9-11-A, CEQA Air Quality Handbook, SCAQMD, 1993.*

[c] *Natural Gas Usage Rates from Table A9-12-A, CEQA Air Quality Handbook, SCAQMD, 1993.*

[d] *Water Usage Rates based on project information.*

[e] *Statewide totals from California Energy Commission, CEC-600-2006-013.*

[f] *All CO2E factors were derived using the California Climate Action Registry General Reporting Protocol; Version 3.0, 2008*

Table A-2
Electricity Greenhouse Gas Emissions
Business As Usual
Otay Crossings Commerce Park

## Electricity

| Land Use | 1,000 Sqft | Usage Rate [a] (kWh\sq.ft\yr) | (KWh\year) | MWh\year |
|---|---|---|---|---|
| **Project** | | | | |
| Distribution Centers | 2000.0 | 12.95 | 25,900,000 | 25900.00 |
| Retail | 250.0 | 13.55 | 3,387,500 | 3387.50 |
| Industrial | 250.0 | 12.95 | 3,237,500 | 3237.50 |
| **Total Project** | | | **32,525,000** | **32525.00** |

[a] Electricity Usage Rates from Table A9-11-A, CEQA Air Quality Handbook, SCAQMD, 1993.

| GHG | lbs/MWh[b] | lbs | metric tons | $CO_2E$ |
|---|---|---|---|---|
| **Project** | | | | |
| **$CO_2$** | 878.71 | 28580042.75 | 12963.67875 | 12963.67875 |
| **$CH_4$** | 0.0067 | 217.9175 | 0.098845635 | 2.075758328 |
| **$N_2O$** | 0.0037 | 120.3425 | 0.054586395 | 16.92178253 |
| | | | | **12982.68** |

[b] Emission factors for $CO_2$, $CH_4$, and $N_2O$ were derived from the California Climate Action Registry General Reporting Protocol; Version 3.0, April 2008

Table A-3
Natural Gas Greenhouse Gas Emissions
Business As Usual
Otay Crossings Commerce Park

## Natural Gas

| Land Use | 1,000 Sqft | Usage Rate[c] (cu.ft\sq.ft\mo) | Total Natural Gas Usage (cu.ft\mo) | Total Natural Gas Usage (cu.ft\year) | Total Natural Gas Usage (MMBTU\year) |
|---|---|---|---|---|---|
| **Project** | | | | | |
| Distribution Center | 2000.0 | 2.0 | 4,000,000 | 48,000,000 | 48,960 |
| Retail | 250.0 | 2.9 | 725,000 | 8,700,000 | 8,874 |
| Industrial | 250.0 | 2.0 | 500,000 | 6,000,000 | 6,120 |
| **Total Project** | | | 5,225,000 | **62,700,000** | **63,954** |

[a] Natural Gas Usage Rates from Table A9-12-A, CEQA Air Quality Handbook, SCAQMD, 1993.

| GHG | Kg/MMBtu[b] | Kg | metric tons | $CO_2E$ (Metric Tons) |
|---|---|---|---|---|
| **Project** | | | | |
| **$CO_2$** | 53.06 | 3,393,399.24 | 1,539.22 | 1,539.22 |
| **$CH_4$** | 0.0059 | 377.33 | 0.17 | 3.59 |
| **$N_2O$** | 0.0001 | 6.40 | 0.0029 | 0.90 |
| | | | | **1543.71** |

[b] Emission factors for $CO_2$, $CH_4$, and $N_2O$ were derived from the California Climate Action Registry General Reporting Protocol; Version 3.0, April 2008

Table A-4
Water Use Greenhouse Gas Emissions
Business As Usual
Otay Crossings Commerce Park

## Water - Business As Usual

| Land Use | GPD | Usage Rate (kWh\million gal) | (KWh\year) | MWh\year |
|---|---|---|---|---|
| **Project** | 298000 | 10800 | 1,174,716 | 1174.72 |
| **Total Project** | | | **1,174,716** | **1174.72** |

[a] Electricity Usage Rates from Table A9-11-A, CEQA Air Quality Handbook, SCAQMD, 1993.

| GHG | lbs/MWh[b] | lbs | metric tons | $CO_2E$ |
|---|---|---|---|---|
| **Project** | | | | |
| **$CO_2$** | 878.71 | 1032234.696 | 468.2134004 | 468.2134004 |
| **$CH_4$** | 0.0067 | 7.8705972 | 0.00357004 | 0.074970838 |
| **$N_2O$** | 0.0037 | 4.3464492 | 0.001971515 | 0.611169522 |
| | | | | **468.90** |

[b] Emission factors for $CO_2$, $CH_4$, and $N_2O$ were derived from the California Climate Action Registry General Reporting Protocol; Version 3.0, April 2008

Table A-5
Electricity Greenhouse Gas Emissions
with GHG Reduction Measures
Otay Crossings Commerce Park

## Electricity

| Land Use | 1,000 Sqft | Usage Rate [a] (kWh\sq.ft\yr) | (KWh\year) | MWh\year |
|---|---|---|---|---|
| **Project** | | | | |
| Distribution Centers | 2000.0 | 10.36 | 20,720,000 | 20720.00 |
| Retail | 250.0 | 10.84 | 2,710,000 | 2710.00 |
| Industrial | 250.0 | 10.36 | 2,590,000 | 2590.00 |
| **Total Project** | | | **26,020,000** | **26020.00** |

[a] Electricity Usage Rates from Table A9-11-A, CEQA Air Quality Handbook, SCAQMD, 1993.

| GHG | lbs/MWh[b] | lbs | metric tons | $CO_2E$ |
|---|---|---|---|---|
| **Project** | | | | |
| **$CO_2$** | 878.71 | 22864034.2 | 10370.943 | 10370.943 |
| **$CH_4$** | 0.0067 | 174.334 | 0.079076508 | 1.660606662 |
| **$N_2O$** | 0.0037 | 96.274 | 0.043669116 | 13.53742602 |
| | | | | **10386.14** |

[b] Emission factors for $CO_2$, $CH_4$, and $N_2O$ were derived from the California Climate Action Registry General Reporting Protocol; Version 3.0, April 2008

Table A-6
Natural Gas Greenhouse Gas Emissions
with GHG Reduction Measures
Otay Crossings Commerce Park

## Natural Gas

| Land Use | 1,000 Sqft | Usage Rate[c] (cu.ft\sq.ft\mo) | Total Natural Gas Usage (cu.ft\mo) | Total Natural Gas Usage (cu.ft\year) | Total Natural Gas Usage (MMBTU\year) |
|---|---|---|---|---|---|
| **Project** | | | | | |
| Distribution Center | 2000.0 | 1.6 | 3,200,000 | 38,400,000 | 39,168 |
| Retail | 250.0 | 2.3 | 580,000 | 6,960,000 | 7,099 |
| Industrial | 250.0 | 1.6 | 400,000 | 4,800,000 | 4,896 |
| **Total Project** | | | 4,180,000 | **50,160,000** | **51,163** |

[a] Natural Gas Usage Rates from Table A9-12-A, CEQA Air Quality Handbook, SCAQMD, 1993.

| GHG | Kg/MMBtu[b] | Kg | metric tons | $CO_2E$ (Metric Tons) |
|---|---|---|---|---|
| **Project** | | | | |
| **$CO_2$** | 53.06 | 2,714,719.39 | 1,231.37 | 1,231.37 |
| **$CH_4$** | 0.0059 | 301.86 | 0.14 | 2.88 |
| **$N_2O$** | 0.0001 | 5.12 | 0.0023 | 0.72 |
| | | | | **1234.97** |

[b] Emission factors for $CO_2$, $CH_4$, and $N_2O$ were derived from the California Climate Action Registry General Reporting Protocol; Version 3.0, April 2008

Table A7
Water Use Greenhouse Gas Emissions
with GHG Reduction Measures
Otay Crossings Commerce Park

## Water - Business As Usual

| Land Use | GPD | Usage Rate (kWh\million gal) | (KWh\year) | MWh\year |
|---|---|---|---|---|
| **Project** | 298000 | 9720 | 1,057,244 | 1057.24 |
| **Total Project** | | | **1,057,244** | **1057.24** |

[a] Electricity Usage Rates from Table A9-11-A, CEQA Air Quality Handbook, SCAQMD, 1993.

| GHG | lbs/MWh[b] | lbs | metric tons | $CO_2E$ |
|---|---|---|---|---|
| **Project** | | | | |
| **$CO_2$** | 878.71 | 929011.2267 | 421.3920604 | 421.3920604 |
| **$CH_4$** | 0.0067 | 7.08353748 | 0.003213036 | 0.067473755 |
| **$N_2O$** | 0.0037 | 3.91180428 | 0.001774363 | 0.550052569 |
| | | | | **422.01** |

[b] Emission factors for $CO_2$, $CH_4$, and $N_2O$ were derived from the California Climate Action Registry General Reporting Protocol; Version 3.0, April 2008

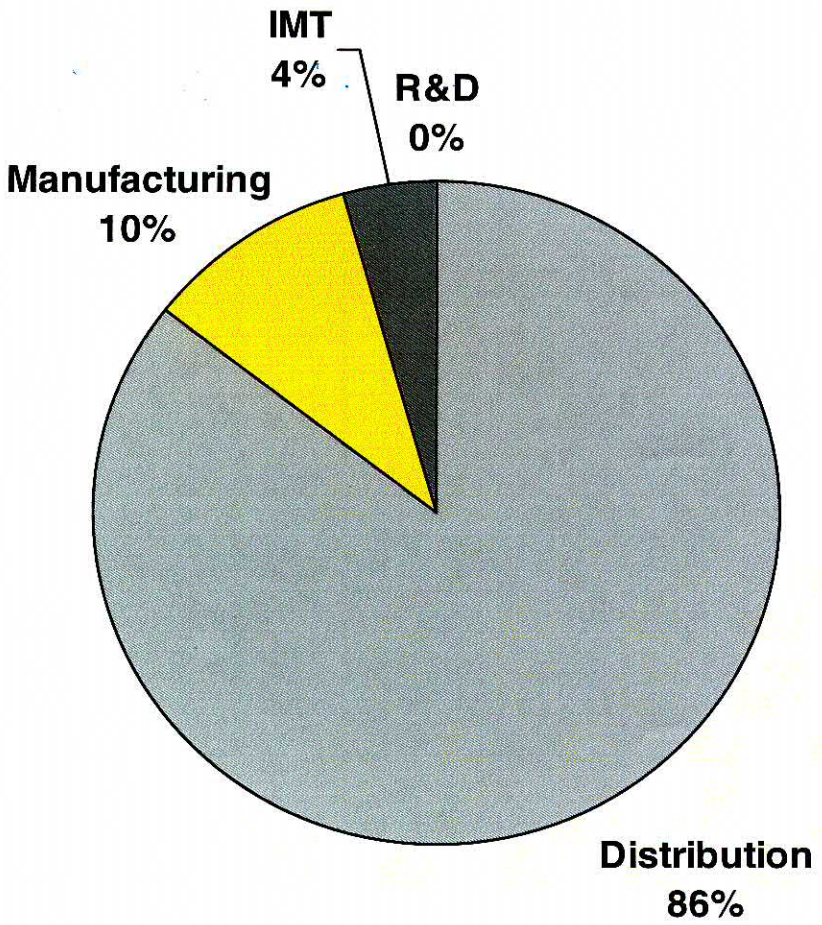
# Appendix B

# Otay Mesa Industrial Market Study

# Inventory Breakdown

GRUBB & ELLIS
From Insight to Results

## *Otay Mesa Industrial*



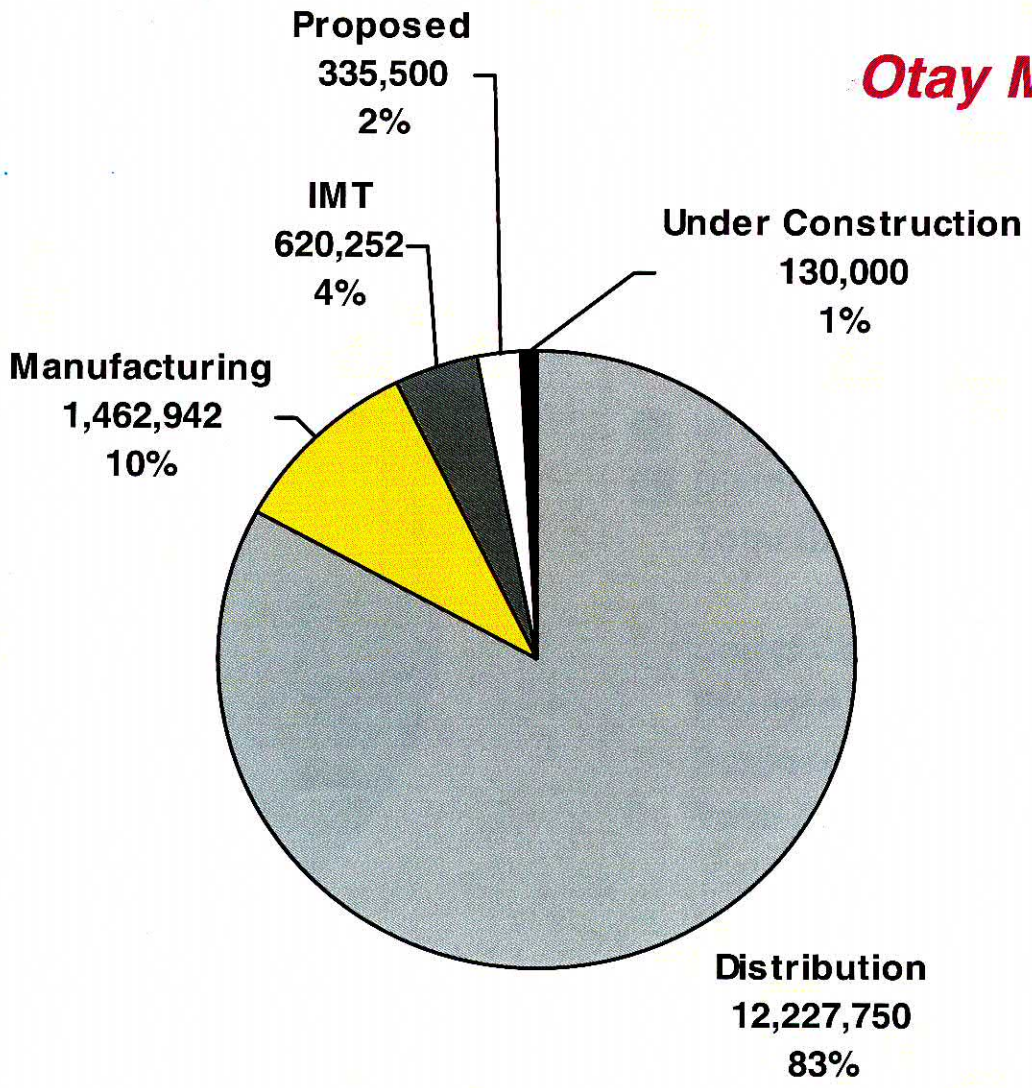

| | |
|---|---|
| R&D | 0 |
| Manufacturing | 1,462,942 |
| IMT | 620,252 |
| Distribution | 12,227,750 |
| Total Existing Inventory | 14,310,944 |
| | |
| Under Construction | 130,000 |
| Planned | 0 |
| Proposed | 335,500 |
| Total Future Inventory | 465,500 |

2Q 2009

# Inventory Breakdown

GRUBB & ELLIS
From Insight to Results

## Otay Mesa Industrial




2Q 2009

# Appendix A

# Greenhouse Gas Emission Calculations

Table A-1
Operational Greenhouse Emissions Summary
Otay Crossings Commerce Park

**Business As Usual**

| Emission Source | $CO_2E$[f] (Metric Tons) |
|---|---|
| **Project** | |
| Mobile Sources[a] | 21,843 |
| Electricity[b] | 12,983 |
| Natural gas[c] | 1,544 |
| Water Usage[d] | 469 |
| Amortized Construction Emissions | 795 |
| **Total** | **37,633** |
| Total | 37633 |
| 2004 Statewide Total[e] | 364,000,000 |
| **Net Increase as Percentage of 2004 Statewide Inventory** | **0.01034%** |

[a] *Mobile source values were derived using EMFAC2007 in addition to the California Climate Action Registry General Reporting Protocol; Version 3.0, 2008.*

[b] *Electricity Usage Rates from Table A9-11-A, CEQA Air Quality Handbook, SCAQMD, 1993.*

[c] *Natural Gas Usage Rates from Table A9-12-A, CEQA Air Quality Handbook, SCAQMD, 1993.*

[d] *Water Usage Rates based on project information.*

[e] *Statewide totals from California Energy Commission, CEC-600-2006-013.*

[f] *All CO2E factors were derived using the California Climate Action Registry General Reporting Protocol; Version 3.0, 2008*

**With GHG Reduction Measures**

| Emission Source | $CO_2E$[f] (Metric Tons) |
|---|---|
| **Project** | |
| Mobile Sources[a] | 15,510 |
| Electricity[b] | 10,386 |
| Natural gas[c] | 1,235 |
| Water Usage[d] | 422 |
| Amortized Construction Emissions | 755 |
| **Total** | **28,308** |
| Total | 28308 |
| 2004 Statewide Total[e] | 364,000,000 |
| **Net Increase as Percentage of 2004 Statewide Inventory** | **0.00778%** |

[a] *Mobile source values were derived using EMFAC2007 in addition to the California Climate Action Registry General Reporting Protocol; Version 3.0, 2008.*

[b] *Electricity Usage Rates from Table A9-11-A, CEQA Air Quality Handbook, SCAQMD, 1993.*

[c] *Natural Gas Usage Rates from Table A9-12-A, CEQA Air Quality Handbook, SCAQMD, 1993.*

[d] *Water Usage Rates based on project information.*

[e] *Statewide totals from California Energy Commission, CEC-600-2006-013.*

[f] *All CO2E factors were derived using the California Climate Action Registry General Reporting Protocol; Version 3.0, 2008*

Table A-2
Electricity Greenhouse Gas Emissions
Business As Usual
Otay Crossings Commerce Park

## Electricity

| Land Use | 1,000 Sqft | Usage Rate [a] (kWh\sq.ft\yr) | (KWh\year) | MWh\year |
|---|---|---|---|---|
| **Project** | | | | |
| Distribution Centers | 2000.0 | 12.95 | 25,900,000 | 25900.00 |
| Retail | 250.0 | 13.55 | 3,387,500 | 3387.50 |
| Industrial | 250.0 | 12.95 | 3,237,500 | 3237.50 |
| **Total Project** | | | **32,525,000** | **32525.00** |

[a] Electricity Usage Rates from Table A9-11-A, CEQA Air Quality Handbook, SCAQMD, 1993.

| GHG | lbs/MWh[b] | lbs | metric tons | $CO_2E$ |
|---|---|---|---|---|
| **Project** | | | | |
| $CO_2$ | 878.71 | 28580042.75 | 12963.67875 | 12963.67875 |
| $CH_4$ | 0.0067 | 217.9175 | 0.098845635 | 2.075758328 |
| $N_2O$ | 0.0037 | 120.3425 | 0.054586395 | 16.92178253 |
| | | | | **12982.68** |

[b] Emission factors for $CO_2$, $CH_4$, and $N_2O$ were derived from the California Climate Action Registry General Reporting Protocol; Version 3.0, April 2008

Table A-3
Natural Gas Greenhouse Gas Emissions
Business As Usual
Otay Crossings Commerce Park

## Natural Gas

| Land Use | 1,000 Sqft | Usage Rate[c] (cu.ft\sq.ft\mo) | Total Natural Gas Usage (cu.ft\mo) | Total Natural Gas Usage (cu.ft\year) | Total Natural Gas Usage (MMBTU\year) |
|---|---|---|---|---|---|
| **Project** | | | | | |
| Distribution Center | 2000.0 | 2.0 | 4,000,000 | 48,000,000 | 48,960 |
| Retail | 250.0 | 2.9 | 725,000 | 8,700,000 | 8,874 |
| Industrial | 250.0 | 2.0 | 500,000 | 6,000,000 | 6,120 |
| **Total Project** | | | 5,225,000 | **62,700,000** | **63,954** |

[a] Natural Gas Usage Rates from Table A9-12-A, CEQA Air Quality Handbook, SCAQMD, 1993.

| GHG | Kg/MMBtu[b] | Kg | metric tons | $CO_2E$ (Metric Tons) |
|---|---|---|---|---|
| **Project** | | | | |
| **$CO_2$** | 53.06 | 3,393,399.24 | 1,539.22 | 1,539.22 |
| **$CH_4$** | 0.0059 | 377.33 | 0.17 | 3.59 |
| **$N_2O$** | 0.0001 | 6.40 | 0.0029 | 0.90 |
| | | | | **1543.71** |

[b] Emission factors for $CO_2$, $CH_4$, and $N_2O$ were derived from the California Climate Action Registry General Reporting Protocol; Version 3.0, April 2008

Table A-4
Water Use Greenhouse Gas Emissions
Business As Usual
Otay Crossings Commerce Park

## Water - Business As Usual

| Land Use | GPD | Usage Rate (kWh\million gal) | (KWh\year) | MWh\year |
|---|---|---|---|---|
| **Project** | 298000 | 10800 | 1,174,716 | 1174.72 |
| **Total Project** | | | **1,174,716** | **1174.72** |

[a] Electricity Usage Rates from Table A9-11-A, CEQA Air Quality Handbook, SCAQMD, 1993.

| GHG | lbs/MWh[b] | lbs | metric tons | $CO_2E$ |
|---|---|---|---|---|
| **Project** | | | | |
| **$CO_2$** | 878.71 | 1032234.696 | 468.2134004 | 468.2134004 |
| **$CH_4$** | 0.0067 | 7.8705972 | 0.00357004 | 0.074970838 |
| **$N_2O$** | 0.0037 | 4.3464492 | 0.001971515 | 0.611169522 |
| | | | | **468.90** |

[b] Emission factors for $CO_2$, $CH_4$, and $N_2O$ were derived from the California Climate Action Registry General Reporting Protocol; Version 3.0, April 2008

Table A-5
Electricity Greenhouse Gas Emissions
with GHG Reduction Measures
Otay Crossings Commerce Park

## Electricity

| Land Use | 1,000 Sqft | Usage Rate [a] (kWh\sq.ft\yr) | (KWh\year) | MWh\year |
|---|---|---|---|---|
| **Project** | | | | |
| Distribution Centers | 2000.0 | 10.36 | 20,720,000 | 20720.00 |
| Retail | 250.0 | 10.84 | 2,710,000 | 2710.00 |
| Industrial | 250.0 | 10.36 | 2,590,000 | 2590.00 |
| **Total Project** | | | **26,020,000** | **26020.00** |

[a] Electricity Usage Rates from Table A9-11-A, CEQA Air Quality Handbook, SCAQMD, 1993.

| GHG | lbs/MWh[b] | lbs | metric tons | $CO_2E$ |
|---|---|---|---|---|
| **Project** | | | | |
| $CO_2$ | 878.71 | 22864034.2 | 10370.943 | 10370.943 |
| $CH_4$ | 0.0067 | 174.334 | 0.079076508 | 1.660606662 |
| $N_2O$ | 0.0037 | 96.274 | 0.043669116 | 13.53742602 |
| | | | | **10386.14** |

[b] Emission factors for $CO_2$, $CH_4$, and $N_2O$ were derived from the California Climate Action Registry General Reporting Protocol; Version 3.0, April 2008

Table A-6
Natural Gas Greenhouse Gas Emissions
with GHG Reduction Measures
Otay Crossings Commerce Park

## Natural Gas

| Land Use | 1,000 Sqft | Usage Rate[c] (cu.ft\sq.ft\mo) | Total Natural Gas Usage (cu.ft\mo) | Total Natural Gas Usage (cu.ft\year) | Total Natural Gas Usage (MMBTU\year) |
|---|---|---|---|---|---|
| **Project** | | | | | |
| Distribution Center | 2000.0 | 1.6 | 3,200,000 | 38,400,000 | 39,168 |
| Retail | 250.0 | 2.3 | 580,000 | 6,960,000 | 7,099 |
| Industrial | 250.0 | 1.6 | 400,000 | 4,800,000 | 4,896 |
| **Total Project** | | | 4,180,000 | **50,160,000** | **51,163** |

[a] Natural Gas Usage Rates from Table A9-12-A, CEQA Air Quality Handbook, SCAQMD, 1993.

| GHG | Kg/MMBtu[b] | Kg | metric tons | $CO_2E$ (Metric Tons) |
|---|---|---|---|---|
| **Project** | | | | |
| **$CO_2$** | 53.06 | 2,714,719.39 | 1,231.37 | 1,231.37 |
| **$CH_4$** | 0.0059 | 301.86 | 0.14 | 2.88 |
| **$N_2O$** | 0.0001 | 5.12 | 0.0023 | 0.72 |
| | | | | **1234.97** |

[b] Emission factors for $CO_2$, $CH_4$, and $N_2O$ were derived from the California Climate Action Registry General Reporting Protocol; Version 3.0, April 2008

Table A7
Water Use Greenhouse Gas Emissions
with GHG Reduction Measures
Otay Crossings Commerce Park

## Water - Business As Usual

| Land Use | GPD | Usage Rate (kWh\million gal) | (KWh\year) | MWh\year |
|---|---|---|---|---|
| **Project** | 298000 | 9720 | 1,057,244 | 1057.24 |
| **Total Project** | | | **1,057,244** | **1057.24** |

[a] Electricity Usage Rates from Table A9-11-A, CEQA Air Quality Handbook, SCAQMD, 1993.

| GHG | lbs/MWh[b] | lbs | metric tons | $CO_2E$ |
|---|---|---|---|---|
| **Project** | | | | |
| **$CO_2$** | 878.71 | 929011.2267 | 421.3920604 | 421.3920604 |
| **$CH_4$** | 0.0067 | 7.08353748 | 0.003213036 | 0.067473755 |
| **$N_2O$** | 0.0037 | 3.91180428 | 0.001774363 | 0.550052569 |
| | | | | **422.01** |

[b] Emission factors for $CO_2$, $CH_4$, and $N_2O$ were derived from the California Climate Action Registry General Reporting Protocol; Version 3.0, April 2008

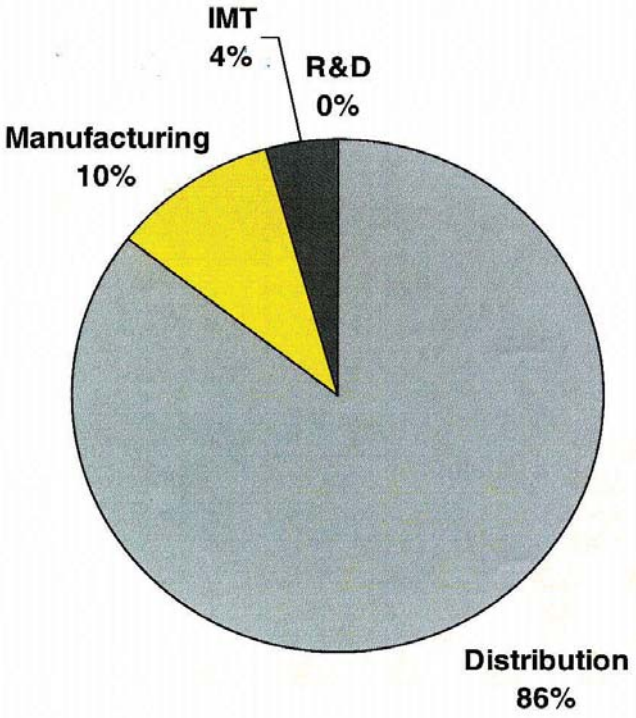
# Appendix B

# Otay Mesa Industrial Market Study

# Inventory Breakdown

GRUBB & ELLIS
From Insight to Results

## *Otay Mesa Industrial*



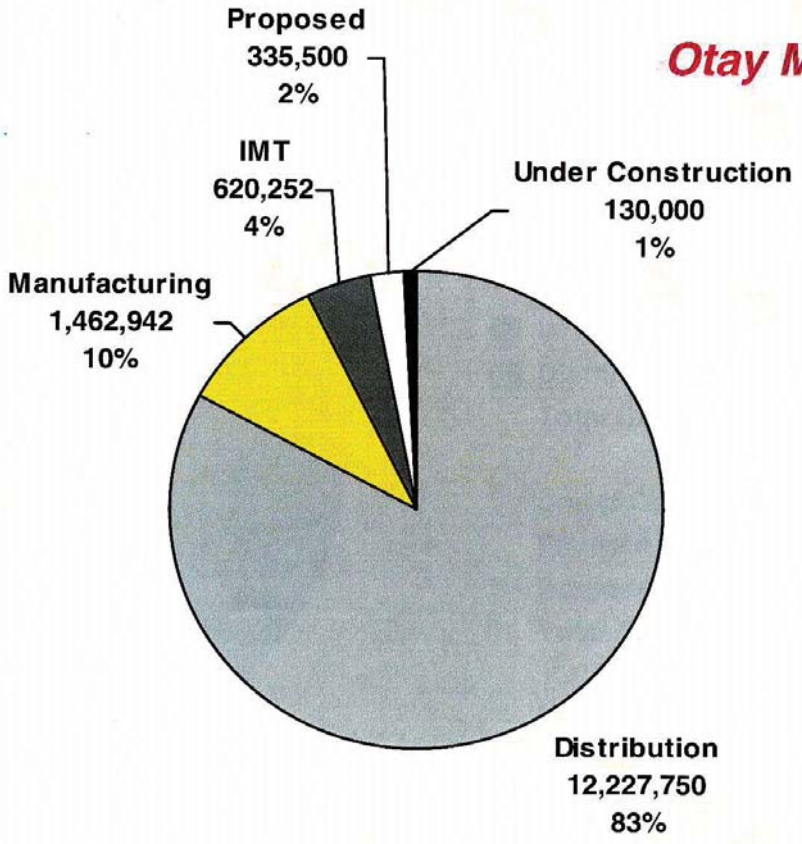

| | |
|---|---|
| R&D | 0 |
| Manufacturing | 1,462,942 |
| IMT | 620,252 |
| Distribution | 12,227,750 |
| Total Existing Inventory | 14,310,944 |
| | |
| Under Construction | 130,000 |
| Planned | 0 |
| Proposed | 335,500 |
| Total Future Inventory | 465,500 |

2Q 2009

# Inventory Breakdown

GRUBB & ELLIS
From Insight to Results

## Otay Mesa Industrial




2Q 2009