GLOBAL CLIMATE CHANGE ANALYSIS
NURSERY PRODUCTS HAWES COMPOSTING FACILITY
SAN BERNARDINO COUNTY, CALIFORNIA

Prepared for:

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LIST OF ACRONYMS

AB 32	California Global Warming Solutions Act of 2006
AEP	Association of Environmental Professionals
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CAT	Climate Action Team
CEQA	California Environmental Quality Act
CH_4	Methane
CFCs	Chlorofluorocarbons
CO_2	Carbon Dioxide
EPA	United States Environmental Protection Agency
GCC	Global Climate Change
GHG	greenhouse gas
gpm	Gallons Per Minute
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
ISO	Insurance Service Organization
N_2O	Nitrous Oxide
O_3	Ozone
OPR	Office of Planning and Research
Project	Nursery Products Hawes Composting Facility Project
Tg CO2 Eq	teragrams of carbon dioxide equivalent
tpy	tons per year

1. INTRODUCTION

Purpose of Report

This report provides analysis of the Global Climate Change (GCC) for the Nursery Products Hawes Composting Facility (Project). This report expands and supplements the analysis of greenhouse gas (GHG) emissions and the impact on global climate change conducted in the draft Environmental Impact Report previously prepared under the California Environmental Quality Act (CEQA).

Project Description

The proposed Nursery Products Hawes Composting Facility Project is a biosolids and green material composting facility. The facility would be located on 80 acres of a 160-acre parcel located within the unincorporated part of the County of San Bernardino, California. The facility would receive a daily average of 1,100 tons/day (400,000 tons per year (tpy)) of biosolids and green material which will be composted to produce agricultural compost.

The Project site is located west of the City of Barstow, approximately 8 miles west of Hinkley, and approximately 12.3 miles east of Kramer Junction. The site is approximately one mile south of State Route 58 and one mile west of Helendale Road. The Project would be located on land owned by Nursery Products, LLC, near the decommissioned Hawes Airport.

A primary goal of the Project is to provide cost-efficient local biosolid and green material composting capacity for the County of San Bernardino and the Inland Empire that complies with applicable Federal, State and local requirements for safely handling these materials.

Global Climate Change Background

Parts of the Earth's atmosphere act as an insulating blanket of just the right thickness, trapping sufficient solar energy to keep the global average temperature in a suitable range. The 'blanket' is a collection of atmospheric gases called 'greenhouse gases' (GHGs) based on the idea that the gases also 'trap' heat like the glass walls of a greenhouse. These gases, mainly water vapor, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), ozone(O_3), and chlorofluorocarbons (CFCs) all act as effective global insulators, reflecting back to earth visible light and infrared radiation. Human activities such as producing electricity and driving internal combustion vehicles have contributed to the elevated concentration of these gases in the atmosphere. The elevated concentration is in turn is causing the Earth's temperature to rise. A warmer Earth may lead to changes in rainfall patterns, much smaller polar ice caps, a rise in sea level, and a wide range of impacts on plants, wildlife, and humans.

The participation of water vapor and ozone as GHGs is poorly understood. It is unclear the extent to which water vapor acts as a GHG. The uncertainty is due to the fact that water vapor can also produce cloud cover, which reflects sunlight away from earth and can counteract its effect, if any, as a GHG. Also, water vapor tends to increase as the earth warms, so it is not well understood whether an increase in water vapor is contributing to climate change or rather a reaction to climate change. Ozone tends to break down in the presence of solar radiation but the mechanism is not well understood. For these reasons methodologies approved by the Intergovernmental Panel on Climate Change (IPCC), United States Environmental Protection Agency (EPA), and the California Air Resources Board (CARB) focus on carbon dioxide, nitrous oxide, methane, and chlorofluorocarbons as GHGs. The following provides a brief description of each GHG emissions considered in this analysis:

Carbon Dioxide

The natural production and absorption of CO_2 is achieved by numerous mechanisms throughout the terrestrial biosphere and the ocean. Human activities have contributed to the alteration of the natural carbon cycle by burning coal, oil, natural gas, and wood. Since the industrial revolution began in the mid 1700s, each of these human caused activities has increased in scale and distribution. Carbon dioxide was the first GHG demonstrated to be increasing in atmospheric concentration with the first conclusive measurements being made in the last half of the 20th century. Prior to the industrial revolution,

atmospheric concentrations were fairly stable at 280 ppm. Today, the levels are around 370 ppm, an increase of well over 30 percent (EPA 2006). Left unchecked, the concentration of carbon dioxide in the atmosphere is projected to increase to a minimum of 540 ppm by 2100 as a direct result of anthropogenic sources (IPCC 2001). Such an increase could result in an average global temperature rise of at least two degrees Celsius (3.6 ^{O}F) (IPPCC 2001).

Methane

Methane is an extremely effective absorber of radiation, its atmospheric concentration is less than carbon dioxide and its lifetime in the atmosphere (10-12 years) is brief compared to some other GHGs (such as carbon dioxide, nitrous oxide, and CFCs). Methane has both natural and anthropogenic (human) sources. It is released as part of the biological processes in low oxygen environments, such as in swamplands or in rice production (at the roots of the plants). Over the last 50 years, human activities such as growing rice, raising cattle, using natural gas and mining coal have added to the atmospheric concentration of methane (EPA 2006b).

Nitrous Oxide

Concentrations of N_2O also began to rise at the beginning of the industrial revolution. Microbial processes in soil and water, including those reactions that occur in fertilizer containing nitrogen, produce nitrous oxide. Global concentration of nitrous oxide in 1998 was 314 ppb, In addition to agricultural sources for the gas some industrial processes (fossil fuel-fired power plants, nylon production, nitric acid production, and vehicle emissions) also contribute to its atmospheric concentration (EPA 2006b).

Because of the molecular similarity N_2O, a GHG, can be confused with nitrogen dioxide (NO_2), a criteria pollutant. The chemical difference between nitrous oxide and nitrogen dioxide is that nitrous oxide has two atoms of nitrogen bonded to one atom of oxygen; whereas, nitrogen dioxide has one atom of nitrogen bonded to two atoms of oxygen, consequently the two molecules behave quite differently. The molecular bonds within nitrous oxide are relatively stable and do not break down in the presence of solar radiation; rather, these molecular bonds tend to briefly absorb, then reflect heat back to earth, making this molecule an effective GHG. By contrast, nitrogen dioxide, a criteria pollutant, tends to break down in the presence of solar radiation and contribute to the formation of ground-level ozone. This analysis focuses on GHG emissions and will evaluate nitrous oxide emissions.

Chlorofluorocarbons

Chlorofluorocarbons have no natural source, but were synthesized for uses as refrigerants, aerosol propellants and cleaning solvents. Since their creation in 1928, the concentrations of CFCs in the atmosphere have been rising. Due to the discovery that they are able to destroy stratospheric ozone, a global effort to halt their production was undertaken and has successfully reduced or stopped the increase in the levels of the major CFCs. However, due to the long atmospheric lifetimes, CFCs will remain in the atmosphere for over 100 years. Since they are also a GHG, along with such other long-lived synthesized gases as CF_4 (carbontatrafuoride) and SF_6 (sulfurhexafluoride), CFCs are of concern. Another set of synthesized compounds called HFCs (hydrofluorcarbons) are also considered GHGs, though they are less stable in the atmosphere and therefore have a shorter lifetime and less of an impact (EPA 2006b). CFCs, CF_4, SF_6 and HFCs have been banned and are no longer commercially available.

The Project will not generate emissions of CFC and therefore they are not considered any further in this analysis.

2. SIGNIFICANCE DETERMINATION CRITERIA

The Nursery Products Project cannot generate enough GHG emissions to influence global climate change on its own. The Project participates in potential climate change by its incremental contribution (positive or negative) of GHG emissions that, when combined with the cumulative increase of all other anthropogenic sources of GHGs, impact global climate change. Therefore, global climate change is a type of cumulative impact and the Project participation in this cumulative impact is through its incremental contribution of GHG emissions. In Section 15064(h)(1) of the State CEQA Guidelines, "cumulatively considerable" is defined to mean *"that the incremental effects of an individual project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects."*

The State CEQA Guidelines advise that an individual project would normally be judged to produce a significant or potentially significant effect on the environment if the project were to result in a cumulatively considerable net increase of an air pollutant creating the impact. In this case, the air pollutants under consideration are GHG emissions, which are creating cumulative global climate change independent of the proposed Project.

To date, no Federal, State, or project area local agencies have developed thresholds against which a proposed project can be evaluated to assist lead agencies in determining whether or not the climate change impact from a proposed project is significant. The Association of Environmental Professionals (AEP) in the document titled "Alternative Approaches to Analyzing Greenhouse Gases and Global Climate Change Impacts in CEQA Documents (June 2007), gave various approaches to use in determining significance for GHG emissions. In January 2008, the California Air Pollution Control Officers Association (CAPCOA) published a White Paper also offering various approaches to determine GHG emissions significance. Both these documents recommend one method, which is to identify and quantify GHG emissions from a project, evaluate project features and mitigation measures to reduce emissions, and determine significance based upon whether or not the Project was consistent with the overall emission reduction strategies of the California Global Warming Act of 2006 (AB 32). On June 19, 2008, the Office of Planning and Research (OPR) published a Technical Advisory on CEQA and climate change. Recognizing the absence of specific thresholds for the determination of significance for GHG, OPR developed draft significance criteria and additional questions for inclusion within Appendix G addressing GHG emissions. The additional significance criteria proposed by OPR included an evaluation of how the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions. On April 13, 2009, OPR provided draft potential amendments to the CEQA Guidelines to the California Resources Agency. The Resources Agency is charged with proposing and adopting CEQA amendments on this topic on or before January 1, 2010. The draft amendments add section 15064.4 which identifies the steps to be followed by the lead agency in determining the significance of impacts from GHG emissions. The approach taken in this analysis is consistent with the draft amendments and CEQA as well as with the approaches recommended by OPR, CAPCOA, and AEP.

San Bernardino County is currently drafting a GHG Emissions Reduction Plan, which is expected to be consistent with the GHG emissions reduction targets and reduction components of AB 32. As an interim GHG emissions threshold for use in CEQA review, San Bernardino County is currently following the method summarized above. The GHG Reduction Plan for San Bernardino County is expected to be adopted in 2010.

Under CEQA, in order to determine whether or not a proposed project would cause a significant impact on the environment, the impact of a project must be determined by examining the types and levels of GHG emissions generated and comparing those to some threshold. In accordance with CEQA Guidelines (Section 15064 (h)(3)). "*A lead agency may determine that a project's incremental contribution to a cumulative effect is not cumulatively considerable if the project will comply with the requirements in a previously approved plan or mitigation program which provides specific requirements that will avoid or substantially lessen the cumulative problem (e.g., water quality control plan, air quality plan, integrated waste management plan) within the geographic area in which the project is located. Such plans or*

programs must be specified in law or adopted by the public agency with jurisdiction over the affected resources through a public review process to implement, interpret, or make specific the law enforced or administered by the public agency…"

AB 32, the California Global Warming Solutions Act of 2006 serves as a standard against which to evaluate GHG emissions. AB 32 adopted a goal that greenhouse gases emitted in California be reduced to 1990 levels by the year 2020. The 2020 reduction target equates to a decrease of approximately 30 percent below the current GHG emissions. Under AB 32, CARB published its Final Expanded List of Early Action Measures to Reduce Greenhouse Gas Emissions in California (CARB 2007), to help achieve the reduction goals of AB 32. These reduction goals are derived from the United Nations Intergovernmental Panel on Climate Change (IPCC: CCAT 2007). The IPCC was formed to assess "the scientific, technical and socio-economic information relevant to understanding the scientific basis of risk of human-induced climate change, its potential impacts, and options for adaptation and mitigation" (IPCC 2004). The IPCC constructed several emission trajectories of GHGs needed to stabilize global temperatures and climate change impacts. It concluded that a stabilization of GHGs at 400-450 ppm carbon dioxide-equivalent concentration is required to keep global mean warming below 2°C, which in turn is assumed to be necessary to avoid 'dangerous' climate change (IPCC 2001). AB 32 has set GHG emission reduction targets with the long range goal of stabilization of GHGs at 400-450 ppm carbon dioxide-equivalent concentrations as described above assuming that all other anthropogenic sources of greenhouse gases provide similar reductions.

The state wide GHG emission reduction targets of AB 32 are 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 (CA 2005). Some literature equates these reductions to 11 percent of the current GHG emissions by 2010 and 25 percent of the current GHG emissions by 2020.

AB 32 requires CARB to 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.

AB 32 is the state statute that addresses global climate change in California and is being implemented in concert with international efforts to address global climate change. The legislature in passing AB 32, set forth a program requiring that certain specific requirements under AB 32 be further elucidated by CARB. The program set up by AB 32 will substantially lessen the cumulative problem of GHG in the state of California and the region and fulfills the definition of a mitigation program found in CEQA Guidelines §15064(H)(3).

This analysis uses compliance with AB 32, considered a "previously approved mitigation program," as set forth in CEQA Guidelines §15064(h)(3), to determine if the Project's incremental contribution of GHGs is a cumulatively considerable contribution to global climate change. OPR's proposed draft amendment to section 15064.7 of the CEQA Guidelines reinforces the use of this approach. CEQA Guideline §15064(h)(3) states three main conditions that a plan must meet to be sufficient for use as a basis for determining significance of GHG emissions. The plan must:

1) Be *"a previously approved plan or mitigation program"*;
2) Provide "*specific requirements that will avoid or substantially lessen the cumulative problem"*; and
3) Be *"specified in law or adopted by the public agency with jurisdiction over the affected resources through a public review process to implement, interpret, or make specific the law enforced or administered by the public agency."*

Rules promulgated by CARB to implement AB 32 and AB 32 meet both conditions one and three as AB 32 was adopted in 2006 and by the California State Legislature. AB 32 focuses on reducing GHG in California and further defines GHG to include carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride.

Further, AB 32 satisfies the second condition because it requires CARB, the State agency charged with regulating statewide air quality, to adopt rules and regulations that would achieve greenhouse gas emissions equivalent to statewide levels from 1990 by 2020.

CARB published its Proposed Early Actions to Mitigate Climate Change in California (CARB 2007b), which recommends discrete early action measures to reduce GHG emissions. The final report was published in July 2007. The measures are part of California's strategy for achieving GHG reductions under AB 32. One of the sources for the potential measures includes the Climate Action Team (CAT) Report to the Governor on Climate Change, which recommends actions the state can take to reduce GHG emissions. Three new regulations are proposed to meet the definition of "discrete early action greenhouse gas reduction measures," which include the following: a low carbon fuel standard; reduction of HFC-134a emissions from non-professional servicing of motor vehicle air conditioning systems; and improved landfill methane capture (CARB 2007b). CARB estimates that by 2020, the reductions from those three measures would be approximately 13-26 million metric tons of carbon dioxide equivalent.

On December 11, 2008, CARB adopted the Scoping Plan to Reduce Greenhouse Gas Emissions in California. The Scoping Plan implements additional GHG reductions under AB 32 including expanding and strengthening energy efficiency standards for buildings; a state commitment to provide 33 percent of the State's energy needs through renewable sources; and develop a cap and trade system for greenhouse gas emissions. Of interest to this Global Climate Change analysis, the Scoping Plan provides measures that will reduce approximately 1.5 teragrams of carbon dioxide equivalent (Tg CO_2 Eq) associated with land use decisions. The reduction measures in the Scoping Plan are used to meet the reduction goals of AB 32.

Therefore, to determine the Project's incremental contribution of GHG emissions to global climate change the impact analysis focuses on the techniques and methodologies supported by OPR and the current CEQA Guidelines including §15064(h)(3) and Appendix G. This approach results in an analysis of whether the impacts are cumulatively significant and, at the same time, consistent with AB 32 and related state and local regulations.

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3. IMPACT ANALYSIS

3.1 IMPACTS FROM PROJECT GHG EMISSIONS

The Nursery Products Project cannot generate enough GHG emissions to influence global climate change on its own. The Project participates in this potential global climate change by its incremental contribution (positive or negative) combined with the cumulative increase of all other sources of GHGs, which when taken together impact global climate change.

The primary source of GHG emissions associated with the Project result from the transportation of materials to the facility and the associated emissions from heavy duty diesel trucks. The area served by the proposed composting Project includes the Inland Empire, and nearby areas in Southern California (DEIR page 1-5). Currently, approximately 2,500,000 wet tpy of biosolids are transported from Southern California to locations in Kern County and Arizona, or to local landfills options in Southern California. The transportation of these materials to those destinations produces GHG emissions which would continue without the Project. The Project is located nearer to the source of the biosolids materials than the facilities in Kern County or Arizona. With the Project, the distance traveled and hence the GHG emissions will decrease. A calculation based on the best available data indicates that diverting the trucks containing biosolids to the proposed Project would eliminate approximately 2 million miles of heavy duty truck travel annually. Similarly, the best available information indicates that the green waste material component of the facility's feedstock is currently delivered to destinations as far or farther from the points of origin than would be necessary if this facility were available (DEIR page 4-19). For purposes of this analysis, it is conservatively assumed that the emissions from transport of green waste material will remain the same. The Project would take approximately 200,000 tpy of biosolids generated in Southern California to the Project site for composting. The Project's GHG emissions associated with the transport of biosolids is the net difference between GHG emissions currently generated to transport 200,000 tpy biosolids to Kern County, Arizona, or landfills in Southern California and GHG emissions that would be generated to transport 200,000 tpy of biosolids to the Project site (DEIR, Section 2.5, page. 2-18).

The GHG emissions associated with the decomposition of the proposed feedstock material (biosolids and greenwaste) currently occur and will continue to occur with or without the Project into the future. Green materials and biosolids that the Project is proposing to use in its proposed composting facility currently occur at existing composting facilities and ground applications in Arizona, Kern County, and land fills in Southern California. GHG emissions associated with the decomposition of this material are therefore, within the baseline conditions and are not an impact generated by the Project.

The following discussion reviews each of the GHGs and the potential generation of these gases associated with the transportation and on-site vehicle usage associated with the Project. On site vehicle usage generates a small amount of GHG emissions. Emissions throughout the analysis are given in both tons per year for the individual gas and the Global Warming Potential (GWP) of the gas in tons per year. The concept of a GWP was developed to compare the ability of each greenhouse gas to trap heat in the atmosphere relative to another gas. The definition of a GWP for a particular greenhouse gas is the ratio of heat trapped by one unit mass of the greenhouse gas to that of one unit mass of CO_2 over a specified time period. As CO_2 is the baseline gas the global warming potential index for CO_2 to GWP is 1. The global warming potential index for methane is 21, and for nitrous oxide is 310.

Carbon Dioxide

Of all the GHG emissions generated by anthropogenic sources, carbon dioxide is the most common. In relation to Project composting operations, the largest source of carbon dioxide is from heavy-duty transport trucks transporting material. As previously discussed, current conditions, without the Project, include the transport of biosolids to locations in Kern County, Arizona, or to other landfills. This condition would continue without the Project. Carbon dioxide emissions from truck transport of biosolids to these locations were calculated using URBEMIS2007 and EMFAC2007 emission factors that are used in URBEMIS2007. On average 48 truck trips per day (24 truckloads of biosolids) will be needed to transport the proposed volume of biosolids (See DEIR page 2-18 section 2.5). In determining the miles traveled per

truck trip the proportions of trips going to Arizona, (approximately 44 percent), Kern County (approximately 44 percent) and local landfills in Southern California (12 percent) were averaged. On average, under current conditions without the Project each truck trip will travel 346 miles. Carbon dioxide emissions generated due to transport of these materials is shown in Table 1 below.

Table 1
Carbon Dioxide Emissions Without The Project

Emission Source	Carbon Dioxide Emissions (tpy)	Global Warming Potential (tpy)
Truck Transport of Biosolids	**14,364.37**	**14,364.37**

The Project will directly generate emissions of carbon dioxide primarily in the form of vehicle exhaust from transport trucks and onsite mobile equipment. Carbon dioxide emissions from transport trucks and onsite mobile equipment were calculated using URBEMIS2007 assumptions and EMFAC2007 emission factors that are used in URBEMIS2007. Construction of the facility will generate GHG emissions associated with the heavy equipment. The carbon dioxide emissions associated with the Nursery Products Project are shown in Table 2.

Table 2
Unmitigated Carbon Dioxide Emissions with Project

Emission Source	Carbon Dioxide Emissions (tpy)	Global Warming Potential (tpy)
Construction Emissions	4.83[1]	4.83
Vehicles (transport trucks and employee commutes)	6,808.53	6,808.53
Onsite Equipment	812.94	812.94
Electric Use[2]	3.79	3.79
Total Operational Emissions	**7,630.09**	**7,630.09**

Notes:
[1] Shows the annualized construction emissions, which are calculated by taking the total construction emissions (96.62 tons) and dividing them by a reasonable economic life of the Project (20 years).
[2] Reduction in emissions associated with photovoltaic solar power as a Project feature are described on page 3-5 and quantified in Table 9 below.

Methane

Methane emissions are commonly associated with various types of composting operations. Nonetheless, emissions from decomposition of the feedstock materials are currently occurring at composting facilities and land applications in Arizona and Kern County, California. The methane emissions from decomposition will continue to occur into the future with or without the Project. Because they are part of the baseline emissions (existing conditions) and will continue to occur regardless of whether or not the proposed Project is implemented, they are not considered Project generated emissions and were eliminated from the analysis in order to accurately analyze Project generated impacts.

Without the Project, the heavy truck transport of biosolids material to Kern County, Arizona or local disposal facilities will generate modest amounts of methane gas. Methane emissions were estimated using EPA emission factors for on-road vehicles. The emissions are shown in Table 3.

Table 3
Methane Emissions Without The Project

Emission Source	Methane Emissions (tpy)	Global Warming Potential (tpy)
Truck Transport of Biosolids	**0.14**	**2.94**

The Project will also contribute methane gas primarily through vehicle emissions including truck trips. The Project will directly generate methane emissions from truck trips, employee commutes, and onsite equipment. The total, non-fugitive Project generated emissions of methane are shown in Table 4. The fugitive emissions from the decomposition of the biosolids and green waste will be identical with or without the Project. The only difference is the location where the emissions will occur.

Table 4
Unmitigated Project Generated Methane Emissions

Emission Source	Methane Emissions (tpy)	Global Warming Potential (tpy)
Construction Period Emissions	0.00250	0.0525
Vehicles(transport trucks and employee commutes)	0.09000	1.89000
Onsite Equipment	0.07000	1.47000
Electric Use	0.00003	0.00067
Total Operational Emissions	**0.16253**	**3.41317**

Notes:
[3] Shows the annualized construction emissions, which are calculated by taking the total construction emissions (96.62 tons) and dividing them by a reasonable economic life of the Project (20 years).
[4] Reduction in emissions associated with photovoltaic solar power as a Project feature are described on page 3-5 and quantified in Table 9 below.

Nitrous Oxide

Of the three types of GHG emissions produced by composting, nitrous oxide is produced in the smallest quantities. However, nitrous oxide is a powerful GHG at 310 times greater the global warming potential of carbon dioxide.

Without the Project the transport of biosolids material to Kern County, Arizona or local landfills will generate small amounts nitrous oxide. Nitrous oxide from truck transport was estimated using EPA emission factors for on-road vehicles (EPA 2004). The emissions are shown in Table 5.

Table 5
Nitrous Oxide Emissions Without The Project

Emission Source	Nitrous Oxide Emissions (tpy)	Global Warming Potential (tpy)
Truck Transport of Biosolids	**0.27710**	**85.901**

The Project generates small amounts of nitrous oxide from vehicle emissions. The Project will directly generate nitrous oxide emissions from truck trips, employee commutes, and onsite equipment. Nitrous oxide was estimated using EPA emission factors and the emissions with the Project are presented in Table 6.

Table 6
Unmitigated Project Generated Nitrous Oxide Emissions

Emission Source	Nitrous Oxide Emissions (tpy)	Global Warming Potential (tpy)
Construction Period Emissions[1]	0.00006	0.0193
Vehicles(transport trucks and employee commutes)	0.14173	43.9363
Onsite Equipment	0.01766	5.47460
Electric Use [2]	0.00002	0.00539
Total Operational Emissions	**0.15947**	**49.43559**

[1] Shows the annualized construction emissions, which are calculated by taking the total construction emissions (921.92 tons) and dividing them by a reasonable economic life of the Project (20 years).
[2] Reduction in emissions associated with photovoltaic solar power as a Project feature are described on page 3-5 and quantified in Table 9 below.

Summary

The primary GHG generated with or without the Project is carbon dioxide. Emissions of methane and nitrous oxide are small in comparison, however due to the global warming potential of methane and nitrous oxide, these greenhouse gases were evaluated and can also contribute to the total global warming potential.

Table 7 summarizes the Global Warming Potential of GHG emissions generated from biosolid transportation without the Project and Table 8 summarizes the Unmitigated Global Warming Potential of GHG emissions generated with the Project.

Table 7
Global Warming Potential Without Project

Emission Sources	Global Warming Potential (tpy)
Truck transport of Biosolids	**14,453.21**

Table 8
Unmitigated Global Warming Potential with Project

Emission Sources	Global Warming Potential (tpy)
Construction Period Emissions[1]	4.90
Vehicles(transport trucks and employee commutes)	6,854.36
Onsite Equipment	819.88
Electric Use [2]	3.80
Total Operational Emissions	**7,682.94**

[1] Shows the annualized construction emissions, which are calculated by taking the total construction emissions (921.92 tons) and dividing them by the economic life of the Project (20 years).

[2] Reduction in emissions associated with photovoltaic solar power as a Project feature are described on page 3-5 and quantified in Table 9 below.

The total unmitigated global warming potential associated with Project-generated GHG emissions is calculated to be 7,682.94 tons/year at full capacity of the proposed facility. This is approximately 47% below the estimated total global warming potential for the transport of waste material (14,453.21 tons/year) without the Project. In other words, the Project results in a net reduction of 6770.27 tpy of GHG emissions. The Project is consistent with the AB 32 goal of reducing GHG emissions; is significantly below the 1.5 Tg CO_2 allocated by CARB; and is not in conflict with any existing guidelines or standards. In addition, in order to determine the significance of the Project GHG emission impact on climate change, consistency or inconsistency with the reduction targets in AB 32 (the mitigation program that addresses climate change) is also evaluated. To do so, Project features that implement specific reduction measures identified in the rules and regulations that implement AB 32 were evaluated.

Project Features that Reduce Greenhouse Gas Emissions and Provide Consistency with AB 32

San Bernardino County has a waste reduction program that diverts green-waste and recyclable material out of the municipal landfill waste stream. The Project will provide cost-efficient local biosolids and green material composting capacity for the County of San Bernardino and the Inland Empire that complies with applicable Federal, State and local requirements for safely handling these materials.

The following Project objectives, set forth in the DEIR will all contribute to a reduction in Greenhouse Gas Emissions:

- Establish an efficient reuse of biosolids in the County and the Inland Empire;
- Increase solid waste diversion through the recycling of green material in compost; and
- Materials considered in this analysis are modeled as being recycled in a closed loop (e.g., green waste is recycled into compost).

The Project includes photovoltaic power generation of sufficient capacity to supply all of the Project electrical demand. A back up generator is also included to supply power when photovoltaic power, due to cloud cover or maintenance of the photovoltaic system, is not sufficient to supply all of the electrical demand.

Greenhouse Gas Mitigation Measures

In order to fully integrate the reduction measures promulgated by AB 32 into the Project and demonstrate full compliance with AB 32 (the Statewide Mitigation Program that addresses the cumulative impact of climate change), the following mitigation measures are recommended.

Construction Period:

- Prior to issuance of any grading or building permit, the Project plans and specifications shall include a statement that construction equipment shall be shut off when not in use and shall not idle for more than 15 minutes;
- Prior to issuance of any grading or building permit, the Project plans and specifications shall include a statement that on-road construction trucks and other vehicles greater than 10,000 pounds shall be shut off when not in use and shall not idle for more than 5 minutes; and
- Prior to issuance of any grading or building permit, the Project plans and specifications shall include education for construction workers about reducing waste and available recycling services.

Operational Period:

- Prior to issuance of a building permit, the applicant shall demonstrate that the design of the proposed office trailer includes the following features:
    - Incorporate duel paned or other energy efficient windows,
    - Incorporate energy efficient space heating and cooling equipment,
    - Incorporate energy efficient light fixtures,
    - Incorporate energy efficient appliances,
    - Incorporate cool roofs/light colored roofing.
- Prior to issuance of a building permit, the applicant shall demonstrate that the proposed facility incorporates exterior storage areas for office and paper recyclables and adequate recycling containers located in the office. Prior to issuance of a building permit, the Project plans and specifications shall include a statement that all onsite equipment shall be shut off when not in use and shall not idle for more than 5 minutes; and
- Prior to issuance of a building permit, the Project plans and specifications shall include a statement that on-road haul trucks and other vehicles greater than 10,000 pounds shall be shut off when not in use and shall not idle for more than 5 minutes.

Table 9 summarizes the reduction in GHGs as a result of mitigation incorporated into the proposed Project.

Table 9
Reduced Global Warming Potential Through Design Features and Mitigation

Emission Sources	GWP of Greenhouse Gases (tpy)	Percent Reduction Resulting from Mitigation and Project Design Features
Construction Period Emissions	4.90	0.00 %[1]
Vehicles (transport trucks and employee commutes)	6,854.36	0.00 %
Onsite Equipment	624.73	23.80 %
Periodic uses of back up generator	0.04	99.9 %[2]
Total Gross Operational Emissions	**7,483.99**	**2.59 %**
Transport of Biosolids without the Project[3]	*-14,453.21*	0.00 %
Total Net Operational Emissions	***-6,969.19***	**193.12 %**

[1] This reduction is associated with the use of photovoltaic electric generation and includes emissions associated with the periodic use of back up generator

[2] This reduction is associated with the use of photovoltaic electric generation and includes emissions associated with the periodic use of back up generator

[3] Represents current emissions from transporting biosolids to Arizona or Kern County, which are subtracted from the Project's Gross total in order to show the net emissions that would result if the Project were implemented.

Table 9 shows that the proposed Project will result in a total reduction of GHG emissions by approximately 48% or 6,969.19 tpy from existing conditions. This is primarily due to the reduction in GHG emissions due to the reduction in transport miles for feedstock material to the Project location. Currently much of the biosolids are transported to Arizona or Kern County for processing or land application. These feedstock materials would be transported to the proposed Project's nearer location.

The analysis in this report has followed the currently available guidance for analysis of GHG under CEQA. The approach follows that recommended by OPR, CAPCOA, and AEP and is consistent with the early draft of the San Bernardino County GHG Emissions Reduction Plan. The GHG emissions associated with the Project have been fully described and evaluated. Even though the Project results in a net decrease of GHG emissions, GHG mitigation measures which further reduce GHG emissions have been proposed and evaluated. The California Environmental Protection Agency prepared a CAT Report to Governor Schwarzenegger and the Legislature that "proposes a path to achieve the Governor's targets that will build on voluntary actions of California businesses, local government and community actions, and State incentive and regulatory programs" (CAT 2006). The report introduces strategies to reduce California's emissions to the levels proposed in AB 32. This is the best information available at this time; it is unknown when and what will be published in the future.

The proposed Project complies with the reduction strategies found in the CAT Report, the AB 32 Scoping Plan, and exceeds the AB 32 reduction target of 30 percent below "business as normal" levels of GHG emissions by year 2020. The proposed Project reduces the current GHG emissions by nearly 200%. Therefore, with mitigation the Project's incremental contribution of GHG emissions to cumulative global climate change impacts are less than significant.

3.2 IMPACTS ON THE PROJECT FROM GLOBAL CLIMATE CHANGE

Climate change is a global, regional, and local problem that is influenced by an array of interrelated factors as described previously in this section. Potential consequences of climate change include rapid increases in temperature; shorter, warmer winters with thinner snowpack; earlier spring runoff; less precipitation; longer periods of drought; slower recharge in groundwater aquifers; longer wildfire seasons, and more wildfires.

The average temperature in California is anticipated to increase within the next forty years. Warmer overall temperatures are expected to result in an increase in precipitation events and an increase in intensity and frequency of winter rainstorms. Precipitation is anticipated to increase rainfall in the winter while decreasing summer and overall precipitation. Currently the prevailing winds over Gulf of California are from the north in winter and the south in summer bringing a late spring wet period. Projections show that warming trends are greater over the landmasses than over the adjacent oceans and this may amplify the northward (summer) winds and decrease the overall annual precipitation in the south-western US.

Because of the dependence of saturation vapor pressure in the atmosphere on temperature, the anticipated warming of the climate is expected to be accompanied by an increase in atmospheric moisture flux and frequency of extreme weather anomalies on a global scale. How these changes affect specific localities is unknown at this time. The Increase in extreme temperature events is anticipated to lead to prolonged hot spells and an increased diurnal temperature range resulting in sever droughts, flood, wildfires, and winter storms. The extremes in climate events may disrupt ecosystems and damage water supplies. However, the rate of change and the specific changes that will occur at discrete locations is not well understood and cannot be quantified at this time.

Quantitative information on climate change impacts at a local site level is unavailable and the predictions presented here are uncertain. However, the information presented below provides a qualitative discussion of potential consequences of global warming on the proposed Project site.

Ecosystems

The disruption in ecosystems due to changes in rainfall and temperature at the site may cause a shift in vegetation types and a loss of habitat that will force species to higher altitudes or more northern latitudes. Because the Project site is situated in an arid climate, the increased summer heat and lack of rainfall may further stress the already fragile desert ecosystem. However, it is uncertain what and when changes in temperature and rainfall will occur at the site or how these changes will ultimately impact these ecosystems because of the complex interrelationships and the uncertainty of how sensitive these interdependent systems are to any varying levels of change.

Water Resources

Eighty percent of California's rainfall occurs in the winter and is stored in snowpack on mountain ranges. Accumulation of snow in winter stores water until spring. Spring melt forms streams and rivers that supply the watershed with water for the duration of the summer. The rapid increase in temperatures projected from climate change will accelerate the water cycle by decreasing snow depth from delayed autumn snowfall and early spring snow melt. The early melt will result in more rapid, earlier, and greater spring runoff. This increased runoff has the potential to result in flooding in the spring followed by excessively dry summers, placing added stress on the already over burdened water supply system.

Excessively dry summers will increase water demands throughout the State exacerbating the demand for water in California. The Project is anticipated to operate a groundwater well to supply the process with its water needs. The well will pump approximately 15 gallons per minute (gpm) and will be pumped to a 30,000 gallon storage tank. Daily processes are estimated to require 1,000 gallons with a total annual draw on the aquifer of approximately 360,000 gallons per year. The storage tank was designed to meet the potential fire flow requirements.

The Project is situated in the Centro Sub Basin of the Mojave Groundwater Basin. According to the County of San Bernardino Water Supply Assessment: "The Mojave Basin Aquifer is well managed and secure water supply, with a California Superior Court imposed physical solution to protect against future overdraft over the next 100 years" and the "1,000-gallon per day to be used by Nursery Products is significantly less than the amount permitted by the Mojave Basin Judgment" (WSA page 14). Therefore, the impact of climate change on the operation of the Hawes facility is less than significant.

Wildfires

The increase in extreme temperature events may lead to an increase in the length of the wildfire season and the number of yearly fires throughout the State. While quantitative information on the increased incidence of wildfires at the Project site due to climate change is unavailable and it is speculative to predict the extent of increased wildfires at the site, an assessment of the available wildfire fuel load in the Project area and a qualitative discussion of the likelihood of a wildfire affecting the Project is possible.

As discussed in the Hazards section of the Draft Environmental Impact Report (DEIR page 4-47), the location of the proposed Project site is in an area of dry, desert vegetation that is generally low-lying and sparsely dispersed. This provides a limited fuel load for wildfires. Additionally the Project site is not listed as an area with significant wildfire potential in the County Hazard maps. "Community-wide fire protection ratings are provided by the Insurance Service Organization (ISO) based on the location of fire station, response time, and availability of water. ISO rankings are on a scale of I to X (1-10) with I (or one) being the best protection and X (or ten) being the worst or no protection. The current ISO rating for the Project area is II (i.e., two)." (DEIR page 4-47). The Project area's fire rating combined with the onsite fire suppression resources will mean the potential impact to the Hawes Facility from wildfires is less than significant.

Summary

Although most scientists agree global climate change will cause temperatures to increase, the amount and rate of that increase is still being debated as is the magnitude of the impact that temperature change will induce. The southwestern region is arid due to the subtropical ridge of high pressure associated with the thermal contrast between the land and adjacent ocean. Little is known about the consequences of higher rates of warming over land then over water, which will impact the climate over the western United States. Therefore, even though some assumptions can be made with respect to potential impacts, the overall impact from climate change remains highly speculative with regards to the localized areas, such as the Project site.

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APPENDIX A

Appendix A

GHG Computation Tables and Urbemis Output

Appendix A1 - Without Project
Appendix A2 - Unmitigated With Project
Appendix A3 - Mitigated With Project
Appendix A4 - Project Construction

APPENDIX A – GHG COMPUTATION TABLES WITHOUT PROJECT

Appendix A1

Without Project

Assumptions:
96 truck trips on an average operating day.
Biosolids trucks travel 345 miles per trip and compose 50% of the trucks.
Greenwawste trucks travel 100 miles per trip and compose 50% of the truck traffic.
For URBEMIS modeling the average distance of 222.5 miles per trip was used for all truck trips.

20017 - Nursery Products
Input data for Green House Gas Emissions

Information input

Construction Scenario(*1a,b)	Summer (lbs/day)	Winter (lbs/day)	Tons/year
Unmitigated			
Mitigated			

Operational(*2a,b) / Area Scenario(*3a,b)	Vehicle			Natural Gas			Total Vehicle + Natural Gas
	Summer (lbs/day)	Winter (lbs/day)	tons/Year	Summer	Winter	Year	
Unmitigated onsite equipment	0	0	0	0	0	0	0.00
Unmitigated Highway vehicles			14364.37	0	0	0	14,364.37
Total Unmitigated	0.00	0.00	14,364.37	0.00	0.00	0.00	14,364.37
Mitigated onsite equipment							0.00
Mitigated Highway vehicles							0.00
Total Mitigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Area Scenario(*3b,c)	Landscaping			Hearth		
	Summer	Winter	Year	Summer	Winter	Year
Unmitigated	0.00	0.00	0.00	0.00	0.00	0.00
Mitigated						

Land Use Type (units)	Unmitigated				Mitigated			
	Summer		Winter		Summer		Winter	
	Total Trips	Total VMT	Total Trips	Total VMT	Total Trips	Total VMT	Total Trips	Total VMT
Composting Facility	96	21388.8	96	21388.8				
	96 Total Trips	21388.8 Total VMT			0 Total Trips	0 Total VMT		

Vehicle fleet information from URBEMIS or traffic study

Vehicle Type	Fleet %		Non-Catalyst		Catalyst		Diesel	
Light Auto	0.00	0.00	1.20	0.01	98.60	0.99	0.20	0.00
Light Truck <3,750 lbs	0.00	0.00	0.00	0.00	100.00	1.00	0.00	0.00
Light Truck 3,751-5,750 lbs	0.00	0.00	0.00	0.00	100.00	1.00	0.00	0.00
Med Truck 5,751-8,500 lbs	0.00	0.00	0.00	0.00	100.00	1.00	0.00	0.00
Lite-Heavy Truck 8,501-10,000 lbs	0.00	0.00	0.00	0.00	83.30	0.83	16.70	0.17
Lite-Heavy Truck 10,001-14,000 lbs	0.00	0.00	0.00	0.00	60.00	0.60	40.00	0.40
Med-Heavy Truck 14,001 - 33,000 lbs	0.00	0.00	0.00	0.00	20.00	0.20	80.00	0.80
Heavy-Heavy Truck 33,001-60,000 lbs	100.00	1.00	0.00	0.00	0.00	0.00	100.00	1.00
Other bus	0.00	0.00	0.00	0.00	0.00	0.00	100.00	1.00
Urban bus	0.00	0.00	0.00	0.00	0.00	0.00	100.00	1.00
Motorcycle	0.00	0.00	33.30	0.33	66.70	0.67	0.00	0.00
School Bus	0.00	0.00	0.00	0.00	0.00	0.00	100.00	1.00
Motor Home	0.00	0.00	0.00	0.00	90.90	0.91	9.10	0.09
	100.00	1.00						

Reduction % for:
Title 24 0

Annual Usages

Input	Single Famil	Multi Family	Food store	Restaurant	Hospital	Retail	University	High School
Natural gas usage rate from URBEMIS	6,665.00	4,011.50	2.90	2.90	2.90	2.90	4.8	4.8
Kilowatt-hour / unit or sqft / year	5,626.50	5,626.50	40.99	40.20	19.61	14.06	12.36	7.46
square footage								
units/rooms								

Input	Elementary	Office small	Office large	Hotel/ Motel	Refrigerated Warehouse	Unrefrigerated Warehouse	Misc	Commercial
Natural gas usage rate from URBEMIS	4.8	2.00	2.00	4.80				2.9
Kilowatt-hour / unit or sqft / year	7.46	13.10	17.70	12.13	20.02	4.45	9.84	13.63
square footage								
units/rooms								

20017 - Nursery Products
Input data for Green House Gas Emissions
Without Project
Carbon Dioxide

A. Mobile (Construction Equipment, Motor Vehicles/Onsite Equipment, and Landscape Equipment) and Stationary Sources (Cooling and Heating)

Emissions of carbon dioxide from mobile (construction equipment, motor vehicles, and landscape equipment) and stationary sources (cooling and heating) are calculated using the following equation:

$$Y_A = (Y_1)+(Y_2)+(Y_3)+(Y_4)$$

Y_A = annual emissions of carbon dioxide from mobile and stationary sources, tons/yr.

Y_1 = annual emissions of carbon dioxide from construction equipment, tons/yr (URBEMIS 2007 9.2.4 output file).

Y_2 = annual emissions of carbon dioxide from motor vehicles, tons/yr (URBEMIS 2007 9.2.4 output file).

Y_3 = annual emissions of carbon dioxide from landscape equipment, tons/yr (URBEMIS 2007 9.2.4 output file).

Y_4 = annual emissions of carbon dioxide from cooling and heating, tons/yr (URBEMIS 2007 9.2.4 output file).

Y_1, tons/yr	Y_2, tons/yr	Y_3, tons/yr	Y_4, tons/yr	Y_A, tons/yr
0.00	14,364.37	0.00	0.00	14,364.37
0.00	1.00	0.00	0.00	

B. Summary Table

Source Type		Emissions, tons/yr
Direct	Mobile and stationary	14364.37000
	Total direct, tons/yr	**14364.37000**
Indirect	Electricity	0.00000
	Total indirect, tons/yr	**0.00000**
	Total, tons/yr	**14364.37000**
	Global warming potential index	**1**
	Global warming potential, tons/yr	**14,364.37000**

20017 - Nursery Products
Input data for Green House Gas Emissions
Without Project
Methane

A. Mobile Source (Motor Vehicles)

Emissions of methane from motor vehicles are calculated using the following equation:

$$Y_A = (M)^*(E)^*(C_1)^{-1}*(C_2)^{-1}$$

Y_A = annual emissions of methane from motor vehicles, tons/yr.
M = annual mileage for motor vehicles, miles/yr (URBEMIS 2007 9.2.2 output file).
E = emission factor for motor vehicles, gr/mile (USEPA Direct Emissions from Mobile Combustion Sources, Climate Leaders, 2004).
C_1 = conversion factor from gr to lbs, 453.59 gr/lbs.
C_2 = conversion factor from lbs to tons, 2,000 lbs/ton.

Unit Type	M, miles/yr	E, gr/mile	C_1, gr/lbs	C_2, lbs/tons	Y_A, tons/yr
Non cat passenger car	0.00	0.1931	453.59	2,000	0.00
Cat passenger car	0.00	0.1127	453.59	2,000	0.00
Diesel passenger car	0.00	0.0161	453.59	2,000	0.00
Non cat light-duty truck	0.00	0.2253	453.59	2,000	0.00
Cat light-duty truck	0.00	0.1448	453.59	2,000	0.00
Diesel light-duty truck	0.00	0.0966	453.59	2,000	0.00
Non cat heavy-duty truck	0.00	0.2012	453.59	2,000	0.00
Cat heavy-duty truck	0.00	0.1448	453.59	2,000	0.00
Diesel heavy-duty truck	7806912.00	0.0161	453.59	2,000	0.14
Non cat motocycles	0.00	0.2092	453.59	2,000	0.00
Cat motocycles	0.00	0.2092	453.59	2,000	0.00
Onsite Equipment	0.00	0.2012	453.59	2,000	0.00
				Total, tons/yr	0.14

B. Summary Table

Source Type		Emissions, tons/yr	Emissions tons/yr (GWP)
Direct	Motor vehicles	0.14000	2.94000
	Total, tons/yr	0.14	2.94000
	Global warming potential index	21	

20017 - Nursery Products
Input data for Green House Gas Emissions
Without Project
Nitrous Oxide

A. Mobile Source (Motor Vehicles)

Emissions of nitrous oxide from motor vehicles are calculated using the following equation:

$$Y_A = (M)*(E)*(C_1)^{-1}*(C_2)^{-1}$$

Y_A = annual emissions of nitrous oxide from motor vehicles, tons/yr.
M = annual mileage for motor vehicles, miles/yr (URBEMIS 2007 9.2.2 output file).
E = emission factor for motor vehicles, gr/mile (USEPA Direct Emissions from Mobile Combustion Sources, Climate Leaders, 2004).
C_1 = conversion factor from gr to lbs, 453.59 gr/lbs.
C_2 = conversion factor from lbs to tons, 2,000 lbs/ton.

Unit Type	M, miles/yr	E, gr/mile	C_1, gr/lbs	C_2, lbs/tons	Y_A, tons/yr
Non cat passenger car	0.00	0.0166	453.59	2,000	0.00000
Cat passenger car	0.00	0.0518	453.59	2,000	0.00000
Diesel passenger car	0.00	0.0161	453.59	2,000	0.00000
Non cat light-duty truck	0.00	0.0208	453.59	2,000	0.00000
Cat light-duty truck	0.00	0.0649	453.59	2,000	0.00000
Diesel light-duty truck	0.00	0.0483	453.59	2,000	0.00000
Non cat heavy-duty truck	0.00	0.0480	453.59	2,000	0.00000
Cat heavy-duty truck	0.00	0.1499	453.59	2,000	0.00000
Diesel heavy-duty truck	7806912.00	0.0322	453.59	2,000	0.27710
Non cat motocycles	0.00	0.0073	453.59	2,000	0.00000
Cat motocycles	0.00	0.0073	453.59	2,000	0.00000
Onsite equipment	0.00	0.0480	453.59	2,000	0.00000
				Total, tons/yr	0.27710

B. Summary Table

Source Type		Emissions, tons/yr	Emissions tons/yr (GWP)
Direct	Motor vehicles	0.27710	85.901
	Total, tons/yr	0.28	85.90
	Global warming potential index	310	

Total Global Warming Potential 14,453.21

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Urbemis 2007 Version 9.2.4

Summary Report for Annual Emissions (Tons/Year)

File Name: R:\General Air Quality Info\Projects\Nursery Products\Modeling\Urbemis\Urbemis March 2009\NP without Project Unmitigated 03-24-09.urb924

Project Name: Nursery Products Without Project 03-09

Project Location: South Coast AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	CO2
TOTALS (tons/year, unmitigated)	14,364.37

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	CO2
TOTALS (tons/year, unmitigated)	14,364.37

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Urbemis 2007 Version 9.2.4

Detail Report for Annual Operational Unmitigated Emissions (Tons/Year)

File Name: R:\General Air Quality Info\Projects\Nursery Products\Modeling\Urbemis\Urbemis March 2009\NP without Project Unmitigated 03-24-09.urb924

Project Name: Nursery Products Without Project 03-09

Project Location: South Coast AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

OPERATIONAL EMISSION ESTIMATES (Annual Tons Per Year, Unmitigated)

Source	CO2
Composting Facility	14,364.37
TOTALS (tons/year, unmitigated)	14,364.37

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2010 Season: Annual

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Composting Facility		1.00	unknown	96.00	96.00	21,388.80
					96.00	21,388.80

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	0.0	1.2	98.6	0.2

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Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Truck < 3750 lbs	0.0	2.7	94.6	2.7
Light Truck 3751-5750 lbs	0.0	0.4	99.6	0.0
Med Truck 5751-8500 lbs	0.0	0.9	99.1	0.0
Lite-Heavy Truck 8501-10,000 lbs	0.0	0.0	81.2	18.8
Lite-Heavy Truck 10,001-14,000 lbs	0.0	0.0	60.0	40.0
Med-Heavy Truck 14,001-33,000 lbs	0.0	0.0	22.2	77.8
Heavy-Heavy Truck 33,001-60,000 lbs	100.0	0.0	0.0	100.0
Other Bus	0.0	0.0	0.0	100.0
Urban Bus	0.0	0.0	0.0	100.0
Motorcycle	0.0	67.9	32.1	0.0
School Bus	0.0	0.0	0.0	100.0
Motor Home	0.0	0.0	88.9	11.1

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	0.0	0.0	0.0	0.0	0.0	0.0
Rural Trip Length (miles)	50.0	50.0	50.0	222.8	222.8	222.8
Trip speeds (mph)	50.0	50.0	50.0	50.0	50.0	50.0
% of Trips - Residential	100.0	0.0	0.0			

% of Trips - Commercial (by land use)

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Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Composting Facility				5.4	2.7	91.9

Operational Changes to Defaults

The urban/rural selection has been changed from Urban to Rural

Home-based work average speed changed from 30 mph to 50 mph

Home-based work urban trip length changed from 12.7 miles to 0 miles

Home-based work rural trip length changed from 17.6 miles to 50 miles

Home-based shop average speed changed from 30 mph to 50 mph

Home-based shop urban trip length changed from 7 miles to 0 miles

Home-based shop rural trip length changed from 12.1 miles to 50 miles

Home-based other average speed changed from 30 mph to 50 mph

Home-based other urban trip length changed from 9.5 miles to 0 miles

Home-based other rural trip length changed from 14.9 miles to 50 miles

Commercial-based commute average speed changed from 30 mph to 50 mph

Commercial-based commute urban trip length changed from 13.3 miles to 0 miles

Commercial-based commute rural trip length changed from 15.4 miles to 222.8 miles

Commercial-based non-work average speed changed from 30 mph to 50 mph

Commercial-based non-work urban trip length changed from 7.4 miles to 0 miles

Commercial-based non-work rural trip length changed from 9.6 miles to 222.8 miles

Commercial-based customer average speed changed from 30 mph to 50 mph

Commercial-based customer urban trip length changed from 8.9 miles to 0 miles

Commercial-based customer rural trip length changed from 12.6 miles to 222.8 miles

APPENDIX A – GHG COMPUTATION TABLES WITH PROJECT - UNMITIGATED

Appendix A2

Unmitigated With Project

Assumptions:
Unmitigated assumes the on-site generator runs 24 hours per day
96 truck trips on an average operating day.
Biosolids trucks travel 100 miles per trip and compose 50% of the trucks.
Greenwawste trucks travel 100 miles per trip and compose 50% of the truck traffic.
10 worker trips per day
Workers average 50 miles per trip.

The Following onsite equipment was used in the analysis

Nursery Products - Composting Facility				
Combustion Sources - Operational Equipment				
Equipment Type	**Urbemis Nomenclature**	**Fuel Type**	**Horsepower[2]**	**Hours/Day Per Unit**
Rubber Tire Loaders # 1	Rubber Tired Loader	D	165	8 hrs/day
Rubber Tire Loaders # 2	Rubber Tired Loader	D	165	8 hrs/day
Rubber Tire Loaders # 3	Rubber Tired Loader	D	165	8 hrs/day
Rubber Tire Loaders # 4	Tractors/Loaders/Backhoes	D	165	4 hrs/day
Misc Screen	Other Material Handling Equipment	D	190	7 hrs/day
Large Grinder	Other General Industrial Equipment	D	1000	8 hrs/month 0.3 hrs/day
Water Truck[1]	Water Truck	D	425	3 hrs/day
Site Truck	Off Highway Truck	D	425	.5 hrs/day
Windrow Turner	Other Equipment	D	550	2 hrs/day

[1]Includes water truck, and one on-site truck. Water truck assumes dust control of road from site to Hy 58.
[2]As assumed by manufacturer specs for similar equipment.

Note: Urbemis considers off-road equipment (such as loaders and backhoes) to be construction related, where as vehicle trips to and from the site are considered operational. Therefore the Urbemis output sheets show the onsite equipment emissions as "construction", although it was combined with the truck and employee trip ("operational") emissions to generate a Total for Project Operation Emissions.

20017 - Nursery Products
Input data for Green House Gas Emissions
With Project

Information input

Construction Scenario(*1a,b)	Summer (lbs/day)	Winter (lbs/day)	Tons/year
Unmitigated	4,391.08	4,391.08	96.60
Mitigated	4,391.08	4,391.08	96.60

Operational(*2a,b) / Area Scenario(*3a,b)	Vehicle			Natural Gas			Total Vehicle + Natural Gas
	Summer (lbs/day)	Winter (lbs/day)	tons/Year	Summer	Winter	Year	
Unmitigated onsite equipment	6229.44	6229.44	812.94	0	0	0	812.94
Unmitigated Highway vehicles	37324.49	37324.49	6808.53	0	0	0	6,808.53
Total Unmitigated	43,553.93	43,553.93	7,621.47	0.00	0.00	0.00	7,621.47
Mitigated onsite equipment	4746.14	4746.14	619.37	0	0	0	619.37
Mitigated Highway vehicles	37324.49	37324.49	6808.53	0	0	0	6,808.53
Total Mitigated	42,070.63	42,070.63	7,427.90	0.00	0.00	0.00	7,427.90

Area Scenario(*3b,c)	Landscaping			Hearth		
	Summer	Winter	Year	Summer	Winter	Year
Unmitigated	0.00	0.00	0.00	0.00	0.00	0.00
Mitigated	0.00	0.00	0.00	0.00	0.00	0.00

Land Use Type (units)	Unmitigated				Mitigated			
	Summer		Winter		Summer		Winter	
	Total Trips	Total VMT	Total Trips	Total VMT	Total Trips	Total VMT	Total Trips	Total VMT
Composting Facility	106	10600	106	10600	106	10600	106	10600
	106 Total Trips	**10600** Total VMT			**106** Total Trips	**10600** Total VMT		

Vehicle fleet information from URBEMIS or traffic study

Vehicle Type	Fleet %		Non-Catalyst		Catalyst		Diesel	
Light Auto	5.40	0.05	1.20	0.01	98.60	0.99	0.20	0.00
Light Truck <3,750 lbs	0.00	0.00	0.00	0.00	100.00	1.00	0.00	0.00
Light Truck 3,751-5,750 lbs	0.00	0.00	0.00	0.00	100.00	1.00	0.00	0.00
Med Truck 5,751-8,500 lbs	0.00	0.00	0.00	0.00	100.00	1.00	0.00	0.00
Lite-Heavy Truck 8,501-10,000 lbs	0.00	0.00	0.00	0.00	83.30	0.83	16.70	0.17
Lite-Heavy Truck 10,001-14,000 lbs	0.00	0.00	0.00	0.00	60.00	0.60	40.00	0.40
Med-Heavy Truck 14,001 - 33,000 lbs	0.00	0.00	0.00	0.00	20.00	0.20	80.00	0.80
Heavy-Heavy Truck 33,001-60,000 lbs	94.60	0.95	0.00	0.00	0.00	0.00	100.00	1.00
Other bus	0.00	0.00	0.00	0.00	0.00	0.00	100.00	1.00
Urban bus	0.00	0.00	0.00	0.00	0.00	0.00	100.00	1.00
Motorcycle	0.00	0.00	33.30	0.33	66.70	0.67	0.00	0.00
School Bus	0.00	0.00	0.00	0.00	0.00	0.00	100.00	1.00
Motor Home	0.00	0.00	0.00	0.00	90.90	0.91	9.10	0.09
	100.00	1.00						

Reduction % for:
Title 24 0

Annual Usages

Input	Single Famil	Multi Family	Food store	Restaurant	Hospital	Retail	University	High School
Natural gas usage rate from URBEMIS	6,665.00	4,011.50	2.90	2.90	2.90	2.90	4.8	4.8
Kilowatt-hour / unit or sqft / year	5,626.50	5,626.50	40.99	40.20	19.61	14.06	12.36	7.46
square footage								
units/rooms								

Input	Elementary	Office small	Office large	Hotel/ Motel	Refrigerated Warehouse	Unrefrigerated Warehouse	Misc	Commercial
Natural gas usage rate from URBEMIS	4.8	2.00	2.00	4.80				2.9
Kilowatt-hour / unit or sqft / year	7.46	13.10	17.70	12.13	20.02	4.45	9.84	13.63
square footage		720						
units/rooms								

20017 - Nursery Products
Input data for Green House Gas Emissions
Unmitigated - With Project
Carbon Dioxide

A. Direct Sources

A1. Mobile (Construction Equipment, Motor Vehicles/Onsite Equipment, and Landscape Equipment) and Stationary Sources (Cooling and Heating)

Emissions of carbon dioxide from mobile (construction equipment, motor vehicles, and landscape equipment) and stationary sources (cooling and heating) are calculated using the following equation:

$$Y_A = (Y_1)+(Y_2)+(Y_3)+(Y_4)$$

Y_A = annual emissions of carbon dioxide from mobile and stationary sources, tons/yr.

Y_1 = annual emissions of carbon dioxide from construction equipment, tons/yr (URBEMIS 2007 9.2.4 output file).

Y_2 = annual emissions of carbon dioxide from motor vehicles, tons/yr (URBEMIS 2007 9.2.4 output file).

Y_3 = annual emissions of carbon dioxide from onsite operational equipment, tons/yr (URBEMIS 2007 9.2.4 output file).

Y_4 = annual emissions of carbon dioxide from cooling and heating, tons/yr (URBEMIS 2007 9.2.4 output file).

Y_1, tons/yr	Y_2, tons/yr	Y_3, tons/yr	Y_4, tons/yr	Y_A, tons/yr
96.60	6,808.53	812.94	0.00	**7,718.07**
0.01	0.88	0.11	0.00	

B. Indirect Sources

B1. Electricity

$$Y_A = (U_A)^*(E)^*(C)^{-1}$$

Y_A = annual emissions of carbon dioxide from electricity usage, tons/yr.

U_A = annual electricity usage, MWh/yr.

E = emission factor for electricity usage, 804.54 lbs/MWh (California Climate Action Registry General Reporting Protocol, Version 2.2, Part III, Chapter 6, 2007).

C = conversion factor from lbs to tons, 2,000 lbs/ton.

Unit Type	R_A *	A **	Unit	U_A, MWh/yr	E, lbs/MWh	C, lbs/ton	Y_A, tons/yr
Office	0.0131	720.00	sq ft	9.43	804.54	2,000	3.79
						Total, tons/yr	**3.79**

* R_A = annual consumption rate (CEQA Handbook, Table A9-11-A). Table A9-11A gives the rate in KWH, we need MWh therefore need to divide by 1000

** A = unit type number.

20017 - Nursery Products
Input data for Green House Gas Emissions
Unmitigated - With Project

B2. Water Usage

** Although water is used onsite, the generator (or solar power) included in the "onsite equipment" will be used to run the well pump therefore no additional

B3. Solid Waste

**With only 6 workers onsite per day, trash generation and therefore emissions from trash generation is negligible.

B4. Wastewater

**All potable water for drinking is being brought into the site in bottles, negligible amounts of waste water is being generated by the onsite facilities (fully contained, portable outhouse and wash station)

C. Summary Table

Source Type		Emissions, tons/yr
Direct	Construction Equipment	4.83
	Motor vehicles	6,808.53
	Onsite Equipment	812.94000
Total direct, tons/yr		**7626.30000**
Indirect	Electricity	3.79000
Total indirect, tons/yr		**3.79000**
Total, tons/yr		**7630.09000**
Global warming potential index		**1**
Global warming potential, tons/yr		**7630.09000**

20 economic life of the Project (Years)

20017 - Nursery Products
Input data for Green House Gas Emissions
Unmitigated - With Project
Methane

A. Direct Sources

A1. Mobile Source (Construction Equipment)

Emissions of methane from construction equipment are calculated using the following equation:

$$Y_A = (M)*(E)*(C_1)^{-1}*(C_2)^{-1}$$

Y_A = annual emissions of methane from construction equipment, tons/yr.
M = annual mileage for construction equipment, miles/yr.
E = emission factor for construction equipment, 0.2012 gr/mile (USEPA Direct Emissions from Mobile Combustion Sources, Climate Leaders, 2004).
C_1 = conversion factor from gr to lbs, 453.59 gr/lbs.
C_2 = conversion factor from lbs to tons, 2,000 lbs/ton.

Unit Type	M*, miles/yr	E, gr/mile	C_1, gr/lbs	C_2, lbs/tons	Y_A, tons/yr
Non cat heavy-duty truck	235,272.00	0.2012	453.59	2,000	**0.05**

* M = annual mileage for construction equipment based on the ratio between annual emissions of carbon dioxide from construction equipment (URBEMIS 2007 9.2.2 output file) and the emission factor for carbon monoxide from construction equipment based on the following EMFAC criteria: 2008 calendar year, all heavy-duty trucks, temperature of 43°F, relative humidity of 74% (average between 63% and 84%, January AM and PM), and speed of 10 miles/hr.

20017 - Nursery Products
Input data for Green House Gas Emissions
Unmitigated - With Project

A2. Mobile Source (Motor Vehicles)

Emissions of methane from motor vehicles are calculated using the following equation:

$$Y_A = (M)*(E)*(C_1)^{-1}*(C_2)^{-1}$$

Y_A = annual emissions of methane from motor vehicles, tons/yr.

M = annual mileage for motor vehicles, miles/yr (URBEMIS 2007 9.2.2 output file).

E = emission factor for motor vehicles, gr/mile (USEPA Direct Emissions from Mobile Combustion Sources, Climate Leaders, 2004).

C_1 = conversion factor from gr to lbs, 453.59 gr/lbs.

C_2 = conversion factor from lbs to tons, 2,000 lbs/ton.

Unit Type	M, miles/yr	E, gr/mile	C_1, gr/lbs	C_2, lbs/tons	Y_A, tons/yr
Non cat passenger car	2507.11	0.1931	453.59	2,000	0.00
Cat passenger car	206001.04	0.1127	453.59	2,000	0.03
Diesel passenger car	417.85	0.0161	453.59	2,000	0.00
Non cat light-duty truck	0.00	0.2253	453.59	2,000	0.00
Cat light-duty truck	0.00	0.1448	453.59	2,000	0.00
Diesel light-duty truck	0.00	0.0966	453.59	2,000	0.00
Non cat heavy-duty truck	0.00	0.2012	453.59	2,000	0.00
Cat heavy-duty truck	0.00	0.1448	453.59	2,000	0.00
Diesel heavy-duty truck	3660074.00	0.0161	453.59	2,000	0.06
Non cat motocycles	0.00	0.2092	453.59	2,000	0.00
Cat motocycles	0.00	0.2092	453.59	2,000	0.00
				Total, tons/yr	**0.09**
Onsite Equipment	333771.00	0.2012	453.59	2,000	0.07

20017 - Nursery Products
Input data for Green House Gas Emissions
Unmitigated - With Project

B. Indirect Sources

B1. Electricity

Emissions of methane from electricity usage are calculated using the following equation:

$$Y_A = (U_A)*(E)*(C)^{-1}$$

Y_A = annual emissions of methane from electricity usage, tons/yr.

U_A = annual electricity usage, MWh/yr.

E = emission factor for electricity usage, 0.0067 lbs/MWh (California Climate Action Registry General Reporting Protocol, Version 2.2, Part III, Chapter 6, 2007).

C = conversion factor from lbs to tons, 2,000 lbs/ton.

Land Use Type	R_A *	Unit	A **	Unit	U_A, MWh/yr	E, lbs/MWh	C, lbs/ton	Y_A, tons/yr
Office	0.0131	MWh/sqft/yr	720	sqft	9.43	0.0067	2,000	0.000032
							Total, tons/yr	**0.000032**

* R_A = annual consumption rate (CEQA Handbook, Table A9-11-A). Converted from KWh/unit/year to MWh/Unit/year

** A = unit type number. (number of units)

C. Summary Table

Source Type		Emissions, tons/yr	Emissions tons/yr (GWP)
Direct	Construction equipment	0.00250	0.05250
	Motor vehicles	0.09000	1.89000
	Onsite Equipment	0.07000	1.47000
Total direct, tons/yr		**0.16250**	**3.41250**
Indirect	Electricity	0.00003	0.00067
Total indirect, tons/yr		**0.00003**	**0.00067**
Total, tons/yr		**0.16**	**3.41317**
Global warming potential index		**21**	

20 economic life of the Project (Years)

20017 - Nursery Products
Input data for Green House Gas Emissions
Unmitigated - With Project
Nitrous Oxide

A. Direct Sources

A1. Mobile Source (Construction Equipment)

Emissions of nitrous oxide from construction equipment are calculated using the following equation:

$$Y_A = (M)*(E)*(C_1)^{-1}*(C_2)^{-1}$$

Y_A = annual emissions of nitrous oxide from construction equipment, tons/yr.

M = annual mileage for construction equipment, miles/yr.

E = emission factor for construction equipment, 0.0048 gr/mile (USEPA Direct Emissions from Mobile Combustion Sources, Climate Leaders, 2004).

C_1 = conversion factor from gr to lbs, 453.59 gr/lbs.

C_2 = conversion factor from lbs to tons, 2,000 lbs/ton.

Unit Type	M*, miles/yr	E, gr/mile	C_1, gr/lbs	C_2, lbs/tons	Y_A, tons/yr
Non cat heavy-duty truck	235272.00	0.0048	453.59	2,000	**0.00125**

* M = annual mileage for construction equipment based on the ratio between annual emissions of carbon dioxide from construction equipment (URBEMIS 2007 9.2.2 output file) and the emission factor for carbon monoxide from construction equipment based on the following EMFAC criteria: 2008 calendar year, all heavy-duty trucks, temperature of 43°F, relative humidity of 74% (average between 63% and 84%, January AM and PM), and speed of 10 miles/hr.

20017 - Nursery Products
Input data for Green House Gas Emissions
Unmitigated - With Project

A2. Mobile Source (Motor Vehicles)

Emissions of nitrous oxide from motor vehicles are calculated using the following equation:

$$Y_A = (M)*(E)*(C_1)^{-1}*(C_2)^{-1}$$

Y_A = annual emissions of nitrous oxide from motor vehicles, tons/yr.

M = annual mileage for motor vehicles, miles/yr (URBEMIS 2007 9.2.2 output file).

E = emission factor for motor vehicles, gr/mile (USEPA Direct Emissions from Mobile Combustion Sources, Climate Leaders, 2004).

C_1 = conversion factor from gr to lbs, 453.59 gr/lbs.

C_2 = conversion factor from lbs to tons, 2,000 lbs/ton.

Unit Type	M, miles/yr	E, gr/mile	C_1, gr/lbs	C_2, lbs/tons	Y_A, tons/yr
Non cat passenger car	2507.11	0.0166	453.59	2,000	0.00005
Cat passenger car	206001.04	0.0518	453.59	2,000	0.01176
Diesel passenger car	417.85	0.0161	453.59	2,000	0.00001
Non cat light-duty truck	0.00	0.0208	453.59	2,000	0.00000
Cat light-duty truck	0.00	0.0649	453.59	2,000	0.00000
Diesel light-duty truck	0.00	0.0483	453.59	2,000	0.00000
Non cat heavy-duty truck	0.00	0.0480	453.59	2,000	0.00000
Cat heavy-duty truck	0.00	0.1499	453.59	2,000	0.00000
Diesel heavy-duty truck	3660074.00	0.0322	453.59	2,000	0.12991
Non cat motocycles	0.00	0.0073	453.59	2,000	0.00000
Cat motocycles	0.00	0.0073	453.59	2,000	0.00000
				Total, tons/yr	**0.14173**
Onsite equipment	333771.00	0.0480	453.59	2,000	0.01766

20017 - Nursery Products
Input data for Green House Gas Emissions
Unmitigated - With Project

B. Indirect Sources

B1. Electricity

Emissions of nitrous oxide from electricity usage are calculated using the following equation:

$$Y_A = (U_A)*(E)*(C)^{-1}$$

Y_A = annual emissions of nitrous oxide from electricity usage, tons/yr.

U_A = annual electricity usage, MWh/yr.

E = emission factor for electricity usage, 0.0037 lbs/MWh (California Climate Action Registry General Reporting Protocol, Version 2.2, Part III, Chapter 6, 2007).

C = conversion factor from lbs to tons, 2,000 lbs/ton. 0.0037

Unit Type	R_A *	Unit	A **	land use unit type	U_A, MWh/yr	E, lbs/MWh	C, lbs/ton	Y_A, tons/yr
Office	0.0131	MWh/sqft/yr	720	sqft	9.43	0.0037	2,000	0.0000174
							Total, tons/yr	**0.0000174**

* R_A = annual consumption rate (CEQA Handbook, Table A9-11-A).

** A = unit type number.

C. Summary Table

Source Type		Emissions, tons/yr	Emissions tons/yr (GWP)
Direct	Construction equipmet	0.00006	0.0192975
	Motor vehicles	0.14173	43.93630
	Onsite Equipment	0.01766	5.47460
Total direct, tons/yr		**0.15945**	49.43020
Indirect	Electricity	0.00002	0.00539
Total indirect, tons/yr		**0.00002**	**0.00539**
Total, tons/yr		**0.15947**	**49.43559**
Global warming potential index		**310**	

20 economic life of the Project (Years)

20017 - Nursery Products
Input data for Green House Gas Emissions
Unmitigated - With Project

Total Unmitigated Global Warming Potentials

Source Type			Emissions tons/yr (GWP)
Direct	Construction equipmet		4.90
	Motor vehicles		6854.36
	Onsite Equipment		819.88
		Total direct, tons/yr	***7679.14***
Indirect	Electricity		3.80
		Total indirect, tons/yr	***3.80***
		Total, tons/yr	**7682.94**

APPENDIX A – GHG COMPUTATION TABLES WITH PROJECT - MITIGATED

Appendix A3

Mitigated With Project

Assumptions:
Mitgated assumes Solar Power. Generator is only used for emergency estimated at 0.5 hrs/day.
96 truck trips on an average operating day.
Biosolids trucks travel 100 miles per trip and compose 50% of the trucks.
Greenwawste trucks travel 100 miles per trip and compose 50% of the truck traffic.
10 worker trips per day
Workers average 50 miles per trip.

The Following onsite equipment was used in the analysis

Nursery Products - Composting Facility				
Combustion Sources - Operational Equipment				
Equipment Type	**Urbemis Nomenclature**	**Fuel Type**	**Horsepower[2]**	**Hours/Day Per Unit**
Rubber Tire Loaders # 1	Rubber Tired Loader	D	165	8 hrs/day
Rubber Tire Loaders # 2	Rubber Tired Loader	D	165	8 hrs/day
Rubber Tire Loaders # 3	Rubber Tired Loader	D	165	8 hrs/day
Rubber Tire Loaders # 4	Tractors/Loaders/Backhoes	D	165	4 hrs/day
Misc Screen	Other Material Handling Equipment	D	190	7 hrs/day
Large Grinder	Other General Industrial Equipment	D	1000	8 hrs/day 0.3 hrs/day
Water Truck[1]	Water Truck	D	425	3 hrs/day
Site Truck	Off Highway Truck	D	425	.5 hrs/day
Windrow Turner	Other Equipment	D	550	2 hrs/day

[1]Includes water truck, and one on-site truck. Water truck assumes dust control of road from site to Hy 58.
[2]As assumed by manufacturer specs for similar equipment.

Note: Urbemis considers off-road equipment (such as loaders and backhoes) to be construction related, where as vehicle trips to and from the site are considered operational. Therefore the Urbemis output sheets show the onsite equipment emissions as "construction", although it was combined with the truck and employee trip ("operational") emissions to generate a Total for Project Operation Emissions.

20017 - Nursery Products
Input data for Green House Gas Emissions
With Project

Information input

Construction Scenario(*1a,b)	Summer (lbs/day)	Winter (lbs/day)	Tons/year
Unmitigated	4,391.08	4,391.08	96.60
Mitigated	4,391.08	4,391.08	96.60

Operational(*2a,b) / Area Scenario(*3a,b)	Vehicle			Natural Gas			Total Vehicle + Natural Gas
	Summer (lbs/day)	Winter (lbs/day)	tons/Year	Summer	Winter	Year	
Unmitigated onsite equipment	6229.44	6229.44	812.94	0	0	0	812.94
Unmitigated Highway vehicles	37324.49	37324.49	6808.53	0	0	0	6,808.53
Total Unmitigated	43,553.93	43,553.93	7,621.47	0.00	0.00	0.00	7,621.47
Mitigated onsite equipment	4746.14	4746.14	619.37	0	0	0	619.37
Mitigated Highway vehicles	37324.49	37324.49	6808.53	0	0	0	6,808.53
Total Mitigated	42,070.63	42,070.63	7,427.90	0.00	0.00	0.00	7,427.90

Area Scenario(*3b,c)	Landscaping			Hearth		
	Summer	Winter	Year	Summer	Winter	Year
Unmitigated	0.00	0.00	0.00	0.00	0.00	0.00
Mitigated	0.00	0.00	0.00	0.00	0.00	0.00

Land Use Type (units)	Unmitigated				Mitigated			
	Summer		Winter		Summer		Winter	
	Total Trips	Total VMT	Total Trips	Total VMT	Total Trips	Total VMT	Total Trips	Total VMT
Composting Facility	106	10600	106	10600	106	10600	106	10600
	106 Total Trips	**10600** Total VMT			**106** Total Trips	**10600** Total VMT		

Vehicle fleet information from URBEMIS or traffic study

Vehicle Type	Fleet %		Non-Catalyst		Catalyst		Diesel	
Light Auto	5.40	0.05	1.20	0.01	98.60	0.99	0.20	0.00
Light Truck <3,750 lbs	0.00	0.00	0.00	0.00	100.00	1.00	0.00	0.00
Light Truck 3,751-5,750 lbs	0.00	0.00	0.00	0.00	100.00	1.00	0.00	0.00
Med Truck 5,751-8,500 lbs	0.00	0.00	0.00	0.00	100.00	1.00	0.00	0.00
Lite-Heavy Truck 8,501-10,000 lbs	0.00	0.00	0.00	0.00	83.30	0.83	16.70	0.17
Lite-Heavy Truck 10,001-14,000 lbs	0.00	0.00	0.00	0.00	60.00	0.60	40.00	0.40
Med-Heavy Truck 14,001 - 33,000 lbs	0.00	0.00	0.00	0.00	20.00	0.20	80.00	0.80
Heavy-Heavy Truck 33,001-60,000 lbs	94.60	0.95	0.00	0.00	0.00	0.00	100.00	1.00
Other bus	0.00	0.00	0.00	0.00	0.00	0.00	100.00	1.00
Urban bus	0.00	0.00	0.00	0.00	0.00	0.00	100.00	1.00
Motorcycle	0.00	0.00	33.30	0.33	66.70	0.67	0.00	0.00
School Bus	0.00	0.00	0.00	0.00	0.00	0.00	100.00	1.00
Motor Home	0.00	0.00	0.00	0.00	90.90	0.91	9.10	0.09
	100.00	1.00						

Reduction % for:
Title 24 0

Annual Usages

Input	Single Famil	Multi Family	Food store	Restaurant	Hospital	Retail	University	High School
Natural gas usage rate from URBEMIS	6,665.00	4,011.50	2.90	2.90	2.90	2.90	4.8	4.8
Kilowatt-hour / unit or sqft / year	5,626.50	5,626.50	40.99	40.20	19.61	14.06	12.36	7.46
square footage								
units/rooms								

Input	Elementary	Office small	Office large	Hotel/ Motel	Refrigerated Warehouse	Unrefrigerated Warehouse	Misc	Commercial
Natural gas usage rate from URBEMIS	4.8	2.00	2.00	4.80				2.9
Kilowatt-hour / unit or sqft / year	7.46	13.10	17.70	12.13	20.02	4.45	9.84	13.63
square footage		720						
units/rooms								

20017 - Nursery Products
Input data for Green House Gas Emissions
Mitigated - With Project

Carbon Dioxide

A. Direct Sources

A1. Mobile (Construction Equipment, Motor Vehicles, and Landscape Equipment) and Stationary Sources (Cooling and Heating)

Emissions of carbon dioxide from mobile (construction equipment, motor vehicles, and landscape equipment) and stationary sources (cooling and heating) are calculated using the following equation:

$$Y_A = (Y_1)+(Y_2)+(Y_3)+(Y_4)$$

Y_A = mitigated annual emissions of carbon dioxide from mobile and stationary sources, tons/yr.

Y_1 = mitigated annual emissions of carbon dioxide from construction equipment, tons/yr (URBEMIS 2007 9.2.2 output file).

Y_2 = mitigated annual emissions of carbon dioxide from motor vehicles, tons/yr (URBEMIS 2007 9.2.2 output file).

Y3 = annual emissions of carbon dioxide from onsite operational equipment, tons/yr (URBEMIS 2007 9.2.4 output file).

Y_4 = mitigated annual emissions of carbon dioxide from cooling and heating, tons/yr (URBEMIS 2007 9.2.2 output file).

Y_1, tons/yr	Y_2, tons/yr	Y_3, tons/yr	Y_4, tons/yr	Y_A, tons/yr
96.60	6,808.53	619.37	0.00	**7,524.50**
			Reduction percentage, %	**2.51**

Additional reductions beyond Urbemis

Heating & Cooling & Transportation

Red_1 = Building design shall incorporate basic or enhanced insulation such that heat transfer and thermal bridging is minimized (20% reduction in heating. Heating is a percentage of total electric, therefore reduction is heating percentage * reduciton pe

Red_2 = Limit air leakage through the structure or within the heating & cooling distribution system (?%reduction). Heating is a percentage of total electric, therefore reduction is heating percentage * reduciton percentage)

Red_3 = Residential buildings meet or exceed ENERGY STAR rated windows. This will reduce heat/cooling energy usage. Heating is a percentage of total electric, reduction = Mitigation reduction * Heating % of total electrical usage. (?% reduction)

Red_4 = Residential buildings meet or exceed ENERGY STAR rated heating and cooling units. This will reduce heat/cooling energy usage. Heating is a percentage of total electric, reduction = Mitigation reduction * Heating % of total electrical usage. (?% r

Red_5 = Plant shade trees around main buildings to reduce direct sunlight into the sturctures (?% reduction)

20017 - Nursery Products
Input data for Green House Gas Emissions
Mitigated - With Project

B. Indirect Sources

B1. Electricity

Emissions of carbon dioxide from electricity usage are calculated using the following equation:

$$Y_{MA} = (Y_{UA})^*(1\text{-Red})$$

Y_{MA} = mitigated annual emissions of carbon dioxide from electricity usage, tons/yr.
Y_{UA} = unmitigated annual emissions of carbon dioxide from electricity usage, tons/yr.
Red_1 = Reduction from Solar Use 0 0 %

Land Use Type	Y_{UA}, tons/yr	Red_1	Red_2	Red_3	Red_4	Red_5	Red_6	Red_7	Red_8	Y_{MA}, tons/yr
Office	3.79	1								0.00
								Total mitigated tons per year		**0.00**
								Reduction percentage, %		**100.00**

C. Summary Table

Source Type		Emissions, tons/yr	GWP tons/yr
Direct	Construction equipmet	4.83	4.83
	Motor vehicles	6,808.53	6,808.53
	Onsite Equipment	619.37	619.37
Total direct, tons/yr		**7,432.73**	**7,432.73**
Indirect	Electricity	0.00	0.00
Total indirect, tons/yr		**0.00**	**0.00**
Total, tons/yr		**7,432.73**	**7,432.73**
Reduction percentage, %		**2.59**	
Global warming potential index		**1**	

20 economic life of the Project (Years)

20017 - Nursery Products
Input data for Green House Gas Emissions
Mitigated - With Project
Methane

A. Direct Sources

A1. Mobile Source (Construction Equipment)

Emissions of methane from construction equipment are not reduced by any mitigation measures; therefore, emissions of methane from construction equipment equal to **0.05** tons/yr.

A2. Mobile Source (Motor Vehicles)

Emissions of methane from motor vehicles are calculated using the following equation:

$$Y_{MA} = (M_M)*(E)*(C_1)^{-1}*(C_2)^{-1}$$

Y_{MA} = mitigated annual emissions of methane from motor vehicles, tons/yr.

M_M = mitigated annual mileage for motor vehicles, miles/yr (URBEMIS 2007 9.2.2 output file).

E = emission factor for motor vehicles, gr/mile (USEPA Direct Emissions from Mobile Combustion Sources, Climate Leaders, 2004).

C_1 = conversion factor from gr to lbs, 453.59 gr/lbs.

C_2 = conversion factor from lbs to tons, 2,000 lbs/ton.

Red_1 = Promote ride sharing programs for all tenants: Non-Residential Land Uses Transportation only; Reduction = %reduction*%vehicle emissions from total use (?% reduction)

Red_2 = Provide Adaquate bicycle parking near building entrances: Non-Residential Land Uses Transportation only; Reduction = %reduction*%vehicle emissions from total use (?% red

Red_3 = Idling is limited to less than 5 minutes: Non-Residential Land Uses Transportation only; Reduction = %reduction*%vehicle emissions from total use (?% reduction)

*Note all reductions are accounted for in Urbemis.

Unit Type	M_M, miles/yr	E, gr/mile	C_1, gr/lbs	C_2, lbs/tons	Y_{MA}, tons/yr
Non cat passenger car	2507.11	0.1931	453.59	2,000	0.00000
Cat passenger car	206001.04	0.1127	453.59	2,000	0.03000
Diesel passenger car	417.85	0.0161	453.59	2,000	0.00000
Non cat light-duty truck	0.00	0.2253	453.59	2,000	0.00000
Cat light-duty truck	0.00	0.1448	453.59	2,000	0.00000
Diesel light-duty truck	0.00	0.0966	453.59	2,000	0.00000
Non cat heavy-duty truck	0.00	0.2012	453.59	2,000	0.00000
Cat heavy-duty truck	0.00	0.1448	453.59	2,000	0.00000
Diesel heavy-duty truck	3,660,074.00	0.0161	453.59	2,000	0.06000
Non cat motocycles	0.00	0.2092	453.59	2,000	0.00000
Cat motocycles	0.00	0.2092	453.59	2,000	0.00000
				Total, tons/yr	**0.09**
				Reduction percentage, %	**0.00**
Onsite Equipment	254296.00	0.2012	453.59	2,000	0.05640

20017 - Nursery Products
Input data for Green House Gas Emissions
Mitigated - With Project

B. Indirect Sources

B1. Electricity

Emissions of methane from electricity usage are calculated using the following equation:

$$Y_{MA} = (Y_{UA})*(1-Red)$$

Y_{MA} = mitigated annual emissions of methane from electricity usage, tons/yr.
Y_{UA} = unmitigated annual emissions of methane from electricity usage, tons/yr.
Red1 = Reduction from Solar Use

Land Use Type	Y_{UA}, tons/yr	Red_1	Red_2	Red_3	Red_4	Red_5	Red_6	Red_7	Y_{MA}, tons/yr
Office	3.20E-05	1.00							0
								Total mitigated tons per year	**0.000000**
								Reduction percentage, %	**100.00**

C. Summary Table

Source Type		Emissions, tons/yr	GWP tons/yr
Direct	Construction equipmet	0.00250	0.05250
	Motor vehicles	0.09000	1.89000
	Onsite Equipment	0.05640	1.18440
Total direct, tons/yr		**0.14890**	**3.13**
Indirect	Electricity	0.00000	0.00000
Total indirect, tons/yr		**0.00000**	**0.00000**
Total, tons/yr		**0.14890**	**3.12690**
Reduction percentage, %		**8.39**	
Global warming potential index		**21**	
Global warming potential, tons/yr		**3.13**	

20 economic life of the Project (Years)

20017 - Nursery Products
Input data for Green House Gas Emissions
Mitigated - With Project
Nitrous Oxide

A. Direct Sources

A1. Mobile Source (Construction Equipment)

Emissions of nitrous oxide from construction equipment are not reduced by any mitigation measures; therefore, emissions of nitrous oxide from construction equipment equal to **0.00125** tons/yr.

A2. Mobile Source (Motor Vehicles)

Emissions of nitrous oxide from motor vehicles are calculated using the following equation:

$$Y_{MA} = (M_M)*(E)*(C_1)^{-1}*(C_2)^{-1}$$

Y_{MA} = mitigated annual emissions of nitrous oxide from motor vehicles, tons/yr.

M_M = mitigated annual mileage for motor vehicles, miles/yr (URBEMIS 2007 9.2.2 output file).

E = emission factor for motor vehicles, gr/mile (USEPA Direct Emissions from Mobile Combustion Sources, Climate Leaders, 2004).

C_1 = conversion factor from gr to lbs, 453.59 gr/lbs.

C_2 = conversion factor from lbs to tons, 2,000 lbs/ton.

Red_1 = Promote ride sharing programs for all tenants: Non-Residential Land Uses Transportation only; Reduction = %reduction*%vehicle emissions from total use (?% reduction)

Red_2 = Provide Adaquate bicycle parking near building entrances: Non-Residential Land Uses Transportation only; Reduction = %reduction*%vehicle emissions from total use (?% red

Red_3 = Idling is limited to less than 5 minutes: Non-Residential Land Uses Transportation only; Reduction = %reduction*%vehicle emissions from total use (?% reduction)

*Note all reductions are accounted for in Urbemis.

Unit Type	M_M, miles/yr	E, gr/mile	C_1, gr/lbs	C_2, lbs/tons	Y_{MA}, tons/yr
Non cat passenger car	2507.11	0.0166	453.59	2,000	0.00005
Cat passenger car	206001.04	0.0518	453.59	2,000	0.01176
Diesel passenger car	417.85	0.0161	453.59	2,000	0.00001
Non cat light-duty truck	0.00	0.0208	453.59	2,000	0.00000
Cat light-duty truck	0.00	0.0649	453.59	2,000	0.00000
Diesel light-duty truck	0.00	0.0483	453.59	2,000	0.00000
Non cat heavy-duty truck	0.00	0.0480	453.59	2,000	0.00000
Cat heavy-duty truck	0.00	0.1499	453.59	2,000	0.00000
Diesel heavy-duty truck	3660074.00	0.0322	453.59	2,000	0.12991
Non cat motocycles	0.00	0.0073	453.59	2,000	0.00000
Cat motocycles	0.00	0.0073	453.59	2,000	0.00000
				Total, tons/yr	**0.14173**
				Reduction percentage, %	**0.00**
Onsite Equipment	254296.00	0.0480	453.59	2,000	0.01346

20017 - Nursery Products
Input data for Green House Gas Emissions
Mitigated - With Project

B. Indirect Sources

B1. Electricity

Emissions of nitrous oxide from electricity usage are calculated using the following equation:

$$Y_{MA} = (Y_{UA})*(1\text{-Red})$$

Y_{MA} = mitigated annual emissions of nitrous oxide from electricity usage, tons/yr.
Y_{UA} = unmitigated annual emissions of nitrous oxide from electricity usage, tons/yr.
Red_1 = Reduction from Solar Use.

Land Use Type	Y_{UA}, tons/yr	Red_1	Red_2	Red_3	Red_4	Red_5	Red_6	Red_7	Y_{MA}, tons/yr
Office	0.0000174	1.00							0.000000
								Total mitigated tons per year	**0.000000**
								Reduction percentage, %	**100.00**

C. Summary Table

Source Type		Emissions, tons/yr	GWP tons/yr
Direct	Construction equipmet	0.000062250	0.019297500
	Motor vehicles	0.141730000	43.936300000
	Onsite	0.013460000	4.172600000
Total direct, tons/yr		**0.155252250**	**48.128197500**
Indirect	Electricity	0.000000000	0.000000000
Total indirect, tons/yr		**0.000000000**	**0.000000000**
Total, tons/yr		**0.155252**	**48.128198**
Reduction percentage, %		**2.64**	
Global warming potential index		**310**	
Global warming potential, tons/yr		**48.13**	

20 economic life of the Project (Years)

20017 - Nursery Products
Input data for Green House Gas Emissions
Mitigated - With Project

Total Mitigated Global Warming Potentials

Source Type		Emissions tons/yr (GWP)	% Reduction
Direct	Construction equipmet	4.90	0.00
	Motor vehicles	6854.36	0.00
	Onsite Equipment	624.73	23.80
	Total direct, tons/yr	***7483.99***	2.54
Indirect	Electricity	0.00	100.00
	Total indirect, tons/yr	***0.00***	100.00
	Total, tons/yr	**7,483.99**	**2.59**

Total emissions without project	14,453.21	
Total emissions with Mitigated Project	**-6,969.22**	**193.12**

Appendix A4

Project Construction

Assumptions:
Construction activities would last approximately 2 months
Construction equipment would be:

Equipment Type	Horsepower[2]	Hours/Day Per Unit
Grader #1	250	8 hrs/day
Grader #2	250	8 hrs/day
Off Highway Truck	430	8 hrs/day
Rubber Tire Loaders	165	8 hrs/day
Water Truck	425	3 hrs/day

Note: Mitigated and Unmitigated Construction GHG Emissions are calculated in the With Project Scenarios, please see Unmitigated With Project (A2) and Mitigated With Project (A3) for GHG Emission Calculations.

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Urbemis 2007 Version 9.2.4

Summary Report for Annual Emissions (Tons/Year)

File Name:

Project Name: Nursery Products Construction revised 4-7-09

Project Location: South Coast AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

CONSTRUCTION EMISSION ESTIMATES

	CO2
2006 TOTALS (tons/year unmitigated)	96.60

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Urbemis 2007 Version 9.2.4

Detail Report for Annual Construction Unmitigated Emissions (Tons/Year)

File Name:

Project Name: Nursery Products Construction revised 4-7-09

Project Location: South Coast AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

CONSTRUCTION EMISSION ESTIMATES (Annual Tons Per Year, Unmitigated)

	CO2
2006	96.60
Mass Grading 03/06/2006-05/04/2006	96.60
Mass Grading Dust	0.00
Mass Grading Off Road Diesel	93.17
Mass Grading On Road Diesel	0.00
Mass Grading Worker Trips	3.43

Phase Assumptions

Phase: Mass Grading 3/6/2006 - 5/4/2006 - Default Mass Site Grading/Excavation Description

Total Acres Disturbed: 80

Maximum Daily Acreage Disturbed: 4

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

2 Graders (250 hp) operating at a 0.59 load factor for 8 hours per day

1 Off Highway Trucks (430 hp) operating at a 0.59 load factor for 8 hours per day

1 Rubber Tired Loaders (165 hp) operating at a 0.59 load factor for 8 hours per day

1 Water Trucks (425 hp) operating at a 0.5 load factor for 3 hours per day