

4.8 Greenhouse Gas Emissions

This section presents an overview of information related to greenhouse gas (GHG) emissions, including a description of global climate change, regional GHG trends, the associated regulatory context, and Project impact assessment. Development of this section was based on a review of existing documentation of GHG emissions in the region, regulations from the United States Environmental Protection Agency (U.S. EPA), the California Air Resources Board (CARB), the Bay Area Air Quality Management District (BAAQMD), Project-specific information, and the analysis in the Ashworth Leininger Group (ALG) *Air Quality Technical Analysis – Revised Reclamation Plan Amendment* (ALG, 2011).

4.8.1 Setting

4.8.1.1 Environmental Setting

Gases that trap heat in the atmosphere are called GHGs. The major concern with GHGs is that increases in their concentrations are causing global climate change, a change in the average weather on Earth that can be measured by wind patterns, storms, precipitation, and temperature. Although there is disagreement as to the rate of global climate change and the extent of the impacts attributable to human activities, most in the scientific community agree that there is a direct link between increased emissions of GHGs and long-term global temperature increases. There are several gases that act as GHGs; their common attribute is that they allow sunlight to enter the atmosphere, but trap a portion of the outward-bound infrared radiation, which warms the air. The process is similar to the effect greenhouses have in raising the air temperature inside the greenhouse, hence the name GHGs. Both natural processes and human activities emit GHGs. The presence of GHGs in the atmosphere regulates the Earth's temperature; however, emissions from human activities such as fossil fuel-based electricity production and the use of motor vehicles have elevated the concentration of GHGs in the atmosphere. It generally is believed that this accumulation of GHGs is contributing to global climate change.

The principal GHGs are carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), sulfur hexafluoride (SF₆), perfluorocarbons (PFCs), and hydrofluorocarbons (HFCs). Because these different GHGs have different warming potential (the amount of heat trapped by a certain mass of a GHG), and CO₂ is the most commonly referenced gas for climate change, GHG emissions often are quantified and reported as CO₂ equivalents (CO₂e). For example, SF₆ commonly is used in the utility industry as an insulating gas in circuit breakers and other electronic equipment. SF₆, while comprising a small fraction of the total GHGs emitted annually worldwide, is a very potent GHG with 23,900 times the global warming potential of CO₂. Therefore, an emission of 1 metric ton of SF₆ could be reported as an emission of 23,900 metric tons (MT) of CO₂e. Large emission sources are reported in million metric tons¹ of CO₂e.

¹ A metric ton is 1,000 kilograms; it is equal to approximately 1.1 U.S. tons and approximately 2,204.6 pounds.

Some of the potential effects of global warming in California may include loss in snow pack, sea level rise, more extreme heat days per year, more high ozone days, more large forest fires, and more drought years (CARB, 2008). Globally, climate change has the potential to impact numerous environmental resources through potential, though uncertain, impacts related to future air temperatures and precipitation patterns. The projected effects of global warming on weather and climate are likely to vary regionally, but are expected to include the following direct effects (IPCC, 2007):

- Higher maximum temperatures and more hot days over nearly all land areas;
- Higher minimum temperatures, fewer cold days and frost days over nearly all land areas;
- Reduced diurnal temperature range over most land areas;
- Increase of heat index over land areas; and
- More intense precipitation events.

Also, there are many secondary effects that are projected to result from global warming, including global rise in sea level, impacts to agriculture, changes in disease vectors, and changes in habitat and biodiversity. While the possible outcomes and the feedback mechanisms involved are not fully understood and much research remains to be done, the potential for substantial environmental, social, and economic consequences over the long term may be great.

The California Air Resources Board (CARB) estimated that in 2008, California produced 478 million gross MT of CO₂e emissions. CARB found that transportation was the source of 37 percent of the state's GHG emissions; followed by electricity generation at 24 percent, and industrial sources at 19 percent (CARB, 2010).

In the San Francisco Bay Area, GHG emissions from the transportation sector and industrial/commercial sector represent the largest sources of the Bay Area's GHG emissions, each accounting for 36.4 percent of the Bay Area's 95.8 million tons of CO₂e in 2007. Electricity/co-generation sources account for about 15.9 percent of the Bay Area's GHG emissions, followed by residential fuel usage at about 7.1 percent. Off-road equipment and agricultural/farming sources currently account for approximately 3 percent and 1.2 percent of the total Bay Area GHG emissions, respectively (BAAQMD, 2010a).

4.8.1.2 Regulatory Setting

Federal Regulations

The federal Clean Air Act (CAA) requires the USEPA to define national standards to protect U.S. public health and welfare. The federal CAA does not specifically regulate GHG emissions; however, GHGs are pollutants that can be regulated under the federal CAA. There are currently no federal regulations that set ambient air quality standards for GHGs.

On September 22, 2009, U.S. EPA released its final Greenhouse Gas Reporting Rule (Reporting Rule). The Reporting Rule is a response to the fiscal year (FY) 2008 Consolidated Appropriations Act (H.R. 2764; Public Law 110-161), that required U.S. EPA to develop "... mandatory

reporting of GHGs above appropriate thresholds in all sectors of the economy....” The Reporting Rule will apply to most entities that emit 25,000 MT of CO₂e or more per year. Starting in 2010, facility owners are required to submit an annual GHG emissions report with detailed calculations of facility GHG emissions. The Reporting Rule also mandates recordkeeping and administrative requirements in order for U.S. EPA to verify annual GHG emissions reports. The EPA Reporting Rule is not applicable to the Permanente Quarry but is applicable to the Cement Plant, which is not part of this Project.

State Regulations

Executive Order S-3-05

In 2005, in recognition of California’s vulnerability to the effects of climate change, Governor Schwarzenegger established Executive Order S-3-05, which set forth a series of target dates by which statewide emissions of GHGs would be progressively reduced, as follows:

- By 2010, reduce GHG emissions to 2000 levels;
- By 2020, reduce GHG emissions to 1990 levels; and
- By 2050, reduce GHG emissions to 80 percent below 1990 levels.

Assembly Bill 32 – California Global Warming Solutions Act

California Assembly Bill (AB) 32, the Global Warming Solutions Act of 2006, requires CARB to establish a statewide GHG emissions cap for 2020 based on 1990 emission levels. AB 32 required CARB to adopt regulations by January 1, 2008 that identify and require selected sectors or categories of emitters of GHGs to report and verify their statewide GHG emissions, and CARB is authorized to enforce compliance with the program. Under AB 32, CARB also was required to adopt, by January 1, 2008, a statewide GHG emissions limit equivalent to the statewide GHG emissions levels in 1990, which must be achieved by 2020. CARB established this limit in December 2007 at 427 million MT of CO₂e. This is approximately 30 percent below forecasted “business-as-usual” emissions of 596 million MT of CO₂e in 2020, and about 10 percent below average annual GHG emissions during the period of 2002 through 2004 (CARB, 2008).

By January 1, 2011, CARB was required to adopt rules and regulations (to be implemented by January 1, 2012), to achieve the maximum technologically feasible and cost-effective GHG emission reductions. AB 32 permits the use of market-based compliance mechanisms to achieve those reductions. AB 32 also requires CARB to monitor compliance with and enforce any rule, regulation, order, emission limitation, emissions reduction measure, or market-based compliance mechanism that it adopts.

In June 2007, CARB directed staff to pursue 37 early strategies for reducing GHG emissions under AB 32. The broad spectrum of strategies that were developed, including a Low Carbon Fuel Standard, regulations for refrigerants with high global warming potentials, guidance and protocols for local governments to facilitate GHG reductions, and green ports, reflects that the serious threat of climate change requires action as soon as possible.

In addition to approving the 37 GHG reduction strategies, CARB directed staff to further evaluate early action recommendations made at its June 2007 meeting, and to report back to CARB within 6 months. The general sentiment of CARB suggested a desire to try to pursue greater GHG emissions reductions in California in the near-term. Since the June 2007 CARB hearing, CARB staff has evaluated all 48 recommendations submitted by stakeholders and several internally generated staff ideas and published the *Expanded List of Early Action Measures To Reduce Greenhouse Gas Emissions In California Recommended For Board Consideration* in September 2007 (CARB, 2007). CARB adopted nine Early Action Measures for implementation, including Ship Electrification at Ports, Reduction of High Global-Warming-Potential Gases in Consumer Products, Heavy-Duty Vehicle Greenhouse Gas Emission Reduction (Aerodynamic Efficiency), Reduction of Perfluorocarbons from Semiconductor Manufacturing, Improved Landfill Gas Capture, Reduction of Hydrofluorocarbon-134a from Do-It-Yourself Motor Vehicle Servicing, Sulfur Hexafluoride Reductions from the Non-Electric Sector, a Tire Inflation Program, and a Low Carbon Fuel Standard.

Climate Change Scoping Plan

In December 2008, CARB approved the AB 32 Scoping Plan outlining the state's strategy to achieve the 2020 GHG emissions limit (CARB, 2008). This Scoping Plan, developed by CARB in coordination with the Climate Action Team (CAT), proposes a comprehensive set of actions designed to reduce overall GHG emissions in California, improve the environment, reduce dependence on oil, diversify California's energy sources, save energy, create new jobs, and enhance public health. The measures in the Scoping Plan will continue to be developed over the next year and are scheduled to be in place by 2012. The Scoping Plan expands the list of the nine Early Action Measures into a list of 39 Recommended Actions contained in Appendices C and E of the Scoping Plan. These measures are presented in **Table 4.8-1**.

In addition, the Scoping Plan identifies challenges to meeting future electrical demand, including building transmission lines for renewable energy sources and modernizing electricity infrastructure.

CEQA Guidelines Revisions

In 2007, the California State Legislature passed Senate Bill (SB) 97, which required amendment of the CEQA Guidelines to incorporate analysis of and mitigation for GHG emissions from projects subject to CEQA. The California Natural Resources Agency adopted these amendments on December 30, 2009, and they took effect March 18, 2010.

The amendments added §15064.4 to the CEQA Guidelines. This section specifically addresses the potential significance of GHG emissions and calls for a "good-faith effort" to "describe, calculate or estimate" GHG emissions; §15064.4 further states that the analysis of the significance of any GHG impacts should include consideration of the extent to which the project would increase or reduce GHG emissions; exceed a locally applicable threshold of significance; and comply with "regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions." The Guidelines also state that a project may be found to have a less-than-significant impact on GHG emissions if it

**TABLE 4.8-1
RECOMMENDED ACTIONS OF CLIMATE CHANGE SCOPING PLAN**

Measure No.	Measure Description	GHG Reductions (Annual Million Metric Tons CO ₂ e)
Transportation		
T-1	Pavley I and II – Light Duty Vehicle Greenhouse Gas Standards	31.7
T-2	Low Carbon Fuel Standard (Discrete Early Action)	15
T-3 ¹	Regional Transportation-Related Greenhouse Gas Targets	5
T-4	Vehicle Efficiency Measures	4.5
T-5	Ship Electrification at Ports (Discrete Early Action)	0.2
T-6	Goods Movement Efficiency Measures. <ul style="list-style-type: none"> • Ship Electrification at Ports • System-Wide Efficiency Improvements 	3.5
T-7	Heavy-Duty Vehicle Greenhouse Gas Emission Reduction Measure – Aerodynamic Efficiency (Discrete Early Action)	0.93
T-8	Medium- and Heavy-Duty Vehicle Hybridization	0.5
T-9	High Speed Rail	1
Electricity and Natural Gas		
E-1	Energy Efficiency (32,000 GWh of Reduced Demand) <ul style="list-style-type: none"> • Increased Utility Energy Efficiency Programs • More Stringent Building & Appliance Standards Additional Efficiency and Conservation Programs	15.2
E-2	Increase Combined Heat and Power Use by 30,000 GWh (Net reductions include avoided transmission line loss)	6.7
E-3	Renewables Portfolio Standard (33% by 2020)	21.3
E-4	Million Solar Roofs (including California Solar Initiative, New Solar Homes Partnership and solar programs of publicly owned utilities) <ul style="list-style-type: none"> • Target of 3000 MW Total Installation by 2020 	2.1
CR-1	Energy Efficiency (800 Million Therms Reduced Consumptions) <ul style="list-style-type: none"> • Utility Energy Efficiency Programs • Building and Appliance Standards • Additional Efficiency and Conservation Programs 	4.3
CR-2	Solar Water Heating (AB 1470 goal)	0.1
Green Buildings		
GB-1	Green Buildings	26
Water		
W-1	Water Use Efficiency	1.4†
W-2	Water Recycling	0.3†
W-3	Water System Energy Efficiency	2.0†
W-4	Reuse Urban Runoff	0.2†
W-5	Increase Renewable Energy Production	0.9†
W-6	Public Goods Charge (Water)	TBD†
Industry		
I-1	Energy Efficiency and Co-Benefits Audits for Large Industrial Sources	TBD
I-2	Oil and Gas Extraction GHG Emission Reduction	0.2
I-3	GHG Leak Reduction from Oil and Gas Transmission	0.9
I-4	Refinery Flare Recovery Process Improvements	0.3
I-5	Removal of Methane Exemption from Existing Refinery Regulations	0.01

**TABLE 4.8-1 (Continued)
 RECOMMENDED ACTIONS OF CLIMATE CHANGE SCOPING PLAN**

Measure No.	Measure Description	GHG Reductions (Annual Million Metric Tons CO ₂ e)
Recycling and Waste Management		
RW-1	Landfill Methane Control (Discrete Early Action)	1
RW-2	Additional Reductions in Landfill Methane <ul style="list-style-type: none"> • Increase the Efficiency of Landfill Methane Capture 	TBD†
RW-3	High Recycling/Zero Waste <ul style="list-style-type: none"> • Commercial Recycling • Increase Production and Markets for Compost • Anaerobic Digestion • Extended Producer Responsibility • Environmentally Preferable Purchasing 	9†
Forests		
F-1	Sustainable Forest Target	5
High Global Warming Potential (GWP) Gases		
H-1	Motor Vehicle Air Conditioning Systems: Reduction of Refrigerant Emissions from Non-Professional Services (Discrete Early Action)	0.26
H-2	SF ₆ Limits in Non-Utility and Non-Semiconductor Applications (Discrete Early Action)	0.3
H-3	Reduction of Perfluorocarbons in Semiconductor Manufacturing (Discrete Early Action)	0.15
H-4	Limit High GWP Use in Consumer Products Discrete Early Action (Adopted June 2008)	0.25
H-5	High GWP Reductions from Mobile Sources <ul style="list-style-type: none"> • Low GWP Refrigerants for New Motor Vehicle Air Conditioning Systems • Air Conditioner Refrigerant Leak Test During Vehicle Smog Check • Refrigerant Recovery from Decommissioned Refrigerated Shipping Containers • Enforcement of Federal Ban on Refrigerant Release during Servicing or Dismantling of Motor Vehicle Air Conditioning Systems 	3.3
H-6	High GWP Reductions from Stationary Sources <ul style="list-style-type: none"> • High GWP Stationary Equipment Refrigerant Management Program: <ul style="list-style-type: none"> - Refrigerant Tracking/Reporting/Repair Deposit Program - Specifications for Commercial and Industrial Refrigeration Systems • Foam Recovery and Destruction Program • SF Leak Reduction and Recycling in Electrical Applications • Alternative Suppressants in Fire Protection Systems • Residential Refrigeration Early Retirement Program 	10.9
H-7	Mitigation Fee on High GWP Gases	5
Agriculture		
A-1	Methane Capture at Large Dairies	1.0†

¹ This is not the SB 375 regional target. CARB will establish regional targets for each Metropolitan Planning Organization (MPO) region following the input of the regional targets advisory committee and a consultation process with MPO's and other stakeholders per SB 375.
 † GHG emission reduction estimates are not included in calculating the total reductions needed to meet the 2020 target.

CARB (2009)

complies with an adopted plan that includes specific measures to sufficiently reduce GHG emissions (§15064(h)(3)). Importantly, however, the CEQA Guidelines do not require or recommend a specific analytical methodology or provide quantitative criteria for determining the significance of GHG emissions.

Carbon Credits: Mandatory and Voluntary

The AB 32 Scoping Plan identifies cap-and-trade as a key strategy for helping California reduce its GHG emissions (CARB, 2008). A cap-and-trade program sets the total amount of greenhouse gas emissions allowable for facilities under the cap and allows covered sources, including producers and consumers of energy, to determine the least expensive strategies to comply. On October 20, 2011, CARB adopted the final cap-and-trade regulation and Resolution 11-32. Under the program, in August and November 2012, the first auction of GHG emissions allowances will be held and on January 1, 2013 the compliance obligation for Covered Entities begins (the proposed Project is not a Covered Entity). The Cap-and-trade program also allows for non-Covered Entities, including Voluntarily Associated Entities, to register with the program and purchase and hold GHG emission allowances.

Several registries of carbon offset credits have emerged in the United States in recent years. In the absence of mandatory GHG reduction requirements, these registries record and transfer ownership of offset credits for the voluntary market. The voluntary market has developed to serve those individuals, businesses, and institutions wishing to offset their own emissions, even in the absence of a regulatory requirement, or who are preparing for anticipated regulatory requirements. Registries facilitate and give legitimacy to carbon offset credit tracking and trading. One of the leading registries, the Climate Action Reserve (CAR), is expected to serve as a source of regulatory offsets under the future California cap-and-trade program; the CAR and its project protocols have been recognized as voluntary early actions under AB 32. CAR is respected as a national project registry that sets standards, accredits verifiers, and registers and tracks projects using sophisticated software to serialize and transfer emission reduction credits.

The Climate Registry

The Climate Registry (TCR) is a non-profit collaboration among North American states, provinces, territories, and Native sovereign nations that sets consistent and transparent standards to calculate, verify, and publicly report GHG emissions into a single registry. TCR does not register or trade carbon offset credits, but rather focuses on both voluntary and mandatory reporting programs and provides comprehensive, accurate data to reduce GHG emissions. TCR encourages voluntary early actions to increase energy efficiency and decrease GHG emissions. TCR accounting infrastructure supports a wide variety of programs that reduce GHG emissions including voluntary, regulatory and market-based programs.

Members of TCR agree to calculate, verify and publicly report their GHG emissions annually, which includes the following steps:

- Identify all sources of GHG emissions;
- Calculate emissions according to TCR protocols;

- Verify emissions with an ANSI-accredited and TCR-recognized verification body;
- Report verified, entity-wide emissions data to the public through TCR.

Annual third-party verification of reported GHG emissions data is intended to ensure that reporting members' GHG inventories are accurate, complete, and transparent.

Local Regulations

Bay Area Air Quality Management District

Bay Area 2010 Clean Air Plan. Bay Area plans are prepared with the cooperation of the Metropolitan Transportation Commission (MTC), and the Association of Bay Area Governments (ABAG). On September 15, 2010, the BAAQMD adopted the most recent revision to the Clean Air Plan - the *Bay Area 2010 Clean Air Plan* (BAAQMD, 2010b). The *Bay Area 2010 Clean Air Plan* serves to:

- Update the *Bay Area 2005 Ozone Strategy* in accordance with the requirements of the California Clean Air Act to implement “all feasible measures” to reduce ozone;
- Consider the impacts of ozone control measures on particulate matter, air toxics, and greenhouse gases in a single, integrated plan;
- Review progress in improving air quality in recent years; and
- Establish emission control measures to be adopted or implemented in the 2010 – 2012 timeframe.

The Project would be consistent with the *Bay Area 2010 Clean Air Plan*.

CEQA Air Quality Guidelines. In June 2010, BAAQMD issued its *CEQA Air Quality Guidelines* replacing former guidelines adopted in December 1999, and adopted new thresholds of significance to assist lead agencies in determining when potential air quality impacts would be considered significant under CEQA. Updated in May 2011, these guidelines include recommendations for analytical methodologies to determine air quality impacts and identify mitigation measures that can be used to avoid or reduce air quality impacts, including for GHGs (BAAQMD, 2011). Separate thresholds are established for operational emissions from stationary sources and non-stationary sources. No threshold has been established for construction-related emissions. The threshold for stationary sources is 10,000 MT of CO₂e/year. For non-stationary sources, three separate thresholds have been established:

- Compliance with Qualified Greenhouse Gas Reduction Strategy (i.e., if a project is found to be out of compliance with a Qualified Greenhouse Gas Reduction Strategy, its GHG emissions may be considered significant); or
- 1,100 MT of CO₂e/yr; or
- 4.6 MT CO₂e/service population/yr (service population is the sum of residents + employees expected for a development project).

For quantifying a project's GHG emissions, BAAQMD recommends that all GHG emissions from a project be estimated, including a project's direct and indirect GHG emissions from operations. Direct emissions refer to emissions produced from onsite combustion of energy, such as natural gas used in furnaces and boilers, emissions from industrial processes, and fuel combustion from mobile sources. Indirect emissions are emissions produced offsite from energy production and water conveyance due to a project's energy use and water consumption. The District has provided guidance on detailed methods for modeling GHG emissions from proposed projects (BAAQMD, 2011). In accordance with those BAAQMD guidelines and methods, and because the vast majority of GHG emissions from the Project come from non-stationary sources, the 1,100 MT/year threshold is the applicable threshold for this EIR analysis.

County of Santa Clara

The County of Santa Clara released its *County of Santa Clara Climate Action Plan for Operations and Facilities* in September 2009 (County of Santa Clara, 2009). This plan presents a number of solutions and policies that focus on County operations, facilities, and employee actions that will reduce GHG emissions associated with energy and water consumption, solid waste, and fuel consumption. The plan focuses primarily on steps needed to reach the 10 percent reduction (13,346 MT) goal by 2015. Since this plan applies to County operations and facilities only, it does not pertain to the Project.

4.8.2 Baseline

The overall baseline for this EIR reflects the physical environmental conditions in the vicinity of the Project as they existed on June 29, 2007, when the County published a NOP in connection with the Applicant's first proposed amendment of the 1985 Reclamation Plan. Pertinent to the GHG analysis, the June 2007 baseline date is prior to the time when the EMSA actively was developed for placement of overburden from the quarry.

With regard to GHG emissions, the proposed Project involves an existing quarry operation. Such operations are characterized by fluctuating production and associated GHG emissions in response to continually changing market demands. An emission inventory that considers only conditions existing in June 2007 (or any other specific point in time) may substantially over- or under-represent typical baseline conditions. Accordingly, baseline GHG emissions for this assessment are based on an average over the 11-year period from January 1, 2000 to December 31, 2010, which includes periods of relatively high production as well as relatively low production at the Permanente Quarry in response to changing market demands. The following operations and activities are included in the baseline GHG emissions estimates:

- Quarry operations
- Waste rock material (overburden) storage
- Associated mobile sources and portable equipment

GHG emissions associated with operation of the adjacent cement manufacturing facility are not included in the analysis since the cement plant is a separately-permitted industrial use, and

because the Project would not affect the cement plant's operations, GHG emission, use permit, operating permits or regulatory status.

4.8.3 Significance Criteria

Consistent with County of Santa Clara Environmental Checklist and Appendix G of the CEQA Guidelines, the Project would have a significant impact if it would:

- a) Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment; or
- b) Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHG.

In accordance with the BAAQMD *CEQA Air Quality Guidelines*, this Project would be considered to have a significant impact if the Project would emit GHGs greater than 1,100 MT per year CO₂e from sources other than permitted stationary sources (the Project does not propose any new or expanded stationary sources that emit GHGs). The BAAQMD *CEQA Guidelines* also state that a project or plan that is consistent with an adopted GHG Reduction Strategy would be considered to have a less than significant impact. As noted above, the County of Santa Clara has adopted a Climate Action Plan for reducing GHG emissions from County operations and facilities. This plan does not, however, pertain to private activities, and so does not cover the existing surface mining operations at the Permanente Quarry or apply to the Project.

4.8.4 Discussion of Criteria with No Greenhouse Gas Emissions Impacts

The Project could cause an impact related to each of the GHG significance criteria. These impacts are analyzed in Section 4.8.5 below.

4.8.5 Impacts and Mitigation Measures

The assessment for GHG emissions is based on the ALG report *Air Quality Technical Analysis – Revised Reclamation Plan Amendment* (ALG, 2011; included in this EIR as **Appendix D**). The ALG report identified and quantified the emission sources of criteria air pollutants, toxic air contaminants (TACs)², and GHGs from existing operations and from the proposed Project. Emission calculations in the ALG report are based on specific equipment and material throughput data provided by the Applicant, as well as emission factors from the following sources:

- CARB's OFFROAD2007 model for off-road vehicles and equipment;
- CARB's EMFAC2007 model for on-road vehicles;
- General Reporting Protocol (The Climate Registry, 2008); and

² Criteria air pollutants and TACs are addressed in Section 4.3, *Air Quality*.

- Australian Greenhouse Office Factors and Methods Workbook (Australian Greenhouse Office, 2006).

The assumptions, emission factors, calculations, and other data in the ALG report were independently reviewed by the EIR authors and were determined to be acceptable for incorporation in this analysis.

This analysis is based on the net change in GHG emissions from the Project compared to baseline. As described above in Section 4.3.2, *Baseline*, baseline air emissions for this GHG assessment are determined from an average over the 11-year period from January 1, 2000 to December 31, 2010, which includes periods of relatively high production as well as relatively low production at the Permanente Quarry in response to changing market demands. Project GHG emissions are calculated the proposed reclamation activities and the Quarry operations that would be ongoing concurrently with the Project. The net change in GHG emissions is then compared to the CEQA significance threshold adopted by the BAAQMD.

Impact 4.8-1: The Project could result in an increase in greenhouse gas emissions and contribute to climate change. (*Less than Significant Impact with Mitigation Incorporated*)

As described in Chapter 2, *Project Description*, the Project includes areas that have been disturbed by prior mining operations, areas that will be disturbed by mining operations within the next 20 years, open space areas that serve to physically separate operations at the Quarry from other uses in the surrounding environs (and additional areas that would be for this purpose), and areas that have been partially disturbed by prior exploratory and/or mining activities. The primary areas to be reclaimed include the existing Quarry pit, two overburden disposal areas referred to as the West Materials Storage Area (WMSA) and the East Materials Storage Area (EMSA), the crusher/Quarry office area, surge pile, rock plant, an area south of Permanente Creek that has been subject to mining operation-related exploratory activities, and seven areas along Permanente Creek known as the Permanente Creek Reclamation Areas (PCRA). General emission sources of GHGs in the baseline include:

- Direct GHG Sources (on-road and off-road combustion equipment and vehicles; blasting activities);
- Indirect GHG Sources (indirect, off-site sources associated with use of electricity for quarry dewatering and quarry office operations).

During Phase 1 of the Project, the Quarry-related operations listed above would continue to occur in addition to the GHG emission sources and activities specific to the Project.

The following GHG emission reduction measure has been committed to by the Applicant as part of the Project, and is included in the calculation of Project GHG emissions:

- Use an Overland Conveyor System, powered by electric motors, to move 75 percent of the waste rock from the WMSA to backfill the Quarry pit.

Project GHG emissions were calculated for Phases 1 and 2 of the Project based on the maximum level of annual activity expected to occur during each phase. (This analysis does not quantify emissions associated with Phase 3 of the Project because off-road vehicle usage and related activities would be substantially lower in Phase 3 than in Phase 1 or 2). The net change in GHG emissions was then calculated by comparing the highest emissions during each Project phase with the average GHG emissions calculated for the baseline period. This analysis determined that GHG emissions would be highest during Phase 1 of the Project, during which emissions associated with ongoing mining operations would also occur.

As described above, pursuant to the BAAQMD *CEQA Air Quality Guidelines*, this Project would be considered to have a significant impact if the Project would emit GHGs greater than 1,100 MT per year CO₂e from sources other than permitted stationary sources (the Project does not propose any new or expanded stationary sources that emit GHGs). Project emissions are compared to these annual thresholds in **Table 4.8-2**.

**TABLE 4.8-2
 MAXIMUM ANNUAL GHG EMISSIONS
 (metric tons CO₂E/year)^a**

Scenario	CO ₂	CH ₄	N ₂ O	Total CO ₂ e
Baseline Emissions	15,707	<1	<1	15,842
Project Emissions	20,587	1	<1	20,762
Annual Incremental Increase	4,880	<1	<1	4,920
BAAQMD Threshold	--	--	--	1,100
Significant Impact (Yes or No)?	--	--	--	Yes

^a Emissions are based on the *Air Quality Technical Analysis – Revised Reclamation Plan Amendment* (ALG, 2011). Specific assumptions and emission factors incorporated into the calculations are included in Appendix D.

SOURCE: ALG, 2011.

As shown in **Table 4.8-2**, GHG emissions associated with the Project would result in a maximum annual generation of 20,762 MT of CO₂e, for a net increase of 4,920 MT per year over the baseline.³ Thus, net GHG emissions that would result from the Project would exceed the 1,100 MT per year threshold established by BAAQMD and would be significant without mitigation.

Mitigation Measure 4.8-1a: Develop Annual GHG Inventory. The Applicant shall become a reporting member of The Climate Registry. Beginning with the first year of the Project and continuing for the duration of the Project, the Applicant shall conduct an annual inventory of GHG emissions and shall report those emissions to The Climate Registry. The

³ It is noted here that there is a net increase in GHG emissions for the Project compared to baseline, whereas there is a net decrease in emissions of most criteria pollutants and toxic air contaminants (TACs) (see Section 4.3, *Air Quality*). The reason for this apparent disparity is that the emission reduction strategy for criteria pollutants and TACs (i.e., replacement of older off-road equipment with newer, cleaner burning engines) does not result in a collateral reduction of GHGs. Rather, GHG emissions are essentially proportional to fuel usage, so the increase in off-road equipment usage with the Project results in a net increase in GHG emissions.

annual inventory shall be conducted according to The Climate Registry protocols and third-party verified by a verification body accredited through The Climate Registry.

Mitigation Measure 4.8-1b: Greenhouse Gas Emissions Reduction Plan. The Applicant shall prepare, submit for County and BAAQMD approval, make available to the public, and implement a Greenhouse Gas Emissions Reduction Plan (GHG Plan) containing quantifiable strategies to ensure that the Project-related incremental increase of GHG emissions does not exceed 1,100 MT CO₂e per year. The GHG Plan shall include, but not be limited to, the following measures:

1. Replacement of on-road and off-road vehicles and construction equipment with lower GHG-emitting engines, such as electric or hybrid.
2. Use of the Overland Conveyor System, powered by electric motors, to move more than 75 percent of the waste rock from the WMSA to reclaim the Quarry pit.

If the Applicant is unable to reduce the Project-related incremental increase of GHG emissions to below 1,100 MT CO₂e per year using the above measures, the Applicant shall offset all remaining Project incremental emissions above that threshold. Any offset of Project emissions shall be demonstrated to be real, permanent, verifiable, enforceable, and additional. To the maximum extent feasible, as determined by the County in coordination with the BAAQMD, offsets shall be implemented locally. Offsets may include but are not limited to, the following (in order of preference):

1. Onsite offset of Project emissions, for example through development of a renewable energy generation facility or a carbon sequestration project (such as a forestry or wetlands project for which inventory and reporting protocols have been adopted). If the Applicant develops an offset project, it must be registered with the Climate Action Reserve or otherwise approved by the BAAQMD in order to be used to offset Project emissions. The number of offset credits produced would then be included in the annual inventory, and the net (emissions minus offsets) calculated.
2. Funding of local projects, subject to review and approval by the BAAQMD, that would result in real, permanent, verifiable, enforceable, and additional reduction in GHG emissions. If the BAAQMD or County of Santa Clara develops a GHG mitigation fund, the Applicant may instead pay into this fund to offset Project incremental GHG emissions in excess of the significance threshold.
3. Purchase of carbon credits to offset Project incremental emissions to below the significance threshold. Carbon offset credits must be verified and registered with The Climate Registry, the Climate Action Reserve, or other source that is approved by the California Air Resources Board as being consistent with the policies and guidelines of the California Global Warming Solution Act of 2006 (AB 32), or available through a County- or BAAQMD-approved local GHG mitigation bank or fund.

Significance after Mitigation: Use of electric or hybrid on-road vehicles and small horsepower construction equipment and establishing onsite renewable energy generation, carbon sequestration projects, and offsite mitigation are among the feasible GHG mitigation strategies identified in the California Air Pollution Control Officers Association (CAPCOA) report *Quantifying Greenhouse Gas Mitigation Measures* (CAPCOA, 2010). The CAPCOA report also

provides methodologies for quantifying the GHG reduction for each of these methods. While the BAAQMD does not have a policy regarding the use of carbon credits as GHG mitigation under CEQA, such use of carbon credits in CEQA has been established by other California air districts (e.g., the Santa Barbara County Air Pollution Control District (SBCAPCD) [SBCAPCD, 2011]). The amount of GHG reductions or offsets can vary widely for any one of these measures, depending upon the specific needs of the application. However, collectively the measures provide ample opportunity to reduce the Project's incremental GHG emission increase to below the significance threshold through a combination of avoidance, onsite or offsite mitigation, and/or purchase of carbon credits. The Climate Action Reserve alone has more than 16 million metric tons of GHG credits registered and available for purchase as of August 2011. Therefore, after mitigation the impact would be less than significant.

Impact 4.8-2: The Project could conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHG. (*Less than Significant Impact*)

Consistency with Local Plans, Policies, or Regulations

With regard to any potential conflict with applicable County of Santa Clara plans, policies, or regulations adopted to reduce GHGs, the County released its *County of Santa Clara Climate Action Plan for Operations and Facilities*, which presents a number of solutions and policies that focus on County operations, facilities and employee actions that will reduce GHG emissions associated with energy and water consumption, solid waste and fuel consumption (County of Santa Clara, 2009). Since this plan applies to County operations and facilities only, it does not pertain to the Project. Therefore, the Project would not conflict with any local plans, policies, or regulations pertaining to GHGs.

Consistency with CARB's AB32 Scoping Plan

Transportation

CARB's Scoping Plan identifies nine transportation-related actions. Actions T-5, T-6, and T-9 are not applicable to this Project. Action T-1 concerns improvements to light-duty vehicle technology for the purposes of reducing GHG emissions. This action focuses on legislating improved controls for vehicle manufacturers and would not generally be considered applicable to the Project. However, it is reasonably anticipated that vehicles utilized by employees would be subject to the new Pavley regulation, as applicable, and would be consistent with and not conflict with this action.

Action T-2 concerns implementation of a Low Carbon Fuel Standard (LCFS). To reduce the carbon intensity of transportation fuels, CARB is developing a LCFS, which would reduce the carbon intensity of California's transportation fuels by at least ten percent by 2020 as called for by Governor Schwarzenegger in Executive Order S-01-07. The LCFS will incorporate compliance mechanisms that provide flexibility to fuel providers in how they meet the requirements to reduce GHG emissions. It is reasonably anticipated that off-road equipment utilized at the Project would

use fuel produced pursuant to the new LCFS, when it has been implemented, and would therefore be consistent with and not conflict with this action.

Action T-3 addresses regional transportation targets for reducing passenger vehicle miles traveled, with the intent to reduce GHG emissions. The Project would generate minimal trips and therefore would not conflict with Action T-3.

Action T-4 is concerned with vehicle efficiency measures. The California Department of Resources Recycling and Recovery (CalRecycle) with various partners continues to conduct a public awareness campaign to promote sustainable tire practices. CARB is pursuing a regulation to ensure that tires are properly inflated when vehicles are serviced. In addition, CEC in consultation with CalRecycle is developing an efficient tire program focusing first on data gathering and outreach, then on potential adoption of minimum fuel-efficient tire standards, and lastly on the development of consumer information requirements for replacing tires. CARB is also pursuing ways to reduce engine load via lower friction oil and reducing the need for air conditioner use. CARB is actively engaged in the regulatory development process for the tire inflation component of this measure. Implementation of such a standard is not within the purview of an industrial mining project, specifically overburden storage and reclamation activities associated with the Project, that does not operate fleet trucks. Therefore, the Project would not conflict with this measure.

Action T-7 requires existing trucks/trailers to be retrofitted with the best available technology and/or CARB-approved technology. Implementation of such a standard is not within the purview of an industrial mining project, specifically overburden storage and reclamation activities associated with the Project, that does not operate fleet trucks. Therefore, the Project would not conflict with Action T-7.

Action T-8 focuses on hybridization of medium- and heavy-duty vehicles. The implementation approach to Action T-8 is to adopt a regulation and/or incentive program that reduces GHG emissions by encouraging hybrid technology as applied to vocational applications that have significant urban, stop-and-go driving, idling, and power take-off operations in their duty cycle. Implementation of such a standard is not within the purview of an industrial mining project, specifically overburden storage and reclamation activities associated with the Project, that does not operate fleet trucks. Therefore, the Project would not conflict with this measure.

Electricity and Natural Gas

Action E-1, together with Action GB-1 (Green Building), aims to reduce electricity demand by increased efficiency of Utility Energy Programs and adoption of more stringent building and appliance standards. Because no additional structures are proposed by the Project, Action E-1 is not applicable to the Project.

Action E-2 encourages an increase in the use of combined heat and power (CHP) use, or co-generation, facilities. Because the Project would not require additional energy facilities, Action E-2 is not applicable to the Project.

Action E-3 concerns Renewable Portfolio Standards for utilities and does not apply to development projects. Therefore, the Project would not conflict with the measure.

Action E-4 strives to promote solar generated electricity. Because no additional structures are proposed by the Project, Action E-1 is not applicable to the Project.

Forestry

Action F-1 concerns the sustainability of forests. The 2020 Scoping Plan target for California's forest sector is to maintain the current estimated 5 million MT CO₂e of carbon sequestration through sustainable management practices, potentially including reducing the risk of catastrophic wildfire, and the avoidance or mitigation of land-use changes that reduce carbon storage. Since reclamation would result in reforestation, the Project would not conflict with this action.

Industrial Use

While most of the Recommended Actions related to industrial use are aimed at oil and gas extraction, refining and transmission (which are not applicable to this Project), Action I-1 targets large emitters of GHGs (in excess of 0.5 million MT per year of CO₂e) for auditing. Because the Project would not exceed the audit threshold, as set forth in the previous impact analysis, the Project is consistent with and would not obstruct the recommended actions.

Consistency with the Bay Area 2010 Clean Air Plan

The 2010 Clean Air Plan performance objectives, consistent with the state's climate protection goals, are to reduce emissions of GHGs to 1990 levels by 2020 and 40 percent below 1990 levels by 2035 (BAAQMD, 2010b). Because, as discussed above, the Project would be consistent with the CARB AB32 Scoping Plan actions or measures to reduce GHG emissions, and the Project's GHG emissions would essentially cease by 2035, the Project is therefore also consistent with the 2010 Clean Air Plan performance objectives.

In summary, the Project would not conflict with Scoping Plan actions or measures to reduce GHG emissions, and would be consistent with the GHG performance objectives in the Bay Area 2010 Clean Air Plan. Thus, this impact would be less than significant.

4.8.6 Alternatives

4.8.6.1 Alternative 1: Complete Backfill Alternative

The reclamation activities associated with Alternative 1 would be more extensive than the activities under the Project. Under this alternative, overburden materials stored in the EMSA would be reclaimed and backfilled into the Quarry pit upon the conclusion of mineral extraction. Compared with the Project, that activity would require considerable additional hours of operation for off-road equipment to excavate, transport, dump, and grade the EMSA materials. This additional equipment activity would result in greater emissions of GHGs compared with the Project, and would require

more extensive mitigation. Therefore, potential impacts to GHGs under this alternative would be greater than for the Project.

4.8.6.2 Alternative 2: Central Materials Storage Area Alternative

The reclamation activities associated with Alternative 2 would be similar to the activities under the Project, except that under this alternative, overburden materials in the Quarry pit would be moved to new, more-distant locations within the Quarry instead of to the EMSA. That activity would generate additional off-road haul truck travel distance compared with the Project, which in turn would result in greater emissions of GHGs. Therefore, potential impacts to GHGs under this alternative would be greater than for the Project.

4.8.6.3 No Project Alternative

The No Project Alternative would extend the time period in which surface mining activities occur within the Project Area and delay final reclamation conditions by approximately 7 years. GHG emissions under the No Project Alternative would be less on an annual basis compared with the Project, but would occur over a longer time and in total would likely be comparable to the Project. However, since the significance of GHG emissions is assessed based on the annual emission rate, the No Project Alternative would result in a lesser impact for GHGs compared with the Project.

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