Appendix
LAX Master Plan Supplement to the Draft EIS/EIR

S-E. Supplemental Air Quality Impact Analysis

June 2003

Prepared for:

Los Angeles World Airports

U.S. Department of Transportation
Federal Aviation Administration

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List of Acronyms

AAM - annual arithmetic mean

ACU - air conditioning unit

ADT - average daily trip

AERMOD - AMS/EPA Regulatory Model

AGM - annual geometric mean

AP - Airport peak hour

APU - auxiliary power unit

AQMP - Air Quality Management Plan

ASU - air start unit

AvGas - aviation gasoline

AVR - average vehicle ridership

BACT - best available control technology

bhp - brake horsepower

CAAQS - California Ambient Air Quality Standard

CAL3QHCR - Model for dispersion of CO from motor vehicles at roadway intersections

CALINE - California Line Source Model

CALMPRO - Calms Processing Model

Caltrans - California Department of Transportation

CARB - California Air Resources Board

CDM - Camp Dresser & McKee Inc.

CEQA - California Environmental Quality Act

CFR - Code of Federal Regulations

CNG - compressed natural gas

CO - carbon monoxide

CT - cooling tower

CTA - Central Terminal Area

CUP - Central Utility Plant

EDMS - Emissions and Dispersion Modeling System

EIR - Environmental Impact Report

EIS - Environmental Impact Statement

EMFAC - California Emission Factor Model

FAA - Federal Aviation Administration

FAEED - FAA Aircraft Engine Emission Database

FR - Federal Register

g - gram

GAV - ground access vehicles

GPU - ground power unit

GRE - ground run-up enclosure

GSE - ground support equipment

GTC - Ground Transportation Center

GVW - gross vehicle weight

HAP - hazardous air pollutant

HC - hydrocarbon

HHDT - heavy heavy diesel truck

ICAO - International Civil Aviation Organization

ISCST3 - Industrial Source Complex Short Term Model

ITC - Intermodal Transportation Center

kg - kilogram

LADWP - Los Angeles Department of Water and Power

LAWA - Los Angeles World Airports

LAX - Los Angeles International Airport

LDA - light duty automobile

LDT - light duty truck

LEV - low emission vehicle

LHGT - light heavy gasoline truck

LNG - liquefied natural gas

LTO - landing and takeoff operation

m - meter

MCY - motorcycle

MDT - medium duty truck

$\mu g/m^3$ - microgram per cubic meter

MHDT - medium heavy diesel truck

MHGT - medium heavy gasoline truck

mmBtu - millions of British thermal units

MOU - Memorandum of Understanding

MPO - Metropolitan Planning Organization

MVEI - California Motor Vehicle Emissions Inventory Model

NAAQS - National Ambient Air Quality Standard

NA / NP - No Action / No Project Alternative

NEPA - National Environmental Policy Act

NO_2 - nitrogen dioxide

NO_x -oxides of nitrogen

O_3 - ozone

OEHHA - California Office of Environmental Health Hazard Assessment

OLM - Ozone Limiting Method

PAH - polynuclear aromatic hydrocarbon

Pb - lead

$PM_{2.5}$ - particulate matter with an equivalent aerodynamic diameter of 2.5 micrometers or less

PM_{10} - particulate matter with an equivalent aerodynamic diameter of 10 micrometers or less

ppm - parts per million

ppmw - parts per million, weight

RAC - rent a car

REL - reference exposure level

ROG - reactive organic gas

RTIP - Regional Transportation Improvement program

RTP - Regional Transportation Plan

SCAB - South Coast Air Basin

SCAQMD - South Coast Air Quality Management District

SIMMOD - Simulation Model

SIP - state implementation plan

SO_2 - sulfur dioxide

SO_x - sulfur oxides

SULEV - super ultra low emission vehicle

SUV - sport utility vehicle

TAC - toxic air contaminant

TAPA - toxic air pollutant assessment

TCDD - tetrachloro-dibenzo-p-dioxin

TIM - time in mode

UBD - urban bus diesel

USEPA - United States Environmental Protection Agency

V/C - volume-to-capacity ratio

VFR - visual flight rules

VMT - vehicle miles traveled

VOC - volatile organic compounds

WTA - West Terminal Area

ZEV - zero emission vehicle

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1. INTRODUCTION

A quantitative air quality assessment was conducted to estimate criteria pollutant mass emissions for the environmental baseline and for each alternative, and to predict the associated ambient concentrations. This Technical Appendix is provided in support of Section 4.6, *Air Quality*, of the Supplement to the Draft EIS/EIR.

A full discussion of the methodology, affected environment, and results of the original analysis is contained in Appendix G, *Air Quality Impact Analysis*, of the Draft EIS/EIR. Where the methodology has been revised for this Supplement to the Draft EIS/EIR, these revisions are noted below. Information in support of the Draft EIS/EIR is provided in Technical Report 4, *Air Quality Technical Report*, of the Draft EIS/EIR. Information in support of this report is provided in Technical Report S-4, *Supplemental Air Quality Technical Report*, of the Supplement to the Draft EIS/EIR.

2. METHODOLOGY

The following sections discuss and identify the categories and types of emission sources inventoried, the calculation procedures and sources of data used to complete the emissions inventories, and the assumptions for dispersion modeling. These sections describe any changes to the approach or methodology detailed in the Draft EIS/EIR revisions to the analysis or results presented in the Draft EIS/EIR for the environmental baseline, No Action/No Project Alternative, and Alternatives A, B, and C; and the results for Alternative D, the preferred alternative. The air quality analysis was performed for both an interim year and the 2015 horizon year.

The year 2015 represents build out of the LAX Master Plan. The interim year was defined for each alternative as the year predicted to have the highest combined, or total, emissions from both operational sources and construction sources. The interim year for any individual alternative is not necessarily the same year as the peak year of operation emissions or the peak year of construction emissions. The interim year for the No Action/No Project Alternative and Alternatives A, B, and C is 2005. Construction emissions associated with Alternatives A, B, and C were also analyzed for 2004, the peak year of construction emissions. The interim year for the analysis of air quality impacts from on- and off-airport sources under Alternative D is 2013, as this is the peak year of combined emissions from construction and operational sources. Construction emissions associated with Alternative D were also analyzed for 2005, the peak year of construction emissions.

Prior to preparing the emissions inventories and conducting the dispersion modeling, the *Air Quality Modeling Protocol for Criteria Pollutants* (see Attachment A to Technical Report 4, *Air Quality*, in the Draft EIS/EIR (January 2001)) was prepared. This protocol was submitted to the South Coast Air Quality Management District (SCAQMD) and to the Federal Aviation Administration (FAA) for review and comment. The protocol was revised to address SCAQMD and FAA comments. The protocol provides a discussion of the basic approach used in this report. The following sections provide additional details and explanations of specific data. The methodologies used in this analysis are based on an extensive body of literature; Attachment A in Technical Report S-4, *Supplemental Air Quality Technical Report*, of the Supplement to the Draft EIS/EIR, contains the bibliography developed to support this effort.

2.1 Emissions Estimates

The emissions estimates presented in this Appendix were developed based on the general approach and methodology described in Appendix G of the Draft EIS/EIR. In addition, the analysis completed for the Supplement to the Draft EIS/EIR includes consideration of changes to the baseline conditions. Changes in the methodology incorporated into the Supplement to the Draft EIS/EIR are detailed in this section.

The emission potential of each source type is dependent upon the number of emission sources, the level of source activity, and the frequency of use. Temporal factors are used in the emissions calculations to account for sources that operate below maximum activity levels and those sources that have intermittent activity. Temporal factors provide the level of activity of operations within a given time frame such as an hour of the day, day of the week, or month of the year. Temporal factors for both mobile and stationary emission sources were used to calculate annual emissions. The temporal factors used were developed for the LAX Master Plan and are presented in Technical Report 4 of the Draft EIS/EIR and Attachment B of Technical Report S-4 of the Supplement to the Draft EIS/EIR.

2.1.1 Pollutants of Concern

This appendix, along with Section 4.6, *Air Quality*, of the Supplement to the Draft EIS/EIR and Technical Report S-4, of the Supplement to the Draft EIS/EIR, address the criteria pollutant impact analysis. The assessment of toxic air pollutants is presented in Section 4.24.1, *Supplemental Human Health Risk Assessment,* and Technical Report 9a, *Supplemental Health Risk Assessment*, of the Supplement to the Draft EIS/EIR.

Emission inventories have been developed for the following criteria pollutants and criteria pollutant precursors: carbon monoxide (CO), oxides of nitrogen (NO_x), nitrogen dioxide (NO_2), volatile organic compounds (VOC), sulfur dioxide (SO_2), and particulate matter with an equivalent aerodynamic diameter less than 10 micrometers (PM_{10}). LAX impacts on ozone (O_3) and sulfate criteria pollutant concentrations are qualitatively determined by assessing the emission inventories developed for their precursors (i.e., NO_x and VOC for O_3, and SO_2 for sulfates). Emissions inventories for lead were not developed as airport operations have negligible emission potentials for these two pollutants.

2.1.2 Construction

An air pollutant emissions inventory was compiled for construction activities associated with Alternative D of the LAX Master Plan. These emissions estimates were based on the type, magnitude, and duration of the planned construction activities, with emission factors obtained primarily from regulatory sources. The construction emission inventory analysis presented in this appendix is based on the general approach and methodology described in Appendix G (subsection 2.1.2) of the Draft EIS/EIR. In addition, the analysis completed for this Supplement to the Draft EIS/EIR includes construction activities associated with Alternative D of the LAX Master Plan. Changes in the methodology incorporated into the Supplement to the Draft EIS/EIR are detailed below.

Construction activity data used to develop the construction emissions inventory for Alternative D is presented in Attachment D to Technical Report S-4 of this Supplement to the Draft EIS/EIR. This document presents order-of-magnitude estimates for the construction equipment and the construction schedule necessary to develop Alternative D by the horizon year 2015. Construction activity data for Alternatives A, B, and C was presented in Technical Report 4 of the Draft EIS/EIR. Equipment types, sizes, manufacturers, and quantities were identified for the construction phases, which included demolition, earthwork and foundation, utilities, structures, pavement, and support. Construction equipment data, such as brake horsepower and fuel consumption estimates, were based on manufacturer's published information and SCAQMD's CEQA Air Quality Handbook[1] (SCAQMD Handbook). Construction equipment was grouped according to the methodology detailed in Appendix G (Section 2.1.2, *Construction*), of the Draft EIS/EIR.

Combustion emission factors (CO, VOC, NO_x, and PM_{10}) for off-road construction equipment were revised based on the California Air Resources Board's (CARB) OFFROAD Model.[2] SO_x emissions factors were derived from sulfur limits set by SCAQMD Rule 431.2, which specifies that a liquid fuel's maximum sulfur content is 500 ppmw until January 1, 2005 and 15 ppmw thereafter. Diesel is the primary fuel used by off-road construction equipment, though some on-road vehicles are assumed to use gasoline. Fugitive PM_{10} emissions (vehicle travel on paved and unpaved roads, grading, loading and unloading) from on-site construction activities were calculated using USEPA's *Compilation of Air Pollutant Emission Factors*, Volume 1, AP-42,[3] (herein referred to as AP-42) and the SCAQMD Handbook. Fugitive PM_{10} emission factors depend on various inputs such as soil moisture content, silt loading, and construction equipment type, weight, speed, and performance characteristics. Unmitigated PM_{10} emissions estimates assume that water is applied to control fugitive dust, as required by SCAQMD Rule 403. For on-road equipment (e.g., on-site automobiles, pickup trucks, haul trucks), exhaust emissions factors were based on CARB's on-road emission factor model, EMFAC2002.[4]

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1 South Coast Air Quality Management District, CEQA Air Quality Handbook, 1993.

2 California Air Resources Board, Emission Inventory of Off-Road Large Compression-Ignited Engines (>25 HP) Using the New Offroad Emissions Model (Mailout MSC #99-32), March 2003, http://www.arb.ca.gov/msei/msei.htm.

3 U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, Volume 1: Stationary Point and Area Sources, March 2003, http: //www.epa.gov/ttn/chief/ap42.

4 California Air Resources Board, Research Division, EMFAC 2002 On-Road Emissions Inventory Estimation Model, Version 2.2,

Alternatives C and D were analyzed using the updated emission factors. The same ratio method of estimation presented in the Draft EIS/EIR, based on the emission calculations done for Alternative C, was used to develop revised emission inventories for Alternatives A and B. These updated values are presented in Section 4.6, *Air Quality* (subsections 4.6.6 and 4.6.8), and are used to determine significance, in the Supplement to the Draft EIS/EIR.

Emission rates were adjusted using load factors from the SCAQMD Handbook[5] and a 0.83 usage factor, which accounts for breaks and lunch during a typical workday. Fuel combustion and fugitive emission rates were summed to obtain the total daily emissions per piece of equipment. Individual construction equipment daily emissions were then summed to determine crew emission rates, which in turn were used to calculate emissions for each activity. Daily, quarterly, and annual project emissions were then calculated based on each activity's start date and duration, assuming construction activities occur during a single 10-hour daily work shift on weekdays only.

Due to the order-of-magnitude nature of the construction emissions inventory, activities deemed to be insignificant relative to overall project emissions were not quantified. Types of activities deemed to be insignificant include VOC emissions from architectural coatings, solvents, hot-mix asphalt paving, and runway/taxiway striping. Most surface coatings by 2005 are assumed to be water-based coatings, in accordance with SCAQMD rules and regulations governing the use of coating applications without control devices (direct release into the atmosphere),[6] thus minimizing VOC emissions.

2.1.3 Operations

This analysis included an identification of all on- and off-airport emission sources associated with LAX. These sources can be divided into three general categories: mobile, stationary, and area. The emission estimate analysis of airport operations presented below is based on the general approach and methodology described in Appendix G (subsection 2.1.3) of the Draft EIS/EIR. Changes in the methodology incorporated into this Supplement to the Draft EIS/EIR are noted below.

2.1.3.1 Mobile Sources

Aircraft Operations

Emissions calculations presented in the Draft EIS/EIR for aircraft were developed primarily using the Emissions and Dispersion Modeling System, Version 3.2 (EDMS 3.2),[7] the FAA-required model for airport air quality analysis.[8] For this Supplement to the Draft EIS/EIR, EDMS 3.2 and EDMS 4.11 were used to determine emissions of CO, NO_X, SO_2, and hydrocarbons (HC) from aircraft. Neither EDMS 3.2 nor EDMS 4.11 calculates emissions of PM_{10} from aircraft, so these emission rates were calculated as described below. Emission rates were estimated for four aircraft operational modes (taxi/idle, takeoff, climbout, and approach). Emissions associated with the use of reverse thrust on aircraft engines were not quantified. Currently emission factors have not been developed for reverse thrust. The relative time that aircraft use reverse thrust compared to the time spent in other operational modes is minimal, thus emissions for this mode are assumed to have minimal impact on the emission inventories.

The most recent major upgrade to EDMS was released in May 2001. EDMS 4.0 was created to incorporate the most current scientific methods available in the areas of aircraft performance and emissions and dispersion modeling, and to improve upon the previous version, 3.2. Most recently, EDMS Version 4.11 has been released to incorporate results of LIDAR studies on plume dispersion[9] and address minor concerns associated with the original 4.0, and subsequent 4.1 releases.

In addition to many user-level improvements, technical improvements from Version 3.2 include the following:

September 2002 http://www.arb.ca.gov/msei/on-road/on-road.htm.

5 South Coast Air Quality Management District, CEQA Air Quality Handbook, 1993.

6 South Coast Air Quality Management District, Rules and Regulations, April 2003, http://www.aqmd.gov/rules.

7 Federal Aviation Administration, Office of Environment and Energy, and U.S. Air Force Armstrong Laboratory, Tyndall Air Force Base, Emission and Dispersion Modeling System (EDMS) Reference Manual 2001 (with supplements through 2002).

8 Federal Register, Vol. 63, No. 70 pp 18068-18069, April 13, 1998.

9 Wayson, R.L., G.G. Gleming, B. Kim, W.L. Eberhard, and W.A. Brewer, Preliminary Report: The Use of LIDAR to Characterize Aircraft Initial Plume Characteristics (FAA-AEE-02-04/DTS-34-FA34T-LRI), 2002.

- Improved and updated emission factor database for aircraft;
- Updated ground support equipment emission factors based on model year, power output, and fuel type;
- Emissions from aircraft landing roll time-in-mode are assessed;
- Plume behavior from aircraft is better characterized.

Comparisons of LAX Alternative D for 2015 show that EDMS 4.11 predicts total emissions higher than or equal to EDMS 3.2. Emissions of CO, NO_X, and PM_{10} are estimated to be approximately equal (within 7 percent), while emissions of HC and SO_X are estimated to be 80-90 percent higher with EDMS 4.11 versus EDMS 3.2. However, although emissions remain steady or increase between EDMS versions 3.2 and 4.11, predicted concentrations are significantly lower with EDMS 4.11. Details on the changes in predicted concentrations are described in Section 2.2

EDMS 3.2 was used to estimate emissions for the environmental baseline, the No Action/No Project Alternative and Alternatives A, B, C, and D. For Alternative D in 2015, the newer Version 4.11 (EDMS 4.11) was used to develop the on-airport emission inventories. Ratios between the predicted emissions by EDMS 3.2 and 4.11 were developed for each modeled criteria pollutant for Alternative D for 2015. These ratios were then used to estimate impacts for the alternative and year combinations previously developed using EDMS 3.2 in the Draft EIS/EIR (as described in more detail in Section 2.2 of this appendix). These updated results, along with the EDMS 4.11 results for Alternative D in 2015, are presented in Section 4.6, *Air Quality* (subsections 4.6.6 and 4.6.8), and are the values used to determine significance in this analysis of the Supplement to the Draft EIS/EIR.

Aircraft and Aircraft Engine Assumptions

SIMMOD, FAA's airport and airspace simulation model, is a comprehensive planning tool for airport designers and managers, air traffic planners, and airline operations analysis. SIMMOD addresses design and procedural aspects of all air traffic operations and procedures measures of airport capacity, aircraft travel time, aircraft delay, and aircraft fuel consumption. The simulation model uses information about the facilities and operations to predict specific timing, volume, and location (e.g., runway used) for future aircraft operations.

SIMMOD data were developed for Alternative D for 2013 and 2015. Aircraft-specific landing and takeoff operations (LTO) values were developed from these datasets and formatted for use in EDMS. Specific taxi and queue times for each forecast year were also calculated from the SIMMOD data for each aircraft size category (heavy, large, and small).

If an aircraft was included in EDMS 3.2, but the engine was not available in the database for that airframe, a similar engine model that was available for that airframe in the database was chosen based on the engine model identification number. If an aircraft was not included in EDMS 3.2, it was added to the system using the "Add Aircraft" utility, along with appropriate times in mode, number of engines, and engine emission factors. Supplemental aircraft/engine information was obtained from the following sources (in order of preference): (1) the *FAA Aircraft Engine Emission Database* (FAEED);[10] (2) the *ICAO Engine Exhaust Emissions Data Bank*;[11] (3) USEPA's *Procedures for Emission Inventory Preparation Vol. IV: Mobile Sources*;[12] and (4) specific engine manufacturers. EDMS 4.11 contains an updated database of aircraft and engine combinations, although these combinations may not be identical to those used in EDMS 3.2. Therefore, some discrepancies in aircraft identifiers may be seen when comparing the two model runs. However, emissions from EDMS 4.11 are generally higher than those found with EDMS 3.2 and considered to be a conservative estimate for this analysis.

Since EDMS 3.2 does not differentiate between passenger and cargo aircraft, cargo aircraft were added to the database identical to their passenger aircraft counterparts, with the differences found in the GSE assignments. The aircraft/engine assignments used in EDMS 3.2 for passenger and cargo aircraft are shown in **Table S1**, LAX Passenger Aircraft Database Assumptions (EDMS 3.2), and **Table S2**, LAX

[10] Federal Aviation Administration, Office of Environment and Energy, FAA Aircraft Engine Emission Database (FAEED), 1995.

[11] International Civil Aviation Organization, ICAO Engine Exhaust Emissions Data Bank, 1995.

[12] U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Procedures for Emission Inventory Preparation, Volume IV: Mobile Sources, 1992.

Cargo Aircraft Database Assumptions (EDMS 3.2), respectively. These tables have not changed since publication of the Draft EIS/EIR, but have been included here for comparison with the EDMS 4.11 assignments. EDMS 4.11 allows for the duplication of aircraft using unique identifiers. Thus, for cargo aircraft operations, duplicate aircraft were added and GSE assignments edited appropriately to reflect the differences between passenger and cargo operations. EDMS 4.11 also notes the most common aircraft/engine assignments for each aircraft type. The aircraft/engine assignments used in EDMS 4.11 for passenger and cargo aircraft are shown in **Table S3**, LAX Passenger Aircraft Database Assumptions (EDMS 4.11), and **Table S4**, LAX Cargo Aircraft Database Assumptions (EDMS 4.11), respectively.

Table S1

LAX Passenger Aircraft Database Assumptions (EDMS 3.2)

SIMMOD Aircraft (abbreviation)	EDMS Aircraft	# of Engines	Engine
Fokker 100 (100)	FOKKER 100-100	2	TAY 650-15
British Aerospace 146 (146)	BAE146-300	4	ALF502R-5
Airbus A310 (310)	A310-200	2	CF6-80C2A2
Airbus A319 (319)	A319	2	CFM56-5A1
Airbus A320 (320/32S)	A320	2	CFM56-5B4
Airbus A330 (330)	A330	2	CF6-80E1A1
Airbus A340 (340)	A340-200	4	CFM56-5C2
Boeing 727-200 (72S)	B727-200	3	JT8D-15
Boeing 737-200 (737)	B737-200	2	JT8D-9A
Boeing 737-300 (733)	B737-300	2	CFM56-3C
Boeing 737-400 (734)	B737-400	2	CFM56-3C
Boeing 737-500 (73S, 735)	B737-500	2	CFM56-3C
Boeing 747-400 (744)	B747-400	4	PW4056
Boeing 747-200 (747/74E/743)	B747-200	4	JT9D-7R4G2
Boeing 747 Combo (74M)	B747 Combination[1]	4	PW4056
New Large Aircraft (74X)	B747-X[1]	4	PW4056
Boeing 757-200 (757)	B757-200	2	PW2037
Boeing 767-300 (763)	B767-300	2	JT9D-7R4D
Boeing 767-200 (767)	B767-200	2	JT9D-7R4D
Boeing 777 (777)	B777-200	2	PW4084
Airbus A300 (AB3)	A300B	2	CF6-50C
Avions de Transport Régional ATR72 (AT7)	ATR72-200	2	PW124-B
Avions de Transport Régional ATR42 (ATR)	ATR42	2	PW121
Beech (BE1)	BH-1900	2	PT6A-65B
Canadair RJ50 (C50)	Canadair RJ50[1]	2	CF34-3A1
Canadair RJ70 (C70)	Canadair RJ70[1]	2	CF34-3A1
General Aviation Prop (CNA)	GenAvProp[1]	1	PT6A-67B
McDonnell Douglas DC10 (D10)	DC10-30	3	CF6-50C2
Douglas DC8-70	DC8-70	4	CFM56-2C5
McDonnell Douglas DC9 (DC9/D9S)	DC9-50	2	JT8D-17
de Havilland Dash 7 (DS7)	DASH-7	4	PT6A-50
Embraer 120 (EM2)	EMB-120	2	PW118
Embraer 110 (EMB)	EMB110KQ1	2	PT6A-27
Fokker F28 (F28)	F-28-4000	2	RR SPEY-MK555
Fokker 50 (F50)	FOKKER 50	2	PW125-B
Fokker 70 (F70)	FOKKER 70	2	TAY620-15
General Aviation Jet (GAJ)	GenAvJet[1]	2	JT15D-1[2]
Ilyushin Il-96 (ILU)	IL-96	4	PS-90A[3]
Jetstream 31 (J31)	Jetstream 31[1]	2	TPE331-3
Lockheed L1011 (L10/L15)	L1011-500	3	RB211-524B4
McDonnell Douglas MD-11 (M11/MIM)	MD-11	3	PW4460
McDonnell Douglas MD-80 (M80)	MD-80	2	JT8D-217A
McDonnell Douglas MD-87 (M87)	MD-80-87	2	JT8D-217
McDonnell Douglas MD-90 (M90)	MD-90-10	2	V2525-D5
McDonnell Douglas MD-95 (M95)	MD-90-95[1]	2	BR700-710A1-10[3]
Saab 2000 (S20)	Saab 2000[1]	2	AE2100A[4]
Shorts 360 (S36)	SHORT 360	2	PT6A-65AR
Saab Fairchild 340 (SF3)	SF-340A	2	CT7-5
Swearingen Metro (SWM)	Swearingen Metro 2	2	TPE331-3

Listed aircraft are from all SIMMOD analyses for 2013 and 2015 horizon years for Alternative D. Individual alternative aircraft are a subset of this list. Times in mode for added aircraft are International Civil Aviation Organization (ICAO) defaults.

Table S1

LAX Passenger Aircraft Database Assumptions (EDMS 3.2)

SIMMOD Aircraft (abbreviation)	EDMS Aircraft	# of Engines	Engine

This table has not changed since publication of the Draft EIS/EIR, but has been included here for comparison with the assumptions developed for the EDMS 4.11 modeling analysis.

[1] Aircraft are not included in EDMS. Assumed by CDM.
[2] Chosen for comparable thrust production.
[3] Emission factors from FAEED.
[4] Emission factors from Allison Engines Inc.

Source: Camp Dresser & McKee Inc., 2000.

Table S2

LAX Cargo Aircraft Database Assumptions (EDMS 3.2)

SIMMOD Aircraft (Abbreviation)	EDMS Aircraft	# Of Engines	Engine
Airbus A300 C4 (300)	A300-C4-200 Cargo	2	CF6-50C2
Airbus A310 (310)	A310-200 Cargo	2	CF6-80C2A2
Boeing 727-200 (72S)	B727 Cargo	3	JT8D-15
Boeing 737-200C (737)	B737-200C Cargo	2	JT8D-17A
Boeing 747-400 (744)	B747-400 Cargo	4	PW4056
Boeing 747-200 (747)	B747-200 Cargo	4	JT9D-7R4G2
Boeing 757-200 (757)	B757-200 Cargo	2	PW2037
Boeing 767-200 (767)	B767-200 Cargo	2	JT9D-7R4D
Beech (BE1)	BH-1900 Cargo	2	PT6A-65B
General Aviation Prop (CNA)	GenAvProp Cargo	1	PT6A-67B
Douglas DC8-70 (DC8)	DC8 Cargo	4	CFM56-2C5
Douglas DC10 (D10)	DC10-30 Cargo	3	CF6-50C2
Douglas DC9 (D9S)	DC9 Cargo	2	JT8D-17
McDonnell Douglas MD-11 (M11)	MD-11 Cargo	3	PW4460

Cargo aircraft included for LAX Master Plan air quality impact analysis.

Listed aircraft are from all SIMMOD analyses for 2013 and 2015 horizon years for Alternative D. Individual alternative aircraft are a subset of this list. Times in mode for added aircraft are International Civil Aviation Organization (ICAO) defaults.

This table has not changed since publication of the Draft EIS/EIR, but has been included here for comparison with the assumptions developed for the EDMS 4.11 modeling analysis.

Source: Camp Dresser & McKee Inc., 2000.

Table S3

LAX Passenger Aircraft Database Assumptions (EDMS 4.11)

SIMMOD Aircraft (abbreviation)	EDMS Aircraft	# of Engines	Engine
Fokker 100 (100)	Fokker 100	2	TAY650-15
Airbus A310 (310)	A310-200	2	JT9D-7R4E1
Airbus A319 (319)	A319	2	CFM56-5B6/P
Airbus A320 (320/32S)	A320	2	V2527-A5
Airbus A330 (330)	A330	2	PW4168
Airbus A340 (340)	A340-200	4	CFM56-5C4
Boeing 737-300 (733)	B737-300	2	CFM56-3-B1
Boeing 737-400 (734)	B737-400	2	CFM56-3B-2
Boeing 737-500 (73S, 735)	B737-500	2	CFM56-3C-1
Boeing 747-400 (744)	B747-400	4	PW4056
Boeing 747-200 (747/74E/743)	B747-200	4	CF6-50E2
Boeing 747 Combo (74M)	B747-200C	4	CF6-50E2
New Large Aircraft (74X)	B747-SP	4	JT9D-7A
Boeing 757-200 (757)	B757-200	2	PW2037
Boeing 767-300 (763)	B767-300	2	CF6-80A2
Boeing 767-200 (767)	B767-200	2	CF6-80A (A1)
Boeing 777 (777)	B777-200	2	PW4077
Airbus A300 (AB3)	A300B	2	CF6-80C2A5
Avions de Transport Régional ATR72 (AT7)	ATR72-200	2	PW124-B
Avions de Transport Régional ATR42 (ATR)	ATR42	2	PW120
Beech (BE1)	BH-1900	2	PT6A-67B
Canadair RJ50 (C50)	Canadair RJ50[1]	2	CF34-3A[2]
Canadair RJ70 (C70)	Canadair Reg-700	2	CF34-8C1
General Aviation Prop (CNA)	Cessna 150	1	O-200
de Havilland Dash 7 (DS7)	Dash 7	2	PT6A-50
Embraer 120 (EM2)	EMB-120	2	PW118
Embraer 110 (EMB)	EMB-110KQ1	2	PT6A-27
Fokker 50 (F50)	Fokker 50	2	PW127-A
Fokker 70 (F70)	Fokker 70	2	TAY620-15
General Aviation Jet (GAJ)	CITATION V	2	JT15D-5 (A & B)
Jetstream 31 (J31)	Jetstream 31[1]	2	TPE331-8[2]
McDonnell Douglas MD-11 (M11/MIM)	MD-11	3	CF6-80C2D1F
McDonnell Douglas MD-80 (M80)	MD-80	2	JT8D-219
McDonnell Douglas MD-87 (M87)	MD-80-87	2	JT8D-219
McDonnell Douglas MD-90 (M90)	MD-90-10	2	V2525-D5
McDonnell Douglas MD-95 (M95)	MD-95	2	BR700-715C1-30
Saab 2000 (S20)	Saab2000[1]	2	AE3700A[2]
Shorts 360 (S36)	Shorts 360	2	PT6A-65AR
Saab Fairchild 340 (SF3)	SF-340-A	2	CT7-5
Swearingen Metro (SWM)	Swearingen Metro 2	2	TPE331-3

Listed aircraft are from all SIMMOD analyses for 2013 and 2015 horizon years. Individual Alternative aircraft are a subset of this list. Times in mode for added aircraft are ICAO defaults.

1 Aircraft are not included in EDMS. Assumed by CDM.
2 Chosen for comparable thrust production.

Source: Camp Dresser & McKee Inc., 2003.

Table S4

LAX Cargo Aircraft Database Assumptions (EDMS 4.11)

SIMMOD Aircraft (Abbreviation)	EDMS Aircraft	# Of Engines	Engine
Airbus A300 C4 (300)	A300-C4-200	2	CF6-50E2
Airbus A310 (310)	A310-200C	2	CF6-80CB42
Boeing 737-200C (737)	B737-200C	2	JT8D-17
Boeing 747-400 (744)	B747-400F	4	CF6-80C2B1F
Boeing 747-200 (747)	B747-200F	4	JT9D-7F
Boeing 757-200 (757)	B757-200F	2	RB211-535E4
Boeing 767-200 (767)	B767-300F	2	PW4056
Beech (BE1)	BH-1900C	2	PT6A-65B
General Aviation Prop (CNA)	Cessna 208 Caravan	1	PT6A-114
Douglas DC10 (D10)	DC10-30F	3	CF6-50C2
McDonnell Douglas MD-11 (M11)	MD-11-11F	3	CF6-80C2D1F

Cargo aircraft included for LAX Master Plan air quality impact analysis.

Listed aircraft are from all SIMMOD analyses for 2013 and 2015 horizon years. Individual Alternative aircraft are a subset of this list. Times in mode for added aircraft are ICAO defaults.

Source: Camp Dresser & McKee Inc., 2003.

As detailed for EDMS 3.2 in Appendix G of the Draft EIS/EIR, EDMS 4.11 also does not contain emission indices for PM_{10} from aircraft and, therefore, neither model can be used to calculate PM_{10} mass emissions from aircraft or to disperse PM_{10} emissions attributable to aircraft. The PM_{10} emission indices used in the LAX Master Plan analysis were developed using the methodology described in the Draft EIS/EIR. The PM_{10} emission indices used for the LAX Master Plan are summarized in Attachment H to Technical Report 4 of the Draft EIS/EIR.

Aircraft LTO Data Assumptions

Aircraft LTO data for Alternative D were obtained from SIMMOD data developed for the LAX Master Plan. **Table S5**, Aircraft Landing/Takeoff Operations (LTO) Summary for Alternative D, presents a summary of the total annual LTOs forecasted for Alternative D for the two forecast years. The same methodology described in Appendix G of the Draft EIS/EIR, was used to determine annual LTO values. The annual LTO data for each aircraft type were then entered into EDMS 3.2 for forecast years 2013 and 2015 and EDMS 4.11 for forecast year 2015 only.

Detailed descriptions of annual LTOs for each aircraft type and runway breakdown by alternative and horizon year are included in Attachment E to Technical Report S-4 of this Supplement to the Draft EIS/EIR and Technical Report 4 of the Draft EIS/EIR.

Table S5

Aircraft Landing/Takeoff Operations (LTO) Summary for Alternative D

Forecast Year	Annual Passenger Aircraft LTOs	Annual Cargo Aircraft LTOs	Annual Total LTOs
2013	371,577	20,243	391,820
2015	371,577	20,243	391,820

Source: Camp Dresser & McKee Inc., 2003.

Aircraft Time-In-Mode Assumptions

The takeoff, climbout, and approach times in mode (TIM) resident in EDMS 3.2 are based on the ICAO default values. The takeoff TIM in EDMS 3.2 are unable to be modified by the user. EDMS 3.2 allows the user to modify taxi TIM, which is the total time spent in taxiing and idling during a complete LTO cycle, to reflect site-specific data.

An average mixing height of 542 meters (approximately 1,800 feet) was assumed based on data developed by SCAQMD for LAX (see Attachment J to Technical Report 4 of the Draft EIS/EIR), which is consistent with data previously reported for this area.[13] **Table S6**, EDMS 3.2, Aircraft Time in Mode, presents the TIM in EDMS 3.2 for approach, climbout, takeoff, and taxi that were used to estimate aircraft emissions for all alternatives in both horizon years. This table has not changed since publication of the Draft EIS/EIR, but has been included here for comparison with the TIM developed for the EDMS 4.11 modeling analysis.

Table S6

EDMS 3.2 Aircraft Time in Mode

		Time In Mode (minutes)					
Aircraft List	**Aircraft Engine**	**ICAO Approach**	**Adjusted Approach**	**ICAO Climbout**	**Adjusted Climbout**	**ICAO Takeoff**	**User-Entered Taxi**
Fokker 100-100	TAY650-15	4.00	2.40	2.20	1.14	0.70	---[1]
BAE 146-300	ALF502R-5	4.00	2.40	2.20	1.14	0.70	---[1]
A310-200	CF6-80C2A2	4.00	2.40	2.20	1.14	0.70	---[1]
A319	CFM56-5A1	4.00	2.40	2.20	1.14	0.70	---[1]
A320	CFM56-5B4	4.00	2.40	2.20	1.14	0.70	---[1]
A330	CF6-80E1A1	4.00	2.40	2.20	1.14	0.70	---[1]
A340-200	CFM56-5C2	4.00	2.40	2.20	1.14	0.70	---[1]
B727-200	JT8D-15	4.00	2.40	2.20	1.14	0.70	---[1]
B737-300	CFM56-3C	4.00	2.40	2.20	1.14	0.70	---[1]
B737-400	CFM56-3C	4.00	2.40	2.20	1.14	0.70	---[1]
B737-500	CFM56-3C	4.00	2.40	2.20	1.14	0.70	---[1]
B747-400	PW4056	4.00	2.40	2.20	1.14	0.70	---[1]
B747-200	JT9D-7R4G2	4.00	2.40	2.20	1.14	0.70	---[1]
B747Combination	PW4056	4.00	2.40	2.20	1.14	0.70	---[1]
B747-X	PW4056	4.00	2.40	2.20	1.14	0.70	---[1]
B757-200	PW2037	4.00	2.40	2.20	1.14	0.70	---[1]
B767-300	JT9D-7R4D	4.00	2.40	2.20	1.14	0.70	---[1]
B767-200	JT9D-7R4D	4.00	2.40	2.20	1.14	0.70	---[1]
B777-200	PW4084	4.00	2.40	2.20	1.14	0.70	---[1]
A300B	CF6-50C	4.00	2.40	2.20	1.14	0.70	---[1]
ATR72-200	PW124-B	4.50	2.70	2.50	1.30	0.50	---[1]
ATR42	PW121	4.50	2.70	2.50	1.30	0.50	---[1]
BH-1900	PT6A-65B	1.60	0.96	0.50	0.26	0.40	---[1]
Canadair RJ50	CF34-3A1	4.00	2.40	2.20	1.14	0.70	---[1]
Canadair RJ70	CF34-3A1	4.00	2.40	2.20	1.14	0.70	---[1]
GenAvProp	PT6A-67B	4.50	2.70	2.50	1.30	0.50	---[1]
DC10-30	CF6-50C2	4.00	2.40	2.20	1.14	0.70	---[1]
DC8-70	CFM56-2C5	4.00	2.40	2.20	1.14	0.70	---[1]
DC9-50	JT8D-17	4.00	2.40	2.20	1.14	0.70	---[1]
DASH-7	PT6A-50	4.50	2.70	2.50	1.30	0.50	---[1]
EMB-120	PW118	4.50	2.70	2.50	1.30	0.50	---[1]
EMB-110KQ1	PT6A-27	4.50	2.70	2.50	1.30	0.50	---[1]
F-28-4000	RR SPEY-MK555	4.00	2.40	2.20	1.14	0.70	---[1]
Fokker50	PW125-B	4.50	2.70	2.50	1.30	0.50	---[1]
Fokker 70	TAY620-15	4.00	2.40	2.20	1.14	0.70	---[1]
GenAvJet	JT15D-1	1.60	0.96	0.50	0.26	0.40	---[1]
IL-96	PS-90A	4.00	2.40	2.20	1.14	0.70	---[1]
Jetstream 31	TPE331-3	4.00	2.40	2.20	1.14	0.70	---[1]
L-1011-500	RB211-524B4	4.00	2.40	2.20	1.14	0.70	---[1]
MD-11	PW4460	4.00	2.40	2.20	1.14	0.70	---[1]
MD-80	JT8D-217A	4.00	2.40	2.20	1.14	0.70	---[1]
MD-80-87	JT8D-217	4.00	2.40	2.20	1.14	0.70	---[1]
MD-90-10	V2525-D5	4.00	2.40	2.20	1.14	0.70	---[1]
MD-90-95	BR700-710A1-10	4.00	2.40	2.20	1.14	0.70	---[1]
Saab 2000	AE2100A	4.00	2.40	2.20	1.14	0.70	---[1]
SHORT 360	PT6A-65AR	4.50	2.70	2.50	1.30	0.50	---[1]
SF-340-A	CT7-5	4.50	2.70	2.50	1.30	0.50	---[1]

[13] U.S. Environmental Protection Agency, Office of Air Programs, Mixing Heights, Wind Speeds and Potential for Urban Air Pollution Throughout the Contiguous United States, 1972.

Table S6

EDMS 3.2 Aircraft Time in Mode

		Time In Mode (minutes)					
Aircraft List	**Aircraft Engine**	**ICAO Approach**	**Adjusted Approach**	**ICAO Climbout**	**Adjusted Climbout**	**ICAO Takeoff**	**User-Entered Taxi**
Swearingen Metro 2	TPE331-3	4.50	2.70	2.50	1.30	0.50	---[1]
A300-C4-200 Cargo	CF6-50C2	4.00	2.40	2.20	1.14	0.70	---[1]
A310-200 Cargo	CF6-80C2A2	4.00	2.40	2.20	1.14	0.70	---[1]
B727 Cargo	JT8D-15	4.00	2.40	2.20	1.14	0.70	---[1]
B737-200C Cargo	JT8D-17A	4.00	2.40	2.20	1.14	0.70	---[1]
B747-400 Cargo	PW4056	4.00	2.40	2.20	1.14	0.70	---[1]
B747-200 Cargo	JT9D-7R4G2	4.00	2.40	2.20	1.14	0.70	---[1]
B757-200 Cargo	PW2037	4.00	2.40	2.20	1.14	0.70	---[1]
B767-200 Cargo	JT9D-7R4D	4.00	2.40	2.20	1.14	0.70	---[1]
BH-1900 Cargo	PT6A-65B	4.00	2.40	2.20	1.14	0.70	---[1]
GenAvProp Cargo	PT6A-67B	4.50	2.70	2.50	1.30	0.50	---[1]
DC8 Cargo	CFM56-2C5	4.00	2.40	2.20	1.14	0.70	---[1]
DC10-30 Cargo	CF6-50C2	4.00	2.40	2.20	1.14	0.70	---[1]
DC9 Cargo	CFM56-2C5	4.00	2.40	2.20	1.14	0.70	---[1]
MD-11 Cargo	PW4460	4.00	2.40	2.20	1.14	0.70	---[1]

This table has not changed since publication of the Draft EIS/EIR, but has been included here for comparison with the TIM developed for the EDMS 4.11 modeling analysis.

[1] Taxi/Idle time-in-mode is dependent on alternative and horizon year.

Source: Camp Dresser & McKee Inc., 2000.

For Aircraft in EDMS 4.11, TIM for approach and climbout are calculated based on aircraft type classification and mixing height. Takeoff time in mode is based on aircraft weight category. Taxi/idle time in mode is the sum of the average taxi and queue times produced by SIMMOD for each aircraft size category and the default landing roll time contained in EDMS 4.11. **Table S7**, EDMS 4.11 Aircraft Time in Mode, presents the TIM in EDMS 4.11 for approach, climbout, takeoff, and taxi that were used to estimate aircraft emissions for all alternatives in both horizon years.

Aircraft Emissions

The aircraft emission analysis of airport operations presented below is based on the same general approach and methodology described in Appendix G (subsection 2.1.3) of the Draft EIS/EIR.

Ground Support Equipment/Auxiliary Power Units

The GSE and APU emission analysis, of airport operations, presented below is based on the general approach and methodology described in Appendix G (subsection 2.1.3) of the Draft EIS/EIR. Changes in the methodology incorporated into this Supplement to the Draft EIS/EIR are noted below.

Table S7

EDMS 4.11 Aircraft Time in Mode

		Time in Mode (minutes)			
Aircraft List	**Aircraft Engine**	**Adjusted Approach**	**Adjusted Climbout**	**Adjusted Takeoff**	**User-Entered Taxi/Queue**
A310-200	JT9D-7R4E1	2.28	0.41	0.95	30.87
A319	CFM56-5B6/P	2.20	0.47	1.01	28.95
A330	PW4168	2.28	0.41	0.95	30.87
A340-200	CFM56-5C4	2.21	0.47	1.15	31.02
B737-300	CFM56-3-B1	2.29	0.32	0.79	29.25
B737-400	CFM56-3B-2	2.29	0.32	0.79	29.25
B737-500	CFM56-3C-1	2.35	0.36	0.90	29.26
B747-400	PW4056	2.09	0.65	1.22	31.04
B747-200	CF6-50E2	2.24	0.96	1.62	31.00
B747-200C (747 Comb)	CF6-50E2	2.13	0.70	1.21	30.97
B747-SP (747X)	JT9D-7A	2.41	0.64	1.14	31.00
B757-200	PW2037	2.41	0.45	0.84	29.28
B767-300	CF6-80A2	2.32	0.51	1.06	30.85
B767-200	CF6-80A (A1)	2.32	0.51	1.06	30.85
B777-200	PW4077	2.87	0.58	1.04	31.40
A300B	CF6-80C2A5	2.31	0.48	1.01	29.33
ATR72-200	PW124-B	3.51	0.81	1.08	29.22
ATR42	PW120	3.57	0.43	0.72	29.17
BH-1900	PT6A-67B	5.09	0.44	0.74	26.45
Canadair Reg-700 (CRJ70)	CF34-8C1	2.32	0.27	0.85	29.14
Cessna 150 (GenAvProp)	O-200	5.54	1.49	1.68	26.47
EMB-120	PW118	2.32	0.27	0.85	26.62
EMB-110KQ1	PT6A-27	5.09	0.44	0.74	26.45
CITATION V (GenAvJet)	JT15D-5 (A & B)	2.76	0.39	0.83	26.57
MD-11	CF6-80C2D1F	2.11	0.48	1.22	31.04
MD-80	JT8D-219	2.25	0.53	1.04	29.31
MD-80-87	JT8D-219	2.25	0.53	1.04	29.31
MD-90-10	V2525-D5	2.27	0.26	0.94	29.16
MD-95	BR700-715C1-30	2.27	0.25	0.84	29.16
SF-340-A	CT7-5	2.74	0.44	0.76	26.65
Swearingen Metro 2	TPE331-3	5.09	0.44	0.74	26.45
A300-C4-200 (Cargo)	CF6-50E2	2.31	0.48	1.01	29.33
A310-200C (Cargo)	CF6-80CB42	2.28	0.41	0.95	30.87
B737-200C (Cargo)	JT8D-17	2.33	0.38	0.83	29.22
B747-200F (Cargo)	JT9D-7F	2.13	0.70	1.21	30.97
B747-400F (Cargo)	CF6-80C2B1F	2.09	0.65	1.22	31.04
B757-200F (Cargo)	RB211-535E4	2.40	0.38	0.71	29.27
B767-300F (Cargo)	PW4056	2.34	0.47	0.85	30.86
BH-1900C (Cargo)	PT6A-65B	5.09	0.44	0.74	26.45
Cessna 208 Caravan (GenAvProp Cargo)	PT6A-114	5.09	0.44	0.74	26.45
DC10-30F (Cargo)	CF6-50C2	2.12	0.49	1.18	30.89
MD-11-11F (Cargo)	CF6-80C2D1F	2.11	0.48	1.22	31.04
A320	V2527-A5	2.20	0.47	1.01	28.95
B737-500 (73S)	CFM56-3C-1	2.35	0.36	0.90	29.26
Canadair RJ50 [1]	CF34-3A	2.40	0.88	0.70	28.88
Jetstream 31 [2]	TPE331-8	2.70	0.88	0.50	28.88
Saab2000 [3]	AE3007A	2.40	0.88	0.70	28.88
Fokker 100	TAY650-15	2.39	0.44	0.81	29.28
Fokker 50	PW127-A	2.96	0.53	0.86	29.20
Fokker 70	TAY620-15	2.42	0.44	0.87	29.27
Dash 7	PT6A-50	3.30	0.58	0.91	26.51
Shorts 360	PT6A-65AR	3.57	0.43	0.72	26.65
A319	CFM56-5B6/P	2.20	0.47	1.01	26.43
B737-400	CFM56-3B-2	2.29	0.32	0.79	29.25

[1] User-created aircraft with emission factors and TIM based on flight profile of CL601-3R aircraft with CF34-3A engines.
[2] User-created aircraft with emission factors and TIM based on flight profile of Cessna 441 Conquest 2 aircraft with TPE331-8 engines.
[3] User-created aircraft with emission factors and TIM based on flight profile of Embraer ERJ 145 aircraft with AE3007A engines.

Source: Camp Dresser & McKee Inc., 2003.

USEPA, CARB, SCAQMD, airlines and airports in the South Coast Air Basin are engaged in a "consultative process" established by USEPA as part of its approval of the 1994 SIP.[14] The focus of this consultative process has been on conversion of GSE to clean fuels. A memorandum of understanding setting forth goals for reducing emissions from GSE was signed by at least 10 airlines and CARB in December 2002.

Emission factors for gasoline and diesel powered GSE were obtained from EDMS 3.2. The emission factors identified by CARB[15] were used for compressed natural gas (CNG) and liquefied natural gas (LNG) fueled GSE. EDMS 4.11 contains a more extensive database of GSE emission factors, and these default factors were used for the calculations using this model. Emissions calculations were based on the equipment fuel type and brake horsepower. Zero emissions were assumed for electric powered GSE. Emission factor data for GSE are presented in Attachment F to Technical Report S-4 of the Supplement to the Draft EIS/EIR.

Assignments of appropriate GSE to aircraft and associated usage times were based on site-specific data developed for the LAX Master Plan (see Attachment G and Attachment H to Technical Report S-4 of this Supplement to the Draft EIS/EIR). Default assignments of GSE included in EDMS 3.2 were used to supplement the site-specific data as needed. Assignments of GSE to aircraft types were made in two steps: assignment of the GSE type to specific aircraft type, and the assignment of fuel usage to the GSE type. For the 2013 and 2015 Alternative D, GSE assignments were made based on EDMS 3.2 default GSE assignments and the assumptions listed in Appendix G (subsection 2.1.3) of the Draft EIS/EIR.

Once specific GSE vehicle types were assigned, the fleet composition was determined for Alternative D. Fuel types were assigned according to the predicted penetration of alternative fuels.[16,17] Fleet composition was determined using the methodology and assumptions detailed in Appendix G (subsection 2.1.3) of the Draft EIS/EIR.

Specific assignments of GSE to aircraft by project alternative horizon year are included in Attachments G and H in Technical Report S-4 of the Supplement to the Draft EIS/EIR. Assignments of APUs to aircraft types for all alternatives in each horizon year were based on EDMS default APU assignments.

Ground Access Vehicles

Ground access vehicle (GAV) trips generated to and from LAX have regional and local air quality impacts. Both a regional off-airport and a local on-airport GAV air quality analysis were conducted using regional traffic and on-airport traffic data developed for the LAX Master Plan for Alternative D 2013 and 2015. GAV emissions for on-road and parking area sources were calculated using the CARB methodology, and site-specific data developed for the LAX Master Plan. The methodologies for both the on-airport and the off-airport traffic analysis are presented in detail in Appendix G (subsection 2.1.3), of the Draft EIS/EIR.

On-Airport

The on-airport GAV analysis includes emissions estimates for on-road traffic and parking structure/area sources. On-road vehicles that access on-airport facilities include privately owned vehicles, government-owned vehicles, rental cars, shuttles, buses, taxicabs, and trucks. The on-airport access ramps connect to on-airport roadway links that lead on-road traffic to and from the proposed Ground Transportation Center (GTC), the proposed Intermodal Transportation Center (ITC) and the Central Terminal Area (CTA), and the commercial cargo and ancillary facilities. The methodology used to calculate emissions from on-road vehicles operated during construction are addressed in Section 2.1.2, *Construction,* of this appendix.

The on-road vehicle and parking facility emissions were calculated using site-specific data developed for the LAX Master Plan and emission factors generated from EMFAC2002, Version 2.2. The CARB and SCAQMD methodologies used in calculating on-road vehicular emission factors for Alternative D in 2013 and 2015 remain constant with those used in the Draft EIR/EIS. The EMFAC2002 emission factors used are presented in Attachment I of Technical Report S-4 of the Supplement to the Draft EIS/EIR.

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[14] Federal Register, Vol. 62, No. 5, January 8, 1997, pp.1151.

[15] California Air Resources Board, Air Pollution Mitigation Measures for Airports and Associated Activity, 1994.

[16] Janneh, Mustapha, CALSTART, Personal Communication, March 3, 2000.

[17] CALSTART, Clean Fuel Vehicle Mitigation Strategy Assessment, 1999.

Traffic data for on-road vehicle and parking facility activity were developed, including trip generation information for acquisition areas and commercial cargo and ancillary facilities, in the 2013 and 2015 horizon years for Alternative D.

Due to varying vehicle emissions characteristics, CARB divides GAV into distinct vehicle classes based upon vehicle weight and fuel type. These vehicle categories are presented in the Draft EIR/EIS. The GAV categories used in the traffic analysis, such as privately owned vehicles, buses, taxicabs, etc., are categorized under the specified vehicle classes used in the CARB mobile-source emission models.

The GAV fleet mix for airport roadway links and parking facilities was calculated using site-specific data developed for the LAX Master Plan. The GAV category fractions were determined by area for the GTC, ITC, CTA, and World Way West for Alternative D in the 2013 and 2015 horizon years. A 65/35 percent breakdown is used between autos (LDAs) and SUVs, pickup trucks and vans (LDTs). The EMFAC2002 output provides the percent distribution of technology type under each vehicle class (i.e., non-catalyst, catalyst, and diesel). The CARB regulations and forecasts for alternative-fuel vehicle use—including low-emission vehicles (LEV), ultra low-emission vehicles (ULEV), super ultra low-emission vehicles (SULEV), and zero-emission vehicles (ZEV) are incorporated into the EMFAC2002 model.

Roadway Traffic

The vehicle fleet mix was estimated for each roadway link within the airport boundary. The on-airport vehicle fleet mix for roadway traffic for Alternative D in the 2013 and 2015 horizon years is presented in Attachment J in Technical Report S-4 of the Supplement to the Draft EIS/EIR. The vehicle fleet mixes for 2013 and 2015 are not noticeably different. Light duty autos and light duty trucks with catalysts generally make up the majority of the on-airport vehicle fleet mix in the GTC, the ITC, and the CTA. Cargo ramps one predicted to have a higher percentage of medium and heavy duty vehicles than the passenger ramps.

The methodology detailed in Appendix G (subsection 2.1.3) in the Draft EIS/EIR was used to determine emission factors for Alternative D, with the exception that the most recent CARB mobile source emission model, EMFAC2002, was used to generate emission factors for each vehicle class.

Vehicle trips, trip distances, idle times, time between engine starts, and average travel speeds were based on specific roadway segments analyzed in the traffic impact studies conducted for the LAX Master Plan EIS/EIR. The specific information on roadway links and vehicles used to calculate on-road vehicular traffic emissions is presented in Attachment L in Technical Report S-4 of the Supplement to the Draft EIS/EIR, by alternative and horizon year.

Parking Facilities

The vehicle fleet mix was calculated for each on-airport parking facility. The parking facilities are for short-term parking, long-term parking, employee parking, commercial vehicle holding areas (staging), and rent a car (RAC) facilities. The on-airport vehicle fleet mix for parking facilities by alternative and horizon year are presented in Attachment K in Technical Report S-4 of the Supplement to the Draft EIS/EIR.

The emissions produced by GAV within the on-airport parking facilities were calculated using the same methodology as was used in the Draft EIS/EIR with the exception that the most recent CARB mobile source emission model, EMFAC2002, was used to generate emission factors.

The specific parking facility data used to estimate emissions from parking sources are given in Attachment K in Technical Report S-4 of the Supplement to the Draft EIS/EIR, by alternative and horizon year.

Off-Airport

The off-airport (regional traffic) emissions were calculated for three separate regional areas: (1) the "Tier 1 Area" surrounding the airport; (2) the South Coast Air Basin, including the Tier 1 Area; and (3) outside the South Coast Air Basin (i.e., Ventura County, Palmdale, Lancaster), as detailed in Appendix G of the Draft EIS/EIR.

The regional traffic emission calculations were performed based on the methodology presented in Appendix G of the Draft EIS/EIR and using vehicle miles traveled (VMT), vehicle hours traveled (VHT) and average-daily trip (ADT) data developed for each specific alternative of the LAX Master Plan.

The peak hourly AM, PM, and airport peak (AP) VMT and VHT traffic numbers were developed for Alternative D for the year 2015, and are presented in Attachment L of Technical Report S-4 of the Supplement to the Draft EIS/EIR. Traffic values for 2013 were approximately equal to those developed for 2015 and, therefore, 2015 VMT, VHT, and ADT values were used for the 2013 off-airport traffic analysis. The fleet mix and average emission factors for 2013 and 2015 per VMT and VHT were calculated using the VMT, VHT, ADT, and vehicle speed mix data, in addition to the regional fleet mix and emission defaults for 2015 developed for the LAX Master Plan.

The AM peak, PM peak, and AP hourly VMT data for Alternative D were converted to daily VMT based on conversion factors provided for the LAX Master Plan.[18]

The regional emission analysis for Alternative D was conducted using the same methodology detailed in Appendix G of the Draft EIS/EIR with the exception that emission factors were developed using the most recent version of CARB's mobile source emission model, EMFAC2002. The emission analyses for the environmental baseline, the No Action/No Project Alternative and Alternatives A, B, and C, that were presented in the Draft EIS/EIR have been updated to also include emission factors developed using EMFAC2002.

EMFAC2002 was run for the 2015 horizon year using the same parameters presented in the Draft EIS/EIR:

- Temperatures (°F): 60, 75, and 85
- Miles per hour (mph): 5, 15, 25, 30, 35, 45, 55, and 65
- Percent relative humidity (RH): 70 percent
- Auto Model Years: 1980-2015

The emission factors for the South Coast Air Basin in 2005 and 2013 were calculated using the same temperature, mph, and RH data. However, the auto model years were revised to 1970 through 2005 for year 2005 emission factors and 1978 through 2013 for year 2013 emission factors.

2.1.3.2 Stationary Point Sources

Stationary source emission estimates for Alternative D generally followed the same methodology used for estimating stationary source emissions for the No Action/No Project Alternative and Alternatives A, B, and C described in the Draft EIS/EIR. Changes to the methodology are noted below.

Combustion Sources

Combustion source emission estimates used the same methodology used for estimating stationary source emissions for the No Action/No Project Alternative and Alternatives A, B, and C described in the Draft EIS/EIR.

Surface Coating and Solvent Use

Surface coating and solvent use emission estimates used the same methodology used for estimating stationary source emissions for the No Action/No Project Alternative and Alternatives A, B, and C described in the Draft EIS/EIR.

Cooling Tower

Cooling tower emission estimates used the same methodology used for estimating stationary source emissions for the No Action/No Project Alternative and Alternatives A, B, and C described in the Draft EIS/EIR.

Off-Airport Stationary Sources

The consumption of electrical power at LAX would increase in the future. Although the Los Angeles Department of Water and Power (LADWP) distributes this electrical power to LAX, only approximately 17 percent of LADWP's electricity is generated from in-basin utility plants.[19] The emissions associated with

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[18] Parsons Transportation Group Inc., Conversion Factors for Hourly VMT to Daily VMT, 1998.

[19] Tucker, Carol, Los Angeles Department of Water and Power, Personal Communication.

electricity consumed at LAX are widely distributed due to the practice of "wheeling" used by the electric utility industry. Also, the energy mix includes generation by hydroelectric, coal, renewable, and nuclear. The in-basin emissions from local generating stations (assumed to be natural gas fired systems with emission controls) are estimated for conversion of GSE to electric power and can be found in Section 4.6, *Air Quality* (subsection 4.6.10) of the Supplement to the Draft EIS/EIS.

2.1.3.3 Area Sources

Area sources associated with existing and future activities at LAX are composed of small emission sources. Area emissions are generated from commercial/residential natural gas consumption, nonroad engines used in landscaping applications, and deicing/anti-icing applications. Fugitive dust emissions from construction-related activities and re-entrained dust from vehicular activity, generally treated as area sources, are discussed above. Area source emission estimates for Alternative D followed the same methodology used as described in Appendix G, *Air Quality Impact Analysis*, of the Draft EIS/EIR.

2.1.4 Uncertainties and Sensitivities of Methods

The methods described herein and used to calculate the emissions presented below are sensitive to the values used to represent the numerous variables (e.g., assignment of a specific APU to a specific airframe). Consequently, the emissions values calculated using these methods are estimates, based on the various assumptions discussed above regarding forecasted future activities, and are therefore subject to the uncertainties inherent in developing the project input information. Different assumptions and values of variables would result in different emissions estimates. For this analysis, well-accepted methods have been used in a consistent manner to develop the best estimates of emissions, based on those particular assumptions discussed above.

2.2 Dispersion Modeling

Air dispersion modeling is used to predict ground-level ambient air concentrations of pollutants from known emission sources. Emissions estimates for each source category at LAX, discussed in the previous Section 2.1, *Emissions Estimates,* were input into air dispersion models to predict ground-level ambient concentrations at LAX and in the areas surrounding the airport. The dispersion modeling analysis is generally based on the methodology used for the No Action/No Project Alternative and Alternatives A, B, and C as described in Appendix G of the Draft EIS/EIR. Changes to the methodology are noted below.

The on-airport dispersion analysis for the Draft EIS/EIR was conducted using EDMS 3.2 (released in February 2000) and the Industrial Source Complex-Short Term model (ISCST3) (see Attachment A in Technical Report 4 of the Draft EIS/EIR). EDMS 3.2 was the FAA-required model for airport air quality analysis at the time the Draft EIS/EIR was prepared, as noted in Section 2.1.3.1, M*obile Sources*. The ISCST3 model, as described in *User's Guide for the Industrial Source Complex (ISC3) Dispersion Models, Volumes 1 and 2*[20] (herein referred to as ISCST3 Users Guide), is a steady-state Gaussian dispersion model capable of estimating the short-term and annual concentrations from point, area, and volume sources. ISCST3 is a USEPA-preferred dispersion model as identified in USEPA's *Guideline on Air Quality Models (Revised)*[21] (herein referred to as the Guideline on Air Quality Models) and is identified as an available model by the FAA's Air Quality Procedures.

EDMS 4.11 has been released by FAA as a major revision to the model since the Draft EIS/EIR was prepared. In addition to many user-level improvements and improvements to the emissions calculations, improvements to the dispersion algorithms have also been made. These technical improvements from version 3.2 include the following:

- Inclusion of aircraft flight profile to model dispersion of elevated emissions after takeoff (climbout) and on approach;
- Use of the most-current dispersion modeling methods: AMS/EPA Regulatory Model (AERMOD) system;

[20] U.S. Environmental Protection Agency, User’s Guide for the Industrial Source Complex (ISC3) Dispersion Models, Volumes 1 and 2, with Addenda (EPA-454/B-95-003a and b), 1995.

[21] 40 CFR 51, Appendix W. Guideline on Air Quality Models (Revised), July 1, 2002.

- Inclusion of the current understanding of aircraft plume behavior.

Although the method of calculation of emissions from version 3.2 to version 4.11 is relatively unchanged, the upgrade in dispersion modeling algorithms is notable. The AERMOD modeling system represents the latest joint effort by both the American Meteorological Society and USEPA to develop a state-of-the-art dispersion model.

In EDMS, the AERMOD dispersion modeling system replaces the PAL and CALINE3 dispersion models, both of which were last updated in 1989. PAL was used in EDMS 3.2 to model aircraft takeoffs, GSE, parking lots, and stationary sources, and CALINE3, was used to model emissions from roadways and aircraft taxi movement. The dispersion of emissions from aircraft in approach and climbout mode was not modeled in EDMS 3.2. Alternatively, EDMS 4.11 models dispersion of emissions from aircraft in approach and climbout modes, as well as during the landing roll.

The AERMOD algorithms in EDMS 4.11 are new or improved from USEPA's modeling workhorse for short-range dispersion modeling, the ISCST3 model. AERMOD's algorithms better handle the following atmospheric dispersion processes: dispersion in both the convective and stable boundary layers; plume rise and buoyancy; plume penetration into elevated inversions; computation of vertical profiles of wind, turbulence, and temperature; the urban boundary layer; and, the treatment of receptors on all types of terrain, from the surface up to and above the plume height.[22]

The most significant difference between the dispersion algorithms contained in EDMS 3.2 versus those in EDMS 4.11 is the level of detail of required meteorological data. EDMS 3.2 requires hourly values of surface wind direction, wind speed, temperature, and Pasquill-Gifford stability class. Only one value of mixing height is used to represent the boundary layer and this value is assumed constant for the entire modeling period. This assumption introduces a significant amount of uncertainty to the predicted concentrations, as the mixing height is one of the primary values in determining the amount and extent of vertical pollutant dispersion in the atmosphere.

EDMS 4.11, with its use of AERMOD, requires more substantial meteorological data, especially in the vertical dimension. Required data include hourly values of surface friction velocity, convective velocity scale, vertical potential temperature gradient in the 500-meter layer above the planetary boundary layer, the heights of the convective and mechanical boundary layers, the Monin-Obukov length, and the surface roughness length, in addition to the wind speed, wind direction, air temperature, and their respective measurement heights.[23] This more detailed representation of the vertical state of the atmosphere, along with the improved dispersion algorithms found in AERMOD, give more credence to the predicted concentration results calculated by EDMS 4.11 than those calculated by EDMS 3.2.

EDMS 3.2 was used to model Alternative D in 2013 and 2015. EDMS 4.11 was used to model only Alternative D in 2015. Ratios between the predicted concentrations by EDMS 3.2 and 4.11 were developed for each modeled criteria pollutant for Alternative D for 2015. These ratios were then used to estimate impacts for the alternative and year combinations previously modeled using EDMS 3.2 in the Draft EIS/EIR. Since EDMS 4.11 is the currently approved version, the results from EDMS 4.11 are used to determine significance of on-airport emissions and impacts.

A review of the top ten predicted concentrations for all four pollutants show decreases of about 70 percent for NO_X, 50-70 percent for CO, 10-50 percent for SO_X, and 55-65 percent for PM_{10} for all averaging times of concern. Little statistical variability in the differences for the top ten concentration values were found for each pollutant and averaging time.

Although some emissions increased and previously unmodeled sources are now included, noticeable decreases in maximum pollutant concentrations were predicted using EDMS 4.11 versus EDMS 3.2. This decrease is likely attributable to the more accurate representation of plume behavior coupled with better representation of meteorology in AERMOD.

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[22] Cimorelli, A., Perry, S., Venkatram, A., Weil, J, Paine, R., Wilson, R., Lee, R., and Peters, W., AERMOD Description of Model Formulation. DRAFT. December 15, 1998.

[23] U.S. EPA, User's Guide for the AMS/EPA Regulatory Model – AERMOD. DRAFT. August 2002.

The ISCST3 model was also used to estimate dispersion of emissions from construction sources. The FAA has indicated that ISCST3 is acceptable for modeling construction emissions at the airport.[24] Construction activities typically occur over a sizeable construction site; therefore, construction activities were modeled as area sources.

The only off-airport emission sources considered in the dispersion analysis were motor vehicles at intersections that may be affected by airport traffic. The CAL3QHCR model was used to model CO hot-spot concentrations at selected off-airport street intersections due to vehicle traffic. CAL3QHCR is a USEPA-developed model for analyzing CO concentrations at intersections.[25] The CAL3QHCR model allows the use of annual meteorological data and one-week temporalized vehicle flow data. Additionally, it provides peak 1-hour and running 8-hour CO concentrations for intersections and roadway links. The specific intersection and roadway links were selected based on results of the off-airport mobile-source emissions analyses conducted by the CDM team. The intersections with the greatest potential increase in project-related traffic, based on level of service and traffic volume, were included in the air quality analysis.

Since various dispersion models (EDMS 3.2, EDMS 4.11, ISCST3, and CAL3QHCR) were used for different sources (on-airport, off-airport, and construction), results from parallel dispersion modeling of various sources were integrated to obtain the total impacts of the project. The maximum of the sum of the predicted concentrations of all operational or construction sources was used to obtain a conservative estimate of total concentrations for all pollutants except NO_2 emissions for Alternative D. Additional refinements and integration were made to the results using USEPA's Calms Processing Model (CALMPRO), and USEPA's Tier 2 Ambient Ratio Method (ARM), and USEPA's Ozone Limiting Method (OLM) which are discussed in detail below.

2.2.1 Meteorological Data

Modeling was performed using meteorological data collected at LAX and obtained from the SCAQMD. At the time of preparation of the Draft EIS/EIR, the most recent set of complete meteorological data (surface and upper air) collected at LAX consisted of hourly surface and upper air data from the LAX meteorological observation station operated by the SCAQMD for the 12-month period beginning March 1, 1996 and ending February 28, 1997.[26] The location of the meteorological station is shown on Figure 4.6-1, Meteorological Station and Air Quality Monitoring Station Locations, in Section 4.6, *Air Quality*, of the Draft EIS/EIR. The SCAQMD provided this meteorological dataset to LAWA specifically for use in analyzing air quality impacts associated with the LAX Master Plan.

The meteorological data set includes hourly values of air, dew point, and virtual temperatures; wind speed and direction; pressure; stability class; and mixing height. Meteorological data were extracted from the database, and rearranged to create a full calendar year (January 1 to December 31) compatible with the ISCST3 and EDMS 3.2 meteorological data input formats. Unit conversions were performed as needed. Where missing data occurred, the previous hour's data were used to fill in data. The electronic meteorological data file used in EDMS is provided in Attachment S in Technical Report 4 of the Draft EIS/EIR. For dispersion modeling with EDMS 3.2, a constant mixing height of 542 meters (1,800 feet) was used based upon an average for the South Coast Air Basin.

EDMS 4.11 uses the AERMOD modeling system, which requires more detailed meteorological data than both EDMS 3.2 and ISCST3. Due to the availability of the required data, an AERMOD format dataset for the calendar year 1996 (the baseline year for this analysis) was created. Surface data used to create this dataset came from the on-site data collected by SCAQMD at LAX, with missing surface data being supplemented from LAX National Weather Service (NWS) data. Twice-daily upper air sounding data were from San Diego Miramar Weather Service Contract Meteorological Observatory (WSCMO). The AERMOD meteorological preprocessing program, AERMET, was used to create the appropriate dataset.

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[24] Federal Aviation Administration, Meeting Summary, November 24, 1997.

[25] U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, User's Guide to CAL3QHC Version 2.0: A Modeling Methodology for Predicting Pollutant Concentrations Near Roadway Intersections (EPA-454/R-02-006 Revised), September 1995.

[26] South Coast Air Quality Management District, SCAQMDMgt.mdb (Microsoft Access file), 1998.

2.2.2 Receptors

Receptor selection and location was based on the methodology used for the No Action/No Project Alternative and Alternatives A, B, and C as described in Appendix G of the Draft EIS/EIR. There have been no changes to the sensitive receptor selection or locations as identified in the Draft EIS/EIR.

2.2.3 Land Use Classification

Land use classifications used in the dispersion modeling analysis are based on the methodology used for the No Action/No Project Alternative and Alternatives A, B, and C as described in Appendix G of the Draft EIS/EIR. There have been no changes to the land use classification selection as detailed in the Draft EIS/EIR.

2.2.4 CAL3QHCR Model for Local Roadway Intersections

The CO concentrations analysis for individual intersections presented below is based on the general approach and methodology described in Appendix G, *Air Quality Impact Analysis*, of the Draft EIS/EIR. Changes in the methodology incorporated into the Supplement to the Draft EIS/EIR have been detailed below.

Traffic volumes are predicted to increase in 2013 and 2015 by varying degrees throughout a large geographic area for Alternative D. The LAX Master Plan team originally provided traffic data for a total of 61 intersections, 30 roadway segments, 3 cross-sections of the I-405 freeway, 2 cross-sections of the I-105 freeway, and 39 freeway ramps. The traffic data were collected in November and December 1999. In addition to the 61 intersections, which were previously analyzed, traffic data were also provided for 24 additional intersections. The data provided included information for the three peak hour periods (e.g., AM peak, PM peak, and Airport Peak).

Specific intersection 1-hour and 8-hour CO concentrations for Alternative D for 2008, 2013, and 2015 were modeled using the CAL3QHCR dispersion model and parameters as detailed in Appendix G of the Draft EIS/EIR. As described in the Draft EIS/EIR, CO concentrations for Alternatives A, B, and C and the No Action/No Project Alternative for 2005 and 2015 were previously modeled. To determine which, if any, of the 24 additional intersections needed to be included in the CO modeling analysis, the same selection criteria listed in the Draft EIS/EIR were used with one exception. The 24 additional intersections were only analyzed as part of the Alternative D traffic analysis and, therefore, information comparing these additional intersections to the environmental baseline is not provided. Because of this, the criterion that required the comparison of increases in congestion from the environmental baseline to the project alternative, could not be used for this selection process. The remaining four selection criteria were used to select two additional intersections for CO hotspot modeling.

A summary of AM and PM peak volume to capacity (V/C) ratios and incremental changes for the selected intersections for the Alternative D is presented in **Table S8**, Volume to Capacity (V/C) Summary for Selected Intersections - 2013/2015, **Table S9**, Incremental Change in Volume to Capacity (V/C) Ratios from No Action/No Project Alternative - 2013/2015 and **Table S10**, Volume to Capacity (V/C) Summary for Selected Intersections - 2008.

Emission factors for 2008, 2013 and 2015 were developed based on the EMFAC2002 emission factor model, recommended for use in CO modeling by the SCAQMD. The composite emission factors reflect the vehicle mix and roadway speeds provided for the LAX Master Plan.

Table S8

Volume to Capacity (V/C) Summary for Selected Intersections - 2013/2015

Intersection	Alternative D AM Peak	Alternative D PM Peak
Airport Blvd. & Century Blvd.	0.405	0.6
Aviation Blvd. & Century Blvd.	0.741	1.026
La Cienega Blvd. & Arbor Vitae St.	0.879	0.824
La Cienega Blvd. & Century Blvd.	1.387	1.181
La Cienega Blvd. & I-405 Ramps N/O Century Blvd.	0.645	0.418
La Cienega Blvd. & Florence	0.804	1.087
La Cienega Blvd. & Manchester Ave.	0.75	0.807
Lincoln Blvd. & Manchester Ave.	0.963	1.401
Lincoln Blvd. & 83rd St.	0.897	1.078
Lincoln Blvd. & La Tijera Blvd.	0.52	0.723
Sepulveda Blvd. & Imperial Hwy.	0.857	1.15
Sepulveda Blvd. & I-105 Ramps	1.181	1.083
Sepulveda Blvd. & Manchester Ave.	0.893	1.02
Sepulveda Blvd. & La Tijera Blvd.	0.884	0.785
Sepulveda Blvd. & Mariposa Ave.	0.843	1.016
Sepulveda Blvd. & Rosecrans Ave.	1.187	1.489
Vista del Mar & Imperial Hwy.	0.922	0.654
La Cienega & Centinela[1]	1.097	1.112
Lincoln & Washington[1]	1.076	1.095

[1] Additional intersection, modeled for Alternative D only

Source: Camp Dresser & McKee Inc., 2003

Table S9

Incremental Change in Volume to Capacity (V/C) Ratios from No Action/No Project Alternative - 2013/2015

Intersection	Alternative D AM Peak	Alternative D PM Peak
Airport Blvd. & Century Blvd.	0.48	0.49
Aviation Blvd. & Century Blvd.	-0.35	0.24
La Cienega Blvd. & Arbor Vitae St.	-0.29	-0.08
La Cienega Blvd. & Century Blvd.	-0.03	0.05
La Cienega Blvd. & I-405 Ramps N/O Century Blvd.	0.11	0.11
La Cienega Blvd. & Florence	0.00	0.01
La Cienega Blvd. & Manchester Ave.	-0.02	0.01
Lincoln Blvd. & Manchester Ave.	-0.11	-0.47
Lincoln Blvd. & 83rd St.	0.02	-0.26
Lincoln Blvd. & La Tijera Blvd.	0.00	0.09
Sepulveda Blvd. & Imperial Hwy.	0.12	-0.06
Sepulveda Blvd. & I-105 Ramps	-0.11	0.07
Sepulveda Blvd. & Manchester Ave.	-0.06	-0.03
Sepulveda Blvd. & La Tijera Blvd.	-0.04	-0.07
Sepulveda Blvd. & Mariposa Ave.	-0.05	-0.02
Sepulveda Blvd. & Rosecrans Ave.	-0.17	-0.06
Vista del Mar & Imperial Hwy.	-0.08	-0.06
La Cienega & Centinela[1]	-	-
Lincoln & Washington[1]	-	-

[1] Additional intersection, modeled for Alternative D only

Source: Camp Dresser & McKee Inc., 2003

Table S10

Volume to Capacity (V/C) Summary for Selected Intersections - 2008

Intersection	Alternative D AM Peak	Alternative D PM Peak
Airport Blvd. & Century Blvd.	0.664	0.585
Aviation Blvd. & Century Blvd.	0.776	0.937
La Cienega Blvd. & Arbor Vitae St.	0.928	0.919
La Cienega Blvd. & Century Blvd.	0.687	0.787
La Cienega Blvd. & I-405 Ramps N/O Century Blvd.	0.687	0.451
La Cienega Blvd. & Florence	0.775	1.023
La Cienega Blvd. & Manchester Ave.	0.721	0.807
Lincoln Blvd. & Manchester Ave.	0.851	1.274
Lincoln Blvd. & 83rd St.	0.953	1.243
Lincoln Blvd. & La Tijera Blvd.	0.630	0.796
Sepulveda Blvd. & Imperial Hwy.	0.868	1.178
Sepulveda Blvd. & I-105 Ramps	1.317	1.167
Sepulveda Blvd. & Manchester Ave.	0.787	0.857
Sepulveda Blvd. & La Tijera Blvd.	0.833	0.943
Sepulveda Blvd. & Mariposa Ave.	0.809	1.014
Sepulveda Blvd. & Rosecrans Ave.	1.168	1.434
Vista del Mar & Imperial Hwy.	0.771	0.595
La Cienega & Centinela[1]	1.037	1.193
Lincoln & Washington[1]	0.875	1.027

[1] Additional intersection, modeled for Alternative D only

Source: Camp Dresser & McKee Inc., 2003

2.2.5 EDMS Model for Operations-Related Criteria Pollutants

The EDMS dispersion analysis presented below is based on the general approach and methodology described in Appendix G of the Draft EIS/EIR. Changes in the methodology incorporated into the Supplement to the Draft EIS/EIR are detailed below.

The FAA requires the use of EDMS for airport air quality analyses conducted for federally required environmental impact statements and environmental assessments. To be consistent with the analyses previously conducted for the Draft EIS/EIR, the EDMS 3.2 model was used to predict LAX operations-related criteria pollutant concentrations, except PM_{10} from aircraft. The latest version of EDMS (version 4.11) was used to model Alternative D for 2015 for comparison, and for development of a set of EDMS 4.11 to EDMS 3.2 emission and concentration ratios. EDMS 4.11 results are used for determining significance of all alternatives.

2.2.5.1 Mobile Sources

Mobile sources modeled in both versions of EDMS include aircraft, GSE, APUs, and GAV. EDMS includes specific algorithms for the dispersion of emissions from aircraft in taxi/idle/queue and takeoff modes only. EDMS 3.2 is unable to model dispersion of emissions from aircraft climbout and approach modes. However, EDMS 4.11 does include these modes in its dispersion calculations. EDMS 3.2 includes GSE as point sources and GAV as roadway and parking lot sources, while EDMS 4.11 models all sources, except stationary point sources, as area sources.

Aircraft (Except Particulate Matter)

This section discusses the parameters and assumptions used to perform dispersion modeling of aircraft at LAX using EDMS 3.2 and EDMS 4.11. The parameters and assumptions are based on the general approach and methodology described in Appendix G of the Draft EIS/EIR. Changes in the methodology incorporated into the Supplement to the Draft EIS/EIR are discussed below.

Aircraft/Engine Combinations and LTOs

As discussed in Section 2.1.3.1, *Mobile Sources*, and shown in **Table S1** and **Table S2,** an appropriate engine for each airframe was included in the analysis. The engines selected for inclusion in the study accurately represent those available for the fleet for each horizon year. Annual LTOs were used for each aircraft type (see Attachment E in Technical Report S-4 of the Supplement to the Draft EIS/EIR) and appropriate temporal distributions were incorporated to reflect the hourly, daily, and monthly variations as noted above.

Runway/Taxiway/Queue/Gate Locations

Runway coordinates were obtained from the site layout drawings for the project alternatives using AutoCAD® and entered into EDMS. The full length of each runway was entered since EDMS uses only the portion of the runway necessary for takeoff based on a linear interpolation of the aircraft takeoff speed and takeoff TIM for each aircraft size classification. EDMS 3.2 default takeoff TIM values are shown in **Table S6** and EDMS 4.11 takeoff TIM values are shown in **Table S7**.

Taxiway segment coordinates were also obtained from the site layout drawings for the project alternatives using AutoCAD®. EDMS 3.2 allows the user to specify up to three taxiways for each aircraft type. Therefore, the taxiway lengths were subdivided to allow EDMS 3.2 to account for the movement of departing aircraft from gate to runway. Arrival taxi segments could not be included in the modeling analysis due to the three-taxiway assignment limitation. Taxiway TIM was calculated assuming an average aircraft taxi speed of 5.4 meters per second (12 miles per hour) for all aircraft types, estimated from SIMMOD data, for each defined taxiway segment length. EDMS 4.11 allows the user to enter an unlimited number of taxiway segments per aircraft. However, to maintain consistency with the two model versions, identical taxiway assignments were used.

Runway/Taxiway/Queue/Gate Assignments

To incorporate the taxi/idle and takeoff emissions accurately into EDMS, it was necessary to determine each aircraft's path from the assigned gate to the assigned departure runway. Earlier versions of EDMS (i.e., EDMS 3.0 and earlier) allowed the assignment of one gate, three taxiway segments, and one runway per individual aircraft type (i.e., a single aircraft type could not be assigned to more than one gate/ taxiway/queue/runway combination). Therefore, for earlier analyses performed using EDMS 3.0, duplicate user-defined aircraft were created for each aircraft in the study to allow the assignment of an aircraft type to multiple gate/taxiway/queue/runway combinations. EDMS 3.2 and 4.11 allow an individual aircraft/engine combination to be added to a study multiple times, removing the need to duplicate aircraft. However, the EDMS 3.2 modifications do not change the modeling results; therefore, recreating these studies, originally created in an earlier version, EDMS 3.0, was not necessary.

The SIMMOD data for each aircraft type were inspected and aircraft were assigned to gates to provide a representative quantity of each aircraft size category at each terminal, and to provide taxi-out movements estimated from the SIMMOD data. Following the assignment of the runway and gate (terminal) for each aircraft type, up to three taxiways and a queue were assigned to each aircraft type to create a travel path from the gate to the assigned departure runway. See Attachment M in Technical Report S-4 of the Supplement to the Draft EIS/EIR, for a list of runway/taxiway/queue/gate assignments for each alternative.

Aircraft Temporal Factors

EDMS uses temporal factors to determine the annual number of LTOs from peak hourly LTOs (or vice-versa) for each aircraft type in the modeled fleet. A series of three temporal factors describing the time-based variability for each source was developed for the hour of the day, day of the week, and month of the year. The hour-of-the-day temporal factors are specific for each aircraft-runway combination modeled in each alternative and are determined directly from the SIMMOD data. The day-of-the-week and month-of-the-year temporal factors, which are assumed to be the same for all aircraft types in each alternative, were provided for the LAX Master Plan. Temporal factors were also developed for the aircraft queue lengths and times, as well as all stationary and roadway sources. The temporal factors are presented in Attachment B in Technical Report S-4 of the Supplement to the Draft EIS/EIR.

Ground Support Equipment/Auxiliary Power Units

The GSE/APU analysis presented below is based on the general approach and methodology described in Appendix G of the Draft EIS/EIR. Changes in the methodology incorporated into the Supplement to the Draft EIS/EIR have been detailed below.

The GSE and APU assignments associated with individual aircraft types are discussed in the calculation of aircraft-related emissions in Section 2.1.3.1, *Mobile Sources,* of this appendix, EDMS 3.2 assumes that emissions from aircraft-associated GSE emanate from a point located at the gate at which the aircraft is assigned, and that emissions from aircraft-associated APUs emanate from the associated aircraft at the assigned gate locations. EDMS 4.11 assumes that GSE and APU emissions emanate from area sources at assigned gate locations.

Ground Access Vehicles

EDMS 3.2 models on-road vehicle emissions as line sources, as opposed to volume sources that are used in the ISCST3 model. Since ISCST3 does not include the line source as a modeling option, the ISCST3 User's Guide recommends the use of volume sources to represent line sources in ISCST3. For input as line sources into the EDMS 3.2 model, the lengths and location of each roadway link were determined from the site layout drawings for the project alternatives using AutoCAD®. EDMS 4.11 uses identical inputs as EDMS 3.2 for roadway sources. However, within the dispersion model algorithms, they are modeled as area sources. The GTC and CTA links have multiple levels. The emissions from all elevated roadway access levels were combined and modeled at ground level. This assumption provides a conservative estimate of impacts from the terminal roadway access links. The cargo ramp access links are located and modeled at ground level. The Alternative D 2013/2015 on-airport roadway link lengths and vehicle counts used in EDMS are provided in **Table S11**, Roadway Link Data Alternative D - 2013/2015. Roadway emission factors for 2013 are presented in **Table S12**, Roadway Link Emission Factors Alternative D - 2013, and **Table S13**, Roadway Link Emission Factors Alternative D - 2015.

EDMS (both versions) models parking facilities as area sources. The build alternatives would include both ground-level parking lots as well as multi-level parking structures. The emissions were calculated for all levels but dispersion from multi-level parking structures was conservatively modeled as if they were ground-level sources. The approximate dimensions and locations of all on-airport parking areas were determined from the site layout drawings for the alternatives using AutoCAD.® The Alternative D 2013/2015 on-airport parking facility vehicle counts and pertinent information used in EDMS are provided in **Table S14**, Parking Facility Data Alternative D - 2013/2015. Parking Facility emission factors are presented in **Table S15**, Parking Facility Emission Factors Alternative D - 2013, and **Table S16**, Parking Facility Emission Factors Alternative D - 2015.

2.2.5.2 Stationary Point Sources

Stationary point source modeling parameters are based on the methodology used for the No Action/No Project Alternative and Alternatives A, B, and C as described in Appendix G of the Draft EIS/EIR. The stationary source model inputs presented in **Table S17**, Stationary Source Modeling Parameters, have not changed since publication of the Draft EIS/EIR; nevertheless, this table has been included here for informational purposes.

Table S11

Roadway Link Data Alternative D - 2013/2015

Roadway Link Name	Link Length (miles)	Annual Vehicles	Peak Hourly Vehicles	Average Vehicle Speed (mph)
T1	0.326	2564747	665	5
T2	0.239	2564747	665	5
T3	0.134	2564747	665	5
TBIT	0.145	2564747	665	5
T4	0.133	2564747	665	10
T5	0.111	2564747	665	5
T6	0.129	2564747	665	5
T7	0.191	2564747	665	5
T8	0.137	2564747	665	5
West Way	0.152	2564747	665	10
East Way	0.155	2564747	665	15
N. Sepulveda	0.145	13279788	327	5
S. Sepulveda	0.301	19854191	488	10
Century	0.118	20948517	515	30
Spine Rd/World Way	0.771	4018306	869	25
Center Way	0.683	2564747	665	5
NECARGO1	0.104	8066482	1746	15
NECARGO2	0.091	8066482	1746	15
NECARGO3	0.100	8066482	1746	15
NECARGO4	0.286	8066482	1746	15
NECARGO5	0.077	8066482	1746	15
NECARGO6	0.254	8066482	1746	15
NECARGO7	0.151	8066482	1746	15
SECARGO1	0.316	5330082	1153	15
SECARGO2	0.261	5330082	1153	15
SECARGO3	0.260	5330082	1153	15
FEDXCAR1	0.089	1772326	383	15
GARRETT1	0.194	24881	5	15
SWCARGO1	0.515	1335681	289	15
SWANCIL1	0.542	177686	38	15
NECARGO8	0.265	8066482	1746	15
NECARGO9	0.147	8066482	1746	15
NECARGO10	0.215	8066482	1746	15
FEDXCAR2	0.130	1772326	383	15
FEDXCAR3	0.084	1772326	383	15
SCARGO	0.194	1167173	252	15
Re-Circulation	0.125	9850433	665	5
P1-North Pier	0.396	3926378	3126	25
North Pier-P2	0.451	3926378	1164	25
P2-South Pier	0.467	3926378	2015	20
South Pier-P3	0.463	3926378	1136	25
P3	0.443	43190162	7485	25
Main GTC Access	0.587	33374216	8088	30
ITC-Main	0.314	3926378	5969	30
Intermodal Trans Cen	0.185	3926378	3649	15
ImpHwy-ITC	0.117	3926378	6337	35
SFC Prkng	0.416	7139951	1568	35
W. Pier Ramps	0.346	11639608	4940	30
E. Pier Ramps	0.343	30728567	4535	35

Source: Camp Dresser & McKee Inc., 2003

Table S12

Roadway Link Emission Factors Alternative D - 2013

Link Name	Vehicle Speed (MPH)	Private Vehicle Idle Time (Min)	Commercial Vehicle Idle Time (Min)	ROG Emission Factor (g/mile)	CO Emission Factor (g/mile)	NO_x Emission Factor (g/mile)	PM_{10} Emission Factor (g/mile)
T1	5	1.47	2.03	2.93	10.96	1.18	0.42
T2	5	1.47	2.03	3.08	11.79	1.23	0.42
T3	5	1.47	2.03	3.51	14.24	1.37	0.42
TBIT	5	3.44	2.95	4.66	20.71	1.74	0.42
T4	10	1.04	2.26	2.06	11.14	1.09	0.39
T5	5	1.04	2.26	3.37	13.43	1.32	0.42
T6	5	1.04	2.26	3.25	12.76	1.28	0.42
T7	5	1.04	2.26	3.02	11.43	1.21	0.42
T8	5	1.04	2.26	3.21	12.53	1.27	0.42
West Way	10	1	1	1.95	10.51	1.05	0.39
East Way	15	0	0	0.92	6.10	0.74	0.37
N. Sepulveda	5	0	0	2.53	8.67	1.05	0.42
S. Sepulveda	10	1.2	1.2	4.14	22.85	1.77	0.39
Century	30	1.2	1.2	7.95	46.55	3.00	0.34
Spine Rd/World Way	25	0	0	0.55	4.76	0.60	0.35
Center Way	5	0	0	2.53	8.67	1.05	0.42
NECARGO1	15	0.5	5	2.59	17.23	1.15	0.38
NECARGO2	15	0.5	5	2.80	18.40	1.22	0.38
NECARGO3	15	0.5	5	2.65	17.56	1.17	0.38
NECARGO4	15	0.5	5	1.66	11.98	0.85	0.38
NECARGO5	15	0.5	5	3.11	20.12	1.32	0.38
NECARGO6	15	0.5	5	1.73	12.36	0.87	0.38
NECARGO7	15	0.5	5	2.14	14.66	1.00	0.38
SECARGO1	15	0.5	5	1.45	10.78	0.78	0.38
SECARGO2	15	0.5	5	1.52	11.15	0.80	0.38
SECARGO3	15	0.5	5	1.52	11.16	0.80	0.38
FEDXCAR1	15	0.5	5	1.51	11.10	0.80	0.38
GARRETT1	15	0.5	5	1.13	9.00	0.67	0.38
SWCARGO1	15	0.5	5	1.18	9.26	0.69	0.38
SWANCIL1	15	0.5	5	1.14	9.02	0.68	0.38
NECARGO8	15	0.5	5	1.70	12.22	0.86	0.38
NECARGO9	15	0.5	5	2.17	14.82	1.01	0.38
NECARGO10	15	0.5	5	1.84	12.97	0.90	0.38
FEDXCAR2	15	0.5	5	1.39	10.43	0.76	0.38
FEDXCAR3	15	0.5	5	1.53	11.23	0.80	0.38
SCARGO	15	0.5	5	1.24	9.62	0.71	0.38
Re-Circulation	5	1.2	5	5.85	27.41	2.13	0.42
P1-North Pier	25	1.2	2	0.96	7.11	0.73	0.35
North Pier-P2	25	1.2	2	0.91	6.83	0.72	0.35
P2-South Pier	20	1.2	2	1.04	7.33	0.77	0.35
South Pier-P3	25	1.2	2	0.90	6.77	0.71	0.35
P3	25	1.2	2	4.66	27.95	1.94	0.35
Main GTC Access	30	1.2	2	2.85	17.85	1.34	0.34
ITC-Main	30	1.2	2	0.98	7.30	0.73	0.34
Intermodal Trans Cen	15	1.2	2	1.81	11.15	1.03	0.37
ImpHwy-ITC	35	1.2	2	1.81	11.99	1.01	0.34
SFC Prkng	35	1.2	2	1.11	8.09	0.78	0.34
W. Pier Ramps	30	0.5	0	1.04	7.66	0.76	0.34
E. Pier Ramps	35	0.5	0	1.97	12.88	1.06	0.34

Source: Camp Dresser & McKee Inc., 2003

Table S13

Roadway Link Emission Factors Alternative D - 2015

Link Name	Vehicle Speed (MPH)	Private Vehicle Idle Time (Min)	Commercial Vehicle Idle Time (Min)	ROG Emission Factor (g/mile)	CO Emission Factor (g/mile)	NO_x Emission Factor (g/mile)	PM_{10} Emission Factor (g/mile)
T1	5	1.47	2.03	2.42	8.62	1.04	0.42
T2	5	1.47	2.03	2.53	9.13	1.07	0.42
T3	5	1.47	2.03	2.86	10.62	1.16	0.42
TBIT	5	3.44	2.95	3.74	14.58	1.41	0.42
T4	10	1.04	2.26	1.66	8.46	0.93	0.39
T5	5	1.04	2.26	2.75	10.13	1.13	0.42
T6	5	1.04	2.26	2.67	9.72	1.11	0.42
T7	5	1.04	2.26	2.49	8.91	1.06	0.42
T8	5	1.04	2.26	2.63	9.58	1.10	0.42
West Way	10	1	1	1.58	8.08	0.91	0.39
East Way	15	0	0	0.76	5.19	0.66	0.37
N. Sepulveda	5	0	0	2.11	7.22	0.95	0.42
S. Sepulveda	10	1.2	1.2	3.24	15.63	1.38	0.39
Century	30	1.2	1.2	6.06	29.53	2.11	0.34
Spine Rd/World Way	25	0	0	0.45	4.08	0.53	0.35
Center Way	5	0	0	2.11	7.22	0.95	0.42
NECARGO1	15	0.5	5	2.04	12.04	0.88	0.39
NECARGO2	15	0.5	5	2.20	12.77	0.92	0.39
NECARGO3	15	0.5	5	2.08	12.24	0.89	0.39
NECARGO4	15	0.5	5	1.32	8.81	0.67	0.39
NECARGO5	15	0.5	5	2.43	13.82	0.99	0.39
NECARGO6	15	0.5	5	1.37	9.04	0.69	0.39
NECARGO7	15	0.5	5	1.69	10.46	0.78	0.39
SECARGO1	15	0.5	5	1.16	8.06	0.63	0.39
SECARGO2	15	0.5	5	1.21	8.30	0.64	0.39
SECARGO3	15	0.5	5	1.21	8.30	0.64	0.39
FEDXCAR1	15	0.5	5	1.20	8.26	0.64	0.39
GARRETT1	15	0.5	5	0.92	6.97	0.56	0.39
SWCARGO1	15	0.5	5	0.95	7.13	0.57	0.39
SWANCIL1	15	0.5	5	0.92	6.98	0.56	0.39
NECARGO8	15	0.5	5	1.36	8.95	0.68	0.39
NECARGO9	15	0.5	5	1.71	10.55	0.78	0.39
NECARGO10	15	0.5	5	1.46	9.42	0.71	0.39
FEDXCAR2	15	0.5	5	1.11	7.85	0.61	0.39
FEDXCAR3	15	0.5	5	1.22	8.34	0.64	0.39
SCARGO	15	0.5	5	1.00	7.35	0.58	0.39
Re-Circulation	5	1.2	5	4.64	18.68	1.67	0.42
P1-North Pier	25	1.2	2	0.77	5.52	0.62	0.35
North Pier-P2	25	1.2	2	0.73	5.34	0.61	0.35
P2-South Pier	20	1.2	2	0.84	5.78	0.66	0.36
South Pier-P3	25	1.2	2	0.72	5.31	0.61	0.35
P3	25	1.2	2	3.57	18.25	1.42	0.35
Main GTC Access	30	1.2	2	2.20	11.98	1.02	0.34
ITC-Main	30	1.2	2	0.78	5.53	0.61	0.34
Intermodal Trans Cen	15	1.2	2	1.44	8.27	0.85	0.37
ImpHwy-ITC	35	1.2	2	1.40	8.31	0.79	0.34
SFC Prkng	35	1.2	2	0.87	5.93	0.64	0.34
W. Pier Ramps	30	0.5	0	0.82	5.75	0.63	0.34
E. Pier Ramps	35	0.5	0	1.52	8.86	0.82	0.34

Source: Camp Dresser & McKee Inc., 2003

Table S14

Parking Facility Data Alternative D - 2013/2015

Parking Facility Name	Average Distance Traveled (meters)	Annual Vehicles	Peak Hourly Vehicles	Average Vehicle Speed (mph)	Idle Time (min)
P1	1250.00	2111614	603	10	1.5
P2	750.00	13117925	3746	10	1.5
P3	750.00	3673439	1049	10	1.5
Surface Parking	250.00	770406	220	10	1.5
ITC	750.00	12046359	3440	10	1.5
West Emp Lot	1000.00	1024341	309	10	1.5
CVHA	250.00	2615765	810	10	1.5
Avion/Cent Emp Lot	750.00	785097	250	10	1.5
RAC Ret/Ready Garage	1000.00	5347788	1656	10	1.5
RAC QT Area	250.00	5347788	1656	10	1.5
RAC Storage Area	250.00	322934	100	10	1.5

Source: Camp Dresser & McKee Inc., 2003

Table S15

Parking Facility Emission Factors Alternative D - 2013

Parking Facility Name	ROG Emission Factor[1] (g/veh)	CO Emission Factor[2] (g/veh)	NO_x Emission Factor[2] (g/veh)	PM_{10} Emission Factor[3] (g/veh)
P1	1.21	5.96	0.69	0.37
P2	1.12	5.76	0.54	0.34
P3	0.81	4.02	0.44	0.34
Surface Parking	0.25	1.26	0.14	0.31
ITC	1.08	5.56	0.53	0.34
West Emp Lot	0.95	4.64	0.55	0.35
CVHA	0.31	1.60	0.16	0.31
Avion/Cent Emp Lot	0.71	3.48	0.41	0.34
RAC Ret/Ready Garage	1.09	5.44	0.59	0.35
RAC QT Area	0.40	2.10	0.19	0.31
RAC Storage Area	0.24	1.17	0.14	0.31

1 Emission factors include idle, hot soak, evaporative losses.
2 Emission factors include idle losses.
3 Emission factors include idle losses and brake wear.

Source: Camp Dresser & McKee Inc., 2003

Table S16

Parking Facility Emission Factors Alternative D - 2015

Parking Facility Name	ROG Emission Factor[1] (g/veh)	CO Emission Factor[2] (g/veh)	NO_x Emission Factor[2] (g/veh)	PM_{10} Emission Factor[3] (g/veh)
P1	1.04	5.07	0.63	0.37
P2	1.10	5.20	0.51	0.34
P3	0.72	3.48	0.40	0.34
Surface Parking	0.22	1.08	0.13	0.31
ITC	1.06	5.00	0.50	0.34
West Emp Lot	0.81	3.94	0.49	0.35
CVHA	0.30	1.41	0.15	0.31
Avion/Cent Emp Lot	0.60	2.96	0.37	0.34
RAC Ret/Ready Garage	0.98	4.72	0.54	0.35
RAC QT Area	0.41	1.91	0.18	0.31
RAC Storage Area	0.20	1.00	0.12	0.31

1 Emission factors include idle, hot soak, evaporative losses.
2 Emission factors include idle losses.
3 Emission factors include idle losses and brake wear.

Source: Camp Dresser & McKee Inc., 2003

Table S17

Stationary Source Modeling Parameters

Source Category	Number of Sources[1]	Height, m	Temperature, °K	Velocity, m/s	Diameter, m
CUP CT	1-2	15	293	2	10
CUP (East, CTA)	1	12	450	14	1.5
Engine Tests	1-5	4 or 12	561	0.5	10
Flight Kitchens	2-5	10	422	5	0.6
Maintenance	4	20	422	10	0.6
LAX Northside	0-1	15	422	10	0.6
Restaurants	4	15	320	5	2

This table has not changed since publication of the Draft EIS/EIR, but has been included here for comparison with the assumption developed for the EDMS 4.11 modeling analysis.

1 The number of sources in each category varies by alternative and year.

Source: Camp Dresser & McKee Inc., 2000.

2.2.5.3 Post Processing of EDMS Model Runs

For the EDMS 3.2 model runs, the methodology using USEPA's CALMPRO[27] postprocessor, as described in Appendix G of the Draft EIS/EIR was used. There were no changes to model parameters or methodology from what was detailed in the Draft EIS/EIR.

Since EDMS 4.11 uses the AERMOD dispersion model, all the features of AERMOD are available. AERMOD inherently calculates block averages and includes decalming algorithms. Therefore, the EDMS 4.11/AERMOD results were used without any further postprocessing.

Because EDMS (both versions) models emissions of NO_x, but the NAAQS and CAAQS are for NO_2, a method must be used to convert NO_x to NO_2. The estimate of annual NO_2 concentrations incorporates the Tier 2 Ambient Ratio Method (ARM) recommended by USEPA in the *Guideline on Air Quality Models*

27 U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Calms Processor (CALMPRO) User's Guide, 1984.

for converting total NO_x to NO_2 values.[28] The annual average NO_2-to-NO_x ratio near LAX is approximately 0.42, based on SCAQMD analysis of three recent years (1994-1996) of data.[29] This ratio was used to convert the modeled annual NO_x concentration to an annual NO_2 concentration.

To provide a more realistic estimate of the 1-hour NO_2 concentrations, the Ozone Limiting Method (OLM), as presented in Attachment P, in Technical Report S-4 of the Supplement to the Draft EIS/EIR, was used to determine the NO_x-to-NO_2 concentrations for Alternative D. The OLM uses ozone concentrations and the chemical formation of NO and NO_2 to determine hourly NO_2 concentrations at each individual receptor. In 1996, USEPA combined the OLM algorithms into the latest ISCST model at the time (ISCST2)[30] to facilitate the calculation of peak hourly NO_2 concentrations for each individual receptor in a modeling analysis. For this analysis, the current available version of USEPA's ISC-OLM model (Version 96113) was modified to include the most recent ISCST3 model and algorithms (Version 02035). The model utilizes one year of hourly meteorological data and one year of hourly ozone data. The same meteorological data presented in the Draft EIS/EIR were used for this analysis. One year of ozone data was provided by the SCAQMD for use in this analysis. For Alternative D, results for on-airport operational NO_X emissions in 2015 and construction-related NO_X emissions in 2013 were combined and used in the ISC-OLM model to determine the overall maximum NO_2 concentration and peak concentration location for the alternative. The 2013 construction emissions were used to show peak concentration, as there are no construction emissions in 2015. The operational NO_X emissions estimations for 2013 are within 2 percent of operational NO_X emissions estimation for 2015.

In this Supplement to the Draft EIS/EIR, to provide a more realistic estimate of the 1-hour NO_2 concentrations for the No Action/No Project Alternative and Alternatives A, B, and C, the equation presented in Attachment Q, in Technical Report S-4 of the Supplement to the Draft EIS/EIR, was used to determine the NO_2-to-NO_X (NO_2/NO_X) ratio. The equation is conservatively based on three years of hourly monitored data collected at the SCAQMD Monitoring Station No. 094, and seven months of hourly monitored data collected at LAX, downwind of Runway 25R. This ratio is based on the predicted peak hourly NO_X concentration and is different for each hour analyzed in the dispersion model. The hourly NO_X concentrations were multiplied by the corresponding hourly NO_2/NO_X ratio. The peak NO_2 concentration was then added to the background concentration for comparison to the CAAQS.

2.2.6 <u>ISCST3 Model for Criteria Pollutants</u>

The ISCST3 model is designed to predict air contaminant concentrations for time periods that are less than or equal to one year. ISCST3 was used to model the dispersion of hydrocarbons for analysis of toxic air pollutants, to model construction emissions, and to model PM_{10} concentrations, since EDMS is not configured to calculate aircraft engine particulate emissions. The ISCST3 modeling analysis used is based on the general approach and methodology described in Appendix G (subsection 2.2.6) of the Draft EIS/EIR. Changes in the methodology incorporated into the Supplement to the Draft EIS/EIR have been detailed below.

2.2.6.1 Construction

The construction dispersion modeling analysis used is based on the general approach and methodology described in Appendix G (subsection 2.2.6) of the Draft EIS/EIR. As explained in the Draft EIS/EIR, dispersion modeling was conducted to assess concentrations of CO, NO_2, and PM_{10} produced during construction activities related to the alternatives. The analysis of CO and PM_{10} concentrations remains the same for this analysis. Changes in the calculation of NO_2 concentrations have been incorporated into this Supplement to the Draft EIS/EIR.

As described above for the post-processing of EDMS results, 1-hour NO_X construction concentrations were converted to NO_2 concentrations using the ISC-OLM model. Construction concentrations were combined with operation concentrations to provide a total concentration impact for NO_2. Results for both

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[28] 40 CFR 51, Appendix W, Section 6.2.3.

[29] Chico, T., H. Wong and A. Schuler, <u>Successes and Failures in Using the Ambient Ratio Method to Estimate Annual NO_2 Impacts</u>, June 1998.

[30] U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, March 2003, <u>ISC-OLM,</u> http://www.epa.gov/scram001/H25.htm.

the combined operation/construction concentration and construction emissions separately are provided in Section 4, *Modeling Results,* of this appendix.

Construction emission estimates were allocated for the construction source areas for Alternative D. Emissions were modeled based on the worst-case quarterly emission rate.

2.2.6.2 Operations

The operational emissions from mobile, stationary, and area sources modeling analysis is based on the general approach and methodology described in Appendix G (subsection 2.2.6) of the Draft EIS/EIR. Changes in the methodology incorporated into the Supplement to the Draft EIS/EIR are noted below.

Mobile Sources

The emissions from the LAX operations discussed in Section 2.1.3.1, *Mobile Sources*, of this appendix, were used in the dispersion modeling analysis.

Aircraft

Aircraft were modeled in ISCST3 as multiple volume sources for PM_{10} and point sources for HC, distributed in equal emission increments for each of four operational modes (taxi/idle, approach, takeoff, climbout) and for each of three aircraft sizes. These three aircraft sizes were defined as Small, Large, and Heavy. In the site layout drawings for each alternative, travel segments were determined for each mode of operation. The travel segments were created for the travel scenarios originating and ending at each terminal gate area and areas used for maintenance and cargo aircraft. Volume sources for aircraft were distributed along each travel segment representing aircraft acceleration and/or constant velocity. The number of sources used for each operational mode and each aircraft size is given in **Table S18,** ISCST3 Number of Sources for Aircraft Operation Modes for Alternative D. Since more taxiways have been added in Alternative D, the number of taxi/queue sources in the Alternative D ISCST3 model is more than those in the previous alternative. The aircraft source coordinates for each mode are re-calculated based on the new airport design for runways and taxiways.

Other volume source parameters and aircraft size groupings were completed as previously detailed in Appendix G of the Draft EIS/EIR.

Table S18

ISCST3 Number of Sources for Aircraft Operation Modes for Alternative D

Volume Sources for PM Modeling			
Taxi/Queue	**Approach**	**Climbout**	**Takeoff**
89	5	5	15
Point Sources for HC Modeling			
Taxi/Queue	**Approach**	**Climbout**	**Takeoff**
89	5	5	15

Source: Camp Dresser & McKee Inc., 2003.

The emissions used for each aircraft source were based on the annual emissions calculated by the EDMS emissions module, with the exception of PM_{10} which was calculated as noted in Section 2.1, *Emissions Estimates*, of this appendix, for each alternative and horizon year. The annual emissions are sorted by aircraft size category (i.e., Small, Large, and Heavy) and by operational mode, divided by the number of point sources used for each operational mode. The units are converted from tons/year into annual average emissions in grams/second. Temporal factors, calculated from the SIMMOD data for each alternative, were used to convert the annual average emissions to maximum hourly emissions.

The hourly temporal factors for departure were used for operation in climbout and queue mode and were calculated using the methodology detailed in Appendix G of the Draft EIS/EIR. Data showing the arrival, departure, and queue aircraft assignments by alternative and horizon year are presented in Attachment M in Technical Report S-4 of the Supplement to the Draft EIS/EIR.

The taxi temporal factors were determined for each taxi point as described in Appendix G of the Draft EIS/EIR. The combined (mixed) arrival and departure temporal factors used for taxi sources is given in Attachment B to Technical Report S-4 of the Supplement to the Draft EIS/EIR.

Ground Support Equipment/Auxiliary Power Units

Emissions from GSE and APU were based on the general approach and methodology described in Appendix G of the Draft EIS/EIR. Changes in the methodology incorporated into the Supplement to the Draft EIS/EIR are noted below. The GSE temporal factors are included in Attachment B to Technical Report S-4 of the Supplement to the Draft EIS/EIR.

Ground Access Vehicles

On-road vehicles on roadway links at the GTC, ITC, CTA, and cargo areas were modeled as volume sources as specified by the ISCST3 User's Guide. The on-airport roadway link lengths used in ISCST3 are provided in **Table S19**, On-Airport Roadway Source Modeling Parameters for Central Terminal Area, **Table S20,** On-Airport Roadway Source Modeling Parameters for the Ground Transportation Center/Intermodal Transportation Center, Alternative D, and **Table S21,** On-Airport Roadway Source Modeling Parameters for Cargo/Ancillary Roadway Sources. The methodology and calculations used in estimating source characteristics and emissions are the same as those detailed for the previous alternatives, as found in Appendix G, of the Draft EIS/EIR. The traffic temporal files used in EDMS 3.2 modeling were used in the ISCST3 modeling analysis and are given in Attachment D in Technical Report 4 of the Draft EIS/EIR.

The emissions from parking areas and structures were also so calculated as described in Appendix G of the Draft EIS/EIR. The areas and number of on-airport parking facilities used in ISCST3 for Alternative D are provided in **Table S22**, Parking Facility Modeling Parameters for Alternative D. The parking temporal factors presented in Attachment D in Technical Report 4 of the Draft EIS/EIR, were used to calculate the emission rate in grams per second as part of the ISCST3 data input.

Table S19

On-Airport Roadway Source Modeling Parameters for Central Terminal Area

	All Project Alternatives		
Link Name	Link Length Miles	ISCST3 Volume Sources	Number of Lanes
T1 (W)	0.326	20	6
T2 (W)	0.239	17	6
T3 (W)	0.134	9	6
TBIT (S)	0.145	8	6
T4 (E)	0.133	8	6
T5 (E)	0.111	7	6
T6 (E)	0.129	10	6
T7 (E)	0.191	12	6
T8 (E)	0.137	7	6
Skyway/N Sepulveda (S/N)	0.145	7	8
S. Sepulveda (S/N)	0.301	16	8
Century (W/E)	0.118	6	8
West Way (S/N)	0.152	11	4
East Way (S/N)	0.155	11	4
Center Way	0.683	58	4
CTA Loop	0.125	10	4

This table has not changed since publication of the Draft EIS/EIR, but has been included here for comparison with the assumption developed for the EDMS 4.11 modeling analysis.

Source: Camp Dresser & McKee Inc., 2000.

Table S20

On-Airport Roadway Source Modeling Parameters for the Ground Transportation Center/Intermodal Transportation Center, Alternative D

	Alternative D		
Link Name	Link Length Miles	ISCST3 Volume Sources	Number of Lanes
NB Imperial7	0.203	8	3
SB Imperial1	0.185	9	3
WB La Cienega, Entrance2	0.323	21	2
EB La Cienega, Exit1	0.317	21	2
AVIAEN (Aviation Entrance)	0.051	3	2
GTC Entrance2	0.078	3	4
GTC Exit	0.458	16	5
EB Century to W. GTC Entrance2	0.088	8	1
GTC Entrance6	0.414	15	5
EB Century to S. GTC Entrance	0.065	7	1
W. GTC Exit6	0.138	7	3
S. GTC Exit5	0.046	3	2
CENTEBIN (EB Century, Entrance)	0.103	7	2
CENTEBEX (EB Century, Exit)	0.264	17	2
S. GTC Exit4	0.032	2	2
W. GTC Entrance1	0.021	1	3
S. GTC Entrance1	0.038	2	2
S. GTC Entrance2	0.083	4	3
W. GTC Entrance2	0.163	7	4
S. GTC Recirculate, South	0.030	3	1
S. GTC Recirculate, North	0.228	20	1
S. GTC Recirculate to W. GTC	0.039	2	2
W. GTC Recirculate to S. GTC	0.048	3	2
W. GTC Recirculate2	0.051	4	1
Century Exit Loop1	0.156	13	1
S. GTC Entrance3	0.132	5	4
CENTWBEX (WB Century, Exit2)	0.038	2	2
Century Exit Loop2	0.114	9	1
WB Century Exit1	0.004	1	1
S. Exit3	0.162	7	4
S. GTC Entrance4	0.086	4	4
S. GTC Exit2	0.131	5	5
South Recirculator2	0.146	13	1
S. GTC Entrance6	0.052	2	5
S. GTC Exit1	0.119	4	5
Pier 3 Parking, South Exit WB	0.030	3	1
Pier 3 Parking, South Exit EB	0.011	1	1
S. GTC Entrance7	0.052	2	5
E. GTC Exit2	0.239	9	5
Pier 3 Parking, E. Entrance	0.040	4	1
E. GTC Entrance1	0.387	16	4
W. GTC Entrance3	0.094	4	4
W. GTC Exit5	0.061	3	4
Pier 3 Parking, West Entrance	0.047	4	1
South Pier, Curbfront B, Entrance	0.038	2	2
E. GTC Entrance2	0.053	3	3
CVHA Stage Lot, W. Entrance	0.309	27	1
W. GTC Entrance4	0.099	5	3
North Pier, Curbfront A, Entrance1	0.081	5	2
W. GTC Exit4	0.079	4	3
South Pier, Curbfront B, Exit	0.114	7	2
South Pier, Curbfront B, Departures Exit	0.019	2	1
South Pier, Curbfront B, Arrivals Exit	0.020	2	1
South Pier, Curbfront B, Departures Entrance	0.017	2	1
South Pier, Curbfront B, Arrivals Entrance	0.016	1	1
W. GTC Exit3	0.018	1	4
CVHA Ramp to South Pier, Curbfront A	0.086	8	1
Pier 2 Parking Recirculator	0.073	6	1
South Pier, Curbfront A, Entrance2	0.022	1	2
South Pier, Curbfront A, Arrivals Entrance2	0.033	3	1
South Pier, Curbfront A, Departures Entrance	0.033	2	2

Table S20

On-Airport Roadway Source Modeling Parameters for the Ground Transportation Center/Intermodal Transportation Center, Alternative D

	Alternative D		
Link Name	**Link Length Miles**	**ISCST3 Volume Sources**	**Number of Lanes**
South Pier, Curbfront A, Arrivals Exit	0.026	2	1
South Pier, Curbfront A, Departures Exit2	0.023	1	2
Pier 2 Parking, East Recirculate Entrance	0.046	5	1
South Pier, Curbfront A, Exit	0.032	2	3
South Pier, Curbfront A, Recirculate to E. GTC Entry	0.068	6	1
E. GTC Entrance3	0.069	3	3
E. GTC Exit1	0.159	8	3
W. GTC Exit2	0.004	1	3
P2 Exit	0.022	2	1
North Pier, Curbfront B, Exit	0.054	4	2
Pier 2 Parking, West Exit	0.018	1	2
Pier 2 Parking, West Entrance	0.016	2	1
North Pier, Curbfront B, Arrivals Exit	0.022	2	1
North Pier, Curbfront B, Departures Exit	0.023	2	1
Pier 2 Parking, East Entrance	0.052	4	1
North Pier, Curbfront B, Arrivals Entrance	0.026	2	1
North Pier, Curbfront B, Departures Entrance	0.023	2	1
North Pier, Curbfront B, Entrance	0.049	3	2
E. GTC Entrance4	0.045	3	2
E. GTC Entrance5	0.087	8	1
North Pier, Curbfront A, Entrance2	0.086	4	4
Pier 1 Recirculation 2	0.149	13	1
W. GTC Exit1	0.096	8	1
Pier 1 Parking, West Entrance	0.015	1	1
North Pier, Curbfront A, Arrivals Entrance	0.018	2	1
North Pier, Curbfront B, Departures Entrance	0.026	2	2
North Pier, Curbfront A, Arrivals Exit	0.033	3	1
North Pier, Curbfront A, Departures Exit	0.033	2	2
North Pier, Curbfront A, Exit to Park1	0.022	2	1
North Pier, Curbfront A, Exit	0.050	2	3
CVEH Entry	0.070	6	1
East Return Loop	0.026	2	1
Pier 1 & CVHA, Exit Road	0.062	5	1
CVHA Stage Lot, South Exit	0.032	3	1
Pier 1 Parking, Exit	0.085	8	1
CVHA Stage Lot, East Entrance	0.060	5	1
Pier 1 Parking, East Entrance	0.033	3	1
North Pier, Curbfront A, Exit to Park 2	0.040	3	1
CVHA Stage Lot, Aviation Entrance	0.020	2	1
CVHA Stage Lot, Aviation Exit	0.020	2	1

Source: Camp Dresser & McKee Inc., 2003.

Table S21

On-Airport Roadway Source Modeling Parameters for Cargo/Ancillary Roadway Sources

Link Name	Alternative D Length Miles	Alternative D ISC Volume Sources
Spine Road	1.219	20
NECARGO 1	0.104	2
NECARGO 2	0.091	2
NECARGO 3	0.100	2
NECARGO 4	0.286	5
NECARGO 5	0.077	2
NECARGO 6	0.254	5
NECARGO 7	0.151	3
NECARGO 8	0.265	5
NECARGO 9	0.147	3
NECARGO 10	0.216	4
SECARGO 1	0.316	5
SECARGO 2	0.262	4
SECARGO 3	0.260	4
FEDXCAR 1	0.089	2
FEDXCAR 2	0.130	2
FEDXCAR 3	0.084	2
SCARGO	0.194	4
GARRETT	0.194	3
SWCARGO	0.515	8
SWANCIL	0.542	8

Source: Camp Dresser & McKee Inc., 2003.

Table S22

Parking Facility Modeling Parameters for Alternative D

Parking Facilities	Alternative D 2015			
	Area, m^2	ISCST3 Sources	EDMS Sources	Level
P1	13,718	5	1	5
P2	38,766	5	1	3
P3	38,766	5	1	3
Surface Parking	134,200	6	1	1
ITC	108,300	6	1	3
West Emp Lot	104,000	4	1	4
CVHA	24,905	1	1	1
Avion/Cent Emp Lot	7,500	2	1	6
RAC Ret/Ready Garage	48,830	2	1	4
RAC QT Area	11,102	3	1	1
RAC Storage Area	311,675	6	1	1

Source: Camp Dresser & McKee Inc., 2003.

Stationary Point Sources

Stationary point sources for Alternative D remained the same as those previously modeled for Alternatives A, B and C. Stationary source parameters can be found in Table 19 of Appendix G in the Draft EIS/EIR.

Area Sources

The deicing/anti-icing and landscaping equipment area sources discussed in Section 2.1, *Emissions Estimates,* of this appendix, were not modeled in ISCST3 since the emissions from these sources were considered to be negligible.

2.2.6.3 Post Processing of ISCST3 Model Runs

Because the version of the ISCST3 model used in this analysis incorporates algorithms comparable to those of the CALMPRO routine discussed in Section 2.2.5.3, *Post Processing for EDMS Modeling Runs,* of this appendix, it was not necessary to perform any post processing of the ISCST3 modeling output to correct for treatment of calm hours.

2.2.7 Uncertainties and Sensitivities of Methods

Dispersion models used in this analysis represent the state of the art in modeling methodology and guidance extant at the time of the analysis, and therefore, the results provided by exercising these models offer the best estimates available to predict future ambient concentrations, given the accuracy of the input data. That is not to say that these models are without limitations. Studies of model accuracy have consistently confirmed the following conclusions: (1) dispersion models are more reliable for predicting long-term concentrations than for estimating short-term concentrations at specific locations; and, (2) dispersion models are reasonably reliable in predicting the magnitude of the highest concentrations occurring, without respect to a specific time or location. A comparison of modeled versus monitored data over a two-week period at LAX indicated that short-term (one-hour) impacts may be substantially over-estimated using approved airport modeling techniques. An approach to address this over-estimation was developed and included in Technical Report 4 of the Draft EIS/EIR. Refer to the *Guideline on Air Quality Models*[31] for additional discussion of dispersion modeling uncertainties and sensitivities.

2.3 Mitigation Measures

Mitigation measures have been developed to reduce project-related air quality impacts both in and around LAX and throughout the South Coast Air Basin. Proposed mitigation measures include measures to reduce construction-related impacts as well as operational mitigation measures that seek permanent air quality reductions from the daily activities at LAX. Mitigation measures were developed through the extensive public participation process that included comments received from federal, state and regional government agencies as well as members of the public and environmental organizations.

Mitigation measures must meet the following criteria in order to be considered feasible and quantifiable.[32]

- The mitigation should coincide with the environmental impact.
- Adequate resources should be available to ensure implementation of mitigation.
- Mitigation should be enforceable.
- Standards should be defined for monitoring and enforcement.
- Mitigation should be accomplished within a reasonable timeframe.
- Public agencies' permit conditions should be verified when identified as mitigation.

All suggested mitigation measures were evaluated for technological feasibility, cost-effectiveness, timeliness, and enforceability.

2.3.1 LAWA's Commitment to On-Going Measures that Improve Air Quality

The proposed air quality mitigation program was developed cognizant of the fact that LAWA already complies with, and will continue to comply with, a myriad of rules and regulations implemented and enforced by federal, state, regional, and local agencies to protect and enhance ambient air quality in the South Coast Air Basin. In particular, due to the long persistence of challenges to attain the ambient air quality standards in the South Coast Air Basin, the rules and regulations promulgated by CARB and SCAQMD are among the most stringent in the U.S. LAWA will continue to comply with all existing applicable air quality regulatory requirements for activities over which it has direct control and will meet in a timely manner all regulatory requirements that become applicable in the future. Likewise, LAWA

[31] 40 CFR 51, Appendix W. Guideline on Air Quality Models (Revised), July 1, 2002.
[32] South Coast Air Quality Management District, CEQA Air Quality Handbook, Table 11-1, 1993.

actively encourages all tenants and users of its facilities to comply with applicable air quality requirements.

It is instructive to identify examples of the nature and extent of the requirements with which LAWA complies and will continue to comply. These requirements include, but are not limited to, the following.

- USEPA Rule 40 CFR 61 Subpart M, National Emission Standard for Asbestos: requires containment and proper disposal of asbestos encountered during demolition and renovation of buildings and structures (Cf. SCAQMD Rule 1403, Asbestos Emissions from Demolition/Renovation Activities). Refer to Master Plan Commitment HM-2, Handling of Contaminated Materials Encountered During Construction, discussed in Section 4.23, *Hazardous Materials*, of the Draft EIS/EIR.
- CARB Rule 13 CCR 1956.8, California Exhaust Emission Standards and Test Procedures for 1985 and Subsequent Model Heavy-Duty Diesel Engines and Vehicles: requires significant reductions in emissions of NO_x, particulate matter, and nonmethane organic compounds using exhaust treatment on heavy-duty diesel engines manufactured in model year 2007 and later years.
- SCAQMD Rule 403, Fugitive Dust: identifies the minimum particulate controls for construction-related fugitive dust. For example, Rule 403 requires twice daily watering of all active grading or construction sites. Haul trucks leaving the facility must be covered and maintain at least two feet of freeboard (CVC Section 23114). Low emission street sweepers must be used at the end of each construction day if visible soil is carried onto adjacent public paved roads, as required by SCAQMD Rule 1186.1, Less-Polluting-Sweepers. Wheel washers must be used to clean off the trucks, particularly the tires, prior to them entering the public roadways. (For the LAX Master Plan construction, wheel washers will be installed at every entrance and exit to the construction site where an unpaved area connects to a paved area.)
- SCAQMD Rule 431.2, Sulfur Content of Liquid Fuels: requires that, after January 1, 2005, only low sulfur diesel fuel (containing 15 parts per million by weight sulfur) will be permitted for sale in the SCAB for any stationary- or mobile-source application.
- SCAQMD Rule 1134, Emissions of Oxides of Nitrogen from Stationary Gas Turbines: requires stringent limits on emissions of NO_x.
- SCAQMD Rule 1146, Emissions of Oxides of Nitrogen from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters: requires stringent limits on emissions of NO_x.
- SCAQMD Rule 1146.1, Emissions of Oxides of Nitrogen from Small Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters: requires stringent limits on emissions of NO_x.
- SCAQMD Rule 1146.2, Emissions of Oxides of Nitrogen from Large Water Heaters and Boilers: requires stringent limits on emissions of NO_x.
- SCAQMD Rule 1191, Clean On-Road Light- and Medium-Duty Public Fleet Vehicles: requires operators of publicly owned fleets of 15 or more light- and medium-duty vehicles to acquire low-emitting gasoline or alternatively fueled vehicles when adding or replacing vehicles.
- SCAQMD Rule 2202, On-Road Motor Vehicle Mitigation Options: requires employers in the SCAB with more than 250 employees to implement an approved rideshare program and attain an average vehicle ridership of at least 1.5.
- Los Angeles City Council directive on diesel engine particulate traps, approved by the Mayor on December 2, 2002: requires that all existing City-owned and City-contracted diesel-fueled vehicles be retrofitted with particulate traps, which engines would henceforth be required to use ultra low sulfur diesel fuel (15 parts per million by weight or less); some exceptions include emergency vehicles and off-road vehicles.

In December 2002, CARB and most major domestic air carriers serving the South Coast Air Basin executed a Memorandum of Understanding (MOU) regarding ground support equipment. This MOU requires signatory airlines that operate ground support equipment at commercial-service airports in the South Coast Air Basin to reduce NO_x emissions from this equipment. While LAWA is not a signatory party to the MOU, in preparing the air quality analyses for the LAX Master Plan, the air quality analysis assumed that, for the No Action/No Project Alternative and Alternatives A, B, C, and D, the airlines will comply with MOU.

Against this backdrop of regulatory requirements, LAWA is committed not only to meet these requirements but also to serve as an example of environmental stewardship by developing and implementing ongoing air quality improvement programs that further reduce the impacts of LAWA operations on local ambient air quality. As part of its continuing commitment to help clean the air and enhance the quality of life for surrounding communities, LAWA has instituted a number of highly effective air quality programs built on innovative environmental technologies and practices. The air quality analysis incorporated these ongoing air quality improvement programs, which include commitments to reduce impacts from LAWA operations and from construction activities at LAX, into the air quality analyses for the No Action/No Project Alternative and Alternatives A, B, C, and D. LAWA continues its commitment to air quality improvement programs for activities over which it has direct control. Likewise, LAWA actively encourages all tenants and users of its facilities to adopt policies and practices that promote air quality benefits.

LAWA began introducing alternative-fuel vehicles into its fleet in 1993, with a goal of having 50 percent of its fleet powered by alternative fuels by the end of 2003. As of 2002, approximately 45 percent of LAWA's fleet vehicles at LAX are alternatively fueled. Many of these alternative-fuel vehicles will qualify as super ultra low emitting vehicles (SULEV) and zero emission vehicles (ZEV). To support its growing fleet of alternative-fuel vehicles, LAWA has installed clean fuel stations at LAX, including compressed natural gas (CNG) and liquefied natural gas (LNG), and will be adding a hydrogen fuel station by the end of 2003. To improve the effectiveness and longevity of the particulate traps on City-owned on-road diesel-fueled vehicles, LAWA uses low sulfur diesel fuel containing no more than 15 parts per million by weight of sulfur. LAWA has provided a number of public-use electric charging stations designed for vehicles using both inductive and conductive charging systems, and charging and parking are free to airport users driving such vehicles.

In addition to LAWA's rideshare and carpool program, most LAWA employees at LAX work a 9/80 work schedule, which reduces employee work trips by one day every two weeks. This saves a significant number of commuter miles and gallons of gasoline, and the associated emissions, per year. Where job function permits, and with management approval, some LAWA employees at LAX are permitted to telecommute.

In 1999, LAWA awarded door-to-door van contracts to three full-service and four long-distance companies under a restructured program that seeks to provide safe, economical, convenient, and efficient transportation to passengers using LAX while reducing traffic congestion and improving air quality in and around the airport. In addition, LAWA required these authorized van operators to phase in clean-burning alternative-fuel vehicles. By the end of 2003, the vehicle fleets of these authorized van operators will be 100 percent alternatively fueled.

It is LAWA's goal to have all of its aircraft gates at LAX equipped with 400-Hz power and preconditioned air in the near future. This feature will allow aircraft pilots to minimize the use of their aircrafts' auxiliary power units (APUs) while parked at the gate. FAA, EPA, and LAWA will engage interested parties in an evaluation of all feasible measures for reducing APU emissions at the gates; such measures may include incentive programs and aircraft guidelines restricting APU use at gates when turnaround time exceeds certain limits.

LAWA has taken a very aggressive approach to energy conservation at LAX, employing both energy-efficient technology and new construction designs. In 1999, LAWA began to make the switch at LAX to electricity generated by nonpolluting, unlimited, or renewable sources through a long-term agreement with the Los Angeles Department of Water and Power to provide “green power.” Green power includes electricity generated by solar, wind, hydropower, biomass, and geothermal sources. By 2010, LAWA intends to increase the use of green power to 50 percent and ultimately to 100 percent by 2015. Where feasible in new construction or existing structures, LAWA will incorporate energy efficient designs such as use of central water heating systems, double-paned glass or accousti-glass tempered and shaded windows, high efficiency metal halide lights in parking areas, lighting controls and energy efficient lighting in indoor areas, energy efficient and automated controls for air conditioning, and increased wall and ceiling insulation beyond existing regulatory requirements.

Although not exclusively an air quality improvement program, LAWA does strictly enforce restrictions on curbside idling and parking in the terminal areas. While this measure is directed to control traffic flow and ease roadway congestion at LAX, as well as to aid security, these efforts realize air quality benefits by reducing vehicle emissions.

The LAX Master Plan contains a variety of airfield designs that would optimize runway and taxiway configurations and improve aircraft movements on the airfield. These provisions include dual taxiways, high-speed runway/taxiway turnoffs, and air traffic and ground traffic control systems to improve the efficiency of aircraft operations and to reduce aircraft ground and airborne delays. Without these improvements, aircraft emissions on the airfield would increase due to increased congestion and delays. The air quality analysis of Alternatives A, B, C, and D incorporate these improvements. As part of Alternative D, LAWA plans to build a consolidated rental car facility at LAX by 2008 to serve those rental car companies that currently operate on property; LAWA would provide alternative-fuel shuttles and buses to transport passengers between the consolidated rental car facility and the terminals, which would reduce congestion and emissions on airport.

As part of the construction storm water prevention program, LAWA would implement erosion-control measures that would necessarily reduce runoff of dirt onto roadways, reducing the roadway dust entrained by on-road construction vehicles. LAWA would also require the construction team to implement a traffic management plan for purposes of traffic safety, which would also provide air quality benefits.

2.3.2 Mitigation Measures for Alternatives A, B, C, and D

As part of the air quality analysis, Section 4.6, *Air Quality* (subsection 4.6.8), of the Draft EIS/EIR contained a discussion of mitigation measure MM-AQ-1, Implement Revised Air Quality Mitigation Program. In that discussion, LAWA pledged to implement "technologically/legally feasible and economically reasonable methods" to mitigate potentially significant air quality impacts of the Master Plan. While a list of approximately 150 potential air quality mitigation measures was included in Attachment X of Technical Report 4 of the Draft EIS/EIR, as indicated in the Draft EIS/EIR, the mitigation measures were considered preliminary at the time of publication.

As a result of the public review of the Draft EIS/EIR, the public (including USEPA, CARB, SCAQMD, and other implementing agencies) generated nearly 200 comments regarding mitigation of air quality impacts of the Master Plan. While it is not a purpose of this report to provide specific responses to these public comments, extensive analysis of these public comments was performed in developing the recommended air quality mitigation approach presented herein. Specific responses to the public comments will be included in the Final EIS/EIR. This report provides a listing of the "technologically/legally feasible and economically reasonable methods” included in the Supplement to the Draft EIS/EIR as recommended mitigation measures.

Potential air quality mitigation measures consolidated from the list contained in Attachment X of Technical Report 4, *Air Quality*, of the Draft EIS/EIR, noted above and the various public comments received on the Draft EIS/EIR were intensively evaluated. From the consolidated list, any measures that could be recommended for elimination from further consideration or alternatively could be considered as part of the recommended air quality mitigation measures proposed in the Supplement to the Draft EIS/EIR were identified. The criteria for recommending elimination from further consideration included the following:

- A measure which was duplicative of another on the list.
- A measure which was otherwise required under the authority of federal, state, regional, or local agencies and with which LAWA is assumed in compliance.
- A measure which was already in place as part of a LAWA or City of Los Angeles ongoing environmental program and to which LAWA or the City of Los Angeles is assumed to have a continuing commitment.
- A measure which was not technologically feasible or not economically reasonable.
- A measure which may be contrary to statutory or regulatory requirements which apply to LAWA or the City of Los Angeles.

The resulting air quality mitigation measures in the Supplement to the Draft EIS/EIR are provided in **Table S23**, Recommended Air Quality Mitigation Measures. Some of these measures have readily quantifiable air quality benefits and some do not. The measures proposed to be implemented to reduce emissions include not only measures associated with operational aspects of the Master Plan alternatives (in the areas of transit and intermodal sources, highways and roadways, parking, vehicles and fuels, stationary sources, and energy conservation) but also measures associated with construction of the Master Plan alternatives. While LAWA proposes to implement and claim as mitigation under CEQA all of the measures listed in **Table S23**, emissions reductions were only quantified for a selected few measures when performing the mitigated air quality analyses for the Supplement to the Draft EIS/EIR. This approach represents a conservative quantitative analysis of air quality impacts following mitigation. For this reason, expected air quality impacts should, in fact, be less than those predicted in the mitigated analyses presented in Section 4.6, *Air Quality* (subsection 4.6.8), of the Supplement to the Draft EIS/EIR.

Several of the recommended air quality mitigation measures rely on the cooperation of members of the public who use LAX to effect emissions reductions. While LAWA cannot dictate or guarantee the behavior of the public, it can seek to influence and modify this behavior in a positive way to realize air quality benefits. Therefore, certain of these mitigation measures (in the categories of parking and transit/intermodal) will incorporate public outreach efforts to communicate information and opportunities to contribute to the success of these measures and the ensuing environmental benefits.

2.3.2.1 Construction Mitigation Measures with Quantifiable Air Quality Benefits

This subsection represents those mitigation measures deemed most technologically viable to control emissions from heavy-duty construction vehicles, on-site power generation (diesel-powered generators), and fugitive dust. The various emission reduction combinations outlined below have been applied to the construction emissions baseline previously calculated for Alternatives A, B, C, and D. Potential emission reductions associated with each mitigation measure have been calculated for the build out of the airport project.

Heavy-Duty Construction Vehicles

All heavy-duty construction vehicles operating on-site would be equipped with particulate traps and use Lubrisol (or an equivalent clean-burning diesel) fuel, where technically feasible. Injection retarding on all heavy-duty construction vehicle engines will also be required, but this analysis does not apply a quantifiable emission reduction to this aspect of construction mitigation.

The mix of heavy-duty construction vehicles is assumed to include a percentage of post-2000 manufactured engines that is reflective of fleet mix in the OFFROAD model. Newer off-road engines are subject to CARB's lower emission standards for NO_x, VOC, and PM_{10}.

Total emissions reductions attributable to this mitigation measure from all heavy-duty construction vehicles over the course of the entire construction period are estimated as follows: 24 percent reduction in NO_x and 85 percent reduction in PM_{10}.

Traps will be installed on diesel engine exhaust systems to lower particulate matter emissions (PM). These traps must be replaced or regenerated on a regular basis. Particulate traps that regenerate use a catalyst or elevated temperature to oxidize the particulate matter. Particulate traps can be easily retrofitted to a diesel engine exhaust systems and have been proven effective and trouble free in a large number of field tests.

Lubrisol is the current trade name of the “clean diesel” previously marketed as “Purinox”. This fuel uses a proprietary emulsification of diesel fuel, water and an emulsifying agent. Lubrisol significantly reduces PM emissions and also achieves moderate emissions reductions of CO, VOC, and NO_x. The presence of water lowers the energy content of the fuel. This, in turn, lowers engine power output and increases fuel use. There is an increased per gallon cost (premium) for Lubrisol. Current users of Lubrisol have found it to be effective in reducing emissions.

Vehicle idling will be reduced to the extent possible. Vehicles not expected to be in use for 10 minutes or more while on airport property will be prohibited from idling.

Power Generation from On-Site Diesel Generators

A required mitigation measure included herein is that use of portable diesel generators will be replaced with an electrical power pole hook up to the maximum extent feasible. In estimating potential emission reductions associated with this measure, it was conservatively assumed that 33.4 percent of portable diesel generators will be so replaced, that another 33.3 percent will use Lubrisol (or an equivalent clean-burning diesel) fuel, and that the remaining 33.3 percent will use particulate traps in combination with Lubrisol (or an equivalent clean-burning diesel) fuel as a retrofit technology, where technically feasible.

Total emissions reductions attributable to this mitigation measure from these construction sources over the course of the entire construction period are estimated as follows: 46 percent reduction in NO_x and 83 percent reduction in PM_{10}.

During construction projects, electrical power is needed to operate electric hand tools and equipment such as air compressors. Typically, portable diesel generators are used on site to provide electric power in these situations. While it is not possible to completely replace the use of on-site diesel generators, temporary power poles can often be installed to supply electrical power. This is especially true when a building is being constructed, because the need for electrical power is in a relatively well-defined, fixed location. The use of temporary power poles, or quick installation of a power panel at a building under construction, will significantly reduce diesel engine emissions at that location. There are also significant cost savings from using a power pole instead of using portable diesel generators to provide electrical power.

Construction-related Measures for Fugitive Dust

The SCAQMD Handbook provides a list of dust-related mitigation measures that can be used for disturbed surface areas, inactive construction sites, paved road track-out, open storage piles, unpaved roads and land clearing/earth moving. In addition, the SCAQMD has several fugitive dust-related rules including Rule 403 - Fugitive Dust. The air quality analyses for Alternatives A, B, C, and D assume full compliance with Rule 403, as the facility will be required to submit a Dust Control Plan pursuant to Rule 403. Beyond the requirements of Rule 403, LAWA will be implementing a host of mitigation measures (see below) designed to further reduce emissions of fugitive dust.

Emission reductions achieved through compliance with Rule 403 is a 50 percent reduction in PM_{10}. Further emission reductions from implementing suggested control measures in the SCAQMD Handbook are conservatively estimated to achieve a further 13 percent reduction in PM_{10}.[33] Therefore, total PM_{10} emission reductions from fugitive dust are approximately 63 percent.

Chemical stabilizers will be used in areas that are not subject to daily disturbances. The SCAQMD Handbook Table 11-4 recommends the application of non-toxic soil stabilizers on inactive construction areas. These inactive construction areas are areas that were previously graded but have had no construction activity for ten days for more. Chemical stabilizers will also be applied throughout the construction site prior to a known wind event.

Vegetation will be applied to all disturbed yet inactive areas. Native vegetation will be used that is drought-resistant. The vegetative ground cover will be applied within 21 days after active operations have ceased. The ground cover will be of sufficient density to expose less than 30 percent of unstabilized ground within 90 days of planting and at all times thereafter.

Any open storage piles of gravel, sand, dirt or debris created as a result of construction activities will be covered. Tarps or plastic sheeting will be applied to the piles and securely fastened to prevent shifting during high wind conditions.

LAWA is further committed to watering disturbed areas no less than three time daily, exceeding requirements under SCAQMD Rule 403. Pre-grading watering will utilize trucks, hoses, and/or sprinklers prior to conducting any land clearing. Pre-grading watering will increase the moisture content of the soil thereby increasing its stability. Post-grading watering of active earth-moving areas will be applied three times daily and in a quantity sufficient to prevent visible emissions from extending more than 100 feet from the point of origin.

To further reduce emissions from this source category, a rock crusher will be permanently on-site to crush debris, therefore minimizing the number of heavy-duty truck trips needed to haul unneeded dirt and debris. Emissions associated with the operation of the rock crusher have been accounted for in the construction analysis, but no emissions reductions have been calculated at this time for the reduced truck haul trips.

[33] Suggested control measures taken from Table 11-4 of the SCAQMD's CEQA Air Quality Handbook. Thirteen percent reduction assumes all measures will be implemented and takes the average control efficiency (i.e., mid-point in the range of achievable emission reductions).

Most of the access roads for the LAX expansion project are already paved. However, any and all unpaved access roads will be paved at least 100 feet onto the site from the main road.

2.3.2.2 Operational Mitigation Measures with Quantifiable Air Quality Benefits

In addition to air quality benefits accruing from traffic mitigation measures which decrease highway congestion and delays, emissions reductions for operations-related measures were quantified for one airside measure (convert GSE to electric power or extremely low emission technology, such as fuel cells) and for one transit/intermodal measure (establish network of strategically placed, off-airport intermodal check-in terminals, similar to the Van Nuys FlyAway, serviced by LAX dedicated clean-fuel buses and providing low-priced parking to LAX users). LAWA proposes to implement many operational mitigation measures, but only a few of these measures have the potential for substantial emissions reductions.

As noted above, the major commercial airlines servicing LAX have recently signed a memorandum of understanding (MOU) with CARB in which they voluntarily agree to reduce emissions from GSE. While these voluntary emissions reductions cannot be claimed by LAWA as mitigation, the MOU does not specify the elimination of emissions from GSE. LAWA does propose the virtual elimination of GSE emissions as part of the Master Plan, which it will affect through incentives and tenant lease requirements, as well as providing appropriate and sufficient fueling infrastructure. Emissions reductions resulting from LAWA's efforts beyond the conditions of the MOU are considered as mitigation.

As part of the recommended mitigation programs, LAWA proposes to construct two remote, intermodal check-in terminals (flyaways) by 2005 and an additional three flyaways by 2015 (total of five). It is anticipated that each flyaway will reduce 750,000 vehicle round trips, and the associated emissions, per year. While some of these emissions reductions would occur on airport, most of the emissions reductions would occur off airport (regional).

Another mitigation measure is LAWA's intention to promote the acquisition of commercial vehicles, trucks, and vans (including rental cars and nonrental car courtesy shuttles) that use SULEV or ZEV engines. Such a program would encourage the early replacement of older vehicles with alternative-fuel vehicles. These types of vehicles operating on airport and in the region are a substantial source of emissions. Since LAWA would not require such acquisition, no emissions reduction benefit has been calculated. However, LAWA would implement this measure by offering incentives to vehicle owners, and substantial emissions reductions are possible.

2.3.2.3 Mitigation Measures for Which No Air Quality Benefits Are Quantified

LAWA is including a variety of air quality mitigation measures that have air quality benefits that cannot readily be quantified at this time. Therefore, no emission reduction has been calculated for these measures in reducing the project's significant air quality impacts. Nonetheless, LAWA proposes to implement these measures for both construction and operational impacts. The following lists include many of the mitigation measures being proposed for which no quantifiable emission reductions have been ascertained. All proposed air quality mitigation measures are presented in **Table S23,** Recommended Air Quality Mitigation Measures.

Operational Mitigation Measures Not Quantified

- Expand the electric and alternative fuel infrastructure facilities for ground support equipment (GSE) and for ground access vehicles.
- Adopt and encourage incentive programs, including pricing structures to reduce commute trips for tenant employees.
- Video-conference facilities will be made available to LAWA employees and tenants to reduce regional VMT.
- The use of fleet vehicles during smog alerts will be minimized.
- Free parking and charging for electric vehicles will be provided.

Construction-related Mitigation Measures Not Quantified

- Construction workers will begin work during off-peak traffic hours.
- An Environmental Coordinator will be assigned to the construction site on a full-time basis to ensure that the Mitigation Monitoring and Reporting Plan is being implemented.
- Construction activities will be suspended during a Stage 2 Smog Alert.
- A sign will be posted on-site with a telephone number for surrounding land uses to issue potential complaints regarding air quality and/or visible emissions from the site.
- All construction equipment will be properly maintained and run according to manufacturer's specifications.
- Steps will be taken to ensure there is no tampering with construction equipment to increase horsepower or to defeat emission control devices.
- Construction trips will be minimized to the maximum extent feasible.
- Equipment clearly producing visible emissions in excess of similar pieces of equipment will be shut down and thoroughly inspected for mechanical problems.
- Construction staging areas will be designed to minimize traffic congestion.
- An on-site lunch truck will be provided to minimize off-site trips by construction workers.
- Construction equipment will be "sized" properly (i.e., lowest appropriate HP rating) for each job.

Table S23

Recommended Air Quality Mitigation Measures

Reference	Description	Comments	Alternative A	Alternative B	Alternative C	Alternative D
Airside						
Draft EIS/EIR, Tech Report 4, Attachment X, Item #G07	Convert GSE to electric power (or extremely low emission technology, such as fuel cells).	Accelerate full conversion, beyond the requirements of the GSE MOU. LAWA to provide incentives or tenant lease requirements.	Yes	Yes	Yes	Yes
Clean Vehicle Fleets						
Draft EIS/EIR, Tech Report 4, Attachment X, Item #F01	Promote commercial vehicles / trucks / vans using terminal areas (LAX and regional intermodal) to install SULEV / ZEV engines.	Evaluation of this measure is based on accelerated replacement of older vehicles with alternative-fueled vehicles. Engine conversion of heavy-duty vehicles can provide cost-effective emission reductions. LAWA to provide incentives.	Yes	Yes	Yes	Yes
Draft EIS/EIR, Tech Report 4, Attachment X, Item #F04	Promote "best-engine" technology (SULEV / ZEV) for rental cars using on-airport RAC facilities.	LAWA to provide incentives.	Yes	Yes	Yes	Yes
Draft EIS/EIR, Tech Report 4, Attachment X, Item #F07	Consolidate nonrental car shuttles using SULEV / ZEV engines.	LAWA to provide incentives.	Yes	Yes	Yes	Yes
Construction						
Draft EIS/EIR, Tech Report 4, Attachment X, Item #F14 and public input	Specify combination of construction equipment using "cleaner burning diesel" fuel and exhaust emission controls.	Options include: diesel engines with catalytic oxidizers (CO, VOC), diesel engines with particulate traps (PM), diesel engines with exhaust gas recirculation (NOx), diesel engine with Lubrizol fuel + catalytic oxidizer (PM, CO, VOC, NOx),	Yes	Yes	Yes	Yes
Public input	Specify combination of electricity from power poles	Cannot completely eliminate need for portable generators	Yes	Yes	Yes	Yes

Table S23

Recommended Air Quality Mitigation Measures

Reference	Description	Comments	Alternative A	Alternative B	Alternative C	Alternative D
	and portable diesel- or gasoline-fueled generators using "cleaner burning diesel" fuel and exhaust emission controls.					
Public input	Have construction employees work during off-peak hours.	Original suggested measure was to develop a trip reduction plan to achieve a 1.5 AVR for construction employees, but this was not feasible.	Yes	Yes	Yes	Yes
Public input	Suspend use of all construction operations during a second-stage smog alert.	There have been no Stage 2 smog alerts since 1986, so air quality benefit assumed very small.	Yes	Yes	Yes	Yes
Public input	Apply non-toxic soil stabilizer to all inactive construction areas (I.e., areas with disturbed soil).	Emission reduction credit for this measure would only account for control efficiency beyond that provided by watering required by SCAQMD Rule 403.	Yes	Yes	Yes	Yes
Public input	Following the addition of materials to, or removal of materials from, the surface of outdoor storage piles, said piles shall be effectively stabilized of fugitive dust emissions utilizing non-toxic soil stabilizer.	Emission reduction credit for this measure would only account for control efficiency beyond that provided by watering required by SCAQMD Rule 403.	Yes	Yes	Yes	Yes
Public input	The contractor or builder shall designate a person or persons to ensure the implementation of all construction mitigation measures through direct inspections, records reviews, and investigations of complaints.	Other large construction projects require an on-site inspector to ensure adherence to plan.	Yes	Yes	Yes	Yes
Public input	Post a publicly visible sign with the telephone number and person to contact regarding dust complaints; this person shall respond and take corrective action within 24 hours.	Procedural method.	Yes	Yes	Yes	Yes
Public input	Prior to final occupancy, the applicant demonstrates that all ground surfaces are covered or treated sufficiently to minimize fugitive dust emissions.	Procedural method.	Yes	Yes	Yes	Yes
Public input	All roadways, driveways, sidewalks, etc. being installed as part of project should be completed as soon as possible; in addition, building pads should be laid as soon as possible after grading.	May not be necessary as long as all inactive (soil disturbed) areas are stabilized with water or non-toxic soil stabilizer.	Yes	Yes	Yes	Yes
Public input	Prohibit staging or parking of construction vehicles (including workers' vehicles) on streets adjacent to sensitive receptors such as schools, daycare centers, and hospitals.	May not reduce emissions but may reduce exposures of sensitive receptors.	Yes	Yes	Yes	Yes
Public input	Prohibit construction vehicle idling in excess of ten minutes.	Procedural method.	Yes	Yes	Yes	Yes
Public input	Utilize construction equipment having the minimum practical	Use of undersized equipment could prolong construction.	Yes	Yes	Yes	Yes

Table S23

Recommended Air Quality Mitigation Measures

Reference	Description	Comments	Alternative A	Alternative B	Alternative C	Alternative D
	engine size (i.e., lowest appropriate horsepower rating for intended job).					
Public input	Make available on-site lunch trucks during construction to minimize off-site worker vehicle trips for intended job).	Reduced vehicle trips will reduce associated vehicle emissions.	Yes	Yes	Yes	Yes
Draft EIS/EIR, Tech Report 4, Attachment X, Item #F20	Utilize on-site rock crushing facility during construction to reuse rock / concrete and minimize off-site truck haul trips.	Reduced vehicle trips will reduce associated vehicle emissions.	Yes	Yes	Yes	Yes
Public input	Require that all construction equipment working on site is properly maintained (including engine tuning) at all times in accordance with manufacturers' specifications and schedules.	May reduce expected deterioration of emissions characteristics with age of equipment.	Yes	Yes	Yes	Yes
Public input	Prohibit tampering with construction equipment to increase horsepower or to defeat emission control devices.	Necessary to ensure air quality benefits of certain mitigation measures.	Yes	Yes	Yes	Yes
Public input	Pave all construction access roads at least 100 feet on to the site from the main road.	Will reduce fugitive dust from on-road construction vehicles.	Yes	Yes	Yes	Yes
Energy Conservation						
Public input	Cover any parking structures that receive direct sunlight to reduce volatile emissions from vehicle gasoline tanks and install solar panels on these roofs where feasible to supply electricity or hot water.	Would potentially apply to surface lots and the top deck of garages. Installation of solar panels may only be feasible in decentralized structures.	Yes	Yes	Yes	Yes
Highways and Roadways						
Draft EIS/EIR, Tech Report 4, Attachment X, Item #B06	Link ITS with off-airport parking facilities, with ability to divert / direct trips to these facilities.	LAWA would act as project sponsor for LADOT implementation of measure. Would reduce on-airport parking volume and potentially reduce ambient concentrations on or near LAX, but would require shuttle services between off-airport parking and CTA or GTC. May not reduce regional VMT.	Yes	Yes	Yes	Yes
Draft EIS/EIR, Tech Report 4, Attachment X, Item #B12	Expand ITS / ATCS, concentrating on I-405 and I-105 corridors, extending into South Bay and Westside surface street corridors.	LAWA would act as project sponsor for LADOT implementation of measure. May reduce regional VHT but not regional VMT.	Yes	Yes	Yes	Yes

Table S23

Recommended Air Quality Mitigation Measures

Reference	Description	Comments	Alternative A	B	C	D
Draft EIS/EIR, Tech Report 4, Attachment X, Item #C06	Link LAX traffic management system with airport cargo facilities, with ability to reroute cargo trips to / from these facilities.	LAWA would act as project sponsor for LADOT implementation of measure. May not reduce regional VMT.	Yes	Yes	Yes	Yes
Public input	Develop a program to minimize the use of fleet vehicles during smog alerts.	SCAQMD Rule 701 imposes requirements during Stage 2 and 3 episodes. LAWA could develop such a measure for Stage 1 episodes. There have been no Stage 1 smog alerts since 1999, so air quality benefit assumed very small.	Yes	Yes	Yes	Yes
Landside						
Public input	Contract with commercial landscapers who operate lowest emitting equipment.	LAWA to provide incentives or contract requirements.	Yes	Yes	Yes	Yes
Parking						
Draft EIS/EIR, Tech Report 4, Attachment X, Item #F03	Provide free parking and preferential parking locations for ULEV / SULEV / ZEV in all (including employee) LAX lots; provide free charging stations for ZEV; include public outreach.	Expand current program, to encourage use of alternative-fueled vehicles by the public as well as by LAWA and tenant employees.	Yes	Yes	Yes	Yes
Draft EIS/EIR, Tech Report 4, Attachment X, Item #F18	Pay-on-foot (before getting into car) to minimize idle time at parking check out; include public outreach.		Yes	Yes	Yes	Yes
Public input	Implement on-site circulation plan in parking lots.	Uses intelligent system to control access within parking facilities to limit "cruising" for available space.	Yes	Yes	Yes	Yes
Public input	Promote employee rideshare opportunities.	In place for LAWA employees; LAWA to provide incentives or tenant lease requirements for tenant employees.	Yes	Yes	Yes	Yes
Draft EIS/EIR, Tech Report 4, Attachment X, Item #35	Encourage employee telecommuting.	In place for LAWA employees; LAWA to provide incentives or tenant lease requirements for tenant employees.	Yes	Yes	Yes	Yes
Public input	Provide video-conference facilities.	Video-conference facilities could be made available to LAWA employees and tenant employees to reduce regional VMT.	Yes	Yes	Yes	Yes
Transit and Intermodal						
Draft EIS/EIR, Tech Report 4, Attachment X, Item #B10 and Draft EIS/EIR, Tech Report 4, Attachment X, Item #B13	Establish network of strategically placed, off-airport intermodal check-in terminals serviced by LAX- dedicated clean-fuel buses; provide low-priced parking to LAX users of off-airport intermodal terminal facilities include public outreach.	Up to five additional facilities similar to the Van Nuys "flyaway."	Yes	Yes	Yes	Yes
Public input	Construct on-site or off-site bus turnouts, passenger benches, or shelters; include public outreach.	To encourage use of transit.	Yes	Yes	Yes	Yes

Table S23

Recommended Air Quality Mitigation Measures

Reference	Description	Comments	Alternative A	B	C	D
Public input	Construct on-site or off-site pedestrian improvements / include showers for pedestrian employees; include public outreach.	Could include wider sidewalks, better lighting of sidewalks, signalized crosswalks, pedestrian bridges; number of pedestrian employees is unknown but assumed small.	Yes	Yes	Yes	Yes

Source: Camp Dresser & McKee Inc., 2003.

2.4 Future Background Concentrations

Future background concentrations for 2013 were calculated using the same methodology detailed in Appendix G (Section 2.4) of the Draft EIS/EIR. The calculated future background concentrations are presented in **Table S24**, Future Background Concentrations. The calculated future background concentrations for 2005 and 2015 have not changed since publication of the Draft EIS/EIR but are included in the table for informational purposes.

Table S24

Future Background Concentrations

Pollutant [2]	Averaging Period	Future Background Concentration [1] 2005	2013	2015
O_3 (ppm)	One Hour	≤ 0.09[3]	≤ 0.09[3]	≤ 0.09[3]
CO (ppm)	Eight Hour	4.9	3.7	3.4
	One Hour	6.2	4.6	4.2
NO_2 (ppm)	AAM	0.0196	0.0159	0.0150
	One Hour	0.0998	0.0812	0.0765
SO_2 (ppm)	AAM	0.0023	0.0026	0.0027
	24 Hour	0.0065	0.0073	0.0075
	Three Hour	0.016	0.018	0.018
	One Hour	0.019	0.021	0.022
PM_{10} (µg/m³)	AAM	28	25	24
	AGM	24	21	20
	24 Hour	61	47	43

AAM = Annual Arithmetic Mean.
AGM = Annual Geometric Mean.
ppm = parts per million (by volume)
$\mu g/m^3$ = micrograms per cubic meter

1 Future background concentration were estimated using a linear rollback approach and future year controlled CO, NO_2 and SO_2 emission inventories from Appendices III and V of the 1997 AQMP (SCAQMD 1996b, 1996c). Future background concentrations of PM_{10} were estimated using the ratio of future year (SCAQMD 1996c) to current year PM_{10} concentrations for downtown Los Angeles applied to the current year PM_{10} concentration at LAX. Future background concentrations are based on monitored ambient air quality and therefore already include contributions from airport sources. Predicted future airport contributions were added to calculated future background concentrations to estimate future total concentrations. Consequently, this approach represents a conservative method for estimating future total concentrations.

2 Lead (Pb) and sulfate concentrations currently meet the NAAQS and CAAQS limits. No significant sources of these pollutants exist or are proposed at LAX.

3 Ozone concentrations with or without the proposed LAX Master Plan.

Source: Camp Dresser & McKee Inc., 2003.

3. ENVIRONMENTAL SETTING

3.1 Climatology

The general climatology for each of the LAX areas is discussed in detail in Appendix G of the Draft EIS/EIR.

3.2 Regulatory Setting

Regulatory agencies have established ambient air quality standards that determine acceptable levels of air quality to protect the public health and welfare. The attainment or nonattainment of ambient air quality standards influences the applicability of emission standards and other requirements in an air quality control region.

LAX is located within Los Angeles County in Southern California. The regulatory agencies with primary responsibility for air quality in the South Coast Air Basin include SCAQMD and CARB with oversight by USEPA Region IX.

3.2.1 Federal Regulatory Agency

The National Environmental Policy Act (NEPA) requires that the air quality impacts of the LAX Master Plan implementation be addressed. Regulatory guidance requires that the air quality impacts from the project be determined by identifying the project incremental emissions and air pollutant concentrations and comparing them to emissions thresholds, and state and federal air quality standards.

USEPA has established NAAQS for criteria air pollutants. These standards are applicable to the LAX area and are summarized in **Table S25**, Ambient Air Quality Standards. Each state is responsible for developing a state implementation plan (SIP) that provides for the attainment and maintenance of the NAAQS. LAX is located in an air basin that is designated as being in nonattainment of the NAAQS for O_3, CO, and PM_{10}.[34] The USEPA classifies the severity of the nonattainment status as "extreme" for O_3, "serious" for CO, and "serious" for PM_{10}. On July 24, 1998, the USEPA redesignated the nonattainment status for NO_2 to an attainment/maintenance status.[35] The area is in attainment of the NAAQS for SO_2 and lead (Pb).

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[34] Attainment demonstrations of the NAAQS and CAAQS for CO in 2002 are included in the Draft 2003 Air Quality Management Plan prepared by SCAQMD, http://www.aqmd.gov/aqmp/AQMD03AQMP.htm, accessed February 24, 2003.

[35] Federal Register, Vol. 63, No. 142, July 24, 1998, pp.39747-39752.

Table S25

Ambient Air Quality Standards

Pollutant	Averaging Time	CAAQS	NAAQS Primary	NAAQS Secondary
Ozone (O_3)	8-Hour	N/A	0.08 ppm ($160\ \mu g/m^3$)	Same as Primary
	1-Hour	0.09 ppm ($180\ \mu/m^3$)	0.12 ppm ($235\ \mu g/m^3$)	Same as Primary
Carbon Monoxide (CO)	8-Hour	9.0 ppm ($10\ mg/m^3$)	9 ppm ($10\ mg/m^3$)	N/A
	1-Hour	20 ppm ($23\ mg/m^3$)	35 ppm ($40\ mg/m^3$)	N/A
Nitrogen Dioxide (NO_2)	Annual	N/A	0.053 ppm ($100\ \mu g/m^3$)	Same as Primary
	1-Hour	0.25 ppm ($470\ \mu g/m^3$)	N/A	N/A
Sulfur Dioxide (SO_2)	Annual	N/A	0.030 ppm (80 µg/m3)	N/A
	24-Hour	0.04 ppm (105 µg/m3)	0.14 ppm (365 µg/m3)	N/A
	3-Hour	N/A	N/A	0.5 ppm (1300 µg/m3)
	1-Hour	0.25 ppm ($655\ \mu g/m^3$)	N/A	N/A
Particulate Matter (PM_{10})	AAM	N/A[(1)]	$50\ \mu g/m^3$	Same as Primary
	AGM	30 µg/m3[(1)]	N/A	N/A
	24-Hour	50 µg/m3[(1)]	$150\ \mu g/m^3$	Same as Primary
Particulate Matter ($PM_{2.5}$)	AAM	N/A[(1)]	$15\ \mu g/m^3$	Same as Primary
	24-Hour	N/A[(1)]	$65\ \mu g/m^3$	Same as Primary
Lead (Pb)	Quarterly	N/A	$1.5\ \mu g/m^3$	Same as Primary
	Monthly	$1.5\ \mu g/m^3$	N/A	N/A
Sulfates	24-Hour	$25\ \mu g/m^3$	N/A	N/A

AAM = Annual arithmetic mean.
AGM = Annual geometric mean.
ppm = parts per million (by volume)
$\mu g/m^3$ = micrograms per cubic meter
mg/m^3 = milligrams per cubic meter
N/A = Not applicable.
CAAQS = California Ambient Air Quality Standards.
NAAQS = National Ambient Air Quality Standards.

1 On June 20, 2002, CARB approved the recommendation to revise the PM_{10} annual average standard to $20\ \mu g/m^3$ and to establish an annual average standard for $PM_{2.5}$ of $12\ \mu g/m^3$. These standards will take effect upon final approval by the Office of Administrative Law, which is expected in Summer 2003.

Source: California Air Resources Board, Ambient Air Quality Standards (California and Federal), May 2003, http://www.arb.ca.gov/aqs/aqs.htm.

In July 1997, USEPA promulgated a new 8-hour O_3 NAAQS and new 24-hour and annual $PM_{2.5}$ NAAQS. In May 1999, the U.S. Court of Appeals for the District of Columbia Circuit remanded these standards to USEPA for reconsideration. On May 22, 2000, the U.S. Supreme Court agreed to hear the appeal of USEPA on the remand action and in February 2001 the Court ruled unanimously in USEPA's favor, thus upholding the new standards.

Section 176 (c) of the Clean Air Act (42 U.S.C. 7506(c)) requires any entity of the federal government that engages in, supports, or in any way provides financial support for, licenses or permits, or approves any activity to demonstrate that the action conforms to the applicable state implementation plan (SIP) required under Section 110 (a) of the Clean Air Act (42 U.S.C. 7410(a)). In this context, conformity means that such federal actions must be consistent with a SIP's purpose of eliminating or reducing the severity and number of violations of national ambient air quality standards (NAAQS) and achieving expeditious attainment of those standards. Each federal agency (including FAA) must determine that any action that is proposed by the agency and that is subject to the regulations implementing the conformity requirements will in fact conform to the applicable SIP before the action is taken.

USEPA promulgated two regulations to address the conformity requirements of the Clean Air Act. On November 24, 1993, USEPA promulgated final transportation conformity regulations at 40 CFR 93 Subpart A to address federally assisted transportation plans, programs, and projects. These regulations have been revised several times since they were first issued to clarify and simplify them. Although in general an airport development project may require or rely on improvements in roadway or transit infrastructure, a determination of transportation conformity related to such improvements would typically be addressed as part of a regional transportation plan or regional transportation improvement program and not as a stand-alone project.

On November 30, 1993, USEPA promulgated final general conformity regulations at 40 CFR 93 Subpart B for all federal activities except those covered under transportation conformity. The general conformity regulations apply to a proposed federal action in a nonattainment or maintenance area if the total of direct and indirect emissions of the relevant criteria pollutants and precursor pollutants caused by the proposed action equal or exceed certain de minimis amounts. Regardless of the proposed action's exceedance of de minimis amounts, if this total represents 10 percent or more of the area's total emissions of that pollutant, the action is considered regionally significant and the federal agency must make a determination of general conformity. USEPA intended the regulating federal agency to make sure that only those emissions that the federal agency can practicably control and that are subject to that agency's continuing program responsibility will be reasonably controlled.

The general conformity regulations incorporate a stepwise process, beginning with an applicability analysis. According to USEPA guidance, before any approval is given for a proposed action, the regulating federal agency must apply the applicability requirements found at 40 CFR 93.153(b) to the proposed action and/or determine the regional significance of the proposed action to evaluate whether a determination of general conformity is required. The guidance states that the applicability analysis can be (but is not required to be) completed concurrently with any analysis required under NEPA. If the regulating federal agency determines that the general conformity regulations do not apply to the proposed action, no further analysis or documentation is required. If the general conformity regulations do apply to the proposed action, the regulating federal agency must next conduct a conformity evaluation in accordance with the criteria and procedures in the implementing regulations, publish a draft determination of general conformity for public review, and then publish the final determination of general conformity.

At issue for the LAX Master Plan is the proposed approval by FAA of a new airport layout plan (ALP) and directly associated improvements for LAX. Alternative D is the LAWA staff-preferred alternative, and therefore, will be the focus of the draft conformity evaluation. FAA is in the process of evaluating alternatives under NEPA and has not yet selected an alternative. FAA has agreed to begin the general conformity evaluation of Alternative D at the request of LAWA, although FAA's choice among alternatives will not be made until the NEPA process is complete. FAA will document its conformity determination, along with the assumptions and methods for evaluating the conformity of this proposed action with the requirements of the Clean Air Act, in a written draft conformity evaluation to be made available for public review. Regional traffic emissions consistent with the assumptions of Alternative D are already included in the conforming Regional Transportation Improvement Program (RTIP) and the conforming Regional Transportation Plan (RTP) prepared by the Southern California Association of Governments (SCAG), the regional metropolitan planning organization (MPO). Because these regional emissions already comply with the transportation conformity requirements, they will not be directly addressed in the general conformity evaluation for Alternative D. FAA will release the draft conformity evaluation of Alternative D prior to the publication of the Final EIS/EIR for the LAX Master Plan. If FAA ultimately selects another alternative, a separate conformity evaluation will be required.

3.2.2 California Regulatory Agency

The California Environmental Quality Act (CEQA) and associated guidance requires that the air quality impacts be determined by comparing project incremental emissions and ambient air quality to emissions thresholds, and state and federal ambient air quality standards.

CARB has established CAAQS for criteria air pollutants. These standards are applicable to the South Coast Air Basin and are summarized in **Table S25**. CARB has designated the South Coast Air Basin as being in nonattainment of the CAAQS for O_3, CO,[36] and PM_{10}. The South Coast Air Basin is in attainment of the CAAQS for NO_2, SO_2, Pb, and sulfates. CARB is the responsible agency in California for developing the SIP, which outlines the regulatory goals and plans for achieving the NAAQS in the state. With respect to the South Coast Air Basin, CARB incorporates approved elements of the SCAQMD AQMP into its SIP submittal to USEPA. CARB is also responsible for developing emission standards for on-road motor vehicles operated in California.

California environmental statutes identify and set requirements for toxic air contaminants. These statutes include the Air Toxics "Hot Spots" Information and Assessment Act (AB 2588) and the Toxic Air Contaminant Identification and Control Act of 1983 (AB 1807).

3.2.3 South Coast Air Basin Regulatory Agency

SCAQMD is the regional regulatory agency with direct oversight of ambient air quality within the South Coast Air Basin. In order to meet the NAAQS and CAAQS for air pollutants in the South Coast Air Basin, SCAQMD has established rules and regulations applicable to stationary point sources to meet these standards. SCAQMD is responsible for developing a regulatory schedule and an AQMP to meet the NAAQS and CAAQS following the guidelines in the California SIP.

Every three years, SCAQMD must prepare and submit an AQMP to CARB that demonstrates attainment of the NAAQS by specified dates and that demonstrates reasonable progress toward attaining the CAAQS for the nonattainment pollutants. The plan includes extensive emissions inventories of all emission sources (including airports) in the South Coast Air Basin. CARB has approved the sections of the 1997 AQMP addressing NO_2 and CO. In 1999, SCAQMD proposed several amendments to the 1997 AQMP for O_3. On April 10, 2000, USEPA approved the most recent O_3 SIP, which is based on the 1997 AQMP. The USEPA has approved[37] the 1997 SIP for PM_{10}. One issue with the 1997 AQMP in regards to airports is an assumption made by SCAQMD that USEPA would adopt significant control regulations for aircraft engine emissions. Since USEPA did not adopt such regulations, and engine technologies are not capable of meeting the SCAQMD-assumed reductions, these AQMP inventories for airports underestimate actual existing airport emissions. The SCAQMD has issued the Draft 2003 AQMP for public review.[38]

SCAQMD's New Source Review of Toxic Air Contaminants (Rule 1401) and Control of Toxic Air Contaminants from Existing Sources (Rule 1402) regulate toxic air pollutant emissions in the South Coast Air Basin and set requirements for air dispersion modeling and health risk analysis to ensure compliance with these regulations.

Since 1998, LAWA has been an active participant in a national effort to reduce aircraft and airport emissions. Stakeholders, including representatives from FAA, USEPA, state and local air quality agencies, environmental groups, air carriers, and airports, have been meeting on a regular basis to negotiate an agreement to reduce emissions from aircraft and airport-related sources. Although the focus of the discussions has been on reducing NO_x emissions, consideration is also being given to limiting other pollutants generated by aviation activities, such as VOC, CO_2, PM and air toxics. This stakeholders' process is anticipated to result in a proposal for a national aviation emissions reduction program. (Note that this is a separate process from the consultation process that addresses GSE emissions discussed in Section 2.1.3.1, *Mobile Sources*, of this appendix.)

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[36] Attainment demonstrations of the NAAQS and CAAQS for CO in 2002 are included in the Draft 2003 Air Quality Management Plan prepared by SCAQMD, February 2003, http://www.aqmd.gov/aqmp/AQMD03AQMP.htm.

[37] Federal Register, Vol. 68, April 18, 2003, pp. 19315-19318.

[38] SCAQMD, Draft 2003 Air Quality Management Plan, February 2003, http://www.aqmd.gov.aqmp/AQMD03AQMP.htm.

3.3 Ambient Air Quality

The existing ambient air quality in the vicinity of LAX describes the affected atmospheric environment for the LAX Master Plan. Emission sources at LAX are not the only sources that contribute to total air pollutant levels in the area. Nearby and distant off-airport sources also contribute to the total ambient concentrations. Air quality data from the closest SCAQMD air monitoring station and from a temporary air quality monitoring station placed at the airport were used to describe the affected environment.

3.3.1 Criteria Pollutants

The primary contaminants that regulatory agencies monitor and use to define air quality are called criteria pollutants. The criteria pollutants with national and California ambient air quality standards are O_3, CO, NO_2, SO_2, lead, sulfates, and PM_{10} as shown in **Table S25**. The on-site ambient air quality conditions collected on LAX property and data from the SCAQMD station located at Hawthorne were used to describe environmental baseline concentrations in the vicinity of LAX as described in detail in Appendix G of the Draft EIS/EIR. These values are briefly summarized in **Table S26**, Environmental Baseline Ambient Air Quality in the Vicinity of LAX. While values have not changed since publication of the Draft EIS/EIR, they have been provided here for informational purposes. For comparison purposes, the ambient air quality for the Year 2000 is also provided in **Table 26**. This baseline also utilizes information from the Hawthorne monitoring station for the previous three years[39,40,41].

[39] South Coast Air Quality Management District, 1998 Air Quality (Summary), 1999

[40] South Coast Air Quality Management District, 1999 Air Quality (Summary), 2000.

[41] South Coast Air Quality Management District, 2000 Air Quality (Summary), 2001.

Table S26

Environmental Baseline Ambient Air Quality in the Vicinity of LAX

Pollutant	Avg. Time	1996 Baseline Air Quality	Year 2000 Air Quality	NAAQS / CAAQS
O_3 (ppm)	8-Hour	0.09[2]	0.09	0.08 / -
	1-Hour	0.13 [2]	0.15	0.12 / 0.09
CO (ppm)	8-Hour	8.5 [3]	8.4	9 / 9.0
	1-Hour	10.6 [3]	10	35 / 20
NO_2 (ppm)	AAM	0.0295 [2]	.0295	0.053 / -
	1-Hour	0.15 [3]	0.13	- / 0.25
SO_2 (ppm)	AAM	0.0039 [2]	0.004	0.030 / -
	24-Hour	0.007 [3]	0.07	0.14 / 0.04
	3-Hour	0.017 [3]	Not Reported	0.50 / -
	1-Hour	0.021 [3]	0.17	- / 0.25
PM_{10} (µg/m³)	AAM	35.5 [2]	37.1	50 / -
	AGM	33.8[1, 2]	34.4	- / 30
	24 Hour	82.3 [3]	75	150 / 50
$PM_{2.5}$ (µg/m³)	AAM	Not Reported	Not Reported	15 / -
	24-Hour	Not Reported	Not Reported	65 / -
Pb (µg/m³)	Quarterly	0.05 [1, 2]	0.05	1.5 / -
	Monthly	0.06 [1, 2]	0.08	- / 1.5
Sulfates (µg/m³)	24 Hour	18.4 [2]	20.6	- / 25

Note: Baseline conditions reflect actual measurements undertaken at LAX for the Master Plan. Where pollutants were not measured (O_3, Pb, sulfates, and annual averages) data collected by the SCAQMD at Monitoring Station 094 (about 2.3 miles southeast of the LAX Theme Building) were used, as noted below.

AAM = Annual Arithmetic Mean.
AGM = Annual Geometric Mean.
N/A = Not Available or Not Applicable.
ppm = parts per million (by volume).
µg/m³ = micrograms per cubic meter.

1 Less than 12 full months of data.
2 Highest reported 1996 through 1998 concentrations from SCAQMD Monitoring Station 094, SW Coastal Los Angeles County.
3 Highest measured concentration from on-site monitoring station.
4 Highest report 1999 through 2001 concentration from SCAQMD Monitoring Station 094, SW Coastal Los Angeles County.

Sources: AeroVironment Environmental Services Inc., Los Angeles International Airport Master Plan Phase III, Environmental Impact Survey/Report Preparation Air Quality and Meteorological Monitoring Program - Measurements Report (AVES-R-50185-0001rev), May 1998; South Coast Air Quality Management District, 1996 Air Quality (Summary), 1997; South Coast Air Quality Management District, 1997 Air Quality (Summary), 1998; South Coast Air Quality Management District, 1998 Air Quality (Summary), 1999; South Coast Air Quality Management District, 1999 Air Quality (Summary), 2000; South Coast Air Quality Management District, 2000 Air Quality (Summary), 2001.; South Coast Air Quality Management District, 2001 Air Quality (Summary), 2002.

3.3.2 Toxic Air Pollutants

Toxic air pollutants include those contaminants listed in 40 CFR 63, Subpart B as hazardous air pollutants (HAP) as well as those contaminants that CARB identifies as toxic air contaminants (TAC). For purposes of this analysis, the toxic air pollutants are limited to those contaminants for which the California Office of Environmental Health Hazard Assessment (OEHHA) has developed unit risk factors or reference concentrations. The toxic air pollutant assessment (TAPA) is summarized in Section 4.24.1, *Human Health Risk Assessment*, of the Draft EIS/EIR and details are included in Technical Report 14a, *Health Risk Assessment*. An updated human health risk assessment is provided in Section 4.24.1, *Human*

Health Risk Assessment, of the Supplement to the Draft EIS/EIR, and details are included in Technical Report 9a, *Supplemental Human Health Risk Assessment.* A brief study of the deposition of several toxic air pollutants was conducted in and around LAX. The deposition report, included in Attachment Y to Technical Report 4, *Air Quality*, of the Draft EIS/EIR, concludes that direct correlations between the airport operations and deposition could not be determined.

3.4 Environmental Baseline Emissions Inventory

Developing emissions inventories for baseline conditions is one of the steps in the air quality impact analysis. The 1996 baseline emissions have been updated as described in Section 2.1.3, *Operations*, of this appendix, and the inventory for LAX-specific sources is summarized in **Table S27**, LAX 1996 Environmental Baseline Emissions Inventory for On-Airport Sources. Estimates of emissions in 2000, based on actual operations data, are presented in **Table S28,** LAX Environmental Baseline Emissions Inventory for On-Airport Sources Year 2000 Emissions Inventory.

Table S27

LAX 1996 Environmental Baseline Emissions Inventory for On-Airport Sources

Source Category	CO	VOC	NO_x	SO_2	PM_{10}
Aircraft Total, lbs/day[1,2]	26,206	5,569	19,164	1,648	278
Aircraft Total, tpy[1,2]	4,783	1,016	3,497	301	51
APU/GSE Total, lbs/day[2]	47,209	19,537	5,883	395	321
APU/GSE Total, tpy[2]	8,616	3,565	1,074	72	59
Stationary Total, lbs/day[2]	1,605	784	3,277	38	296
Stationary Total, tpy[2]	293	143	598	7	54
Motor Vehicles:[2]					
MV, On-Airport Total, lbs/day	30,868	3,245	2,364	11	120
MV, On-Airport Total, tpy	5,633	592	431	2	22
Fugitive Dust, Total lbs/day					107
Fugitive Dust, Total tpy					19
Total Operating, lbs/day	**105,888**	**29,135**	**30,688**	**2,092**	**1,121**
Total Operating, tpy	**19,325**	**5,317**	**5,601**	**382**	**204**

1 Aircraft engine testing included in stationary total. Note that in Attachment C to Technical Report 4, *Air Quality*, of the Draft EIS/EIR, aircraft engine testing is included with the Aircraft source category instead.

2 These values have been revised since publication of the Draft EIS/EIR, as detailed in Section 2.1 of this appendix.

Source: Camp Dresser & McKee Inc., 2003.

Table S28

LAX Environmental Baseline Emissions Inventory for On-Airport Sources
Year 2000 Emissions Inventory

Source Category	CO	VOC	NO_x	SO_2	PM_{10}
Aircraft Total, lbs/day[1]	24,118	3,591	19,967	1,737	280
Aircraft Total, tpy[1]	4,402	655	3,644	317	51
APU/GSE Total, lbs/day	50,141	24,469	8,133	543	494
APU/GSE Total, tpy	9,151	4,466	1,484	99	90
Stationary Total, lbs/day	614	274	1,085	33	186
Stationary Total, tpy	112	50	198	6	34
Motor Vehicles:					
MV, On-Airport Total, lbs/day[1]	35,228	2,847	10,086	70	212
MV, On-Airport Total, tpy	6,429	520	1,841	13	39
Fugitive Dust, Total lbs/day					107
Fugitive Dust, Total tpy					19
Total Operating, lbs/day	**110,101**	**31,181**	**39,272**	**2,384**	**1,280**
Total Operating, tpy	**20,093**	**5,691**	**7,167**	**435**	**233**

[1] Aircraft engine testing included in stationary total. Note that in Attachment C to Technical Report 4, *Air Quality*, of the Draft EIS/EIR, aircraft engine testing is included with the Aircraft source category instead.

Source: Camp Dresser & McKee Inc., 2003.

The emissions inventory for on-airport sources is higher in 2000, compared to the 1996 inventory, for each pollutant measured, due to an increase in the number of passengers and on-airport traffic volumes. The major sources of CO emissions at the airport in 1996 were aircraft engines (25 percent), APU/GSE (45 percent), and motor vehicles (29 percent). The major sources of VOC emissions were APU/GSE (67 percent). Aircraft were the major source of NO_x emissions (62 percent) and SO_2 emissions (79 percent). The major sources of PM_{10} emissions were aircraft engines (25 percent), and stationary sources (27 percent). The major sources of CO emissions at the airport in 2000 were aircraft engines (22 percent), APU/GSE (46 percent), and motor vehicles (32 percent). The major sources of VOC emissions were APU/GSE (78 percent). Aircraft were the major source of NO_x emissions (51 percent) and SO_2 emissions (73 percent). The major sources of PM_{10} emissions were aircraft engines (22 percent), and APU/GSE (39 percent).

4. MODELING RESULTS

This section tabulates the results of the air quality impact analyses of Alternative D. Also included here are updated results for the No Action/No Project Alternative and Alternatives A, B, and C, using the results based on EDMS 4.11 emission calculations and dispersion modeling. The air pollutant emissions and associated concentrations during airport operations and construction are presented for each alternative and each horizon year. The discussion of the Environmental Consequences and Mitigation Measures for Alternative D are provided in Section 4.6, *Air Quality*, of the Supplement to the Draft EIS/EIR. The discussion of the Environmental Consequences and Mitigation Measures for the No Action/No Project Alternative and the four build alternatives can be found in Section 4.6, *Air Quality*, of the Draft EIS/EIR, and Section 4.6, *Air Quality*, of the Supplement to the Draft EIS/EIR.

Table S29, Unmitigated Alternative D Operational Emissions Inventories for On-Airport Sources, presents summaries of the inventories from on-airport sources in 2013 and 2015. **Table S30**, Unmitigated Construction Emissions (Peak Daily, Peak Quarterly and Annual)--Interim, 2015, and Peak Year, presents summaries of the construction emission source inventories for the three build alternatives, the No Action/No Project Alternative, and environmental baseline. **Table S31**, Unmitigated Operational Emissions Inventories for Off-Airport Sources in the South Coast Air Basin, presents summaries of the inventories from off-airport sources for the four build alternatives without mitigation and the No Action/No

Project Alternative in 2005 and 2015. The adjusted environmental baseline emissions inventories are also included in this table.

Table S29

Unmitigated Alternative D Operational Emissions Inventories for On-Airport Sources

Source Category	CO	VOC	NO_x	SO_2	PM_{10}
2013:					
Aircraft Total, tpy	6,193	1,006	4,866	406	60
APU/GSE Total, tpy	2,416	1,642	490	9	5
Stationary Total, tpy	120	51	220	7	39
On-Airport Motor Vehicles, tpy	1,860	225	153	13	60
Total Operating in 2013, tpy	**10,589**	**2,924**	**5,728**	**436**	**163**
2015:					
Aircraft Total, tpy	6,159	1,000	4,860	405	62
APU/GSE Total, tpy	2,416	1,633	488	13	3
Stationary Total, tpy	120	51	220	7	39
On-Airport Motor Vehicles, tpy	1,350	313	124	13	60
Total Operating in 2015, tpy	**10,046**	**2,997**	**5,692**	**438**	**164**

Source: Camp Dresser & McKee Inc., 2003.

Table S30

Unmitigated Construction Emissions (Peak Daily, Peak Quarterly, and Annual) -- Interim, 2015, and Peak Year

	Year	CO	VOC	NO_X	SO_X	PM_{10}
Daily Emissions (lbs/day)						
Alternative A[3]	2004[1]	14,828	2,682	41,054	1,233	10,721
	2005	11,027	1,733	28,317	74	7,598
	2015	3,545	460	6,180	20	1,939
Alternative B[3]	2004[1]	12,940	2,341	35,829	1,076	9,356
	2005	9,623	1,513	24,713	64	6,631
	2015	3,094	402	5,394	18	1,692
Alternative C[3]	2004[1]	13,480	2,438	37,322	1,121	9,746
	2005	10,024	1,576	25,743	67	6,907
	2015	3,223	418	5,618	18	1,763
Alternative D	2005[2]	5,589	873	14,564	32	4,722
	2013	5,614	759	11,625	34	3,933
	2015	-	-	-	-	-
Quarterly Emissions (tons/quarter)						
Alternative A[3]	2004[1]	489	89	1,355	41	354
	2005	353	55	906	2	243
	2015	113	15	198	1	62
Alternative B[3]	2004[1]	427	77	1,182	36	309
	2005	308	48	791	2	213
	2015	99	13	173	1	54
Alternative C[3]	2004[1]	445	80	1,232	37	322
	2005	321	50	824	2	221
	2015	103	13	180	1	56
Alternative D	2005[2]	182	28	473	1	153
	2013	182	25	378	1	128
	2015	-	-	-	-	-
Annual Emissions (tons/year)						
Alternative A[3]	2004[1]	1,773		4,910	147	1,282
	2005	1,121		2,878	7	772
	2015	363		633	2	199
Alternative B[3]	2004[1]	1,548		4,285	129	1,191
	2005	978		2,511	7	674
	2015	317		553	2	173
Alternative C[3]	2004[1]	1,612		4,464	134	1,166
	2005	1,019		2,616	7	702
	2015	330		576	2	181

Table S30

Unmitigated Construction Emissions (Peak Daily, Peak Quarterly, and Annual) -- Interim, 2015, and Peak Year

	Year	CO	VOC	NO_X	SO_X	PM_{10}
Alternative D	2005[2]	564		1,470	3	477
	2013	563		1,166	3	394
	2015	-	-	-	-	-

[1] Construction emissions for Alternatives A, B, C, and No Action/No Project peak in the year 2004.
[2] Construction emissions for Alternative D peak in year 2005. There would be no construction emissions in 2015 under Alternative D.
[3] These values have been revised since publication of the Draft EIS/EIR.

Source: Environmental Compliance Solutions, 2003

Table S31

Unmitigated Operational Emissions Inventories for Off-Airport Sources in the South Coast Air Basin, tons per year

Pollutant[1]	2005 Adjusted Environmental Baseline[2]	Horizon Year Interim Year Alternative[3] NA/NP[2,4]	A[2]	B[2]	C[2]	D
CO	21,361	31,114	30,386	30,366	29,672	17,917
VOC	1,886	2,794	2,344	2,319	2,221	1,426
NO_x	3,260	4,665	4,499	4,592	4,542	2,724
SO_2	37	52	50	52	51	26
PM_{10}	222	319	309	314	310	331
Pollutant[1]	**2015 Adjusted Environmental Baseline[4]**	**Horizon Year 2015 Alternative NA/NP[2,4]**	**A[4]**	**B[4]**	**C[4]**	**D**
CO	9,248	15,188	17,433	17,296	17,401	14,342
VOC	873	1,606	1,338	1,333	1,326	1,152
NO_x	1,531	2,368	2,806	2,801	2,824	2,198
SO_2	17	27	32	32	32	26
PM_{10}	198	314	370	368	371	297

[1] These inventories include emissions from on-road mobile sources within the South Coast Air Basin traveling to or from LAX.
[2] These values have been revised since publication of the Draft EIS/EIR.
[3] Interim year is 2005 for NA/NP and Alternatives A-C, and 2013 for Alternative D.
[4] NA/NP = No Action/No Project Alternative.

Source: Camp Dresser & McKee Inc., 2003

Table S32, Unmitigated Peak Combined Concentrations for On-Airport and Construction Sources, presents summaries of the combined project concentrations for associated with each alternative during the interim year and 2015 from all operational and construction emission sources.

Table S33, Unmitigated Local CO Concentrations at Off-Airport Intersections, presents summaries of the CO hot spots analysis for each alternative in 2013 and 2015. **Table S34**, Unmitigated Local CO Concentrations at Off-Airport Intersections, 2008 presents the summary of the CO hot-spots analysis for Alternative D during the year of peak traffic during construction.

Table S32

Unmitigated Peak Combined Concentrations for On-Airport Operation and Construction Sources

Pollutant (Conc. units)	Averaging Period	Environmental Baseline	Horizon Year Interim Year[2] Alternative NA/NP[3]	A[3]	B[3]	C[3]	D
CO (ppm)	8-Hour	8.5	7.2	9.2	9.0	8.3	4.7
	1-Hour	10.6	10.3	17.8	17.4	15.6	10.1
NO_2 (ppm)	Annual	0.0295	0.0336	0.064	0.060	0.089	0.033[4]
	1-Hour [1]	0.13	0.14	0.15	0.13	0.14	0.15
SO_2 (ppm)	Annual	0.0025	0.0057	0.0052	0.0070	0.0098	0.0067
	24-Hour	0.007	0.014	0.020	0.022	0.026	0.018
	3-Hour	0.017	0.050	0.073	0.083	0.100	0.067
	1-Hour	0.021	0.137	0.098	0.112	0.136	0.124
PM_{10} ($\mu g/m^3$)	AAM	36	36	102	61	87	36
	AGM	34	32	102	61	87	36
	24-Hour	82	74	386	155	292	81

Pollutant (Conc. units)	Averaging Period	Environmental Baseline	Horizon Year 2015 Alternative NA/NP[3]	A[3]	B[3]	C[3]	D
CO (ppm)	8-Hour	8.5	4.7	6.0	6.0	7.0	6.4
	1-Hour	10.6	8.7	18.5	19.9	21.5	9.0
NO_2 (ppm)	Annual	0.0295	0.0276	0.040	0.043	0.051	0.028
	1-Hour [1]	0.13	0.11	0.11	0.19	0.18	0.11
SO_2 (ppm)	Annual	0.0025	0.0058	0.0056	0.0062	0.0069	0.0048
	24-Hour	0.007	0.015	0.022	0.023	0.028	0.016
	3-Hour	0.017	0.046	0.062	0.073	0.088	0.041
	1-Hour	0.021	0.135	0.135	0.185	0.232	0.096
PM_{10} ($\mu g/m^3$)	AAM	36	33	32	32	25	32
	AGM	34	29	32	32	25	28
	24-Hour	82	56	67	64	91	71

AAM = Annual Arithmetic Mean.
AGM = Annual Geometric Mean.
NA/NP = No Action/No Project.
ppm = parts per million (by volume).
$\mu g/m^3$ = micrograms per cubic meter.

1 Future concentration results from EDMS modeling. See Attachment P to Technical Report S-4, *Supplemental Air Quality Technical Report*, of the Supplement to the Draft EIS/EIR, for supplemental one-hour NO_2 modeling analyses.
2 Interim year for Alternative D is 2013. For all other alternatives, Interim year is 2005
3 These values have been revised since publication of the Draft EIS/EIR, as detailed in Section 2.2 of this Appendix.

Source: Camp Dresser & McKee Inc., 2003.

Table S33

Unmitigated Local CO Concentrations at Off-Airport Intersections (Including Background)

	Horizon Year - Interim[3,4]									
	No Action/ No Project, ppm		Alternative A, ppm		Alternative B, ppm		Alternative C, ppm		Alternative D, ppm	
Intersection	**1-Hr**	**8-Hr**	**1-Hr [1]**	**8-Hr [2]**	**1-Hr**	**8-Hr**	**1-Hr**	**8-Hr**	**1-Hr**	**8-Hr**
Airport Blvd. and Century Blvd.	6.5	5.0	6.8	5.1	6.7	5.1	6.6	5.1	4.8	3.6
Aviation Blvd. and Century Blvd.	6.6	5.0	6.4	5.1	6.7	5.3	6.7	5.3	5.1	3.8
La Cienega Blvd. and Arbor Vitae St.	6.4	4.9	6.4	5.0	6.6	5.1	6.6	5.1	5.2	4.0
La Cienega Blvd. and Century Blvd.	6.3	5.0	6.3	5.0	6.9	5.1	6.7	5.1	5.2	3.9
La Cienega Blvd. and I-405 Ramps N/O Century Blvd.	6.4	5.0	6.4	5.0	6.6	5.1	6.5	5.1	5.0	3.8
La Cienega Blvd. and Florence Ave.	6.4	5.0	6.6	5.1	6.7	5.2	6.6	5.2	4.9	3.8
La Cienega Blvd. and Manchester Ave/	6.1	4.9	6.4	5.0	6.6	5.2	7.0	5.2	5.2	3.8
Lincoln Blvd. and Manchester Ave.	6.8	5.2	6.5	5.1	6.6	5.2	6.6	5.1	5.5	3.9
Lincoln Blvd. and 83rd St.	6.6	5.1	6.4	5.0	6.5	5.0	6.5	5.0	5.2	3.8
Lincoln Blvd. and La Tijera Blvd.	8.4	6.3	6.5	5.1	6.6	5.2	6.5	5.1	4.9	3.7
Sepulveda Blvd. and Imperial Hwy.	6.2	4.9	6.6	5.1	7.0	5.2	6.6	5.2	5.4	4.1
Sepulveda Blvd. and I-105 Ramps	6.3	5.1	6.2	4.9	6.4	5.0	6.1	4.9	5.7	4.0
Sepulveda Blvd. and Manchester Ave.	6.8	5.0	6.9	5.3	6.8	5.3	6.7	5.2	5.1	3.7
Sepulveda Blvd. and La Tijera Blvd.	6.5	5.0	7.5	5.3	7.7	5.4	7.5	5.3	4.9	3.7
Sepulveda Blvd. and Mariposa Ave.	6.5	5.0	6.9	5.2	7.0	5.3	6.8	5.3	5.3	3.8
Sepulveda Blvd. and Rosecrans Ave.	6.4	5.0	6.7	5.2	7.0	5.3	7.0	5.2	5.2	4.0
Vista del Mar and Imperial Hwy.	7.4	5.2	6.5	5.0	6.5	5.0	6.4	5.0	4.8	3.7
La Cienega & Centinela[5]	-	-	-	-	-	-	-	-	5.4	3.9
Lincoln & Washington[5]	-	-	-	-	-	-	-	-	4.8	3.7

Concentrations in ppm	Horizon Year 2015[6]									
	NA/NP, ppm		Alternative A, ppm		Alternative B, ppm		Alternative C, ppm		Alternative D, ppm	
Intersection	**1-Hr**	**8-Hr**	**1-Hr**	**8-Hr**	**1-Hr**	**8-Hr**	**1-Hr**	**8-Hr**	**1-Hr**	**8-Hr**
Airport Blvd. and Century Blvd.	4.4	3.5	4.3	3.5	4.3	3.5	4.3	3.6	4.8	3.6
Aviation Blvd. and Century Blvd.	4.5	3.5	4.4	3.6	4.4	3.5	4.6	3.7	5.0	3.7
La Cienega Blvd. and Arbor Vitae St.	4.5	3.6	4.6	3.5	4.4	3.5	4.6	3.5	5.1	3.9
La Cienega Blvd. and Century Blvd.	4.4	3.6	4.4	3.5	4.4	3.5	4.5	3.5	4.7	3.6
La Cienega Blvd. and I-405 Ramps N/O Century Blvd.	4.4	3.5	4.3	3.5	4.3	3.5	4.2	3.5	4.8	3.7
La Cienega Blvd. and Florence Ave.	4.3	3.5	4.3	3.5	4.3	3.5	4.3	3.6	4.6	3.6
La Cienega Blvd. and Manchester Ave.	4.3	3.5	4.5	3.5	4.5	3.5	4.6	3.5	5.1	3.7
Lincoln Blvd. and Manchester Ave.	4.6	3.7	4.7	3.6	4.6	3.5	4.7	3.6	5.3	3.8
Lincoln Blvd. and 83rd St.	4.7	3.6	4.3	3.5	4.3	3.5	4.3	3.5	5.0	3.7
Lincoln Blvd. and La Tijera Blvd.	4.7	3.7	4.5	3.7	4.5	3.6	4.5	3.7	4.9	3.6
Sepulveda Blvd. and Imperial Hwy.	4.4	3.5	4.6	3.6	4.5	3.5	4.5	3.6	5.2	3.9
Sepulveda Blvd. and I-105 Ramps	4.2	3.5	4.1	3.4	4.1	3.3	4.2	3.4	5.3	3.9
Sepulveda Blvd. and Manchester Ave.	4.3	3.5	4.2	3.4	4.2	3.4	4.2	3.5	5.0	3.7
Sepulveda Blvd. and La Tijera Blvd.	4.3	3.5	4.4	3.6	4.5	3.6	4.4	3.6	4.7	3.7
Sepulveda Blvd. and Mariposa Ave.	4.3	3.4	4.4	3.6	4.4	3.5	4.5	3.6	5.0	3.8
Sepulveda Blvd. and Rosecrans Ave.	4.2	3.4	4.7	3.7	4.5	3.7	4.7	3.6	5.2	3.9

Table S33

Unmitigated Local CO Concentrations at Off-Airport Intersections (Including Background)

	Horizon Year - Interim[3,4]									
	No Action/ No Project, ppm		Alternative A, ppm		Alternative B, ppm		Alternative C, ppm		Alternative D, ppm	
Intersection	**1-Hr**	**8-Hr**	**1-Hr [1]**	**8-Hr [2]**	**1-Hr**	**8-Hr**	**1-Hr**	**8-Hr**	**1-Hr**	**8-Hr**
Vista del Mar and Imperial Hwy.	5.1	3.6	4.2	3.4	4.2	3.4	4.2	3.4	4.7	3.6
La Cienega & Centinela[5]	-	-	-	-	-	-	-	-	5.2	3.8
Lincoln & Washington[5]	-	-	-	-	-	-	-	-	4.7	3.6

1 1-hr CO CAAQS = 20 ppm; 1-hr CO NAAQS = 35 ppm
2 8-hr CO CAAQS = 9.0 ppm; 8-hr CO NAAQS = 9 ppm
3 Interim horizon year for NA/NP, and Alternatives A, B, and C was 2005. Interim Year for Alternative D is 2013
4 Background CO concentration for 2005 is 6.2 ppm 1-hr average, and 4.9 ppm 8-hr average. Background CO concentration for 2013 is 4.6 ppm 1-hr average, and 3.7 ppm 8-hr average.
5 Additional intersection, modeled for Alternative D only.
6 Background CO concentration for 2015 is 4.2 ppm 1-hr average, and 3.2 ppm 8-hr average.

Source: Camp Dresser & McKee Inc., 2003.

Table S34
Unmitigated Local CO Concentrations at Off-Airport Intersections, 2008
(Including Background)

Intersection	Horizon Year 2008 Alternative D, ppm 1-Hr[1]	8-Hr[2]
Airport Blvd. and Century Blvd.	6.1	4.5
Aviation Blvd. and Century Blvd.	6.3	4.6
La Cienega Blvd. and Arbor Vitae St.	6.5	4.7
La Cienega Blvd. and Century Blvd.	6.4	4.7
La Cienega Blvd. and I-405 Ramps N/O Century Blvd.	6.0	4.6
La Cienega Blvd. and Florence Ave.	6.2	4.8
La Cienega Blvd. and Manchester Ave.	6.5	4.7
Lincoln Blvd. and Manchester Ave.	6.6	4.6
Lincoln Blvd. and 83rd St.	6.1	4.6
Lincoln Blvd. and La Tijera Blvd.	6.0	4.5
Sepulveda Blvd. and Imperial Hwy.	6.6	4.9
Sepulveda Blvd. and I-405 Ramps	6.9	4.8
Sepulveda Blvd. and Manchester Ave.	6.5	4.7
Sepulveda Blvd. and La Tijera Blvd.	6.0	4.5
Sepulveda Blvd. and Mariposa Ave.	6.7	4.7
Sepulveda Blvd. and Rosecrans Ave.	6.9	4.9
Vista del Mar and Imperial Hwy.	6.0	4.5
La Cienega & Centinela	6.8	4.8
Lincoln & Washington	6.1	4.6

1 1-hr CO CAAQS = 20 ppm; 1-hr CO NAAQS = 35 ppm. 1-hr background concentration in 2008 is ppm.
2 8-hr CO CAAQS = 9.0 ppm; 8-hr CO NAAQS = 9 ppm. 1-hr background concentration in 2008 is ppm.

Source: Camp Dresser & McKee Inc., 2003

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