Clean Air Act
Draft General Conformity Determination

Los Angeles International Airport
Proposed Master Plan Improvements
Alternative D

Los Angeles, Los Angeles County, California

January 2004

Written comments on the Draft General Conformity Determination should be addressed to:

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Written comments must be received by FAA no later than 5:00 p.m. Pacific Standard Time, on Monday, February 9, 2004.

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1. INTRODUCTION

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)) before the action is otherwise approved. 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 the Federal Aviation Administration [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.

At issue for the Los Angeles International Airport (LAX) Master Plan is the approval by FAA of a new airport layout plan (ALP) and directly associated improvements for LAX as well as the approval by FAA of certain funding mechanisms under the Airport Improvement Program (AIP) and Passenger Facility Charges (PFC). This draft general conformity determination documents the evaluation of this proposed action with the requirements of the Clean Air Act for public review. The remainder of Section 1 discusses the background of the regulatory requirements. Section 2 discusses the proposed action (project) to be approved by FAA. Section 3 describes how applicability of the conformity requirements to the proposed action was analyzed. Section 4 discusses the regulatory procedures for the conformity evaluation. Section 5 presents the methods and criteria that were used to evaluate the conformity of the proposed action. Section 6 discusses the concepts of mitigation required under conformity regulations. Section 7 presents the reporting process to be followed to formalize the conformity determination. Section 8 provides references for the evaluation.

1.1 Transportation Conformity Requirements

The U.S. Environmental Protection Agency (EPA) promulgated two regulations to address the conformity requirements of the Clean Air Act. On November 24, 1993, EPA 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. On September 14, 1994, the South Coast Air Quality Management District (SCAQMD), which oversees air quality management in the South Coast Air Basin (SCAB) of California, adopted these regulations by reference as part of Rule 1902. The SCAQMD rule has also been amended since its original issuance. 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 by the Federal Highway Administration (FHWA) or the Federal Transit Administration (FTA) as part of a regional transportation plan or regional transportation improvement program and not as a stand-alone project. If it could have been confirmed that the regional (i.e., off airport) emissions associated with the proposed action are included with those from 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), then it would not have been necessary to include these regional emissions in the general conformity evaluation. Since this cannot be confirmed, then those regional emissions that are not included in the RTP were addressed in the general conformity evaluation.

1.2 General Conformity Requirements

On November 30, 1993, EPA promulgated final general conformity regulations at 40 CFR 93 Subpart B for all federal activities except those covered under transportation conformity. On September 14, 1994, SCAQMD adopted these regulations by reference as part of Rule 1901. 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, thus requiring the federal agency to make a determination of general conformity. 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. By requiring an analysis of direct and indirect emissions, EPA intended the regulating federal agency to make sure that only those emissions that are reasonably foreseeable and that the federal agency can practicably control subject to that agency's continuing program responsibility will be addressed.

The general conformity regulations incorporate a stepwise process, beginning with an applicability analysis. According to EPA guidance (EPA 1994), before any approval is given for a proposed action to go forward, 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, on a pollutant-by-pollutant basis, 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 the National Environmental Policy Act (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 accord 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.

2. DESCRIPTION OF PROPOSED FEDERAL ACTION

In accordance with applicable general conformity regulations and guidance, FAA is only required to conduct a general conformity evaluation for a specific proposed action, i.e., the selected alternative for a project or program (EPA 1994), and FAA must issue a positive conformity determination before the proposed action may proceed or is otherwise approved. Each federal agency is responsible for determining conformity of those proposed actions over which it has jurisdiction. This draft general conformity determination is related only to those actions proposed by FAA with respect to the LAX Master Plan alternative selected by the Los Angeles World Airports (LAWA) and approved by the City of Los Angeles (City) and by FAA. If any other federal agency has jurisdiction over any emissions from this project, it must conduct its own general conformity evaluation or adopt the FAA determination by reference (EPA 1994).

The general conformity requirements only apply to actions proposed in nonattainment areas (i.e., areas where one or more NAAQS are not being achieved at the time of the proposed action and requiring SIP provisions to demonstrate how attainment will be achieved) and in maintenance areas (i.e., areas recently reclassified from nonattainment to attainment and requiring SIP provisions to demonstrate how attainment will be maintained). The attainment status in the vicinity of LAX will be discussed in Section 3.

2.1 LAX Master Plan Preferred Alternative

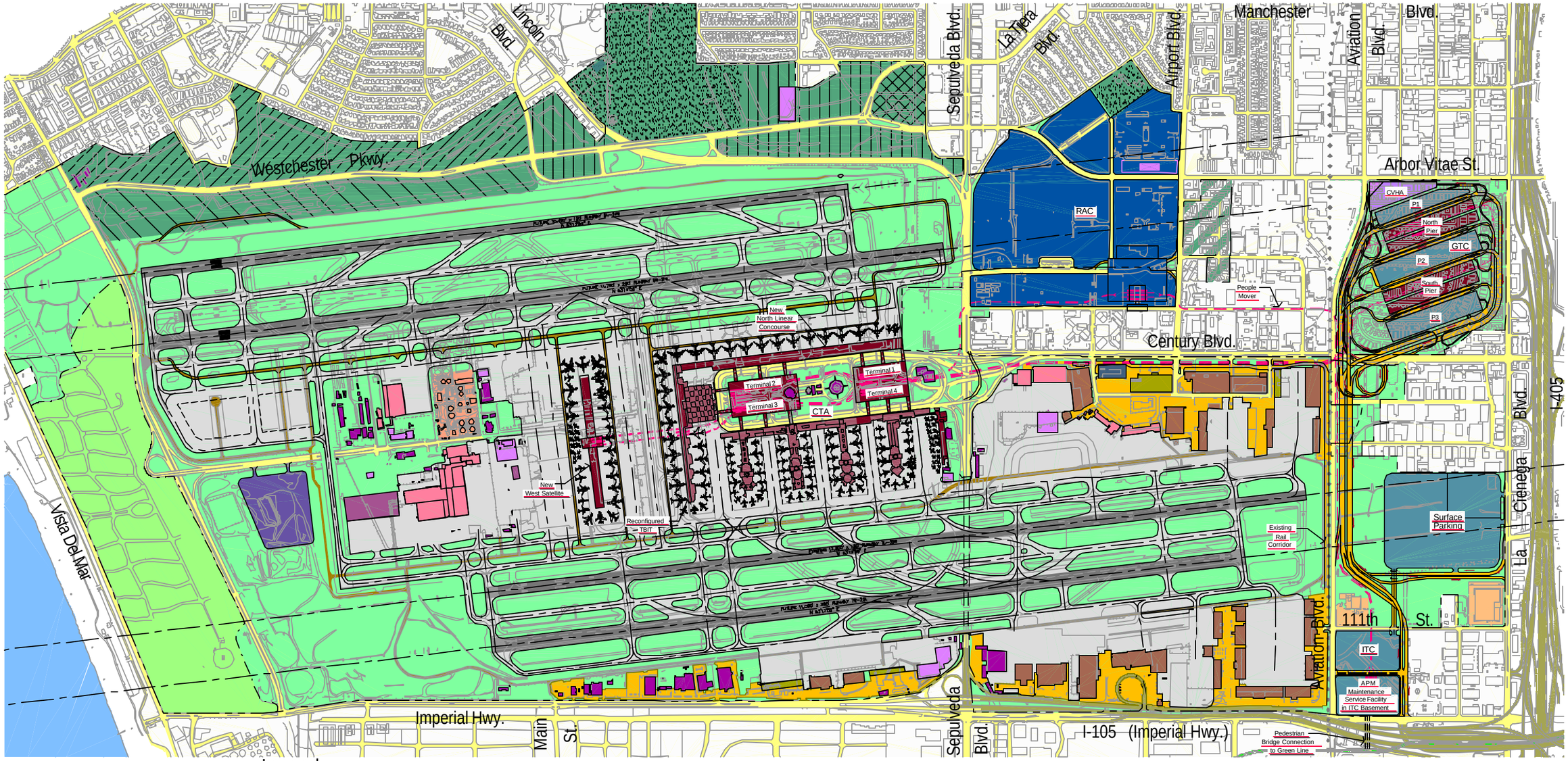
The City is preparing the Master Plan for LAX to identify facilities needed through the year 2015. As part of the environmental review for the LAWA staff-preferred alternative (Alternative D - Enhanced Safety and Security Plan), FAA, in coordination with the City, has prepared this draft general conformity determination to demonstrate compliance with the general conformity requirements in support of FAA's approval of the new ALP, directly associated improvements, and any funding mechanisms for the LAX Master Plan. For purposes of this draft general conformity determination, Alternative D, including the air quality mitigation measures proposed in the LAX Master Plan Supplement to the Draft EIS/EIR (Supplement to the Draft EIS/EIR) (FAA/LAWA 2003), is the proposed federal action. The airport layout in 2015 for Alternative D is presented in **Figure 1** Alternative D - 2015 Enhanced Safety and Security Plan.

2.2 Relationship to Other Environmental Analyses

Both NEPA and the California Environmental Quality Act (CEQA) require that the air quality impacts of the LAX Master Plan implementation be analyzed and disclosed. Regulatory guidance implementing these statutes requires that the air quality impacts from the project alternatives be determined by identifying the associated project incremental emissions and air pollutant concentrations and comparing them respectively to emissions thresholds and state and national ambient air quality standards. For CEQA purposes, the impacts of the build alternatives (Alternatives A, B, C, and D) were compared to the impacts of the environmental baseline and an adjusted environmental baseline to determine environmental significance to develop appropriate mitigation measures. The impacts of the build alternatives (Alternatives A, B, C, and D) were also compared to the No Action/No Project Alternative impacts for NEPA purposes of public disclosure. FAA is the lead agency for the NEPA analysis documented in an Environmental Impact Statement (EIS). The City is the lead agency for the CEQA analysis documented in an Environmental Impact Report (EIR). A joint Draft EIS/EIR was published for public review and comment in January 2001 (FAA/LAWA 2001) providing an analysis of three build alternatives (Alternatives A, B, and C). A joint Supplement to the Draft EIS/EIR was published in July 2003 (FAA/LAWA 2003) providing an analysis of a new build alternative (Alternative D).

The Airport and Airway Improvement Act (AAIA) of 1982, as amended, is an applicable federal law. The AAIA has required, in pertinent part, that, as a necessary condition of approval by the Secretary of the Department of Transportation of an application for an airport development project involving the location of an airport or runway or a major runway extension, the governor of the state in which the project will be located must certify in writing that there is reasonable assurance that the project will be located,

designed, constructed, and operated in compliance with applicable air and water quality standards. On December 12, 2003, President Bush signed into law the FAA reauthorization bill known as Flight 100--Century of Aviation Reauthorization Act. This Act eliminates the requirement for the governor's certificate previously required under the AAIA.



Legend

- Airport Property Boundary Line
- El Segundo Blue Butterfly Preserve
- Airfield/Airport Open Space
- Runways
- Taxiways/Aircraft Aprons
- Existing Terminal Buildings
- Existing Cargo Building
- Existing Maintenance Facility
- Existing Collateral Development
- Existing Light Rail Transit
- Existing Ancillary Facility
- Existing Roadways
- Existing Commercial Use
- Existing Off-Airport Use
- Existing Employee Parking
- Existing Fuel Farm
- Proposed Terminals
- Existing MTA Right-of-Way
- Proposed Cargo Building
- Proposed Maintenance Facility
- Proposed Ancillary Facility
- Proposed Airside Service Roads
- Proposed Public Parking
- Proposed Commercial Vehicle Staging Area
- Proposed Employee Parking
- Airport Landside
- Proposed People Mover
- Proposed Rental Car Facility
- High Density Mixed Use (Hotel, Office, Retail)
- Medium Density Commercial (Hotel, Office, Retail)
- R/D Business Park
- Airport Related
- Golf Course/Open Space/Recreation
- ANMP Acquisition Area

375' 750' 2,250'
750' 0 1,500'

Prepared by: Landrum & Brown, April 2003

LAX Master Plan - General Conformity Determination

Alternative D - 2015 Enhanced Safety and Security Plan

Figure
1

3. REGULATORY PROCEDURES

The general conformity regulations establish certain procedural requirements that must be followed when preparing a general conformity evaluation. This section addresses the major procedural issues and specifies how these requirements are met for the evaluation of Alternative D.

3.1 Use of Latest Planning Assumptions

The general conformity regulations require the use of the latest planning assumptions for the area encompassing the proposed federal action, derived from the estimates of population, employment, travel, and congestion most recently approved by the MPO (40 CFR 93.159(a)). It should be noted that the latest planning assumptions available from the MPO at the time of this evaluation may differ from the planning assumptions used in establishing the applicable SIP emissions budgets. The approved 1997/1999 AQMP was developed with data similar to that used in the 1998 RTP. However, the approved 2001 RTP assumes a lower activity level at LAX than the 1998 RTP, which it supersedes.

As noted previously, SCAG is the MPO for the region encompassing LAX. The SCAG region covers an area of over 38,000 square miles and includes the counties of Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura. To support the 2001 RTP, SCAG prepared the *2001 Social Economic Forecast Report* and conducted the 2001 *Travel and Congestion Survey* (SCAG 2001). The growth forecast for the 2001 RTP estimated a region-wide population growth rate of 1.4 percent per year between 1997 and 2025 and a region-wide employment growth rate of 1.5 percent per year for the same period. The growth rates for population and employment in Los Angeles County were forecast to be approximately half those for the region as a whole over the forecast period, as people and jobs are expected to shift eastward within the region over the forecast period.

The Alternative D planning assumptions reflected in the Supplement to the Draft EIS/EIR are based on the airport accommodating 78.9 million annual passengers and 3.1 million tons of cargo in 2015, and the activity level will be constrained by airside gate access for aircraft. The 2001 RTP explicitly assumes that the airport will accommodate 78 million annual passengers and 3 million tons of cargo in 2025. In a letter dated November 6, 2003, addressed to Mr. Jim Ritchie of LAWA from Mr. Jeffrey Smith of SCAG providing comments on the Supplement to the Draft EIS/EIR, Mr. Smith noted that the forecast activity levels of Alternative D are generally consistent, but not specifically consistent, with the adopted forecast for LAX in the 2001 RTP. In its analysis to support the 2001 RTP, SCAG assumed that when the constrained capacity at LAX is reached, it will not be exceeded, but the analysis did not predict when the constrained capacity level would be reached (Armstrong 2003a). Alternative D is consistent with the policy framework of the 2001 RTP, which calls for no expansion of LAX, and, instead, shifts the accommodation of future aviation demand to other airports in the region.

It should be noted that, at the time of this evaluation, SCAG is currently engaged in development of its 2004 RTP. Information provided by SCAG (Armstrong 2003b) indicates that LAX is expected to reach a passenger demand level of 78 MAP in 2015, based on predictions of the SCAG RADAM 9.11 model based on the Service Brokerage Concept including the Incentive Package designed to boost demand at outlying airports. This model prediction is generally consistent with the market forecasts developed by the LAX Master Plan team to support Alternative D.

3.2 Use of Latest Emission Estimation Techniques

The general conformity regulations require the use of the latest and most accurate emission estimation techniques available, unless such techniques are inappropriate (40 CFR 93.159(b)). Prior written approval from SCAQMD or EPA is required to modify or substitute emission estimation techniques. It should be noted that the latest and most accurate emission estimation techniques available at the time of this evaluation may differ from the emission estimation techniques used in establishing the applicable SIP emissions budgets. The details of emissions estimating are described in Appendix B. The emission estimation techniques used in this evaluation are generally consistent with those used in preparing the Supplement to the Draft EIS/EIR (FAA/LAWA 2003).

For on-road motor vehicle emissions, the general conformity regulations require the use of the most current version of the motor vehicle emission factor model specified by EPA and available for use in the preparation or revision of the SIP. In California, this model is CARB's EMFAC model, and the most current version available at the time of this evaluation is EMFAC2002, approved by EPA in 2003 (68 FR 15720).

FAA requires the use of the Emissions and Dispersion Modeling System (EDMS) to evaluate emissions from aviation sources at airports (63 FR 18068). The most current version of EDMS available from FAA at the time of this evaluation is EDMS 4.11. One exception is the fact that EDMS does not currently incorporate emission factors for particulate matter from aircraft and auxiliary power units because such data are not readily available. For this general conformity evaluation, the methods introduced in the LAX Master Plan Draft EIS/EIR (Draft EIS/EIR) (FAA/LAWA 2001), and further described by Whitefield et al. (Whitefield et al. 2001), were used to estimate particulate emissions from aircraft for the No Action/No Project Alternative and Alternative D, consistent with the guidance for using the best available information (EPA 2002). Particulate emissions from APUs were considered negligible and were not quantified for this evaluation.

Emission factors for stationary point and area sources were based primarily on EPA's Compilation of Air Pollutant Emission Factors AP-42 (EPA 2003) unless more representative data were identified at SCAQMD's website (http://www.aqmd.gov) under annual emission reports.

For nonroad mobile emissions, the most current emission factors were taken from CARB's OFFROAD emissions model or the CEQA Air Quality Handbook (SCAQMD 1993), whichever is more relevant. Emissions from GSE were calculated based on emission factors from the OFFROAD model which had been entered into EDMS.

3.3 Use of Applicable Dispersion Models

The general conformity regulations require the use of the applicable air quality models, databases, and other requirements in the most recent version of EPA's Guideline on Air Quality Models (40 CFR 51, Appendix W), unless such techniques are inappropriate (40 CFR 93.159(c)). Prior written approval from SCAQMD or EPA is required to modify or substitute dispersion models. The details of dispersion modeling are described in Appendix B.

As with emissions from airport aviation sources, FAA requires the use of EDMS to evaluate dispersion from aviation sources (e.g., aircraft, ground support equipment, auxiliary power units) at airports. One exception is the fact that EDMS does not currently incorporate algorithms to treat the dispersion of particulate matter from aircraft and auxiliary power units, since particulate matter emission data for these source types are not readily available. Because it was only necessary to perform dispersion modeling of particulate matter for this evaluation, EDMS was not used for that purpose.

The Industrial Source Complex - Short Term (ISCST3) model was used to evaluate dispersion of particulate matter from aircraft as well as from construction-related sources (particulate matter emissions from auxiliary power units are considered negligible). The ISCST3 model is identified in the Guideline on Air Quality Models as a preferred model. The most current version of ISCST3 available from EPA at the time of this evaluation is ISCST3 (Version 02035).

3.4 Emission Scenarios

The general conformity regulations require that the evaluation must reflect certain emission scenarios (40 CFR 93.159(d)). Specifically, these scenarios must include emissions from the proposed federal action for the following years: (1) for nonattainment areas, the year mandated in the Clean Air Act for attainment and for maintenance areas, the farthest year for which emissions are projected in the approved maintenance plan; (2) the year during which emissions are projected to be the greatest on an annual basis; and (3) any year for which the applicable SIP specifies an emissions budget. These emission scenarios will be described in more detail in Section 5. **Table 1**, Emission Scenario Years for General Conformity Evaluation, lays out the years for which the general conformity evaluation was performed.

Table 1

Emission Scenario Years for General Conformity Evaluation

Pollutant	Attainment/ Maintenance Year	Greatest Emissions Year	Emissions Budget Years
Nitrogen Dioxide	2010	2005	Not Applicable
Ozone (VOC or NO_x)	2010	2005	2005, 2008
Carbon Monoxide	2000	2005	Not Applicable
Particulate Matter	2006	2013	2003

Source: Camp Dresser & McKee Inc., 2003.

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4. APPLICABILITY ANALYSIS

Prior to conducting the general conformity evaluation, FAA prepared a draft protocol and submitted it to EPA, the California Air Resources Board (CARB), SCAG, and SCAQMD for review and comment. On February 27, 2003, U.S. Transportation Secretary Norman Y. Mineta announced a list of six transportation construction projects nationwide that included the LAX Master Plan and EIS/EIR that would receive accelerated environmental review under President Bush's Executive Order 13274 on environmental stewardship. Further coordination with EPA, CARB, SCAG and SCAQMD on the analysis protocols and the development of this Draft General Conformity Determination were undertaken by FAA pursuant to Executive Order 13274. FAA prepared the final protocol by addressing comments received from these agencies, and it served as the basis for this draft general conformity determination (see Appendix A).

As previously noted, FAA requires the use of EDMS for airport air quality analysis of aviation sources. FAA's recent guidance document (FAA/USAF 1997) does allow that supplemental methodology and models for more refined analysis of non-aviation sources would be permitted in consultation with the appropriate FAA regional program office. FAA's recent guidance document supports early consultation and coordination with other agencies (e.g., state/regional air quality agencies, EPA) for proposed actions with potentially significant air quality impacts, and where the general conformity regulations apply to a proposed project FAA will issue a conformity determination following review and comment on a draft by the public (including other interested agencies).

As stated previously, the first step in a general conformity evaluation is an analysis of whether the requirements apply to a federal action proposed to be taken in a nonattainment or a maintenance area. Unless exempted by the regulations or otherwise presumed to conform, a proposed federal action requires a general conformity determination for each pollutant where the total of direct and indirect emissions caused by the proposed action would equal or exceed an annual de minimis emission rate. Notwithstanding the de minimis emission rate, if a proposed action is identified to be regionally significant, the federal agency must make a general conformity determination.

4.1 Attainment Status of South Coast Air Basin

LAX is located within Los Angeles County in the SCAB of southern California. The regulatory agencies with primary responsibility for air quality management in the SCAB include SCAQMD and CARB, with oversight by EPA. Pursuant to the Clean Air Act, EPA established primary NAAQS to protect the public health with an adequate margin of safety and secondary NAAQS to protect the public welfare for seven air pollutants. These pollutants are known as criteria pollutants: particulate matter with an equivalent aerodynamic diameter less than or equal to 10 micrometers (µm) in diameter (PM_{10}), particulate matter with an equivalent aerodynamic diameter less than or equal to 2.5 µm in diameter ($PM_{2.5}$), sulfur dioxide (SO_2), carbon monoxide (CO), ozone (O_3), nitrogen dioxide (NO_2), and lead (Pb). EPA has delegated authority to SCAQMD to implement and enforce the NAAQS in the SCAB.

That portion of the SCAB encompassing LAX is in an area that is designated as being in nonattainment of the NAAQS for O_3 (one-hour average), CO, and PM_{10}. In addition, the severity of the nonattainment status for this area has been classified as "extreme" for O_3, "serious" for CO, and "serious" for PM_{10}. On July 24, 1998, this area was redesignated from nonattainment to attainment/maintenance status for NO_2 by EPA (63 FR 39747). The area is in attainment of the NAAQS for SO_2 and Pb. The attainment status of the area for O_3 (eight-hour average) and $PM_{2.5}$ has not been established at the time of this evaluation. Thus, for purposes of the general conformity requirements, this evaluation addresses NO_2, O_3, CO, and PM_{10}.

4.2 Exemptions from General Conformity Requirements

As noted previously, the general conformity requirements apply to a proposed federal action if the net project emissions equal or exceed certain de minimis emission rates. The only exceptions to this applicability criterion are the topical exemptions summarized below. However, the emissions attributable to Alternative D do not meet any of these exempt categories.

- Actions which would result in no emissions increase or an increase in emissions that is clearly below the de minimis levels (40 CFR 93.153(c)(2)). Examples include administrative actions and routine maintenance and repair.
- Actions where the emissions are not reasonably foreseeable (40 CFR 93.153(c)(3)).
- Actions which implement a decision to conduct or carry out a conforming program (40 CFR 93.153 (c)(4)).
- Actions which include major new or modified sources requiring a permit under the New Source Review (NSR) program (40 CFR 93.153(d)(1)).
- Actions in response to emergencies or natural disasters (40 CFR 93.153(d)(2)).
- Actions which include air quality research not harming the environment (40 CFR 93.153(d)(3)).
- Actions which include modifications to existing sources to enable compliance with applicable environmental requirements (40 CFR 93.153(d)(4)).
- Actions which include emissions from remedial measures carried out under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) that comply with other applicable requirements (40 CFR 93.153(d)(5)).

In addition to these topical exemptions, the general conformity regulations allow each federal agency to establish a list of activities that are presumed to conform (40 CFR 93.153(f)). Although FAA has signaled its intention to publish such a list, to date, no official list is available. FAA may publish such a list in the future (Plante 2003).

4.3 De Minimis Emission Rates

The general conformity requirements will apply to LAX Master Plan Alternative D for each pollutant for which the total of direct and indirect emissions caused by Alternative D (i.e., the net, or incremental, emissions between the projected emissions for Alternative D and the projected emissions for the No Action/No Project Alternative) equal or exceed the de minimis emission rates shown in **Table 2,** De Minimis Emission Rates for Determining Applicability of General Conformity Requirements to LAX Master Plan Alternative D. These emission rates are expressed in units of tons per year (tpy) and are compared to the total of direct and indirect emissions caused by Alternative D for the calendar year during which the net emissions are expected to be the greatest. It should be noted that, because O_3 is a secondary pollutant (i.e., it is not emitted directly into the atmosphere but is formed in the atmosphere from the photochemical reactions of volatile organic compounds, VOC, and oxides of nitrogen, NO_x, in the presence of sunlight), its de minimis emission rate is based on primary emissions of its precursor pollutants - VOC and NO_x. The designation "oxides of nitrogen" (NO_x) includes several distinct but related compounds, primarily nitric oxide (NO), nitrogen dioxide (NO_2), and nitrous oxide (N_2O), although others such as dinitrogen pentoxide (N_2O_5) also exist. As a conservative assumption for this evaluation, it was assumed that all NO_x was emitted as NO_2, therefore, NO_x and NO_2 are considered equivalent in this document. Most NO_x is emitted from anthropogenic sources as NO, but due to the atmospheric conditions extant as each molecule moves through the air (e.g., temperature, insolation, and types and concentrations of other chemical species such as various VOC) as well as the time following emission, NO_x exists in the lower troposphere in a dynamic equilibrium of its various component compounds, the most abundant of which are NO and NO_2. For purposes of this evaluation, the discussion related to ozone will utilize the designation "NO_x," whereas the discussion related to nitrogen dioxide will utilize the designation "NO_2." If the net emissions of either VOC or NO_x exceed the de minimis emission rate for O_3 (EPA 1994), then Alternative D is subject to a general conformity evaluation for O_3.

Table 2

De Minimis Emission Rates for Determining Applicability of General Conformity Requirements to LAX Master Plan Alternative D

Pollutant	SCAB Attainment Status Designations	De Minimis Emission Rate (tons/year)
Nitrogen Dioxide	Attainment/Maintenance	100
Ozone (VOC or NO_x)	Nonattainment/Extreme	10
Carbon Monoxide	Nonattainment/Serious	100
Particulate Matter	Nonattainment/Serious	70

Source: 40 CFR 93.153 and 40 CFR 81.305

4.4 Regional Significance

Even if a proposed federal action is less than the applicable de minimis emission rate for a given pollutant, the general conformity requirements state that a regionally significant action must undergo a conformity evaluation. A regionally significant action is one for which the total of direct and indirect emissions represent 10 percent or more of the nonattainment or maintenance area's emissions inventories for all sources (as identified in the applicable SIP for stationary point, mobile, and area sources) for that pollutant. EPA guidance also indicates that any milestone emissions inventory in the applicable SIP should also be considered when evaluating regional significance (EPA 1994).

4.5 Applicability for Proposed Federal Action

The applicability of the general conformity requirements to Alternative D were evaluated by comparing the total of direct and indirect emissions (calculated as discussed in Appendix B) for the calendar year of greatest emissions to the de minimis emission rates in **Table 2**. Where emissions from Alternative D were found to be excluded from the general conformity requirements because they are below the de minimis emission rates for a pollutant or any portion of Alternative D was found to meet an exempt or presumed-to-conform category, the total of direct and indirect emissions for that pollutant were compared to the nonattainment or maintenance area's emission inventory for that pollutant to determine whether it is regionally significant. Those pollutants that could not be excluded from applicability by one of these mechanisms underwent a complete general conformity evaluation consistent with the procedures in Section 3 above using the methods in Appendix B and the criteria in Section 5 below.

4.5.1 Methodology

Appendix A contains a discussion of the planned approach for estimating emissions for this general conformity evaluation. Appendix B contains explicit details on most of the significant assumptions and calculational methods used to estimate emissions for both the No Action/No Project Alternative and for Alternative D. In the event that data or methods referenced in Appendix A were updated or revised following the publication date of Appendix A, the updated or revised information was incorporated into this evaluation as reflected below and in Appendix B.

4.5.2 Estimated Emissions

Emissions were calculated for VOC, CO, NO_x, and PM_{10} for on-airport activities (operations and construction) as well as for off-airport activities associated with both the No Action/No Project Alternative and Alternative D. For purposes of this evaluation, emissions of NO_2 are assumed to equal emissions of NO_x. These emissions are associated with stationary point, mobile, and area sources forecasted to exist for these two alternatives across the planning horizons developed for the LAX Master Plan.

4.5.2.1 No Action/No Project Alternative

The No Action/No Project Alternative represents the no-build scenario, i.e., the configuration and activity levels expected for LAX in the absence of approval of the LAX Master Plan. Emissions for this alternative were developed for two planning horizons, 2005 and 2015, as presented in the Draft EIS/EIR, Appendix

G, *Air Quality Impact Analysis*, Section 4 (FAA/LAWA 2001). Non-Master Plan and previously locally approved projects would, however, be constructed under the No Action/No Project Alternative which include LAX Northside and Continental City. The Northside Development Project assumes build out of approximately 4.5 million square feet of local government approved improvements including but not limited to office space, hotel space, retail space, and a golf course in an area of approximately 340 acres of land that straddles both sides of the Westchester Parkway north of LAX. The Continental City Development Project assumes build out of approximately 3 million square feet of local government approved improvements including but not limited to office space, hotel space, and retail space in an area of approximately 28.5 acres of land situated along Aviation Boulevard between 111th Street and Imperial Highway. Construction of these projects would have emissions occurring in the time periods considered for this evaluation.

Using as a starting point the on-airport operations emissions estimated for year 2005 as presented in the Draft EIS/EIR, Appendix G, *Air Quality Impact Analysis*, Section 4 (FAA/LAWA 2001), on-airport operations emissions for interim years out to 2015 were estimated following a linear interpolation approach. The off-airport (regional) emissions associated with operations at LAX, based on a linear interpolation between estimates in 2005 and 2015, were added to the on-airport operations emissions. To these emissions were also added the estimated construction emissions by year as presented in the Draft EIS/EIR, Technical Report 4, *Air Quality Technical Report*, Attachment G (FAA/LAWA 2001). It is assumed that, in the absence of approval of the LAX Master Plan, on-going projects and other entitled projects (as noted above) would be constructed. The year-by-year operations and construction emissions were then added together. These data are summarized in **Table 3**, LAX Master Plan Emissions for No Action/No Project Alternative Interim Years.

Table 3

LAX Master Plan Emissions for No Action/No Project Alternative Interim Years

	2005	2006	2008	2010	2013	2015
VOC						
Aircraft, tpy[1]	996	1,022	1,073	1,124	1,201	1,252
APU[2], tpy	9	9	9	9	9	9
GSE[3], tpy	182	168	140	111	69	40
Stationary, tpy	50	50	50	50	50	51
MV[4] On Airport, tpy	414	392	347	303	236	192
MV Off Airport, tpy	2,795	2,676	2,438	2,200	1,843	1,606
Construction, tpy	909	566	222	136	0	0
Total, tpy	**5,355**	**4,882**	**4,279**	**3,934**	**3,409**	**3,150**
CO						
Aircraft, tpy	5,817	5,904	6,079	6,254	6,517	6,692
APU, tpy	183	184	187	190	195	198
GSE, tpy	2,588	2,440	2,146	1,851	1,409	1,114
Stationary, tpy	112	113	114	116	118	120
MV On Airport, tpy	3,120	2,948	2,605	2,261	1,745	1,402
MV Off Airport, tpy	31,114	29,522	26,336	23,151	18,373	15,188
Construction, tpy	667	512	324	110	0	0
Total, tpy	**43,601**	**41,624**	**37,792**	**33,934**	**28,358**	**24,714**
NO_x and NO_2						
Aircraft, tpy	4,428	4,502	4,651	4,799	5,021	5,169
APU, tpy	92	93	95	98	101	103
GSE, tpy	1,229	1,140	960	780	511	331
Stationary, tpy	198	200	205	209	215	220
MV On Airport, tpy	406	388	352	316	261	225
MV Off Airport, tpy	4,665	4,435	3,976	3,517	2,827	2,368
Construction, tpy	405	291	178	74	0	0
Total, tpy	**11,424**	**11,050**	**10,416**	**9,792**	**8,937**	**8,416**
PM_{10}						
Aircraft, tpy	51	52	54	57	60	63
APU, tpy	0	0	0	0	0	0
GSE, tpy	41	38	32	27	18	12
Stationary, tpy	34	35	36	37	38	39
MV On Airport, tpy	54	54	54	54	53	53
MV Off Airport, tpy	1,617	1,634	1,666	1,699	1,747	1,780
Construction, tpy	68	60	41	12	0	0
Total, tpy	**1,866**	**1,873**	**1,884**	**1,884**	**1,917**	**1,947**

[1] tpy = tons per year
[2] APU = auxiliary power unit
[3] GSE = ground support equipment
[4] MV = motor vehicles

Source: Camp Dresser & McKee Inc., 2003.

It should be noted that the on-airport operations emissions estimates taken from the Draft EIS/EIR as mentioned above were adjusted as follows for presentation herein. First, these data were originally developed using EDMS 3.2. As noted in Appendix B, all operations emissions were adjusted to a basis of EDMS 4.11. Second, the GSE emissions for horizon year 2015 were remodeled to better account for the full implementation of the Memorandum of Understanding (MOU) signed in December 2002 (see Section 5.2.2 below). The MOU is assumed to reach completion in 2010, and by 2015 it is assumed that approximately 30 percent of all GSE at LAX would be zero-emission equipment. Third, although the APU emissions are listed separately from other source categories herein, it should be noted that APU emissions are combined with aircraft emissions in the SIP emissions inventories developed by SCAQMD.

4.5.2.2 Alternative D

Alternative D represents the build scenario, i.e., the configuration and activity levels expected for LAX with approval of the LAX Master Plan. Emissions for this alternative were developed for two planning

horizons, 2013 and 2015, as presented in the Supplement to the Draft EIS/EIR, Section 4.6.8.1, *Mitigated Airport Emissions Inventory* (FAA/LAWA 2003).

Using as a starting point the on-airport operations emissions estimated for year 2005 for the No Action/No Project Alternative as presented in the Draft EIS/EIR, Appendix G, *Air Quality Impact Analysis,* Section 4 (FAA/LAWA 2001), on-airport operations emissions for interim years out to 2015 for Alternative D were estimated following a linear interpolation approach. The off-airport (regional) emissions associated with operations at LAX, based on a linear interpolation between the 2005 estimate for the No Action/No Project Alternative and the 2015 estimate for Alternative D, were added to the on-airport operations emissions. To these emissions were also added the estimated construction emissions by year as presented in the Supplement to the Draft EIS/EIR, Technical Report S-4, *Supplemental Air Quality Technical Report,* Attachment D (FAA/LAWA 2003), to build out Alternative D. The year-by-year operations and construction emissions were added together to identify the year of highest emissions. These data are summarized in **Table 4**, LAX Master Plan Emissions for Alternative D Interim Years.

Table 4

LAX Master Plan Emissions for Alternative D Interim Years

	2005	2006	2008	2010	2013	2015
VOC						
Aircraft, tpy[1]	996	1,018	1,060	1,103	1,167	1,167
APU[2], tpy	9	9	9	9	9	9
GSE[3], tpy	182	164	128	91	36	0
Stationary, tpy	50	50	50	50	51	51
MV[4] On Airport, tpy	414	395	356	317	259	248
MV Off Airport, tpy	2,795	2,616	2,258	1,901	1,365	1,091
Construction, tpy	86	78	65	32	72	0
Total, tpy	**4,532**	**4,329**	**3,927**	**3,504**	**2,960**	**2,567**
CO						
Aircraft, tpy	5,817	5,879	6,003	6,128	6,314	6,314
APU, tpy	182	182	184	186	189	189
GSE, tpy	2,588	2,329	1,811	1,294	518	0
Stationary, tpy	112	113	115	117	120	120
MV On Airport, tpy	3,120	2,976	2,687	2,398	1,965	1,672
MV Off Airport, tpy	31,114	29,315	25,716	22,117	16,719	13,166
Construction, tpy	556	526	461	252	547	0
Total, tpy	**43,488**	**41,320**	**36,978**	**32,492**	**26,372**	**21,461**
NO_x and NO_2						
Aircraft, tpy	4,428	4,524	4,714	4,904	5,190	5,190
APU, tpy	92	93	96	98	102	102
GSE, tpy	1,229	1,106	861	615	246	0
Stationary, tpy	198	201	206	212	220	220
MV On Airport, tpy	406	396	377	357	327	287
MV Off Airport, tpy	4,665	4,410	3,901	3,392	2,628	2,102
Construction, tpy	1,141	999	819	365	905	0
Total, tpy	**12,160**	**11,730**	**10,973**	**9,934**	**9,618**	**7,900**
PM_{10}						
Aircraft, tpy	51	52	54	56	59	59
APU, tpy	0	0	0	0	0	0
GSE, tpy	41	37	29	21	8	0
Stationary, tpy	34	35	36	37	39	39
MV On Airport, tpy	54	57	64	71	80	79
MV Off Airport, tpy	1,617	1,634	1,668	1,701	1,752	1,658
Construction, tpy	335	205	155	76	272	0
Total, tpy	**2,133**	**2,021**	**2,006**	**1,962**	**2,210**	**1,835**

1 tpy = tons per year
2 APU = auxiliary power unit
3 GSE = ground support equipment
4 MV = motor vehicles

Source: Camp Dresser & McKee Inc., 2003.

It should be noted that for purposes of developing the interim-year emission estimates, the on-airport and off-airport operations emissions for Alternative D in 2005 were assumed to be equal to the on-airport and off-airport operations emissions for the No Action/No Project Alternative in 2005. The rationale for this assumption is that none of the early construction projects under Alternative D would be complete by 2005, meaning that from an operational standpoint, LAX would operate much the same with or without the LAX Master Plan in 2005.

4.5.3 Comparison to De Minimis Emission Rates

The total of direct and indirect emissions for the proposed federal action is taken to be the difference between the emissions of the build and the no-build scenarios. To identify the year that the total of direct and indirect emissions is greatest, the year-by-year emissions for the No Action/No Project Alternative were subtracted from the emissions for Alternative D for each pollutant over the period from 2005 to 2015 and compared to the general conformity de minimis emission rates; see **Table 5**, LAX Master Plan

Alternative D Total Direct and Indirect Emissions (tpy). As mentioned above, it is assumed that airport operations would be essentially the same for the two alternatives in 2005, so no differences in operational emissions would be expected before that time.

Table 5

LAX Master Plan Alternative D Total Direct and Indirect Emissions (tpy)

Pollutant	2005	2006	2008	2010	2013	2015	De Minimis
VOC	-823	-553	-353	-430	-449	-583	10
CO	-113	-304	-814	-1,442	-1,986	-3,252	100
NO_x	736	680	557	142	681	-516	10
NO_2	736	680	557	142	681	-516	100
PM_{10}	267	154	127	77	294	-112	70

Source: Camp Dresser & McKee Inc., 2003.

As one can see in **Table 5**, in the year of greatest emissions under Alternative D, the difference in emissions is negative for VOC and CO and positive for NO_x, NO_2, and PM_{10}. This indicates that the total of direct and indirect emissions of VOC and CO are less than the de minimis emission rates. In the year of greatest emissions from Alternative D, the totals of direct and indirect emissions of NO_x, NO_2, and PM_{10} exceed their respective de minimis threshold emission rates.

4.5.4 Regional Significance

The total of direct and indirect emissions of VOC and CO for the proposed federal action are next compared to the regional emissions inventories of these pollutants prepared by SCAQMD for the SCAB for the project year for which this total is greatest. Two comparisons are presented, using data taken from the 1997 Air Quality Management Plan (AQMP) (SCAQMD 1996) and from the 2003 AQMP (SCAQMD 2003). The results of this comparison are summarized in **Table 6**, Comparison of Emissions in 2005 and 2008 for Regional Significance. As one can see, the project totals are much less than 10 percent of the SCAB emissions inventories, therefore, the proposed federal action is not regionally significant for VOC or CO.

Table 6

Comparison of Emissions in 2005 and 2008 for Regional Significance

Pollutant	Net Project Emissions (tpy)	Approved SIP Emissions[1] (tpy)	Percent of Approved SIP	2003 AQMP Emissions[2] (tpy)	Percent of 2003 AQMP
VOC	-353	286,718	-0.12	240,046	-0.15
CO	-113	1,368,130	-0.01	1,496,569	-0.01

[1] Based on data in 1997 AQMP Appendix III Attachment A Table A-9 (2005 for CO) and Table A-12 (2008 for VOC).
[2] Based on data in 2003 AQMP Appendix III Attachment A Table A-6 (2005 for CO) and Table A-9 (2008 for VOC).

Source: Camp Dresser & McKee Inc., 2003.

4.5.5 Applicability Determination

The total of direct and indirect emissions of VOC and of CO are less than the general conformity de minimis threshold emission rates and Alternative D is not regionally significant for either VOC or CO. Therefore, the general conformity requirements do not apply to these pollutants, and there will be no further evaluation of these pollutants herein.

Because the total of direct and indirect emissions of NO_x, of NO_2, and of PM_{10} exceed the respective general conformity de minimis threshold emission rates, the general conformity requirements do apply to these pollutants. Subsequent sections of this document will address the general conformity evaluation of these pollutants as they apply to Alternative D of the LAX Master Plan.

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5. GENERAL CONFORMITY EVALUATION

For federal actions subject to a general conformity evaluation, the regulations delineate several criteria that can be used to demonstrate conformity (40 CFR 93.158). In fact, a combination of these criteria may be used to support a positive general conformity determination (EPA 1994). The approach to be taken to evaluate Alternative D relies on a combination of these available criteria, and the remainder of this section summarizes the findings to make the determination.

5.1 Designation of Applicable SIP

Section 110(a) of the Clean Air Act (42 U.S.C. 7410(a)) requires each state to adopt and submit to EPA a plan which provides for the implementation, maintenance, and enforcement of each NAAQS. This plan is known as the state implementation plan (SIP). Over time, states have made and continue to make many such submittals to EPA to address issues as they arise related to the various NAAQS. As EPA reviews these submittals, it can either approve or disapprove them in whole or in part. The compilation of a state's approved submittals constitutes that state's applicable SIP. In California, the state agency responsible for preparing and maintaining the SIP is CARB.

5.1.1 SIP Process in the South Coast Air Basin

CARB designates both air quality management districts and air pollution control districts within California for the purpose of implementing and enforcing ambient air quality standards on a regional or airshed basis. These district agencies must prepare regional plans (Air Quality Management Plans [AQMPs]) to support the broader SIP, as well as to meet the goals of the California Clean Air Act.

Every three years, SCAQMD must prepare and submit to CARB an AQMP to demonstrate how the SCAB will attain and maintain the NAAQS and the California ambient air quality standards. The AQMP contains extensive emissions inventories of all emission sources in the SCAB as well as various control measures applicable to most of these sources. Once CARB approves the AQMP, it is submitted to EPA for approval into the SIP. The approved SIP for the SCAB is based on the AQMP which SCAQMD submitted to CARB in 1997 (SCAQMD 1996) and supplemental information as discussed in Appendix A Section 5.1.2. SCAQMD recently submitted to CARB the final 2003 AQMP (SCAQMD 2003).

5.1.2 Status of Applicable SIP and Emissions Budgets by Pollutant

The Clean Air Act requires attainment of the NAAQS as expeditiously as practicable, but no later than the statutory dates listed below for those criteria pollutants for which the SCAB is nonattainment and for which a finding of general conformity must be determined. Upon redesignation of an area from nonattainment to attainment for each standard, the area will be considered to be a maintenance area for that standard, and as such, must meet all applicable requirements to maintain the standard.

- Extreme O_3: November 15, 2010 (one-hour NAAQS only).
- Serious PM_{10}: December 31, 2006 (On April 18, 2003, EPA approved this new attainment date (68 FR 19315)).

To support the general conformity determination for Alternative D, FAA demonstrates herein that the emissions of NO_x (as an O_3 precursor) and NO_2 from the proposed action either will result in a level of emissions which, together with all other emissions in the nonattainment (or maintenance) area, will not exceed the emissions budgets specified in the approved SIP (criterion at 40 CFR 93.158(a)(5)(i)(A)) or in the alternative will not exceed the emissions budgets specified in the 2003 AQMP (where the 2003 AQMP represents a written commitment from the state of California as a basis to revise the SIP for the SCAB pursuant to the criterion at 40 CFR 93.158(a)(5)(i)(B)), see Section 5.2 below, and, by way of local (i.e., nonregional) air quality modeling, PM_{10} and its precursors will not cause or contribute to any new violation of the NAAQS (criteria at 40 CFR 93.158(a)(3) or 40 CFR 93.158(a)(4)(i)), see Section 5.3 below. See Appendix A for a more detailed discussion identifying the applicable SIP for each pollutant and the relevant emissions budgets. The currently approved SIPs are summarized below.

- O_3: SIP approved by EPA on April 10, 2000 (65 FR 18903), based on the 1997 AQMP and a 1999 amendment to the 1997 AQMP.
- PM_{10}: SIP approved by EPA on April 18, 2003 (68 FR 19315), based on the 1997 AQMP, amendments to the 1997 AQMP submitted in 1998 and 1999, and further modifications to the 1997 AQMP submitted in a status report to EPA in 2002.
- NO_2: SIP approved by EPA on July 24, 1998 (63 FR 39747), based on the 1997 AQMP. In this SIP approval, EPA also redesignated the SCAB from nonattainment to attainment/maintenance for NO_2.

On February 24, 2003, SCAQMD released the Draft 2003 AQMP for public review. SCAQMD released the final 2003 AQMP on August 1, 2003. This evaluation will make comparisons both to applicable emissions inventories in the current EPA-approved SIPs and to applicable emissions inventories contained in the 2003 AQMP. For purposes of the general conformity determination, the applicable SIP will be the most recent EPA-approved SIP at the time of the release of the final general conformity determination.

5.2 Comparison to SIP Emissions Inventories

As noted in the preceding section, the most recent EPA-approved SIP at the time of the release of the final general conformity determination must be used for emission budget analyses. The 1997 AQMP together with supplemental information form the basis for the current, EPA-approved O_3, PM_{10}, and NO_2 SIPs. However, the EPA may approve all or part of the 2003 AQMP for one or more of these pollutants before the final general conformity determination is published. Therefore, to avoid revisions to and/or recirculation of the draft general conformity determination, emissions for the proposed action presented in this section are compared to both the currently approved SIP emissions budgets and to the 2003 AQMP emissions budgets.

The emissions inventories developed by SCAQMD and fully documented in the AQMPs are delineated by source types. **Table 7**, Relationship of LAX Master Plan Source Categories and AQMP Source Types, provides a concordance between the emission source categories that characterize the LAX Master Plan alternatives and the emission source types in the AQMPs. In the following discussion, the term "NO_x" should be understood to represent both NO_x and NO_2 (see discussion in Section 4.3).

Table 7

Relationship of LAX Master Plan Source Categories and AQMP Source Types

LAX Master Plan Source Category	1997 AQMP Source Type	2003 AQMP Source Type
Aircraft	Aircraft - Government Aircraft - Other	Aircraft
Auxiliary Power Unit	Aircraft - Government Aircraft - Other	Aircraft
Ground Support Equipment	Mobile Equipment	Off-Road Equipment
Motor Vehicles	On-Road Vehicles Entrained Road Dust - Paved	On-Road Motor Vehicles Paved Road Dust
Stationary	Other Service and Commerce	Service and Commercial
Construction	On-Road Vehicles Entrained Road Dust - Paved Off-Road Vehicles Entrained Road Dust - Unpaved Other Service and Commerce Fugitive Windblown Dust Construction and Demolition	On-Road Motor Vehicles Paved Road Dust Off-Road Equipment Unpaved Road Dust Service and Commercial Fugitive Windblown Dust Construction and Demolition

Source: Camp Dresser & McKee Inc., 2003.

The source types "Aircraft - Government" and "Aircraft - Other" in the 1997 AQMP and "Aircraft" in the 2003 AQMP include emissions from both aircraft and APUs, and the baseline inventories are based on special analyses prepared for SCAQMD (EEA 1999). Data provided by SCAQMD (Hsiao 2003a and Hsiao 2003b) itemize the emissions inventories prepared for the 1997 AQMP and the 2003 AQMP for these aircraft source types attributable to LAX in future years. Because EDMS was used to generate the emissions inventories for aircraft in the special analyses prepared for SCAQMD, and EDMS as noted above does not contain emission indices for PM_{10} for aircraft or APUs, very small PM_{10} emissions inventories were developed by SCAQMD for aircraft and APUs based on limited data (EPA 1992).

5.2.1 NO_x Emissions From Aircraft and APUs Under Alternative D

Milestone years in both the 1997 AQMP and the 2003 AQMP for O_3 and NO_2 are 2005, 2008, and 2010. Emissions of NO_x from both these AQMPs for aircraft, which include emissions from APUs, in the milestone years are listed in **Table 8**, Comparison of Alternative D NO_x Emissions for Aircraft and APUs to Regulatory Emissions Inventories Attributable to LAX for Aircraft and APUs. Emissions of NO_x for Alternative D for aircraft, including APUs, are also listed in **Table 8** for comparison. The aircraft plus APU NO_x emissions for Alternative D are less than their respective allocations in the approved SIP and in the 2003 AQMP for all emission budget years. Therefore, the aircraft NO_x emissions for Alternative D, taken together with NO_x emissions for all other aircraft in the SCAB, would not exceed the NO_x emissions budgets for aircraft specified in the approved SIP, or alternatively in the 2003 AQMP, consistent with the criterion at 40 CFR 93.158(a)(5)(i)(B).

Table 8

Comparison of Alternative D NO_x Emissions for Aircraft and APUs to Regulatory Emissions Inventories Attributable to LAX for Aircraft and APUs

Year	Alternative D Emissions (tpy)	Approved SIP Emissions (tpy)	2003 AQMP Emissions (tpy)
2005	4,520	4,546	6,686
2008	4,810	4,869	6,754
2010	5,002	5,084	6,800

Source: Camp Dresser & McKee Inc., 2003 and Hsiao 2003a and Hsiao 2003b.

5.2.2 NO_x Emissions From GSE Under Alternative D

The major commercial airlines servicing LAX signed a MOU with CARB in December 2002 in which they voluntarily agreed to reduce emissions from GSE. The MOU does not specify the elimination of emissions from GSE, but LAWA does propose the virtual elimination of GSE emissions under Alternative D, which it will effect through incentives and tenant lease requirements (FAA/LAWA 2003). For purposes of the general conformity evaluation, it is assumed that the signatory GSE operators will comply with the conditions of the MOU and that under Alternative D, emissions from GSE will be eliminated at LAX by 2015.

Under the terms of the MOU, the signatory GSE operators agreed that, by 2010 when the MOU is considered complete, they will have done the following: (1) replaced at least 30 percent of the 1997 GSE fleet with zero-emissions equipment; (2) acquired at least 45 percent of new GSE as zero-emissions equipment; (3) achieved an industry average combined VOC and NO_x emission rate of 2.65 grams per brake-horsepower hour; and (4) reduced diesel particulates using CARB-verified diesel control technology on selected GSE. The terms of the MOU have been represented to result in an approximate 80 percent reduction in NO_x emissions from GSE in the SCAB by 2010 (Honcoop 2003).

Emissions from GSE are included in the broad source types "Mobile Equipment" in the 1997 AQMP and "Off-Road Equipment" in the 2003 AQMP and an allocation of GSE emissions within these source types cannot be apportioned to LAX based on available data. However, because neither the 1997 AQMP nor the 2003 AQMP accounted for the GSE MOU noted above, the NO_x emissions from GSE included in

these source types in the AQMPs are expected to overestimate these emissions in years following 2004 when the MOU will begin to be implemented. Therefore, it is the opinion of FAA that the GSE NO_x emissions for Alternative D, taken together with NO_x emissions for all other off-road equipment in the SCAB, would not exceed the NO_x emissions budgets for off-road equipment specified in the approved SIP or alternatively in the 2003 AQMP.

5.2.3 NO_x Emissions from Stationary Point Sources Under Alternative D

Emissions from stationary point sources at LAX are included primarily in the broad source type "Other Service and Commerce" in the 1997 AQMP and "Service and Commercial" in the 2003 AQMP. These stationary point sources are owned and operated not only by LAWA but by tenants at LAX. These sources are significant sources for which their owners hold permits to operate them in the SCAB. It is, therefore, reasonable to assume that emissions from these sources are accounted for in the AQMPs. Therefore, it is the opinion of FAA that the stationary point source NO_x emissions for Alternative D, taken together with NO_x emissions for all other fuel combustion sources in the SCAB, would not exceed the NO_x emissions budgets for fuel combustion sources specified in the approved SIP or alternatively in the 2003 AQMP.

5.2.4 NO_x Emissions From Motor Vehicles Under Alternative D

The emissions inventories for motor vehicles included in the AQMPs were developed with data supplied to SCAQMD by CARB, the California Department of Motor Vehicles (DMV), the California Department of Transportation (Caltrans), and SCAG. CARB is responsible for developing the composite emissions factors for motor vehicles with its EMFAC model. DMV maintains a count of registered vehicles. Caltrans provides traffic counts and road capacity data. SCAG exercises its Travel Demand Model for the SCAB by forecasting trip generation, defining trip distribution (destination choice), determining mode choice, and making travel assignments to estimate the vehicle miles traveled and associated speeds on roadways in the SCAB.

Within the analyses used by SCAQMD to generate estimates of emissions from regional motor vehicles, LAX cannot be readily isolated as an origin or destination of motor vehicle trips. This is due to the lack of specific trip generation data for LAX and the fact that the airport is located near two Federal Interstate Highways (I-405, and I-105) in addition to several surface arterial streets where vehicles pass near the airport without stopping at the airport. While the estimates of motor vehicle emissions are generated on a gridded basis within the SCAB, and the motor vehicle emissions in the grid or grids enclosing LAX may be largely attributable to LAX, the attribution of motor vehicle emissions in grids farther removed from LAX becomes more problematic. This impediment to disaggregation of the regional motor vehicle emissions renders it technically infeasible as a practical matter to develop a quantitative evaluation of motor vehicle emissions associated with Alternative D to that portion of the emissions inventories in the AQMPs that might reasonably be associated with LAX.

As demonstrated above in Sections 5.2.1, 5.2.2, and 5.2.3, operational emissions estimated for aviation sources (aircraft, APUs, GSE, stationary) at LAX under Alternative D are within the respective emissions budgets of the applicable SIP. By making the reasonable assumption that motor vehicle activity which has LAX as a source or destination is directly related to the level of aircraft operations at LAX, together with the knowledge that the aircraft activity levels under Alternative D are generally consistent with those in the RTP, it is inferred that SCAG has modeled the requisite motor vehicle trips in the SCAB and SCAQMD has modeled the associated motor vehicle emissions to support the activity levels represented by the emissions estimates for aviation sources at LAX in the AQMPs. Therefore, it is the opinion of FAA that the motor vehicle NO_x emissions for Alternative D, taken together with NO_x emissions for all other motor vehicle sources in the SCAB, would not exceed the NO_x emissions budgets for motor vehicle sources specified in the applicable SIP or alternatively in the 2003 AQMP.

5.2.5 NO_x Emissions From Construction Sources Under Alternative D

At the time that SCAQMD prepared the 1997 AQMP, LAWA and FAA had only recently announced their intentions to prepare a new Master Plan for LAX. For this reason, it is evident that the 1997 AQMP does not contain specific estimates of emissions for construction activities under any of the LAX Master Plan

build alternatives, including Alternative D. On the other hand, SCAQMD prepared the 2003 AQMP after release of the Draft EIS/EIR, and as a responsible agency SCAQMD reviewed that Draft EIS/EIR and provided comments to LAWA and FAA. For that reason, it would be reasonable to assume that SCAQMD allowed for an accommodation for such a major construction program within the 2003 AQMP.

As noted in the Supplement to the Draft EIS/EIR, Section 4.6.8, *Mitigated Airport Emissions Inventory*, and Appendix S-E, *Supplemental Air Quality Impact Analysis*, Section 2.3 (FAA/LAWA 2003), construction activities will comply with all applicable requirements and are designed to incorporate multiple components to the air quality mitigation measure for construction activities under Alternative D.

Table 9, Comparison of Alternative D NO_x Emissions for Construction in 2005 to Regulatory Emissions Inventories for Construction-Related Source Types, **Table 10**, Comparison of Alternative D NO_x Emissions for Construction in 2008 to Regulatory Emissions Inventories for Construction-Related Source Types, and **Table 11**, Comparison of Alternative D NO_x Emissions for Construction in 2010 to Regulatory Emissions Inventories for Construction-Related Source Types, summarize a comparison of estimated NO_x emissions from construction activities under Alternative D in 2005, 2008, and 2010, respectively, to the applicable source types under the AQMPs. Because the SIP for the SCAB has to accommodate many planned and some unplanned construction projects, the construction-related emissions inventories included in the AQMPs are very substantial. Despite the fact that Alternative D will require a fairly large program of construction, one can note that the construction emissions from Alternative D are small compared to the emissions inventories in the AQMPs. For that reason, FAA believes that the emissions from construction activities under Alternative D can be accommodated in future emissions growth from the construction sector within the approved SIP or alternatively within the 2003 AQMP. Therefore, it is the opinion of FAA that the construction NO_x emissions for Alternative D, taken together with NO_x emissions for all other construction sources in the SCAB, would not exceed the NO_x emissions budgets for construction-related source types specified in the applicable SIP.

Table 9

Comparison of Alternative D NO_x Emissions for Construction in 2005 to Regulatory Emissions Inventories for Construction-Related Source Types

Source Type	Alternative D Emissions (tpy)	Approved SIP Emissions (tpy)	2003 AQMP Emissions (tpy)
Heavy-Duty Diesel Trucks	220	54,078	NA
Heavy Heavy Duty Diesel Trucks	220	NA	79,139
Mobile Equipment	860	45,943	NA
Off-Road Equipment	860	NA	60,773
Other Service and Commerce	83	2,818	NA
Service and Commercial	83	NA	2,533

Source: Camp Dresser & McKee Inc., 2003 and 1997 AQMP Appendix III Attachment A Table A-9 and 2003 AQMP Appendix III Attachment A Table A-6.

Table 10

Comparison of Alternative D NO_x Emissions for Construction in 2008 to Regulatory Emissions Inventories for Construction-Related Source Types

Source Type	Alternative D Emissions (tpy)	Approved SIP Emissions (tpy)	2003 AQMP Emissions (tpy)
Heavy-Duty Diesel Trucks	182	54,316	NA
Heavy Heavy Duty Diesel Trucks	182	NA	68,109
Mobile Equipment	471	44,599	NA
Off-Road Equipment	471	NA	53,994
Other Service and Commerce	166	2,734	NA
Service and Commercial	166	NA	2,562

Source: Camp Dresser & McKee Inc., 2003 and 1997 AQMP Appendix III Attachment A Table A-12 and 2003 AQMP Appendix III Attachment A Table A-9.

Table 11

Comparison of Alternative D NO_x Emissions for Construction in 2010 to Regulatory Emissions Inventories for Construction-Related Source Types

Source Type	Alternative D Emissions (tpy)	Approved SIP Emissions (tpy)	2003 AQMP Emissions (tpy)
Heavy-Duty Diesel Trucks	100	55,874	NA
Heavy Heavy Duty Diesel Trucks	100	NA	58,484
Mobile Equipment	185	43,493	NA
Off-Road Equipment	185	NA	47,797
Other Service and Commerce	80	2,653	NA
Service and Commercial	80	NA	2,139

Source: Camp Dresser & McKee Inc., 2003 and 1997 AQMP Appendix III Attachment A Table A-13 and 2003 AQMP Appendix III Attachment A Table A-10.

5.3 Comparison to the National Ambient Air Quality Standards

Conformity means that a proposed federal action will not cause or contribute to any new violation of any NAAQS; not increase the frequency or severity of any existing violation of any NAAQS; and not delay timely attainment of any NAAQS or any required interim emission reductions or other milestones (42 U.S.C. 7506(c)(1)(B)). The general conformity regulations allow that local air quality modeling may be used to demonstrate that these requirements are met in support of a positive conformity determination (40 CFR 93.158(a)(3) and 40 CFR 93.158(a)(4)(i)). This approach is particularly suitable for the evaluation of PM_{10}, since Alternative D emissions exceed the applicable SIP budgets for this pollutant. This evaluation used dispersion modeling to predict the impacts of primary PM_{10} emissions and a proportioning technique to estimate the impacts of secondary PM_{10} emissions (i.e., effects of PM_{10} precursors). Input and output data for specified dispersion model runs are available upon written request to FAA following publication of both the draft and final general conformity determinations.

5.3.1 Predicted Impacts of Primary PM_{10} Emissions

Dispersion modeling of primary PM_{10} emissions was performed as proposed in Appendix A and as described in detail in Appendix B. Because the LAX Master Plan was neither approved nor an alternative selected as of 2003, FAA did not conduct an evaluation of PM_{10} impacts for the emission budget year of 2003. **Table 12**, Combined Predicted Operations and Construction PM_{10} Concentrations in 2013 (Including Background), summarizes the predicted peak concentrations from combined operations and construction emission sources for 2013, the year during which the total of direct and indirect emissions from Alternative D is expected to be the greatest. **Table 13**, Combined Predicted Operations and

Construction PM_{10} Concentrations in 2006 (Including Background), summarizes the estimated peak concentrations from combined operations and construction emission sources for 2006, the mandated attainment year for PM_{10} in the SCAB. Concentrations were combined by adding the peak concentration for each receptor from the operation source evaluation to the peak concentration from the same location/receptor in the construction evaluation. While the location of the peak concentration from the operation source evaluation does not necessarily coincide with the location of the peak concentration from the construction evaluation, these peak concentrations were found in the general vicinity of LAX. **Table 12** and **Table 13** present the highest combined totals, including background, at any receptor location, making this a conservative estimate of the combined impacts. It should be noted that for Alternative D in 2013 and in 2006, the 24-hour and annual PM_{10} concentrations are all predicted to be below the NAAQS.

Table 12

Combined Predicted Operations and Construction PM_{10} Concentrations in 2013 (Including Background)

Averaging Period	NAAQS ($\mu g/m^3$)	Future Background ($\mu g/m^3$)	Alternative D ($\mu g/m^3$)	Alternative D plus Background ($\mu g/m^3$)
Annual	50	25	15	40
24 Hours	150	47	39	86

Source: Camp Dresser & McKee Inc., 2003.

Table 13

Combined Predicted Operations and Construction PM_{10} Concentrations in 2006 (Including Background)

Averaging Period	NAAQS ($\mu g/m^3$)	Future Background ($\mu g/m^3$)[1]	Alternative D ($\mu g/m^3$)[2]	Alternative D plus Background ($\mu g/m^3$)
Annual	50	28	20	48
24 Hours	150	61	47	108

[1] Future background concentration was conservatively estimated for 2005.

[2] PM_{10} impacts for Alternative D were predicted for year 2005, the year of peak construction emissions; operational emissions for 2006 are substantially similar to those in 2005 (see Table 4). Modeled impacts from construction were adjusted by the ratio of construction emissions in 2006 to construction emissions in 2005.

Source: Camp Dresser & McKee Inc., 2003.

5.3.2 Estimated Impacts of Secondary PM_{10} Formation

Emissions of some gaseous contaminants, notably NO_x, SO_x, and VOC can contribute to the secondary formation of components of PM_{10} through such atmospheric processes as nucleation and chemical reactions on dry particle surfaces. For example, NO_x can lead to the generation of particulate nitrates, SO_x can lead to the generation of particulate sulfates, and VOC can lead to the generation of particulate organic carbon.

For the 1997 AQMP, SCAQMD did not estimate the contributions of gaseous PM_{10} precursors (VOC, NO_x, and SO_x) to predicted component PM_{10} concentrations. However, for the 2003 AQMP, SCAQMD used the UAMAERO-LT regional photochemical model to estimate these contributions in future years. This model takes into account emissions throughout the SCAB, and the speciated impacts are relatively small. The highest measured and modeled concentrations of speciated PM_{10} in the SCAB are found in Rubidoux, California (approximately 90 kilometers east, generally downwind, of LAX); this is due to the time required for the processes in the atmosphere to convert precursor compounds into particulate

components. To estimate the potential contributions of VOC, NO_x, and SO_x to regional PM_{10} concentrations, Alternative D emissions were scaled to SCAB emissions of these contributing compounds reported in the 2003 AQMP for 1995, the baseline year modeled for the impacts of each component of PM_{10} (see SCAQMD 2003 at Appendix V Chapter 2).

Table 14, Estimated Annual PM_{10} Concentrations From Precursor Compounds Attributable to Alternative D, summarizes the results for the estimate of annual concentrations. Based on this evaluation, the maximum expected annual impact attributable to Alternative D in 2013 (the last year of construction) at Rubidoux, the site of the highest monitored speciated PM_{10} concentrations, is approximately 0.25 µg/m^3. On the conservative assumption that the 24-hour concentration is approximately ten times the annual concentration, the maximum expected 24-hour impact attributable to Alternative D in 2013, also at Rubidoux, is approximately 2.5 µg/m^3. Expected concentrations of PM_{10} from precursors at the location of the modeled maximum primary PM_{10} impacts presented in **Table 12** and **Table 13** will be less than the estimated maximum secondary PM_{10} impacts presented in **Table 14**. Adding these concentrations to the results of primary PM_{10} dispersion modeling in **Table 12** and **Table 13** demonstrates that the PM_{10} NAAQS will be protected. Based on this evaluation, Alternative D will not cause or contribute to exceedances of the PM_{10} NAAQS in the surrounding area.

Table 14

Estimated Annual PM_{10} Concentrations From Precursor Compounds Attributable to Alternative D

PM_{10} Precursor Species	SCAB Emissions in 1995 (tpd)	Alternative D Emissions in 2013 (tpd)	Modeled PM_{10} Components	Predicted Concentration at Rubidoux, CA in 1995 (µg/m^3)	Estimated Concentration From Alternative D in 2013 (µg/m^3)
VOC	1306.7	3.8	Organic carbon	7.0	0.02
NO_x	1440.1	17.0	Nitrate	18.9	0.20
SO_x	107.9	1.2	Sulfate	2.8	0.03

Source: Camp Dresser & McKee Inc., 2003 and 2003 AQMP Appendix V Chapter 2 Tables 2-10 and 2-12.

5.4 Consistency with Requirements and Milestones in Applicable SIP

The general conformity regulations state that notwithstanding the other requirements of the rule, a proposed action may not be determined to conform unless the total of direct and indirect emissions from the action is in compliance or consistent with all relevant requirements and milestones in the applicable SIP (40 CFR 93.158(c)). This includes but is not limited to such issues as reasonable further progress schedules, assumptions specified in the attainment or maintenance demonstration, prohibitions, numerical emission limits, and work practice standards. This section briefly addresses how Alternative D was assessed for SIP consistency for this evaluation.

5.4.1 Applicable Requirements from EPA

EPA has already promulgated, and will continue to promulgate, numerous requirements to support the goals of the Clean Air Act with respect to the NAAQS. Typically, these requirements take the form of rules regulating emissions from significant new sources, including emission standards for major stationary point sources and classes of mobile sources as well as permitting requirements for new major stationary point sources. Since states have the primary responsibility for implementation and enforcement of requirements under the Clean Air Act and can impose stricter limitations than EPA, the EPA requirements often serve as guidance to the states in formulating their air quality management strategies.

5.4.2 Applicable Requirements from CARB

In California, to support the attainment and maintenance of the NAAQS, CARB is primarily responsible for regulating emissions from mobile sources. In fact, EPA has delegated authority to CARB to establish emission standards for on-road and some nonroad vehicles separate from the EPA vehicle emission standards, although CARB is preempted by the Clean Air Act from regulating emissions from many nonroad mobile sources, including aircraft.

5.4.3 Applicable Requirements from SCAQMD

To support the attainment and maintenance of the NAAQS in the SCAB, SCAQMD is primarily responsible for regulating emissions from stationary sources. As noted above, SCAQMD develops and updates its AQMP regularly to support the California SIP. While the AQMP contains rules and regulations geared to attain and maintain the NAAQS, these rules and regulations also have the much more difficult goal of attaining and maintaining the California ambient air quality standards.

5.4.4 Consistency with Applicable Requirements

In operating LAX, 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 SCAB. In particular, due to the long persistence of challenges to attain the ambient air quality standards in the SCAB, 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 actively encourages all tenants and users of its facilities to comply with applicable air quality requirements.

The nature and extent of the requirements with which LAWA complies and will continue to comply include, but are not limited to, the following.

- EPA 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).
- 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.

6. MITIGATION

As part of a conformity evaluation, it may be necessary for the federal agency to identify mitigation measures and mechanisms for their implementation and enforcement. For example, if a proposed action does not initially conform to the applicable SIP, mitigation measures could be pursued. If mitigation measures are used to support a positive conformity determination, the federal agency must obtain a written commitment from the entity required to implement these measures and the federal agency must include the mitigation measures as conditions in any permit or license granted for the proposed action (40 CFR 93.160). Mitigation measures may be used in combination with other criteria to demonstrate conformity. Alternative D as evaluated herein incorporates various air quality mitigation measures as described in the Supplement to the Draft EIS/EIR (FAA/LAWA 2003) to meet CEQA requirements. Based on CEQA provisions that mitigation measures be required in, or incorporated into, the project (Section 15091(a)(1) of the CEQA Guidelines), the City will implement and enforce these air quality mitigation measures as a condition of project approval by FAA. As such, this "mitigated" Alternative D is considered the proposed federal action as designed, and no mitigation as defined under the general conformity regulations (40 CFR 93.160) or guidance (EPA 1994) are required to support a positive general conformity determination.

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7. REPORTING

To support the approval of the new ALP, directly associated improvements, and any funding mechanisms for Alternative D at LAX, FAA is issuing this draft general conformity determination for public review and comment. FAA will also make public its final general conformity determination for this action.

7.1 Draft General Conformity Determination

At a minimum, FAA is providing copies of this draft general conformity determination to the appropriate regional offices of EPA, FHWA, FTA, and to any affected federal land manager as well as to CARB, SCAQMD, and SCAG, providing opportunity for a 30-day review. FAA is also placing a notice in a daily newspaper of general circulation in the SCAB announcing the availability of this draft general conformity determination and requesting written public comments for a 30-day period. For any member of the public requesting a copy of this draft general conformity determination, FAA will provide such person a copy.

7.2 Final General Conformity Determination

At a minimum, FAA will provide copies of its final general conformity determination to the appropriate regional offices of EPA, FHWA, FTA, and to any affected federal land manager as well as to CARB, SCAQMD, and SCAG, within 30 days of its promulgation. FAA will also place a notice in a daily newspaper of general circulation in the SCAB announcing the availability of its final general conformity determination within 30 days of its promulgation. As part of the general conformity evaluation, FAA will document its responses to all comments received on the draft general conformity determination and will make both the comments and responses available upon request by any person within 30 days of the promulgation of the final general conformity determination.

7.3 Frequency of General Conformity Determinations

The general conformity regulations state that the status of a specific conformity determination lapses five years after the date of public notification for the final general conformity determination, unless the action has been completed or a continuous program has been commenced to implement the action (40 CFR 93.157(a)). Because the new LAX Master Plan envisions a development program extending beyond five years, it is important to note that the final general conformity determination will remain active only under this "continuous program to implement."

As part of a phased program, the implementation of each element of the development of Alternative D does not require separate conformity determinations, even if they are begun more than five years after the final determination, as long as those elements are consistent with the original program which was determined to conform (EPA 2002). However, if this original conforming program is changed such that there is an increase in the total of direct and indirect emissions above the de minimis threshold levels, FAA will conduct a new general conformity evaluation.

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Appendix
LAX Master Plan
Draft General Conformity Determination

A. Protocol for General Conformity Evaluation

July 2003

Prepared for:

Los Angeles World Airports

U.S. Department of Transportation
Federal Aviation Administration

Prepared by:

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Table 15 Existing Ambient Air Quality and Projected Future Background Concentrations (Based on the 1997 AQMP) in the Vicinity of LAX for Pollutants Relevant to General Conformity in the SCAB 30

1. INTRODUCTION

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)) before the action is otherwise approved. 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 the Federal Aviation Administration [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.

At issue for the Los Angeles International Airport (LAX) Master Plan is the approval by FAA of a new airport layout plan (ALP) and directly associated improvements for LAX as well as the approval by FAA of certain funding mechanisms under the Airport Improvement Program (AIP) and Passenger Facility Charges (PFC). This protocol sets forth the assumptions and methods for evaluating the conformity of this proposed action with the requirements of the Clean Air Act and documenting this evaluation in a written conformity determination for public review. The remainder of Section 1 discusses the background of the regulatory requirements. Section 2 discusses the proposed action (project) to be approved by FAA. Section 3 describes how applicability of the conformity requirements to the proposed action will be analyzed. Section 4 discusses the regulatory procedures for the conformity evaluation. Section 5 presents the methods and criteria that will be used to evaluate the conformity of the proposed action. Section 6 discusses the concepts of mitigation required under conformity regulations. Section 7 presents the reporting process to be followed to formalize the conformity determination. Section 8 provides references for the evaluation.

1.1 General Conformity Requirements

The U.S. Environmental Protection Agency (EPA) promulgated two regulations to address the conformity requirements of the Clean Air Act. On November 24, 1993, EPA 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. On September 14, 1994, the South Coast Air Quality Management District (SCAQMD), which oversees air quality management in the South Coast Air Basin (SCAB) of California, adopted these regulations by reference as part of Rule 1902. The SCAQMD rule has also been amended since its original issuance. 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 by the Federal Highway Administration (FHWA) or the Federal Transit Administration (FTA) as part of a regional transportation plan or regional transportation improvement program and not as a stand-alone project. If it can be confirmed that the regional (i.e., off airport) emissions associated with the proposed action being evaluated under this protocol are included with those from 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), then it will not be necessary to include these regional emissions in the general conformity evaluation. If this cannot be confirmed, then those regional emissions that are not included in the RTP will be addressed in the general conformity evaluation.

On November 30, 1993, EPA promulgated final general conformity regulations at 40 CFR 93 Subpart B for all federal activities except those covered under transportation conformity. On September 14, 1994, SCAQMD adopted these regulations by reference as part of Rule 1901. 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 precursors to the criteria pollutants caused by the proposed action equal or exceed certain de minimis amounts, thus requiring the federal agency to make a determination of general conformity. Regardless of the proposed action's exceedance of deminimis 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. By requiring an analysis of direct and indirect emissions, EPA

intended the regulating federal agency to make sure that only those emissions that are reasonably foreseeable and that the federal agency can practicably control subject to that agency's continuing program responsibility will be addressed.

The general conformity regulations incorporate a stepwise process, beginning with an applicability analysis. According to EPA guidance (EPA 1994), before any approval is given for a proposed action to go forward, 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 the National Environmental Policy Act (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 accord 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.

1.2 FAA Responsibilities

Current FAA guidelines for the assessment of environmental impacts (FAA 1986) predate the general conformity regulations. More recent guidance is provided in "Air Quality Procedures For Civilian Airports & Air Force Bases" (FAA/USAF 1997).

FAA's policy reflected in its recent guidance document affirms the agency's responsibility to assure that its actions conform to the applicable SIP and supports the approach that, before FAA can fund or support in any way any activity, it must address the conformity of the action with the applicable SIP using the criteria and procedures in the general conformity regulations.

FAA requires the use of the Emissions and Dispersion Modeling System (EDMS) for airport air quality analysis of aviation sources (63 FR 18068). FAA's recent guidance document does allow that supplemental methodology and models for more refined analysis of non-aviation sources would be permitted in consultation with the appropriate FAA regional program office. FAA's recent guidance document supports early consultation and coordination with other agencies (e.g., state/regional air quality agencies, EPA) for proposed actions with potentially significant air quality impacts, and where the general conformity regulations apply to a proposed project FAA will issue a conformity determination following review and comment on a draft conformity determination by the public (including other interested agencies).

2. DESCRIPTION OF PROPOSED FEDERAL ACTION

In accordance with applicable general conformity regulations and guidance, FAA is only required to conduct a general conformity evaluation for a specific proposed action, i.e., the selected alternative for a project or program (EPA 1994), and FAA must issue a positive conformity determination before the proposed action may proceed or is otherwise approved. Each federal agency is responsible for determining conformity of those proposed actions over which it has jurisdiction. The general conformity evaluation for which this protocol is being developed is related only to those actions proposed by FAA with respect to the LAX Master Plan. If any other federal agency has jurisdiction over any emissions from this project, it must conduct its own general conformity evaluation or adopt the FAA evaluation by reference (EPA 1994).

The general conformity requirements only apply to actions proposed in nonattainment areas (i.e., areas where one or more NAAQS are not being achieved at the time of the proposed action and requiring SIP provisions to demonstrate how attainment will be achieved) and in maintenance areas (i.e., areas recently reclassified from nonattainment to attainment and requiring SIP provisions to demonstrate how attainment will be maintained). The attainment status in the vicinity of LAX will be discussed in Section 3.

2.1 LAX Master Plan Preferred Alternative

The City of Los Angeles (City) is updating the Master Plan for LAX to identify facilities needed through the year 2015. As part of the environmental review for the preferred alternative (Alternative D - Enhanced Safety and Security Plan), FAA, in coordination with the City, will develop emissions inventories, conduct dispersion modeling, and prepare appropriate documentation to demonstrate compliance with the general conformity requirements in support of FAA's approval of the new ALP and other related actions directly associated improvements for the LAX Master Plan.

2.2 Relationship to Other Environmental Analyses

Both NEPA and the California Environmental Quality Act (CEQA) require that the air quality impacts of the LAX Master Plan implementation be analyzed and disclosed. Regulatory guidance requires that the air quality impacts from the project alternatives be determined by identifying the associated project incremental emissions and air pollutant concentrations and comparing them respectively to emissions thresholds and state and national ambient air quality standards. For CEQA purposes, the impacts of the build alternatives (Alternatives A, B, C, and D) were compared to the impacts of the environmental baseline and an adjusted environmental baseline. The impacts of the build alternatives (Alternatives A, B, C, and D) were also compared to the No Action/No Project Alternative impacts for NEPA purposes. FAA is the lead agency for the NEPA analysis documented in an Environmental Impact Statement (EIS). The City is the lead agency for the CEQA analysis documented in an Environmental Impact Report (EIR). A joint Draft EIS/EIR was published for public review and comment in January 2001. A joint Supplement to the Draft EIS/EIR was published in July 2003 providing an evaluation of a new build alternative (Alternative D).

The Airport and Airway Improvement Act (AAIA) of 1982, as amended, is an applicable federal law. The AAIA requires, in pertinent part, that, as a necessary condition of approval by the Secretary of the Department of Transportation of an application for an airport development project involving the location of an airport or runway or a major runway extension, the governor of the state in which the project will be located must certify in writing that there is reasonable assurance that the project will be located, designed, constructed, and operated in compliance with applicable air and water quality standards. While this requirement for a governor's certification is somewhat redundant with the NEPA and CEQA processes and the general conformity requirements (for air quality), it is a separate and distinct requirement that must be completed before FAA approves any funding for the LAX Master Plan through the Airport Improvement Program administered under the AAIA.

3. APPLICABILITY ANALYSIS

As stated previously, the first step in a general conformity evaluation is an analysis of whether the requirements apply to a federal action proposed to be taken in a nonattainment or a maintenance area. Unless exempted by the regulations or otherwise presumed to conform, a proposed federal action requires a general conformity determination for each pollutant where the total of direct and indirect emissions caused by the proposed action would equal or exceed an annual de minimis emission rate. Notwithstanding the de minimis emission rate, if a proposed action is identified to be regionally significant, the federal agency must make a general conformity determination.

3.1 Attainment Status of South Coast Air Basin

LAX is located within Los Angeles County in the South Coast Air Basin (SCAB) of southern California. The regulatory agencies with primary responsibility for air quality management in the SCAB include SCAQMD and the California Air Resources Board (CARB), with oversight by EPA. Pursuant to the Clean Air Act, EPA established primary NAAQS to protect the public health with an adequate margin of safety and secondary NAAQS to protect the public welfare for seven air pollutants (40 CFR 50). These pollutants are known as criteria pollutants: particulate matter with an equivalent aerodynamic diameter less than or equal to 10 micrometers (µm) in diameter (PM_{10}), particulate matter with an equivalent aerodynamic diameter less than or equal to 2.5 micrometers (µm) in diameter ($PM_{2.5}$), sulfur dioxide (SO_2), carbon monoxide (CO), ozone (O_3), nitrogen dioxide (NO_2), and lead (Pb). As of the time of

preparation of this draft general conformity determination, EPA has not fully implemented the NAAQS for $PM_{2.5}$ and designation of attainment and nonattainment areas for this pollutant is not expected to occur until 2004 at the earliest. EPA has delegated authority to SCAQMD to implement and enforce the NAAQS in the SCAB.

That portion of the SCAB encompassing LAX is in an area that is designated as being in nonattainment of the NAAQS for O_3 (one-hour average), CO, and PM_{10}. In addition, the severity of the nonattainment status for this area has been classified as "extreme" for O_3, "serious" for CO, and "serious" for PM_{10}. On July 24, 1998, this area was redesignated from nonattainment to attainment/maintenance status for NO_2 by EPA (63 FR 39747). The area is in attainment of the NAAQS for SO_2 and Pb. The attainment status of the area for O_3 (eight-hour average) and $PM_{2.5}$ has not been established at the time of this protocol. Thus, for purposes of the general conformity requirements, this evaluation will address NO_2, O_3, CO, and PM_{10}.

3.2 Exemptions from General Conformity Requirements

As noted previously, the general conformity requirements apply to a proposed federal action if the net project emissions equal or exceed certain de minimis emission rates. The only exceptions to this applicability criterion are the topical exemptions laid out in the regulations. Therefore, before attempting to estimate the emissions attributable to Alternative D, it will be evaluated to assess whether it, or any portion of it, as proposed meets one or more of these exempt categories. The following regulatory exemptions exclude a proposed action from a conformity evaluation.

- Actions which would result in no emissions increase or an increase in emissions that is clearly below the de minimis levels (40 CFR 93.153(c)(2)). Examples include administrative actions and routine maintenance and repair.
- Actions where the emissions are not reasonably foreseeable (40 CFR 93.153(c)(3)).
- Actions which implement a decision to conduct or carry out a conforming program (40 CFR 93.153 (c)(4)).
- Actions which include major new or modified sources requiring a permit under the New Source Review (NSR) program (40 CFR 93.153(d)(1)).
- Actions in response to emergencies or natural disasters (40 CFR 93.153(d)(2)).
- Actions which include air quality research not harming the environment (40 CFR 93.153(d)(3)).
- Actions which include modifications to existing sources to enable compliance with applicable environmental requirements (40 CFR 93.153(d)(4)).
- Actions which include emissions from remedial measures carried out under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) that comply with other applicable requirements (40 CFR 93.153(d)(5)).

In addition to these topical exemptions, the general conformity regulations allow each federal agency to establish a list of activities that are presumed to conform (40 CFR 93.153(f)). Although FAA has signaled its intention to publish such a list, to date, no official list is available. FAA may publish such a list in 2003 (FAA 2003). Should FAA publish a list of presumed-to-conform activities before the draft conformity determination for the LAX Master Plan is made available for public review, the proposed action will be evaluated against this list to assess whether any portion of Alternative D can be presumed to conform, subject to the exception at 40 CFR 93.153(j); see Section 3.4 below.

3.3 De Minimis Emission Rates

The general conformity requirements will apply to LAX Master Plan Alternative D if the total of direct and indirect emissions caused by Alternative D (i.e., the net, or incremental, emissions between the projected emissions for Alternative D and the projected emissions for the No Action/No Project Alternative) equal or exceed the de minimis emission rates shown in **Table 1**, De minimis Emission Rates for Determining Applicability of General Conformity Requirements to LAX Master Plan Alternative D. These emission rates are expressed in units of tons per year (tpy) and will be compared to the total of direct and indirect emissions caused by Alternative D for the calendar year during which the net emissions are expected to

be the greatest. It should be noted that, because O_3 is a secondary pollutant (i.e., it is not emitted directly into the atmosphere but is formed in the atmosphere from the photochemical reactions of volatile organic compounds, VOC, and oxides of nitrogen, NO_x, in the presence of sunlight), its de minimis emission rate is based on primary emissions of its precursor pollutants - VOC and NO_x. If the net emissions of either VOC or NO_x exceed the de minimis emission rate for O_3 (EPA 1994), then Alternative D is subject to a general conformity evaluation for O_3.

Table 1

De minimis Emission Rates for Determining Applicability of General Conformity Requirements to LAX Master Plan Alternative D

Pollutant	De Minimis Emission Rate (tons/year)
Nitrogen Dioxide	100
Ozone (VOC or NO_x)	10
Carbon Monoxide	100
Particulate Matter	70

Source: 40 CFR 93.153

Section 182(f) of the Clean Air Act (42 U.S.C. 7511a(f)) allows EPA to exempt any O_3 nonattainment area from requirements applicable to NO_x emissions, such as the general conformity requirements, on a finding that net air quality benefits are greater in the absence of reductions of NO_x from the sources concerned. The process for this exemption is known as a NO_x waiver. While a NO_x waiver has neither been approved nor requested for the SCAB, should EPA publish a final NO_x waiver for the SCAB before the draft conformity determination for the LAX Master Plan is made available for public review, the proposed action will be evaluated in light of such waiver.

3.4 Regional Significance

Even if a proposed federal action is less than the applicable de minimis emission rate for a given pollutant, the general conformity requirements state that a regionally significant action must undergo a conformity evaluation. A regionally significant action is one for which the total of direct and indirect emissions represent 10 percent or more of the nonattainment or maintenance area's emission inventory for all sources (as identified in the applicable SIP for stationary point, mobile, and area sources, see Section 5) for that pollutant and its precursors. EPA guidance also indicates that any milestone emissions inventory in the applicable SIP should also be considered when evaluating regional significance (EPA 1994).

It should also be noted that any federal action which has been identified by the relevant federal agency as being presumed to conform will still require a general conformity evaluation if it is found to be regionally significant (40 CFR 93.153(j)). However, a federal action that was declared by EPA to be exempt from the general conformity requirements because it would result in no emissions increase or an increase in emissions that is clearly below the de minimis levels, as specified at 40 CFR 93.153(c)(2), is considered a non-rebuttable de minimis determination (EPA 1994).

3.5 Applicability for Proposed Federal Action

First, Alternative D will be evaluated to determine if the project in its entirety, or any portion of it, may be exempt from the general conformity requirements by meeting any exempt or presumed-to-conform categories. Second, the applicability of the general conformity requirements to Alternative D will be analyzed by comparing the total of direct and indirect emissions (calculated as discussed in Section 5) for the calendar year of greatest emissions to the de minimis emission rates in **Table 1**. Third, if Alternative D is found to be excluded from the general conformity requirements because its emissions are below the de minimis emission rates for any pollutant or it or any portion of it is found to meet an exempt or presumed-to-conform category, the total of direct and indirect emissions for that pollutant will be compared to the nonattainment or maintenance area's emission inventory for that pollutant to determine

whether it is regionally significant. Any portion of the project for any pollutant that cannot be excluded from applicability by one of these mechanisms will undergo a complete general conformity evaluation consistent with the procedures in Section 4 and using the methods and criteria in Section 5.

4.0 REGULATORY PROCEDURES

The general conformity regulations establish certain procedural requirements that must be followed when preparing a general conformity evaluation. This section will address the major procedural issues and specify how these requirements will be met for the evaluation of Alternative D.

Based on the nature of the procedural requirements, it is clearly advisable for FAA to establish contact with the appropriate air quality agencies (SCAQMD, CARB) and the MPO (SCAG) early in the process to form a consultative and working relationship to facilitate the evaluation. At a minimum, FAA should seek review and comment on this protocol from SCAQMD, with particular attention to the appropriate SIP emission budgets, emission estimation techniques, and dispersion models. Likewise, FAA should seek review and comment on this protocol from SCAG, with particular attention to the latest planning assumptions used to characterize population, employment, travel, and congestion in the SCAB over the planning horizon for Alternative D.

4.1 Use of Latest Planning Assumptions

The general conformity regulations require the use of the latest planning assumptions for the area encompassing the proposed federal action, derived from the estimates of population, employment, travel, and congestion most recently approved by the MPO (40 CFR 93.159(a)). It should be noted that the latest planning assumptions from the MPO may differ from the planning assumptions used in establishing the applicable SIP emissions budgets. The approved 1997/1999 AQMP was developed with data similar to that used in the 1998 RTP. However, the approved 2001 RTP assumes a lower activity level at LAX than the 1998 RTP.

As noted previously, SCAG is the MPO for the region encompassing LAX. The SCAG region covers an area of over 38,000 square miles and includes the counties of Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura. To support the 2001 RTP, SCAG prepared the *2001 Social Economic Forecast Report* and conducted the *2001 Travel and Congestion Survey* (SCAG, 2001). The growth forecast for the 2001 RTP estimated a region-wide population growth rate of 1.4 percent per year between 1997 and 2025 and a region-wide employment growth rate of 1.5 percent per year for the same period. The growth rates for population and employment in Los Angeles County were forecast to be approximately half those for the region as a whole over the forecast period, as people and jobs are expected to shift eastward within the region over the forecast period.

The Alternative D planning assumptions reflected in the Supplement to the Draft EIS/EIR are based on the airport handling 78.9 million annual passengers in 2015, and the activity level will be constrained by landside access to the airport. The 2001 RTP assumes that the airport will handle 78 million annual passengers in 2025. In its analysis to support the 2001 RTP, SCAG assumed that when the constrained capacity at LAX is reached, it will not be exceeded, but the analysis did not predict when the constrained capacity level would be reached (Armstrong 2003). Alternative D is consistent with the policy framework of the 2001 RTP, which calls for no expansion of LAX, and, instead, shifts the accommodation of future aviation demand to other airports in the region.

4.2 Use of Latest Emission Estimation Techniques

The general conformity regulations require the use of the latest and most accurate emission estimation techniques available, unless such techniques are inappropriate (40 CFR 93.159(b)). Prior written approval from SCAQMD or EPA is required to modify or substitute emission estimation techniques. It should be noted that the latest and most accurate emission estimation techniques available may differ from the emission estimation techniques used in establishing the applicable SIP emissions budgets. The details of emissions estimating will be described in Section 5. The emission estimation techniques will be consistent with those used in preparing the Supplement to the Draft EIS/EIR.

For on-road motor vehicle emissions, the general conformity regulations require the use of the most current version of the motor vehicle emission factor model specified by EPA and available for use in the preparation or revision of the SIP. In California, this model is CARB's EMFAC model, and the most current version is EMFAC2002, approved by EPA in 2003 (68 FR 15720).

As noted previously, FAA requires the use of the EDMS model to evaluate emissions from aviation sources at airports (e.g., aircraft, ground support equipment, auxiliary power units). The most current version of EDMS available from FAA at the time of this protocol is EDMS 4.11. One exception is the fact that EDMS does not currently incorporate emission factors for particulate matter from aircraft because such data are not readily available. For this general conformity evaluation, the method introduced in the Draft EIS/EIR (FAA/LAWA 2001) will be used to estimate PM emissions from aircraft for Alternative D, consistent with the approach of using the best available information (EPA 2002).

Emission factors for stationary point and area sources will be based on source-specific outlet emission test data, if available. Otherwise, appropriate emission factors will be taken from SCAQMD databases or be taken from EPA's *Compilation of Air Pollutant Emission Factors AP-42* (EPA 2003). The most current version of these data can be found, respectively, at SCAQMD's website at http://www.aqmd.gov under annual emission reports and at EPA's website at http://www.epa.gov/ttn/chief.

For nonroad mobile emissions, the most current emission factors will be taken from CARB's OFFROAD emission model or the *CEQA Air Quality Handbook* (SCAQMD 1993), whichever is more relevant.

4.3 Use of Applicable Dispersion Models

The general conformity regulations require the use of the applicable air quality models, databases, and other requirements in the most recent version of EPA's *Guideline on Air Quality Models* (40 CFR 51, Appendix W), unless such techniques are inappropriate (40 CFR 93.159(c)). Prior written approval from SCAQMD or EPA is required to modify or substitute dispersion models. The details of dispersion modeling will be described in Section 5.

As noted previously, FAA requires the use of the EDMS model to evaluate dispersion from aviation sources at airports (e.g., aircraft, ground support equipment, auxiliary power units). The EDMS model is identified in the *Guideline on Air Quality Models* as a preferred model. The most current version of EDMS available from FAA at the time of this protocol is EDMS 4.11. One exception is the fact that EDMS does not currently incorporate algorithms to treat the dispersion of particulate matter from aircraft, since particulate matter emission data are not readily available.

The Industrial Source Complex - Short Term (ISCST3) model will be used to evaluate dispersion of particulate matter from aircraft as well as to evaluate dispersion of all pollutants from construction-related sources. The ISCST3 model is identified in the *Guideline on Air Quality Models* as a preferred model. The most current version of ISCST3 available from EPA at the time of this protocol is ISCST3 (Julian Date 02035).

Local "hot-spot" modeling of emissions from motor vehicles due to queuing and delays at selected signalized intersections will use the CAL3QHCR model. The CAL3QHCR model is identified in the *Guideline on Air Quality Models* as a screening model.

4.4 Emission Scenarios

The general conformity regulations require that the evaluation must reflect certain emission scenarios (40 CFR 93.159(d)). Specifically, these scenarios must include emissions from the proposed federal action for the following years: (1) for nonattainment areas, the year mandated in the Clean Air Act for attainment and for maintenance areas, the farthest year for which emissions are projected in the approved maintenance plan; (2) the year during which emissions are projected to be the greatest on an annual basis; and (3) any year for which the applicable SIP specifies an emissions budget. These emission scenarios will be described in more detail in Section 5. **Table 2**, Emission Scenario Years for General Conformity Evaluation, lays out the years for which the general conformity evaluation will be performed.

Table 2

Emission Scenario Years for General Conformity Evaluation

Pollutant	Attainment/Maintenance Year	Greatest Emissions Year	Emissions Budget Years
Nitrogen Dioxide	2010	2013	Not Applicable
Ozone (VOC or NO_x)	2010	2013	2005, 2008
Carbon Monoxide	2000	2013	Not Applicable
Particulate Matter	2006	2013	2003

Source: Camp Dresser & McKee Inc., 2003.

5. METHODOLOGY AND CRITERIA

For federal actions subject to a general conformity evaluation, the regulations delineate several criteria that can be used to demonstrate conformity (40 CFR 93.158). In fact, a combination of these criteria may be used to support a positive general conformity determination (EPA 1994). The approach to be taken to evaluate Alternative D will rely on a combination of these available criteria, and the remainder of this section will discuss the methods that will be used to make the final demonstration.

5.1 Designation of Applicable SIP

Section 110(a) of the Clean Air Act (42 U.S.C. 7410(a)) requires each state to adopt and submit to EPA a plan which provides for the implementation, maintenance, and enforcement of each NAAQS. This plan is known as the state implementation plan (SIP). Over time, states have made and continue to make many such submittals to EPA to address issues as they arise related to the various NAAQS. As EPA reviews these submittals, it can either approve or disapprove them in whole or in part. The compilation of a state's approved submittals constitutes that state's applicable SIP. In California, the state agency responsible for preparing and maintaining the SIP is CARB.

5.1.1 SIP Process in the South Coast Air Basin

CARB designates both air quality management districts and air pollution control districts within California for the purpose of implementing and enforcing ambient air quality standards on a regional or airshed basis. These district agencies must prepare regional plans (Air Quality Management Plans [AQMPs]) to support the broader SIP, as well as to meet the goals of the California Clean Air Act.

Every three years, SCAQMD must prepare and submit to CARB an AQMP to demonstrate how the SCAB will attain and maintain the NAAQS and the California ambient air quality standards. The AQMP contains extensive emissions inventories of all emission sources in the SCAB as well as various control measures applicable to most of these sources. Once CARB approves the AQMP, it is submitted to EPA for approval into the SIP. SCAQMD last submitted an AQMP to CARB in 1997 (with an amendment in 1999) and has prepared a draft 2003 AQMP that has been released for public review (SCAQMD 2003a).

5.1.2 Status of Applicable SIP and Emissions Budgets by Pollutant

The Clean Air Act requires attainment of the NAAQS as expeditiously as practicable, but no later than the statutory dates listed below for those criteria pollutants for which the SCAB is nonattainment. Upon redesignation of an area from nonattainment to attainment for each standard, the area will be considered to be a maintenance area for that standard, and as such, must meet all applicable requirements to maintain the standard.

- Extreme O_3: November 15, 2010 (one-hour NAAQS only).
- Serious CO: December 31, 2000.
- Serious PM_{10}: December 31, 2006 (On April 18, 2003, EPA approved this new attainment date (68 FR 19315)).

To support the general conformity determination for Alternative D, FAA intends to demonstrate that the emissions from the proposed action will result in a level of emissions which, together with all other emissions in the nonattainment (or maintenance) area, will not exceed the emissions budgets specified in the applicable SIP (criteria at 40 CFR 93.158(a)(5)(i)(A)), see Section 5.2 below, or, by way of local (i.e., nonregional) air quality modeling, will not cause or contribute to any new violation of the NAAQS (criteria at 40 CFR 93.158(a)(3) or 40 CFR 93.158(a)(4)(i)), see Section 5.3 below. The following discussion will identify the applicable SIP for each pollutant and the relevant emissions budgets. As used in the context of general conformity, the term "emissions budget" represents those portions of the applicable SIPs projected emission inventories that describe the levels of emissions that provide for meeting reasonable further progress milestones, attainment, and/or maintenance for any criteria pollutant or its precursors (40 CFR 93.152). As part of the general conformity evaluation for Alternative D, the SCAB emissions inventories will be apportioned to identify those contributions to LAX-related activities.

On February 24, 2003, SCAQMD released the Draft 2003 AQMP for public review. In response to public comments, SCAQMD released modifications to the Draft 2003 AQMP on June 6, 2003. Due to the timing of the general conformity evaluation, it is unknown at the time of this protocol development whether EPA will approve any portion of a SIP revision based on a 2003 AQMP prior to FAA's release of the final general conformity determination on the LAX Master Plan. For that reason, the evaluation will make comparisons both to applicable emissions inventories in the current EPA-approved SIPs and to applicable emissions inventories contained in the Draft 2003 AQMP (or a Final 2003 AQMP if available prior to release of the draft general conformity determination). For purposes of the general conformity determination, the applicable SIP will be the most recent EPA-approved SIP at the time of the release of the final general conformity determination.

5.1.2.1 Ozone

On April 10, 2000, EPA approved a SIP revision submitted by CARB to provide for attainment of the one-hour O_3 NAAQS in the SCAB (65 FR 18903). This approved SIP revision was based on the 1997 AQMP and a 1999 amendment to the 1997 AQMP. In addition to approving commitments by SCAQMD to implement various control measures with this SIP revision and a revised attainment demonstration, EPA also approved projected emissions inventories as well as a revised rate-of-progress (ROP) plan for the milestone years 1999, 2002, 2005, 2008, and 2010.

As noted previously, O_3 is a secondary pollutant, so emissions reductions to control O_3 focus on its precursors, VOC and NO_x. **Table 3**, SCAB Emissions Budgets in EPA-approved SIP for O_3 Precursors by Milestone Year (tons/day), presents the emissions budgets for VOC and NO_x for the ROP milestone years, as adopted in the 1999 amendment to the 1997 AQMP and approved by EPA. The emissions are based on the summer planning inventories.

Table 3

SCAB Emissions Budgets in EPA-approved SIP for O_3 Precursors by Milestone Year (tons/day)

Year	Stationary VOC	Stationary NO_x	On-Road VOC	On-Road NO_x	Nonroad VOC	Nonroad NO_x	Total VOC	Total NO_x
1999	435.2	115.7	354.0	526.8	137.3	292.6	926.5	935.1
2002	402.4	96.7	273.1	447.1	125.1	270.7	800.6	814.5
2005	334.4	91.4	206.0	369.1	116.6	234.0	657.0	694.5
2008	305.1	89.7	145.4	310.1	106.7	209.2	557.2	609.0
2010	267.6	88.3	80.7	277.8	65.1	164.3	413.4	530.4

Sources: 65 FR 18903 and 1997 AQMP Appendix V Chapter 4 Table 4-9 and 1999 amendment Chapter 2 Table 2-7.

Table 4, SCAB Emissions Budgets in Draft 2003 AQMP for O_3 Precursors by Milestone Year (tons/day), presents the emissions budgets for VOC and NO_x (summer planning inventory) for the rate-of-progress milestone years, as proposed in the Draft 2003 AQMP.

Table 4

SCAB Emissions Budgets in Draft 2003 AQMP for O_3 Precursors by Milestone Year (tons/day)

Year	Stationary VOC	Stationary NO_x	On-Road VOC	On-Road NO_x	Nonroad VOC	Nonroad NO_x	Total VOC	Total NO_x
2000	395.5	120.6	414.3	695.1	188.5	312.3	998.2	1117.9
2002	353.5	107.0	349.6	633.4	169.6	309.5	872.8	1049.8
2005	316.2	95.2	278.3	540.3	131.9	293.9	726.4	929.4
2008	308.4	92.9	238.6	463.7	114.6	275.9	661.6	832.5
2010	314.7	85.5	208.1	398.7	106.0	255.8	628.8	740.1

Source: Draft 2003 AQMP Appendix III Attachment B.

5.1.2.2 Carbon Monoxide

On April 21, 1998, EPA approved a SIP revision submitted by CARB to provide for attainment of the one-hour and eight-hour CO NAAQS in the SCAB (63 FR 19661). This approved SIP revision was based on the 1997 AQMP. In addition to approving projected emissions inventories, EPA also granted interim approval to the reasonable further progress and attainment demonstration portions of the plan.

Table 5, SCAB Projected CO Emissions in EPA-approved SIP by Year (tons/day), presents the projected emissions for CO for the projected attainment year (2000) and two future years (2006 and 2010) as adopted in the 1997 AQMP and approved by EPA. The emissions are based on the winter planning inventories.

Table 5

SCAB Projected CO Emissions in EPA approved SIP by Year (tons/day)

Year	Stationary	On Road	Nonroad	Total
2000	293	3125	1550	4968
2006	329	1889	938	3157
2010	337	1483	605	2425

Sources: 63 FR 19661 and 1997 AQMP Appendix III Chapter 2 Tables 2-11 and 2-13 and personal communication with Tom Chico (2003).

Table 6, SCAB Projected CO Emissions in Draft 2003 AQMP by Year (tons/day), presents the emissions inventories for CO (winter planning inventory) for milestone years, as proposed in the Draft 2003 AQMP.

Table 6

SCAB Projected CO Emissions in Draft 2003 AQMP by Year (tons/day)

Year	Stationary	On Road	Nonroad	Total
2000	340	3778	715	4834
2006	379	2311	655	3345
2010	387	1771	626	2784

Sources: Draft 2003 AQMP Appendix III Attachment C.

5.1.2.3 Particulate Matter

On April 18, 2003, EPA approved a SIP revision submitted by CARB to provide for attainment of the 24-hour and annual PM_{10} NAAQS in the SCAB (68 FR 19315). This approved SIP is based on the 1997 AQMP, amendments to the 1997 AQMP submitted in 1998 and 1999, and further modifications to the 1997 AQMP submitted in a status report to EPA in 2002. In addition to approving an attainment date extension to December 31, 2006, with this SIP revision, EPA also approved projected emissions inventories as well as approved the reasonable further progress and attainment demonstration portions of the plan.

PM_{10} is not only a primary pollutant, but it is also a secondary pollutant, so emissions reductions to control PM_{10} must focus not only on the primary emissions but also on its precursors which include VOC, NO_x, and oxides of sulfur (SO_x). **Table 7**, SCAB Emissions for PM_{10} and Precursors in EPA-approved SIP by Milestone Year (tons/day), presents the emissions inventories for PM_{10}, VOC, NO_x, and SO_x for the reasonable further progress milestone years, as adopted in the 1997 AQMP, modified by the 2002 status report, and approved by EPA. These emissions are based on the average annual inventories for each pollutant.

Table 7

SCAB Emissions for PM_{10} and Precursors in EPA-approved SIP by Milestone Year (tons/day)

Year	PM_{10}	VOC	NO_x	SO_x
2003	310	747	748	64
2006	301	623	635	67

Source: 68 FR 19315.

Table 8, SCAB Emissions for PM_{10} and Precursors in Draft 2003 AQMP by Milestone Year (tons/day), presents the emissions inventories for PM_{10}, VOC, NO_x, and SO_x (annual average day) for milestone years as proposed in the Draft 2003 AQMP.

Table 8

SCAB Emissions for PM_{10} and Precursors in Draft 2003 AQMP by Milestone Year (tons/day)

Year	PM_{10}	VOC	NO_x	SO_x
2006	310.6	638.0	920.0	58
2010	299.5	291.7	623.3	57.5

Source: Draft 2003 AQMP Appendix V Chapter 2 Table 2-10.

5.1.2.4 Nitrogen Dioxide

On July 24, 1998, EPA approved a SIP revision submitted by CARB for NO_2 attainment and maintenance plans and a request to redesignate the SCAB from nonattainment to attainment of the annual NO_2 NAAQS (63 FR 39747). This approved SIP revision was based on the 1997 AQMP. Data presented in the 1997 AQMP demonstrated that the last year with an NO_2 violation of the NAAQS in the SCAB was 1991. EPA pointed out in its approval that redesignation to attainment requires that improvements in air quality must be shown to have occurred because of enforceable controls. Because the SCAB NO_x emissions inventory (NO_x includes NO_2 and other oxides of nitrogen which are its precursors, primarily nitric oxide, NO) showed increases in activity levels for most of the significant source categories (including motor vehicle use) during the years with no NO_2 violations, EPA concluded that this demonstrates that the

reductions in NO_x emissions were not due to an economic recession, but were associated with the impact of permanent and enforceable CARB controls on mobile source emissions and SCAQMD regulations on stationary point and area sources.

EPA also noted that it approved the NO_2 maintenance plan because it demonstrates that the future year inventory will not exceed the inventory that existed at the time of the request for redesignation, notwithstanding new control measures. Therefore, EPA concluded that the California SIP already included fully adopted regulations, prior to consideration of the 1997 AQMP, which will generate reductions in NO_x emissions in future years that will provide an ample margin of safety to ensure maintenance of the NO_2 NAAQS. **Table 9**, SCAB Actual (1993) and Projected NO_x Emissions in EPA-approved SIP by Year (tons/day), presents the emissions inventories for NO_x for the SCAB, as approved by EPA, based on the uncontrolled inventories adopted in the 1997 AQMP. These emissions are based on the winter planning inventory.

Table 9

SCAB Actual (1993) and Projected NO_x Emissions in EPA-approved SIP by Year (tons/day)

Year	NO_x
1993	1284
2000	960
2010	759

Sources: 63 FR 39747 and 1997 AQMP Appendix V chapter 1 Table 1-1.

Table 10, SCAB Actual (1995) and Projected NO_x Emissions in Draft 2003 AQMP by Year (tons/day), presents the emissions inventories for NOx (winter planning inventory) for milestone years as proposed in the Draft 2003 AQMP.

Table 10

SCAB Actual (1995) and Projected NO_x Emissions in Draft 2003 AQMP by Year (tons/day)

Year	NO_x
1995	1465
2000	1244
2010	793

Source: Draft 2003 AQMP Appendix III Attachment C Tables C-1, C-4, and C-11.

5.2 Total of Direct and Indirect Emissions Caused by Proposed Federal Action

The general conformity regulations state that a conformity determination is required for each pollutant where the total of direct and indirect emissions in a nonattainment or maintenance area caused by a federal action would equal or exceed the de minimis emission rates listed in 40 CFR 93.153(b). These total emissions are the sum of the direct and indirect emissions increases and decreases (i.e., the net change in emissions) caused by the federal action. Any emissions which are exempt or presumed to conform are not to be included in these total emissions, and the total emissions must include not only

criteria pollutants but also precursors of the criteria pollutants and only those pollutants for which the area is in nonattainment or maintenance. The application of these concepts to Alternative D is addressed in the following discussion.

5.2.1 Meaning of "Direct" Emissions

Direct emissions are those emissions of a criteria pollutant or its precursors that are caused or initiated by the federal action and that occur at the same time and place as the federal action, subject to the exclusions noted above. For Alternative D, this includes not only the permanent emissions associated with and contributing to on-airport operations resulting from the implementation of the new LAX Master Plan but also the temporary emissions associated with the construction of the various facets of the new LAX Master Plan.

Direct emissions include those from airside activities (e.g., aircraft, ground support equipment, emergency electrical generators) and on-airport landside activities (e.g., ground access vehicles, central utility plant, heavy construction vehicles). Emissions calculations should incorporate the impact of emission controls designed into the new facilities as well as the impacts of any mitigation required for general conformity purposes.

EPA guidance does not allow segmentation, or tiering, of projects that could circumvent the applicability of general conformity (EPA 1994). Further EPA guidance states that, for airport development, if projects or actions are combined together for NEPA, then generally they should be kept together for general conformity unless there are specific reasons to separate the projects or actions (EPA 2002). While Alternative D envisions multiple elements, taken together (as is being done for the EIS evaluation required under NEPA) these elements constitute a long-term continuing program of construction to achieve a new unified airport layout. Emissions associated with Alternative D will be calculated based on the planning assumptions identified in the LAX Master Plan documentation and the Supplement to the Draft EIS/EIR for the planning horizons and any necessary interim years.

5.2.2 Meaning of "Indirect" Emissions

Indirect emissions are those emissions of a criteria pollutant or its precursors that are caused or initiated by the federal action but may occur later in time and/or may be further removed in distance from the federal action, are reasonably foreseeable, and can be practicably controlled by the federal agency through its continuing program responsibility. The meaning of indirect emissions is necessarily more vague than that of direct emissions.

The question of what a federal agency has control over may seem clear: an agency in its executive capacity will issue rules and regulations to place boundaries on those activities under its jurisdiction, and the agency can then enforce those limitations to ensure control. Under EPA guidance, the concept of control also implies the effect on emission units from the authority an agency exercises such as through conditions it places on the nature of the activity that may be established in permits or approvals or by the design of the action (EPA 1994). When FAA approves an ALP or provides funding through the AIP, emissions which are reasonably foreseeable as a consequence of these actions are under the control of FAA. Conversely, emissions which are not reasonably foreseeable or which cannot be practicably controlled by the FAA are excludable from a general conformity evaluation.

For example, if the planned action is an airport expansion that is expected to increase the motor vehicle traffic of passengers and employees to and from the airport, the sum of the on-road mobile source emissions resulting from new passenger and employee traffic for an average commute trip while off airport would be considered indirect emissions. On the other hand, if such off-airport emissions are accounted for as part of a conforming transportation plan or transportation improvement program, they are excludable from the general conformity evaluation (EPA 2002).

5.2.3 Meaning of "Caused by"

In the context of the general conformity regulations, the term "caused by" means those direct and indirect emissions that would not otherwise exist in the absence of the federal action. Therefore, the total emissions attributable to the federal action are the net, or incremental, emissions due to the action. To determine these net emissions at any point in time, it becomes necessary to estimate not only the total of direct and indirect emissions that would occur when the action is implemented but also the total of direct and indirect emissions that would exist at the same point in time in the absence of the proposed action.

Thus, the general conformity evaluation is always a "build/no-build" ("but for") test. For this evaluation, the emissions associated with Alternative D will be netted against the emissions associated with the No Action/No Project Alternative.

5.2.4 Emission Sources

As part of the general conformity evaluation, all on- and off-airport emission sources associated with Alternative D and the No Action/No Project Alternative were identified. The evaluation will address all sources that are not excludable as noted above, including those that are on airport property, motor vehicles carrying passengers and cargo to or from LAX, and construction activity. These sources are divided into two general categories: operations-related sources and construction-related sources.

5.2.4.1 Operations-Related Sources

The operations-related sources include all the nonconstruction-related sources that generate emissions under Alternative D or under the No Action/No Project Alternative either on or off airport. In general, these include mobile sources and stationary sources.

For purposes of the general conformity evaluation, the operations-related mobile sources include both on-road and nonroad vehicles. These on-road vehicles include the automobiles, trucks, buses, and other motor vehicles that operate on the public roadways and in the parking areas at and near LAX. The on-road vehicles are further characterized as either on-airport (direct) or off-airport (indirect). Nonroad vehicles include aircraft, ground support equipment, and auxiliary power units that operate in the nonpublic access areas (airport operations area [AOA]) of LAX. (An exception to this is the determination of aircraft emissions which are calculated from ground level to the height above ground level where the lower tropospheric mixing height terminates, a distance that goes beyond the LAX property boundaries.) Engine exhaust emissions as well as reentrained dust from mobile-source activities is included with the mobile source emissions.

Stationary sources consist of point and area sources. Point sources include fixed combustion equipment (e.g., boilers, electrical power generators, aircraft engine test cells), coating- and solvent-use facilities (e.g., paint-spray booths), organic liquid storage and transfer activities, and miscellaneous activities. Area sources include numerous small sources such as commercial/residential combustion equipment.

5.2.4.2 Construction-Related Sources

The construction-related sources include all the nonoperations-related sources that generate emissions under Alternative D or under the No Action/No Project Alternative either on or off airport. In general, these include mobile sources and stationary sources.

For purposes of the general conformity evaluation, the construction-related mobile sources include both on-road and nonroad vehicles. These on-road vehicles include the haul trucks, construction-worker vehicles, and other motor vehicles involved in specific construction activities that will operate on the public roadways at and near LAX. The on-road vehicles are further characterized as either on-airport (direct) or off-airport (indirect). Nonroad vehicles include primarily heavy construction equipment (e.g., scrapers, bulldozers, cranes) involved in specific construction activities that will operate on airport. Engine exhaust emissions as well as reentrained dust from mobile-source activities is included with the mobile source emissions.

Stationary sources consist of point and area sources. Point sources include primarily fixed combustion equipment (e.g., temporary electrical power generators). Area sources include wind-blown dust and outdoor coating and solvent use (e.g., architectural coating evaporation).

5.2.5 Emissions Estimates

As noted above, the pollutants of concern for the general conformity evaluation include O_3,(represented by its precursors, VOC and NO_x), CO, PM_{10}, and certain gaseous pollutants (notably NO_x, SO_x, and VOC) which can contribute significantly to secondary formation of PM_{10} and NO_2. All emissions calculations will utilize the latest and most accurate emission estimating techniques and take into consideration all applicable air quality control standards, limitations, and work practices, as described below. Input data and calculations used in estimating emissions will be summarized in both the draft and final general conformity determinations.

5.2.5.1 Operations-Related Emissions

Emissions for all operations-related sources will be calculated taking into account the latest LAX Master Plan descriptions and assumptions of Alternative D and the No Action/No Project Alternative, as presented in the Supplement to the Draft EIS/EIR.

5.2.5.1.1 Mobile Sources

Usually, the largest number and range of types of emission sources at an airport are the mobile sources. These mobile sources consist of on-road sources (e.g., light-duty cars, buses) and nonroad sources (e.g., aircraft, ground support equipment).

5.2.5.1.1.1 On-Road Sources

On-road mobile sources consist of those vehicles which are registered and licensed for use on public roadways. Emissions from these types of sources can occur on paved roadways and in parking facilities both on and off airport property.

5.2.5.1.1.1.1 Roadway Emissions

Emissions from on-road, or ground access vehicles, will be calculated using CARB mandated methodology. Only on-airport ground access vehicles will be included in the emissions inventories. Ground access vehicles include, but are not limited to, privately owned vehicles, government owned vehicles, rental cars, shuttles, buses, taxicabs, and trucks. Vehicle emissions will be estimated using the emission factors from the latest version of CARB's motor vehicle emission factor model, EMFAC2002 (CARB 2003, EPA 2003). It should be noted that SCAQMD used an earlier version of the EMFAC model (EMFAC7G) to generate roadway emissions when preparing the emissions inventory used to support the 1997 AQMP and the 1999 amendment to the 1997 AQMP.

Vehicle trip distances, idle times, hot start vs. cold soak, and average travel speeds will be based on specific roadway segments analyzed in the traffic impact studies conducted for the LAX Master Plan. The CARB mandated default values will be used where appropriate. Temporal data for on-airport traffic will be determined from the project's transportation analysis.

Entrained road dust will also be estimated. Emission factors from the SCAQMD CEQA Air Quality Handbook (SCAQMD 1993) will be used to calculate emissions of entrained dust from major roads and highways.

Because regional traffic volumes and patterns consistent with the assumptions of Alternative D are included in the conforming 2001 RTP (within one percent), emissions inventories for off-airport ground access vehicles will not be prepared for this evaluation for comparison to the SIP budgets (40 CFR 93.158(a)(5)(ii)). However, local air quality modeling of emissions at selected off-airport intersections affected by LAX-related traffic will be performed.

5.2.5.1.1.1.2 Parking Emissions

Methodologies similar to those used to estimate on-road emissions will be used to estimate emissions from vehicles in on-airport parking facilities. EMFAC2002 will be used and site-specific data will be incorporated. Resting evaporation emissions will be included for parking facility emissions.

Emissions will be calculated for each on-airport parking lot or garage. Estimates and assumptions made by the LAX Master Plan traffic consultants about the idle time, the average distance traveled, and the vehicle mix within each parking facility will be used. Temporal files for parking facilities will be provided by the project's transportation analysis.

5.2.5.1.1.2 Nonroad Sources

Nonroad mobile sources consist of those vehicles which are neither registered nor licensed for use on public roadways. Emissions from these types of sources occur only on airport property, primarily in the AOA. (Emissions from nonroad mobile area sources, such as fossil fuel-powered landscaping equipment, occurring on airport property are not included in the inventory.)

5.2.5.1.1.2.1 Aircraft Emissions

Aircraft emissions will be calculated using EDMS 4.11, consistent with methodology accepted by the EPA (EPA 1992) and the FAA (FAA/USAF 1997, FAA 2001). Emissions produced by LAX activity during five aircraft operational modes (approach, taxi/idle in, taxi/idle out, takeoff, and climbout) will be calculated for Alternative D. Two types of modal data may be used when modeling airport emissions: default times-in-mode representing an average airport, or airport-specific times-in-mode. Since LAX handles more operations than a typical airport, LAX-specific times-in-mode will be used. Taxi/in, taxi/out and queue (idle) times in mode will be developed from the LAX Master Plan airport simulation modeling (SIMMOD) results for Alternative D. The EDMS 4.11 (FAA 2001) default times in mode for each airframe will be the basis for climbout, approach, landing roll, and takeoff times; however, climbout and approach times will be adjusted according to the average mixing height adjustment parameters contained in EDMS (FAA 2001). An average mixing height of 625 meters (approximately 2,050 ft) will be used to calculate the adjustments to approach and climbout times in mode. A mixing height of 2,050 ft was used in the aircraft emission inventory calculations for LAX in support of the 1997 AQMP and the 1999 amendment to the 1997 AQMP as well as the Draft 2003 AQMP using EDMS (EEA 1999). The FAA approved model EDMS (Version 4.11) will be used to calculate aircraft emission inventories assuming the model default engines assigned to the mix of airframes. If emission factors for specific engines forecast for use at LAX are not available in EDMS, factors for other engines that can be used with the given airframe will be substituted. Fleet mix data and airport operations (LTOs) will be taken from the Master Plan forecasts. A list of the aircraft/engine combinations that will be included in the emissions and dispersion analysis is presented in **Table 11**, Aircraft and Engine Combinations Assumed for Emissions and Dispersion Modeling.

EDMS 4.11 does not contain emission indices for PM_{10} from aircraft since there is a dearth of generally available data, therefore, the model cannot 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 for this general conformity evaluation will be developed from three primary sources: (1) an analysis of existing aircraft emissions data collected for upper atmosphere research by University of Missouri Professors Philip Whitefield and Donald Hagen (Whitefield and Hagen 1999); (2) correlations of smoke number versus PM_{10} concentration; and (3) pre-1980 emission factors for several aircraft engines. The PM_{10} emission indices used for the general conformity evaluation are summarized in the Draft EIS/EIR, Technical Report 4, *Air Quality Technical Report,* Attachment H (FAA/LAWA 2001).

Table 11

Aircraft and Engine Combinations Assumed for Emissions and Dispersion Modeling

Aircraft Type	No. of Engines	Engine Type	Engine Model
Airbus A300B	2	Turbofan	CF6-80C2A5
Airbus A300-C4-200	2	Turbofan	CF6-50E2
Airbus A310-200	2	Turbofan	JT9D-7R4E1
Airbus A310-200C	2	Turbofan	CF6-80CB42
Airbus A319	2	Turbofan	CFM56-5B6/P
Airbus A320	2	Turbofan	V2527-A5
Airbus A330	2	Turbofan	PW4168
Airbus A340-200	4	Turbofan	CFM56-5C4
ATR42	2	Turboprop	PW120
ATR72-200	2	Turboprop	PW124-B
Boeing B737-200C	2	Turbofan	JT8D-17
Boeing B737-300	2	Turbofan	CFM56-3-B1
Boeing B737-400	2	Turbofan	CFM56-3B-2
Boeing B737-500	2	Turbofan	CFM56-3C-1
Boeing B747-200	4	Turbofan	CF6-50E2
Boeing B747-200C	4	Turbofan	CF6-50E2
Boeing B747-200F	4	Turbofan	JT9D-7F
Boeing B747-400	4	Turbofan	PW4056
Boeing B747-400F	4	Turbofan	CF6-80C2B1F
Boeing B747-SP	4	Turbofan	JT9D-7A
Boeing B757-200	2	Turbofan	PW2037
Boeing B757-200F	2	Turbofan	RB211-535E4
Boeing B767-200	2	Turbofan	CF6-80A (A1)
Boeing B767-300	2	Turbofan	CF6-80A2
Boeing B767-300F	2	Turbofan	PW4056
Boeing B777-200	2	Turbofan	PW4077
BH-1900	2	Turboprop	PT6A-67B
BH-1900C	2	Turboprop	PT6A-65B
Canadair Reg-700	2	Turbofan	CF34-8C1
Canadair RJ50	2	Turbofan	CF34-3A1
Cessna 150	1	Piston	O-200
Cessna 208 Caravan	1	Turboprop	PT6A-114
CITATION V	2	Turbofan	JT15D-5 (A & B)
Dash 7	4	Turboprop	PT6A-50
DC10-30F	3	Turbofan	CF6-50C2
EMB-110KQ1	2	Turboprop	PT6A-27
EMB-120	2	Turboprop	PW118
Fokker 100	2	Turbofan	TAY650-15
Fokker 50	2	Turboprop	PW127-A
Fokker 70	2	Turbofan	TAY620-15
Jetstream 31	2	Turboprop	TPE331-3
MD-11	3	Turbofan	CF6-80C2D1F
MD-11-11F	3	Turbofan	CF6-80C2D1F
MD-80	2	Turbofan	JT8D-219
MD-80-87	2	Turbofan	JT8D-219
MD-90-10	2	Turbofan	V2525-D5
MD-95	2	Turbofan	BR700-715C1-30
Saab2000	2	Turboprop	AE2100A
SF-340-A	2	Turboprop	CT7-5
Shorts 360	2	Turboprop	PT6A-65AR
Swearingen Metro 2	2	Turboprop	TPE331-3

Source: Camp Dresser & McKee Inc., 2003.

5.2.5.1.1.2.2 Ground Support Equipment/Auxiliary Power Unit Emissions

Emissions from ground support equipment (GSE) and auxiliary power units (APU) will also be calculated using the latest version of EDMS, as required by FAA (63 FR 18068). The GSE are nonroad surface vehicles that operate primarily on the airfield apron, near the terminal gate, which are used to service a flight. The APU is a small, on-board engine that operates to provide power to an aircraft while it is parked at the gate. The GSE and APU used at terminal buildings are typically owned and operated by the airlines using the equipment. Assignments of appropriate GSE and APU to aircraft and associated usage

times will be made based on site-specific data developed for Alternative D. Default values for GSE and APU assignments to aircraft and activity rates included in EDMS will be used to supplement the site-specific data as needed.

It should be noted that the default settings in the current version of EDMS calculate emissions from GSE based on emission factors and equipment operating assumptions used in the EPA NONROAD model. The EDMS model does allow the user to specify alternative emission factors for GSE to those used in the default settings and consideration has been given to substituting GSE emission factors from the CARB OFFROAD model. Because SCAQMD estimated emissions attributable to GSE for the 1997 AQMP and the Draft 2003 AQMP using the OFFROAD model, the general conformity evaluation will use EDMS with GSE emission factors from the OFFROAD model. To support the 1997 AQMP, the 1999 amendment to the 1997 AQMP, and the Draft 2003 AQMP, emissions inventories for APUs were developed using EDMS.

The major commercial airlines servicing LAX signed a memorandum of understanding (MOU) with CARB in December 2002 in which they voluntarily agreed to reduce emissions from GSE. The MOU does not specify the elimination of emissions from GSE, but LAWA does propose the virtual elimination of GSE emissions under Alternative D, which it will effect through incentives and tenant lease requirements. For purposes of the general conformity evaluation, it is assumed that the signatory airlines will comply with the conditions of the MOU and that under Alternative D, emissions from GSE will be eliminated at LAX by 2015.

The penetration of alternatively fueled and electric powered GSE will be developed from studies conducted for the City (CALSTART 1999) as well as from the conditions of the MOU cited above. In addition to the factors identified by CARB for GSE fueled by compressed natural gas (CNG) and liquefied petroleum gas (LPG) (CARB 1994), literature searches will be conducted to identify other appropriate emission factors for alternatively fueled GSE (CALSTART 1998). Emissions will be based on the equipment fuel type, brake horsepower, and/or time in mode. Zero direct emissions will be assumed for electric powered GSE. Indirect emissions estimated to occur within the SCAB attributable to the use of electric powered GSE will also be included in the analysis following the approach used to calculate secondary emissions from electricity production in the Supplement to the Draft EIS/EIR for the LAX Master Plan (FAA/LAWA 2003). (That approach assumes that 17.3 percent of the electricity needed at LAX would be generated locally from electric generating plants utilizing natural gas as fuel.) A central gate power system replacing a ground power unit (GPU - a ground vehicle with a portable generator that can be used to provide power to aircraft parked at a gate) as well as most aircraft APU[1] usage at terminal gates will be assumed for Alternative D as well as future No Action/No Project conditions (LADOA 1997). The gate electrification is assumed to be completed by the year 2005.

Pollutant emissions will be calculated using methodology accepted by EPA (EPA 1992, EPA 2003) and FAA (FAA/USAF 1997) for emergency generators, air-start units (ASU - a ground unit used to start aircraft turbofan engines), and air conditioning units (ACU) holding SCAQMD permits. Emissions will be calculated based on the generator or engine/turbine power rating, usage rate, and pollutant emission indices (based on power output and fuel type). Any air pollution control equipment in use, or emission standards required in the future as identified in SCAQMD, CARB, or EPA rules and regulations, will be incorporated into the calculations.

The equipment capacities, typical operating hours, and pollution controls will be based on the existing conditions survey (see Attachment C of Technical Report 4, *Air Quality Technical Report*, of the Draft EIS/EIR). Future condition emissions will be based on the number of aircraft operations for Alternative D and the No Action/No Project Alternative. Control efficiencies will be applied to those units with control devices/technologies. A central cooling system replacing portable ACU at terminal gates will be assumed (LADOA 1997). Cargo and general aviation gates will be assumed to have power connections also, which run on-board ACU.

[1] APU's will operate approximately 7 minutes per LTO: 5 minutes during departure for initial flight checks and main engine starts, and 2 minutes during arrival to provide power after the main engines are shutdown while the aircraft is being connected to central power and air.

5.2.5.1.2 Stationary Sources

Stationary sources include a variety of types of equipment operated in fixed and permanent locations, primarily on airport property. These stationary sources consist of point sources (e.g., boilers, surface coating facilities) and area sources (e.g., commercial combustion equipment).

5.2.5.1.2.1 Point Source Emissions

Point sources include larger sources that emit pollutants from a single stack or vent. Point sources considered in this evaluation are located primarily on airport property.

5.2.5.1.2.1.1 Utility Plants

Emissions from on-site power plants and heating facilities will be calculated using EPA and FAA accepted methodologies (EPA 2003, FAA/USAF 1997), assuming that natural gas is the primary fuel. Natural gas is the primary fuel for the existing Central Utility Plant (CUP) and SCAQMD Best Available Control Technology Guidelines (BACT Guidelines) (SCAQMD 2003b) require that natural gas be used on any new utility boilers and turbines to minimize PM_{10} and SO_2 emissions. Emissions for individual sources can be calculated based on the source's fuel consumption and pollutant emission factors:

$$E_{Ti} = 3\ [\ F \times EI_i\ ]$$

where: E_{Ti} = total emissions of pollutant i emitted from the source during the inventory period (grams),

F = total amount of fuel consumed during the inventory period (million cubic meters of natural gas),

EI_i = emission index for pollutant i (grams of pollutant per million cubic meters of fuel).

The emission index for each pollutant is based on the fuel type and combustion equipment type (e.g., boiler, turbine), and any air pollution control equipment in operation at the source. In addition, the SO_2 emission index is affected by the fuel sulfur content and the PM emission index is affected by the fuel ash content. The emission index can be calculated as follows:

$$EI_i = UI_i \times (\ 1 - CF / 100\ ) \times FM_i$$

where: EI_i = emission index for pollutant i (grams of pollutant per million cubic meters of fuel),

UI_i = uncontrolled emission index for pollutant i (grams of pollutant per million cubic meters of fuel),

CF = air pollution control factor (%)

FM_i = fuel modifier (fuel weight percent sulfur for SO_2 emission index and fuel weight percent ash for PM emission index).

Fuel consumption and air pollution control information will be based on the existing conditions survey and future year forecasts of fuel usage and SCAQMD control requirements. Utility plant fuel usage will be based on the ratio of existing fuel usage to existing terminal area (in square feet). This ratio will be applied to both Alternative D and the No Action/No Project Alternative. Emission factors will be obtained primarily from available information, and controlled or permitted emission limits for these sources.

5.2.5.1.2.1.2 Fuel Storage Tanks

Emissions from fuel storage tanks will be calculated using algorithms developed by SCAQMD and similar to Version 4.06 of EPA's TANKS emissions estimation program. Emission estimates for both Alternative D and the No Action/No Project Alternative will consider storage tank type (floating or fixed roof), fuel type, fuel throughput, and tank-specific characteristics (color, breather vent settings, etc.). Climatic data contained in the TANKS database will be used to calculate evaporative emissions. Storage tank requirements in the SCAQMD Rules and Regulations and BACT Guidelines will be addressed in the emission estimates.

Fuel transfer losses will be accounted for using methods presented in EPA 2003. These transfer losses primarily occur during the filling of aircraft and GSE.

5.2.5.1.2.1.3 Surface Coating Facilities

Surface coating operations emit volatile hydrocarbons (VOC or HC) into the atmosphere through evaporation of the paint vehicle, thinner, or solvent used to facilitate the application and clean up of the coatings. Emissions of VOC will be calculated using methods recommended in *Air Quality Procedures for Civilian Airports and Air Force Bases* (FAA/USAF 1997), taking into account requirements in the SCAQMD Rules and Regulations and BACT Guidelines:

$$E_{VOC} = 3 \quad [\, Q_i \times VOC_i \times (1 - CF / 100) \,]$$

where: E_{VOC} = total volatile organic compound emissions from painting operations (g)

Q_i = total quantity of coating type i used in inventory period (kiloliters)

VOC_i = VOC content for coating type i (g VOC/kiloliter)

CF = air pollution control factor (%)

Information regarding the types and quantities of coatings used at on-site facilities, in addition to any air pollution control information, will be based on the existing conditions survey. VOC contents of coatings will be obtained from Material Safety Data Sheets (MSDS), or default values from *Air Quality Procedures for Civilian Airports and Air Force Bases* (FAA/USAF 1997) will be substituted if the MSDS information is unavailable. The VOC limits specified in SCAQMD Rules and Regulations and BACT Guidelines will also be accounted for when developing these emission inventories.

5.2.5.1.2.1.4 Solvent Degreasers

The use of organic solvents such as chlorinated hydrocarbons, petroleum distillates, ketones, and alcohols results in the evaporation of VOC or other hydrocarbons. The quantity of VOC allowed to be emitted from degreasing operations is limited by SCAQMD Rule. Emissions are based on the assumption that the total amount of solvent used will be either recaptured and disposed of as waste liquid, or released into the atmosphere as evaporated VOC. Emissions from solvent degreasing will be calculated using methods recommended in *Air Quality Procedures for Civilian Airports and Air Force Bases* (FAA/USAF 1997):

$$E_{VOC} = D \times (QC - QD)$$

where: E_{VOC} = volatile organic compound emissions from the solvent degreasing unit (grams)

QC = quantity of solvent consumed during a given time period (kiloliter)

QD = quantity of solvent disposed of as liquid in a given time period (kiloliter)

D = density of the solvent (g/kiloliter)

Quantities of solvent consumed and disposed will be estimated for each alternative based on data from the existing conditions survey, taking into account the size of areas to be used for maintenance activities. If water-based or other inorganic degreasers are used, evaporation of VOC or hydrocarbons will not occur. The VOC limits specified in SCAQMD Rules and Regulations and BACT Guidelines will also be accounted for when developing these emission inventories.

5.2.5.1.2.1.5 Deicing/Anti-Icing Operations

Due to the airport location in Southern California, and the mild winter climate that accompanies the area, deicing/anti-icing operations are minimal. Some deicing fluid is used on a small portion of aircraft arriving from the east coast that have over-the-wing fuel tanks. However, the emissions of volatile hydrocarbons from deicing/anti-icing fluid are minor and will not be estimated.

5.2.5.1.2.1.6 Training Fires

Air pollutants from the burning of training fires include PM, CO, NO_X, SO_X, and VOC. The emissions depend on the type of fuel burned and the duration of the burn (quantity of fuel burned). Emissions from the burning of training fires will be calculated using EDMS 4.11, consistent with methods recommended by the FAA (FAA/USAF 1997). The training frequency and quantity of fuel burned will be obtained from the aircraft rescue and fire fighting department at LAX for existing conditions. This frequency and quantity will be used to estimate training fire impacts for the No Action/No Project Alternative only, in 2005, 2015,

and any interim year analyzed for this evaluation. Emissions from the burning of training fires can be calculated as follows:

E_{Ti} = $QF \times EF_i$

where:

E_{Ti} = Total emissions of pollutant i from the training fire for the inventory period (g)

QF= = quantity of fuel burned in the fire (kiloliters)

EF_i = emission factor for pollutant i (g/kiloliter)

The LAX Master Plan proposes that future training fire operations be located off-airport and outside of the SCAB. Therefore, no emissions from training fires will be assumed for Alternatives D in 2005, 2015, or any interim year analyzed for this evaluation.

5.2.5.1.2.1.7 Aircraft Engine Testing

In addition to standard operations, engine testing or run-up emissions will also be estimated using EDMS. The emission rates will be based on the aircraft or engine type being tested, the duration of the test and the thrust setting for the test. The engine type, test duration and thrust setting will be provided by LAWA operations personnel.

5.2.5.1.2.2 Area Source Emissions

Several areas within the airport property line may be developed for non-airport related activities, such as general commercial or light industrial facilities. These areas include the LAX Northside and any new acquisition areas not used for airport operations. Emissions from these areas will be estimated following methodology in SCAQMD 1993.

5.2.5.2 Construction-Related Emissions

Emissions for all construction-related sources will be calculated taking into account the latest LAX Master Plan descriptions and assumptions of Alternative D and the No Action/No Project Alternative, as presented in the Supplement to the Draft EIS/EIR.

5.2.5.2.1 Mobile Sources

Mobile construction sources include a large number and range of types of emission sources. These mobile sources consist of on-road sources (e.g., light-duty cars, heavy-duty trucks) and nonroad sources (e.g., scrapers, bulldozers, cranes). Engine exhaust emissions as well as reentrained dust from mobile-source activities are included with these mobile source emissions.

5.2.5.2.1.1 On-Road Sources

On-road mobile construction-related sources consist of those vehicles which are registered and licensed for use on public roadways, even though some of these construction-related sources may operate both on-road and off-road. On-road mobile construction-related sources will include on-road, off-airport vehicle traffic. Such traffic will include construction employee traffic, construction material delivery trucks, and construction debris haul trucks. On-road mobile construction-related sources will also include on-road, on-airport vehicle traffic, such as vehicle traffic on internal roads to construction site locations as well as off-road, on-airport vehicle traffic, such as vehicle traffic off internal roads to construction site locations. The emission factors used for this activity will be taken from the CARB EMFAC2002 model. The parameters needed to construct the on- and off-road emission inventory (such as vehicle miles traveled (VMT), cold soak and hot start percentages, vehicle mix, and average vehicle speeds) will be taken from either SCAQMD 1993 or will be generated in the various traffic studies prepared for the LAX Master Plan. The City will seek concurrence from EPA and SCAQMD for any parameter values not included in EMFAC2002 or the CEQA Air Quality Handbook. Off-airport emissions from this category of construction-related sources will be limited to those emissions which are reasonably foreseeable and are subject to FAA's continuing program responsibility.

5.2.5.2.1.2 Nonroad Sources

Nonroad mobile construction-related sources consist of those vehicles which are neither registered nor licensed for use on public roadways, even though some of these construction-related sources may operate both on-road and off-road. Nonroad mobile construction-related equipment emissions will be quantified using the construction schedule and activity levels developed by the project engineering team, and correlated with equipment types from the Caterpillar Performance Handbook (Caterpillar 1993) and the National Construction Estimator (Kiley 1995). Construction equipment usage will be based on common practices for the types of construction to be undertaken. Emissions based on these activity levels will then be calculated using emission factors from the CARB OFFROAD model, SCAQMD CEQA Air Quality Handbook, and specific equipment manufacturer supplied data.

5.2.5.2.2 Stationary Sources

Stationary construction-related sources include a variety of types of equipment operated in fixed but temporary locations on airport property. These stationary sources consist of point sources (e.g., electrical generators) and area sources (e.g., fugitive dust).

5.2.5.2.2.1 Point Source Emissions

Point source construction-related equipment emissions will be quantified using the construction schedule and activity levels developed by the project engineering team. Construction equipment usage will be based on common practices for the types of construction to be undertaken. Emissions based on these activity levels will then be calculated using emission factors from the *Compilation of Air Pollutant Emission Factors (AP-42)*, SCAQMD CEQA Air Quality Handbook, and specific equipment manufacturer supplied data.

5.2.5.2.2.2 Area Source Emissions

The category of fugitive dust incorporates all sources of dust production during construction. These fugitive dust sources include but are not limited to: grading and excavation, concrete plant operations, and demolition. Emissions from these sources will be quantified using emission factors from the *Compilation of Air Pollutant Emission Factors (AP-42)*, the SCAQMD CEQA Air Quality Handbook, and available documentation addressing fugitive dust. Measures required under SCAQMD Rule 403 (Fugitive Dust) will be accounted for in the emission calculations.

The emissions from construction materials, including but not limited to asphalt paving and striping and architectural coating operations, will be calculated using activity levels and emission factors from the project engineering team and assumptions provided in the *Compilation of Air Pollutant Emission Factors (AP-42)* and the SCAQMD CEQA Air Quality Handbook.

5.2.5.3 Uncertainties and Sensitivities of Methods

The methods described herein and used to calculate the emissions 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. The emissions calculations developed for the general conformity evaluation will be based on well-accepted methods in a consistent manner to develop the best estimates of emissions, based on those particular assumptions discussed above.

5.2.6 Comparison of Emissions Caused by Proposed Federal Action to Applicable SIP Budgets

The emissions caused by the build out of Alternative D will be compared to the those portions of the applicable SIP emissions budgets which are attributable to LAX to assess whether or not they will exceed the budgets. For each pollutant of concern for which the portion of the applicable budget is not exceeded in all milestone years, a positive conformity determination is made.

The determination of the applicable SIP emissions budgets allowable to LAX is a nontrivial exercise and will require the concurrence of SCAQMD and CARB, and possibly of EPA. The difficulty arises from the

pooled nature of the emissions inventories that form the bases of the budgets. Because emissions are determined on a categorical basis within the SCAB (e.g., all on-road mobile sources, all nonroad mobile sources) and not necessarily for specific sources, the emissions attributable to any subset of such categories (e.g., on-road mobile sources on LAX property) is not clearly defined. The complex nature of the emission sources at LAX (multiple source types under the control of multiple owners and operators) further complicates the issue. For SIP development purposes, future emissions are often based on best estimates of actual emissions for some baseline point in time then projected to a later time using regional macroeconomic growth assumptions.

Aircraft and APU emissions may be a special case, since it is known that in developing the SCAB emissions inventories for the 1997 AQMP, SCAQMD commissioned a special study to estimate all aircraft emissions in the SCAB (EEA 1999). These data were also used in developing the aircraft and APU emissions inventories for the Draft 2003 AQMP. On the other hand, emissions due to other source categories are not so easily separated from the pooled inventories. For example, emissions from GSE are part of the nonroad, nonconstruction inventories.

The City and FAA will work directly with SCAQMD and CARB to identify and confirm in writing those portions of the applicable SIP emissions budgets that are allowable to LAX operations and construction activities for all milestone years. The incremental emissions due to Alternative D will then be compared to these subsets of the budgets to assess whether they are within allowable amounts.

5.3 Local Air Quality Modeling

Conformity means that a proposed federal action will not cause or contribute to any new violation of any NAAQS; not increase the frequency or severity of any existing violation of any NAAQS; and not delay timely attainment of any NAAQS or any required interim emission reductions or other milestones (42 U.S.C. 7506(c)(1)(B)). The general conformity regulations allow that local air quality modeling may be used to demonstrate that these requirements are met in support of a positive conformity determination (40 CFR 93.158(a)(3) and 40 CFR 93.158(a)(4)(i)). This approach may be particularly suitable for the evaluation of CO and PM_{10}, in the event that Alternative D emissions exceed the applicable SIP budgets for these pollutants. It is assumed herein that areawide air quality modeling (as defined at 40 CFR 93.152) for the evaluation of either CO or PM_{10} for Alternative D is not practical. Input and output data for specified dispersion model runs will be made available upon written request to FAA following publication of both the draft and final general conformity determinations.

5.3.1 Model Selection

As noted previously, the general conformity regulations require the use of the applicable air quality models identified in the most recent version of EPA's *Guideline on Air Quality Models*. The following discussion addresses the selection of models to support the local air quality modeling portion of this evaluation.

5.3.1.1 Operations-Related Sources

The on-airport pollutant emissions will be generated from both mobile and stationary sources. The on-airport dispersion analysis of operations-related sources will be conducted using EDMS 4.11 (FAA 2001) and the Industrial Source Complex - Short Term (ISCST3) version 02035 (U.S. EPA 1995).

5.3.1.1.1 All Sources Except Primary PM from Aircraft

As noted previously, EDMS is the FAA-required model for airport air quality analysis of aviation sources and will be used to compare concentrations associated with Alternative D relative to the NAAQS. The EDMS 4.11 model will be used to predict CO concentrations from aircraft engines, APUs, GSE, stationary sources, and ground access vehicles (on-road and parking) as well as PM_{10} concentrations from on-airport sources other than aircraft engines.

While for purposes of this draft general conformity evaluation NO_x, SO_x, and VOC can be considered precursors to PM_{10} (40 CFR 93.152, definition of "precursors of a criteria pollutant;" see also 62 FR 38652) since they are considered by SCAQMD as significant contributors to PM_{10} levels, it is not practical to model activities associated with Alternative D to predict PM_{10} impacts attributable to these precursor compounds (Servin 2003; Ryan 2003). Although there are no models approved by EPA to model secondary PM_{10} emissions, SCAQMD used the UAMAERO-LT model for the Draft 2003 AQMP to predict

PM_{10} concentrations throughout the SCAB due to precursor compounds. The UAMAERO-LT model is a photochemical grid model which is used to estimate the regional impacts of PM_{10} precursors using complex chemical mechanisms applied to emission sources across a regional airshed (such as the SCAB) arrayed in five-kilometer-by-five-kilometer girds. As an alternative to regional modeling of PM_{10} precursors, it is proposed to scale the UAMAERO-LT modeling results performed for the Draft 2003 AQMP relative to the Alternative D precursor emissions from all sources (including aircraft) to predict the potential PM_{10} impacts for the general conformity evaluation. This approach provides a measure of consistency between the PM_{10} impacts attributable to Alternative D and the basis of PM_{10} impacts predicted in the Draft 2003 AQMP.

5.3.1.1.2 Primary PM from Aircraft

When and if appropriate and applicable PM_{10} emission factors for aircraft engines have been identified, the ISCST3 model will be used to predict PM_{10} concentrations from aircraft engines, the one potential PM_{10} source not included in the EDMS 4.11 model. ISCST3 is a steady-state Gaussian dispersion model capable of estimating the short-term and annual concentrations from point, area or volume sources (EPA 1995). ISCST3 is an EPA-preferred dispersion model (40 CFR 51, Appendix W) and is identified as an available model by the FAA (FAA/USAF 1997).

5.3.1.2 Construction-Related Sources

Construction sources typically include construction equipment and motor vehicle engines as well as fugitive dust. The ISCST3 model will be used to predict dispersion from construction emission sources. As previously indicated, the ISCST3 model is capable of analyzing various source types (EPA 1995) and is an EPA-preferred model (40 CFR 51, Appendix W). The FAA has indicated that ISCST3 is acceptable for modeling construction sources at the airport (FAA 1997).

5.3.1.3 Induced Sources: CO "Hot-Spot" Analysis

The off-airport emission sources will be nonconstruction-related mobile vehicles. The modeling conducted for off-airport dispersion will be the local CO intersection analysis. The analysis will be conducted following the "Transportation Project-Level Carbon Monoxide Protocol, Revised December 1997" (CalTrans 1997) developed for the California Department of Transportation Environmental Program. The latest version of the CAL3QHCR model will be used to model CO concentrations at street intersections due to vehicle traffic. CAL3QHCR is an EPA-recommended model for analyzing CO concentrations at intersections (40 CFR 51, Appendix W). The CAL3QHCR model allows the use of annual meteorological data, and one-week temporalized vehicle flow data. Additionally, it will provide one-hour and running eight-hour CO concentrations for intersections and roadway links. The specific intersection and roadway links will be selected based on results of the off-airport transportation analyses being conducted by the City. Up to 19 intersections will be included in the air quality analysis.

5.3.2 Model Inputs and Assumptions

The following discussion addresses the model inputs and assumptions that will be used to exercise the models introduced above to conduct this evaluation.

5.3.2.1 Source Parameters

The correct representation of each source type in each model is critical to the accuracy of the results.

5.3.2.1.1 EDMS Modeling

FAA requires the use of EDMS 4.11 for all airport air quality analyses of aviation sources. A very detailed model, EDMS requires the user to input information regarding all air pollutant emissions sources typically found at an airport. These sources include aircraft, GSE, APU, ground vehicular traffic, and stationary sources.

5.3.2.1.1.1 On-Road Sources

The on-airport roadways are modeled as area sources in EDMS. Roadway locations will be determined from site drawings. In recognizing that the Central Terminal Area (CTA) has a second level roadway, all emissions from both levels will be modeled as emanating from the lower level. This assumption puts the CTA emission sources at approximately the same elevation as the receptors, providing a conservative

(high) estimate of impacts in the CTA. The on-airport parking lots are modeled as area sources in EDMS. The approximate parking lot dimensions and locations will determined from site drawings.

5.3.2.1.1.2 Aircraft

Aircraft/engine combinations and LTOs:

As noted previously and shown in **Table 11**, an appropriate engine for each airframe will be included in the analysis. The engines will accurately represent those available for the fleet for each study year. Yearly landing and takeoff (LTO) operations for each aircraft type as forecast by the SIMMOD runs conducted for Alternative D will be used and appropriate temporal distributions will be incorporated to reflect the hourly, daily, and monthly variations.

Runway/taxiway/queue/gate locations:

Runway coordinates will be obtained from site layout drawings and input into EDMS. Since EDMS 4.11 uses only a portion of the runway for takeoff based on aircraft speeds and takeoff TIM, the full length of the runways will be input. Takeoff and landing roll times are the EDMS default values, and climbout and approach values are based on EDMS defaults values, adjusted for mixing height.

Taxiway segment coordinates will also be obtained from site drawings. Full taxiways will be subdivided to allow EDMS to accurately account for reasonable movement of aircraft from gates to runways. Using the segment length and assuming a constant aircraft taxi speed, taxiway times will be calculated by dividing the taxiway segment length by the aircraft speed.

The coordinates defining the queue segments will be obtained from SIMMOD data and site drawings. The first queue endpoint will always coincide with the runway endpoint. Since EDMS allows only one linear segment to define a runway's queue, the second endpoint will usually be located on a nearby taxiway. The maximum length of the modeled queue segment will be calculated by assuming 225 feet per aircraft for the peak number of aircraft in queue for each runway. The SIMMOD data indicate that approximately 40 aircraft (maximum) can depart from the main departure runways (7L/25R and 6R/24L) each hour, which is equivalent to an average departure interval of 1.5 minutes per aircraft. Therefore, queue times will be calculated assuming 1.5 minutes per aircraft for the peak number of aircraft in queue for each runway. Temporal distributions are also allowed and will be developed to incorporate the hourly variability of the queue into the analyses.

The EDMS model allows each defined aircraft/engine combination to be assigned to one gate, and multiple taxiways and runways. However, the SIMMOD runs analyze over 200 gates and many more aircraft/gate/taxiway/runway combinations than can reasonably be accounted for in EDMS. Therefore, representative gate locations, taxiways and runways for each defined aircraft type will be selected based on providing each terminal with an appropriate number of aircraft operations developed from the SIMMOD data. The consolidation of all gates into a representative gate (or gates) at each terminal conservatively combines the GSE emissions for the dispersion analysis.

Aircraft runway/taxiway/gate assignments:

To accurately incorporate the spatial variations of the emitting sources, the aircraft's path from the gate to the runway must be determined. Since takeoff runways are located on both the northern and southern sides of the airport, duplicate user-created aircraft will be created to allow the user to assign a given aircraft type to more than one gate/taxiway/runway combination.

The gate and runway assignments for each aircraft type will be obtained from an objective inspection of the SIMMOD data. The most common northern (24) and southern (25) runway will be identified for and assigned to each aircraft type. Since the majority of takeoffs occur from east to west on the innermost runways, runways 24L and 25R are expected to be the most commonly used runways for takeoffs.

Again, the SIMMOD data will be inspected for each aircraft type, and the terminal associated with the most common gate(s) will be assigned to the aircraft. Following assignment of the runway and gate for each aircraft type, up to three taxiways will be assigned to each aircraft type to create a travel path from the gate to the runway.

Aircraft temporal factors:

Temporal factors are used in EDMS to determine the annual number of LTOs from peak hourly LTOs for each aircraft in the modeled fleet. Temporal factors are a set of load factors that, taken together, profile the activity of a given source over the course of an entire year on an hour-by-hour basis. A series of three temporal factors are used in EDMS for each source which gives the temporal variation in operations by (1) hour-of-the-day, (2) day-of-the-week, and (3) month-of-the-year. The hour-of-the-day temporal factors are specific for each source and alternative and are determined from the SIMMOD runs for aircraft. The day-of-the-week and month-of-the-year temporal factors are also developed from actual operations in 1996 and are assumed to be the same for all aircraft and all alternatives. The day-of-the-week and month-of-the-year temporal factors are presented in **Table 12**, Month-of-the-Year and Day-of-the-Week Temporal Factors Used in EDMS Aircraft Modeling.

Table 12

Month-of-the-Year and Day-of-the-Week Temporal Factors Used in EDMS Aircraft Modeling

Month	Temporal Factor	Day	Temporal Factor
January	0.9	Monday	1.0
February	0.9	Tuesday	1.0
March	1.0	Wednesday	1.0
April	1.0	Thursday	1.0
May	1.0	Friday	1.0
June	1.0	Saturday	0.9
July	1.0	Sunday	0.9
August	1.0		
September	1.0		
October	1.0		
November	0.9		
December	0.9		

Source: FAA/LAWA 2001 Attachment D to Technical Report 4.

5.3.2.1.1.3 GSE and APUs

GSE associated with individual aircraft types are discussed in the calculation of aircraft-related emissions above. EDMS assumes emissions from aircraft-associated GSE emanate from a point located at the representative gate for each terminal at which the aircraft is assigned. EDMS assumes an APU is collocated with its assigned aircraft.

5.3.2.1.1.4 Stationary Sources

Stationary sources are modeled as point sources in EDMS 4.11. In addition to training fires, these sources will include flight kitchens, aircraft maintenance operations (coating and degreasing), airport utility boilers and turbines.

Engine testing emissions will be modeled as stationary point sources in EDMS. The engine test locations will be provided by LAWA operations personnel.

5.3.2.1.2 ISCST3 Modeling

Because the EDMS model cannot treat the dispersion of PM_{10} emissions from aircraft (including engine testing) nor the dispersion of any pollutants from construction-related sources, the ISCST3 model will be used to perform the evaluation of these sources.

5.3.2.1.2.1 Aircraft

Aircraft are modeled as multiple volume sources distributed in equal emission increments for each of the five engine modes (taxi/idle in, taxi/idle out, approach, climbout, takeoff) and each of three aircraft sizes. Volume sources using plume height and initial dispersion parameters based on preliminary findings of a recent Light Detection and Ranging (LIDAR) study conducted for the FAA (Wayson, et al 2002) will be

used to model dispersion of PM_{10} from aircraft. The initial dispersion parameters used in the dispersion model are shown in **Table 13**, Volume Source Parameters Used to Model PM10 Dispersion from Aircraft.

Table 13

Volume Source Parameters Used to Model PM10 Dispersion from Aircraft

Parameter	Horizontal Dispersion Coefficient, meters	Vertical Dispersion Coefficient, meters	Plume Height, meters
Aircraft Volume Source Parameter Values	10.5	4.1	12.0

Source: Wayson, et al. (2002).

The number of point sources to be used for each engine mode and each aircraft size is as follows:

Taxi/Idle	Queue	Approach	Climbout	Takeoff
60	1 to 25	5	5	15

The annual emissions are sorted by aircraft type (i.e. heavy, large, small, as defined in EDMS) and by engine mode, divided by the number of volume sources used for each engine mode and converted from tons/year into annual average emissions in grams/second. The annual average emissions are then converted into maximum hourly emissions using temporal files calculated from the SIMMOD model data. Temporal files for takeoff, climbout, and approach are based on the actual time of departure/arrival data as appropriate for each aircraft type. The taxi temporal file is a combination of the departure and arrival temporal files. The queue temporal files are calculated, for each queue position, using the hourly number of each aircraft type that passes through each queue and the average hourly depth of queue that was determined through analysis of the SIMMOD model results. Monthly and daily temporal files are not used in the ISCST3 airport modeling.

Engine Testing

Engine testing, like the other aircraft operations, are modeled as volume sources. Engine testing is assumed to be performed with engine exhaust pointed towards blast gates. The source parameters are consistent with those used for ground-based aircraft volume sources.

5.3.2.1.2.2 Construction-Related Sources

Construction activities typically occur over a sizeable construction site; therefore, area sources will be used in ISCST3 to model dispersion from all on-airport construction activities, both mobile and stationary.

5.3.2.2 Meteorological Data

The EPA *Guideline on Air Quality Models* states that five years of National Weather Service meteorological data or at least one year of site-specific meteorological data is required when predicting concentrations with an air quality model. In pertinent part, the Guideline states "[I]f one year or more (including partial years), up to five years, of site specific data is available, these data are preferred for use in air quality analyses" (40 CFR 51 Appendix W, Section 9.3.1.2 b). One 12-month period of hourly meteorological data collected on site by SCAQMD at LAX will be used for final dispersion modeling. The SCAQMD has indicated that upper air data (mixing heights) it recently collected at LAX should be used in the dispersion models (SCAQMD 1998b). Therefore, the meteorological data file will consist of hourly surface and upper air data from the LAX meteorological observation stations operated by SCAQMD for the 12-month period beginning March 1, 1996, and ending February 28, 1997 (SCAQMD 1998c). The surface data set consists of hourly values of wind speed, wind direction, surface air temperature, and atmospheric stability. The upper air data consists of hourly mixing heights. This data set contains the most recent set of representative (surface and upper air) data collected on site at LAX. It should be noted that the surface data set includes calm wind conditions.

5.3.2.3 Urban/Rural Land Use Determination

Appendix W of 40 CFR Part 51, Section 8.2.8 provides guidance on the selection of urban or rural dispersion coefficients to be used in dispersion modeling. The land use character of an area is determined based on a categorical classification scheme proposed by Auer (1978). Descriptions of each land use classification are presented in **Table 14**, Auer Land Use Classification Scheme. If land use types I1, I2, C1, R2, and R3 account for 50 percent or more of the area circumscribed by a 3 km radius circle about the source, then urban dispersion coefficients (Briggs-McElroy-Pooler curves) should be used. Otherwise, rural dispersion coefficients (Pasquill-Gifford curves) should be used. Inspection of a 3 km area surrounding LAX indicates that the local land use is predominantly compact residential/commercial. Therefore, urban dispersion coefficients will be used in the air dispersion modeling analysis.

Table 14

Auer Land Use Classification Scheme

Type	Description	
	Use and Structures	**Vegetation**
I1	Heavy Industrial Major chemical, steel, and fabrication industries; general 3-5 story buildings, flat roofs	Grass and tree growth extremely rare; < 5% vegetation
I2	Light-Moderate Industrial Rail yards, truck depots, warehouses, industrial parks, minor fabrications; generally 1-3 story buildings, flat roofs	Very limited grass, trees almost total absent; < 5% vegetation
C1	Commercial Office and apartment buildings, hotels; >10 story heights, flat roofs	Limited grass and trees; <15% vegetation
R1	Common Residential Single family dwelling with normal easements; generally one story, pitched roof structures; frequent driveways	Abundant grass lawns and light-moderately wooded; >70% vegetation
R2	Compact Residential Single, some multiple, family dwelling with close spacing; generally < 2 story, pitched roof structures; garages via alley, no driveways	Limited lawn sizes and shade trees; <30% vegetation
R3	Compact Residential Old multi-family dwellings with close (<2 m) lateral separation; generally 2 story, flat roof structures; garages (via alley) and ashpits, no driveways	Limited lawn sizes, old established shade trees; <35% vegetation
R4	Estate Residential Expansive family dwelling on multi-acre tracts	Abundant grass lawns and lightly wooded; >80% vegetation
A1	Metropolitan Natural Major municipal, state, or federal parks, golf courses, cemeteries, campuses; occasional single story structures	Nearly total grass and lightly wooded; >95% vegetation
A2	Agricultural Rural	Local crops (e.g., corn, soybean); >95% vegetation
A3	Undeveloped Uncultivated; wasteland	Mostly wild grasses and weeds, lightly wooded; >90% vegetation
A4	Undeveloped Rural	Heavily wooded; >95% vegetation
A5	Water Surfaces Rivers, lakes	

Source: Auer 1978.

5.3.2.4 Receptors

Pollutant concentrations produced from airport sources will be predicted at sufficient publicly accessible receptor locations to identify the maximum ambient air quality impacts from the airport sources. Up to 300 receptors will be used in each initial EDMS dispersion modeling scenario and approximately 1000 receptors will be used in each ISCST3 modeling scenario. Receptors will be located along the property line defined for Alternative D, and spaced a maximum of 300 meters and a minimum of 100 meters from the next property line receptor. An overlaying receptor grid (with receptors spaced a maximum of 500 meters and a minimum of 100 meters apart in EDMS and a maximum of 250 meters and a minimum of 100 meters apart in ISCST3) will also be included in each modeling scenario. The grid will be centered approximately on the LAX Theme Building and extend 4.5 km to both the east and west and 5 km to both the north and south. Grid receptors falling within the property line but not in areas accessible to the public will be removed from the analyses. The height of all receptors will be 1.8 m (EDMS default), the approximate breathing height of persons standing on the ground. The receptor locations will be submitted to the SCAQMD, FAA, and EPA prior to completing the air quality impact analysis.

Receptors will also be placed at locations sensitive to the public interest. These locations include schools, hospitals, nursing homes, and day-care facilities. Pollutant concentrations will be predicted at all readily identifiable sensitive locations within a radius of at least 3 km from the LAX Theme Building.

A discrete receptor will also be placed at the SCAQMD Hawthorne Monitoring Station, for comparison to previously measured ambient air pollutant concentrations. Discrete receptors will also be placed at the Tier I roadway intersections modeled with CAL3QHCR and at the project air quality monitoring station east of Runway 25R.

Since the area around the airport has relatively flat terrain, receptor terrain elevations will not be considered.

5.3.2.5 Aerodynamic Downwash and Cavity Effects

Aircraft operations occurring on the runways and taxiways are expected to be the main contributor to NO_X and CO emissions. These sources are far enough from airport structures to avoid being influenced by building downwash. Downwash occurs when the exhaust plume from an emission source is trapped in the recirculation (eddy) zone on the leeward side of a building or structure. Since the impacts from other emission sources are expected to be located well within the airport boundaries, any aerodynamic effects on stack emissions due to nearby structures would be insignificant at publicly accessible receptor locations. Therefore, analyses of building downwash and cavity impacts will not be performed.

5.3.3 <u>Integrating Results</u>

Since various dispersion models (EDMS, ISCST3, and CAL3QHCR) will be used for differing sources (on-airport, off-airport and construction), results from parallel dispersion modeling of various sources must be integrated to obtain cumulative impacts in the vicinity of the project. A future background concentration for each pollutant will be added to the maximum of the sum of the predicted concentrations of all other sources (from the three models) to obtain a conservative estimate of total concentrations for comparison to the NAAQS.

5.3.3.1 Future Background Concentrations

The modeling that will be undertaken for the LAX Master Plan cannot reflect all pollutant sources in the area that contribute to total air pollutant levels. Therefore, background concentrations must be defined which reflect the emissions from all nearby and distant major sources. Background concentrations, when added to the airport modeling results, will reflect the total pollutant concentrations at a specific site.

The background concentrations of CO near LAX in 2005 and 2015 will be estimated using a linear rollback approach. This approach assumes that changes in emission inventories will change the background concentrations proportionally. The rollback equation can be written as (SCAQMD 1996c):

$$C_p = [(C_b - k) \times Q_p / Q_b] + k$$

Where C_p and C_b are the future year and existing concentrations, respectively, Q_p and Q_b are the future year and existing emission rates, and k denotes natural background. The value of k is assumed to be negligible for CO based on the composition of natural (clean) air (SCAQMD 1996b, Prinn 1992). The

presence of these compounds in the SCAB is primarily from human (anthropogenic) activities (SCAQMD 1996a).

The winter planning inventories will be used for estimating future year CO concentrations. Existing emission rates are taken from Appendix III of the 1997 AQMP (SCAQMD 1996a) for the 1997 year. The future year emission rates will be the controlled levels presented in Appendices III and V of the 1997 AQMP (SCAQMD 1996a, SCAQMD 1996b). The 2015 controlled emission rates will be estimated from linear interpolation of the controlled emission rates for 2010 and 2020. The calculated future background concentrations are presented in **Table 15**, Existing Ambient Air Quality and Projected Future Background Concentrations (Based on the 1997 AQMP) in the Vicinity of LAX for Pollutants Relevant to General Conformity in the SCAB.

Table 15

Existing Ambient Air Quality and Projected Future Background Concentrations (Based on the 1997 AQMP) in the Vicinity of LAX for Pollutants Relevant to General Conformity in the SCAB

Pollutant	Avg. Time	Existing[1] Air Quality	Future Background[2] 2005	Future Background[2] 2015	NAAQS
O_3 (ppm)	1-Hr	0.15[3]	<0.09[4]	<0.09[4]	0.12
CO (ppm) [5]	8-Hr	8.5[6]	5.0	3.5	9
	1-Hr	10.6[6]	6.2	4.4	35
PM_{10} (µg/m³)	AAM[7]	37[3]	28	24	50
	24-Hr	82.3[6]	61	43	150

Note: Existing conditions reflect actual measurements undertaken at LAX for the Master Plan. Where pollutants were not measured (O_3 and annual averages) data collected by the SCAQMD at Monitoring Station 094 (about 2.4 miles southeast of the LAX Theme Building) were used, as noted below.

1 Existing ambient air quality includes the contribution from airport and non-airport sources.
2 Future background concentrations are estimated using a linear rollback approach and the current and future year controlled CO emission inventories from Appendices III and V of the 1997 AQMP (SCAQMD 1996a, 1996b). Future background concentrations are assumed to exclude contribution from airport sources. However, the projected background is based on existing ambient air quality and, therefore, does include some contribution from airport sources. Consequently, this approach represents a very conservative method for estimating future background concentrations.
3 Highest reported 1999 through 2001 concentrations from SCAQMD Monitoring Station 094, SW Coastal Los Angeles County (SCAQMD 1999, 2000, 2001).
4 Ozone concentrations with or without the LAX Master Plan. Although regional O_3 modeling predicts exceedances of the O_3 NAAQS at some locations in the SCAB in 2005, that modeling predicts O_3 concentrations below the NAAQS in the immediate vicinity of LAX in 2005 (SCAQMD 1996b; SCAQMD 2003a).
5 1 ppm CO = 1145 µg/m³ CO
6 Highest measured concentration from on-site monitoring station (LAWA 1998, AeroVironment 1998).
7 AAM = Annual Arithmetic Mean

Source: Camp Dresser & McKee Inc., 2003.

The future year background concentration of PM_{10} at LAX will be estimated from the ratio of future year to existing PM_{10} concentrations for downtown Los Angeles multiplied by the current PM_{10} concentrations at the airport. This approach assumes that changes in PM_{10} concentrations at downtown locations are equivalent to changes in background concentrations in the LAX vicinity. The future year PM_{10} concentrations for downtown Los Angeles will be those values presented in Appendix V of the 1997 AQMP (SCAQMD 1996b) for the years 2000, 2006 and 2010. The estimated value for 2005 will be interpolated and the estimated value for 2015 will be extrapolated. The downtown Los Angeles monitoring station is the nearest station to LAX for which existing and future year PM_{10} concentrations are available.

The approach that will be used in this evaluation to estimate future background will be based on existing ambient air quality measurements, which include the current contribution from LAX sources. Therefore, this methodology is conservative since airport sources are implicitly included in the calculated future background concentrations. Modeled airport contributions will be added to the background values and then compared to the NAAQS. Refinements to the background concentration calculation may be

developed if the double counting of airport contributions significantly impacts the estimated future air quality values. Any proposed refinements to the calculation will be coordinated with the FAA, SCAQMD, and EPA.

The estimates of future year O_3 concentrations have been presented in Appendix V of the 1997 AQMP (SCAQMD 1996b) and in Appendix V of the Draft 2003 AQMP (SCAQMD 2003a). These estimates are based on regional modeling and indicate that the project area is not predicted to exceed the one-hour O_3 NAAQS through the year 2020. Therefore, the future year O_3 concentrations are estimated to remain below the standards with or without the LAX Master Plan (SCAQMD 1998a).

5.3.3.2 Predicted Ambient Concentrations

The EPA model CALMPRO (EPA 1984) will be used to post-process the EDMS raw results. The final CALMPRO results will be used to demonstrate compliance with air quality standards and regulations. The ISCST3 model already includes the CALMPRO algorithms and EPA calculation methods for multiple-hour averaging. Background concentrations will be added to the airport contributions and the sum will be compared to the NAAQS.

5.3.4 Uncertainties and Sensitivities of Methods

Dispersion models to be used in this general conformity evaluation represent the state of the art in modeling methodology and guidance extant at the time of the evaluation, 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. We refer the reader to the Guideline on Air Quality Models (40 CFR 51 Appendix W) for additional discussion of dispersion modeling uncertainties and sensitivities.

5.4 Consistency with Requirements and Milestones in Applicable SIP

The general conformity regulations state that notwithstanding the other requirements of the rule, a proposed action may not be determined to conform unless the total of direct and indirect emissions from the action is in compliance or consistent with all relevant requirements and milestones in the applicable SIP (40 CFR 93.158(c)). This includes but is not limited to such issues as reasonable further progress schedules, assumptions specified in the attainment or maintenance demonstration, prohibitions, numerical emission limits, and work practice standards. This section briefly addresses how Alternative D will be assessed for SIP consistency for this evaluation.

5.4.1 Compliance with Applicable Requirements from EPA

EPA has already promulgated, and will continue to promulgate, numerous requirements to support the goals of the Clean Air Act with respect to the NAAQS. Typically, these requirements take the form of rules regulating emissions from significant new sources, including emission standards for major stationary point sources and classes of mobile sources as well as permitting requirements for new major stationary point sources. Since states have the primary responsibility for implementation and enforcement of requirements under the Clean Air Act and can impose stricter limitations than EPA, the EPA requirements often serve as guidance to the states in formulating their air quality management strategies. As part of this evaluation, and in consultation with EPA, FAA will identify all EPA requirements in support of the NAAQS which are applicable to Alternative D and will confirm that, within the limit of its continuing program responsibility, Alternative D will be consistent with those requirements.

5.4.2 Compliance with Applicable Requirements from CARB

In California, to support the attainment and maintenance of the NAAQS, CARB is primarily responsible for regulating emissions from mobile sources. In fact, EPA has delegated authority to CARB to establish emission standards for on-road and some nonroad vehicles separate from the EPA vehicle emission

standards, although CARB is preempted by the Clean Air Act from regulating emissions from many nonroad mobile sources. As part of this evaluation, and in consultation with CARB, FAA will identify all CARB requirements in support of the NAAQS which are applicable to Alternative D and will confirm that, within the limit of its continuing program responsibility, Alternative D will be consistent with those requirements.

5.4.3 Compliance with Applicable Requirements from SCAQMD

To support the attainment and maintenance of the NAAQS in the SCAB, SCAQMD is primarily responsible for regulating emissions from stationary sources. As noted above, SCAQMD develops and updates its AQMP regularly to support the California SIP. While the AQMP contains rules and regulations geared to attain and maintain the NAAQS, these rules and regulations also have the much more difficult goal of attaining and maintaining the California ambient air quality standards. As part of this evaluation, and in consultation with SCAQMD, FAA will identify all SCAQMD requirements in support of the NAAQS which are applicable to Alternative D and will confirm that, within the limit of its continuing program responsibility, Alternative D will be consistent with those requirements.

6. MITIGATION

As part of a conformity evaluation, it may be necessary for the federal agency to identify mitigation measures and mechanisms for their implementation and enforcement. For example, if a proposed action does not initially conform to the applicable SIP, mitigation measures could be pursued. If mitigation measures are used to support a positive conformity determination, the federal agency must obtain a written commitment from the entity required to implement these measures and the federal agency must include the mitigation measures as conditions in any permit or license granted for the proposed action (40 CFR 93.160). Mitigation measures may be used in combination with other criteria to demonstrate conformity.

6.1 Identification of Mitigation Measures

According to EPA guidance, mitigation measures within the framework of the general conformity requirements are used to reduce the impact of emission increases from a proposed action and are generally emissions reductions that occur at the site of the proposed action and which are not specifically related to the proposed action (i.e., are not part of the project design) but are needed to demonstrate conformity (EPA 2002). It is important to differentiate elements of the proposed action that, by design, incorporate low-emitting infrastructure or practices from measures added to the proposed action which are unrelated to the project but that reduce emissions to support the demonstration of conformity.

This is important because conformity guidance requires that if mitigation measures (as defined in the guidance) are used to support a conformity demonstration, they should be used to reduce emissions from the action to zero (i.e., no incremental emissions attributable to the action would be allowed) and not just to below the de minimis levels (EPA 1994). Thus, if conformity cannot be demonstrated for Alternative D (as described and analyzed in the Supplement to the Draft EIS/EIR) using the regulatory criteria in 40 CFR 93.158, it may be necessary to identify and describe mitigation measures to support the conformity determination.

6.2 Commitment to Implement Mitigation Measures

If mitigation measures are needed to support a positive conformity determination for the new ALP, directly associated improvements, and any funding mechanisms for Alternative D at LAX, prior to issuing a positive conformity determination, FAA will obtain written commitments from the City, and other relevant entities as necessary, to implement those measures. Furthermore, FAA will condition approval of the new ALP, directly associated improvements, and any funding mechanisms for Alternative D at LAX on the City meeting the mitigation measures specified in the conformity evaluation. The general conformity regulations allow that committed mitigation measures may be modified "when necessary because of changed circumstances" so long as the modified measures continue to support a positive conformity determination, subject to the public participation requirements (40 CFR 93.160(e)).

7. REPORTING

To support the approval of the new ALP, directly associated improvements, and any funding mechanisms for Alternative D at LAX, FAA will issue a draft general conformity determination for public review and comment. FAA will also make public its final general conformity determination for this action.

7.1 Draft General Conformity Determination

At a minimum, FAA will provide copies of its draft general conformity determination to the appropriate regional offices of EPA, FHWA, FTA, and any affected federal land manager as well as to CARB, SCAQMD, and SCAG, providing opportunity for a 30-day review. FAA will also place a notice in a daily newspaper of general circulation in the SCAB announcing the availability of its draft general conformity determination and requesting written public comments for a 30-day period. For any member of the public requesting a copy of this draft general conformity determination, FAA will provide such person a copy.

7.2 Final General Conformity Determination

At a minimum, FAA will provide copies of its final general conformity determination to the appropriate regional offices of EPA, FHWA, FTA, and any affected federal land manager as well as to CARB, SCAQMD, and SCAG, within 30 days of its promulgation. FAA will also place a notice in a daily newspaper of general circulation in the SCAB announcing the availability of its final general conformity determination within 30 days of its promulgation. As part of the general conformity evaluation, FAA will document its responses to all comments received on the draft general conformity determination and will make both the comments and responses available upon request by any person within 30 days of the promulgation of the final general conformity determination.

7.3 Frequency of General Conformity Determinations

The general conformity regulations state that the status of a specific conformity determination lapses five years after the date of public notification for the final general conformity determination, unless the action has been completed or a continuous program has been commenced to implement the action (40 CFR 93.157(a)). Because the new LAX Master Plan envisions a development program extending beyond five years, it is important to note that the final general conformity determination will remain active only under this "continuous program to implement."

As part of a phased program, the implementation of each element of the development of Alternative D does not require separate conformity determinations, even if they are begun more than five years after the final determination, as long as those elements are consistent with the original program which was determined to conform (EPA 2002). However, if this original conforming program is changed such that there is an increase in the total of direct and indirect emissions above the de minimis levels, FAA will conduct a new general conformity evaluation.

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Appendix
LAX Master Plan
Draft General Conformity Determination

B. Air Quality Impact Methodologies

January 2004

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

This Appendix B is provided in support of the Draft General Conformity Determination for the LAX Master Plan. It provides summaries of the methodologies used to develop the quantitative evaluations presented in that document.

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. The air quality evaluation was performed for the No Action/No Project Alternative (no-build scenario) and for Alternative D (build scenario) for both an interim year and the 2015 horizon year.

The year 2015 represents build out of the LAX Master Plan. An 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 is 2005. The interim year for the evaluation of air quality impacts from on- and off-airport sources under Alternative D is 2013. Operational emissions for Alternative D in 2005 were assumed to be the same as the operational emissions for the No Action/No Project Alternative in 2005 because development projects under Alternative D would not be significantly advanced to warrant an appreciable difference at that point in time. Interim year emissions for both the No Action/No Project alternative and Alternative D were estimated using linear interpolation.

Prior to preparing the emissions inventories and conducting the dispersion modeling, the *Protocol for General Conformity Evaluation* (see Appendix A to Draft General Conformity Determination (January 2004)) was prepared. This protocol was submitted to the South Coast Air Quality Management District (SCAQMD), the U.S. Environmental Protection Agency (EPA), the California Air Resources Board (CARB), the Southern California Association of Governments (SCAG), and the Federal Aviation Administration (FAA) for review and comment. The protocol was revised to address comments from these agencies. 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; the LAX Master Plan Supplement to the Draft EIS/EIR (Supplement to the Draft EIS/EIR), Technical Report S-4, *Supplemental Air Quality Technical Report,* Attachment A (FAA/LAWA, 2003) contains the bibliography developed to support this effort.

2. EMISSIONS ESTIMATES

The emissions estimates were developed using emission factors from a number of agencies, including the EPA, FAA, CARB, and SCAQMD. Several different emission source categories and source types at the airport generate air pollutant emissions. The emission source categories include construction activities, airport operations, on- and off-airport vehicle traffic, and miscellaneous airport-related area sources. The emission source types include aircraft (which is comprised of four operating modes), auxiliary power units (APUs), aircraft engine testing, ground support equipment (GSE), ground access vehicles (GAV), construction equipment, the Central Utility Plant (CUP), and food preparation, which are described in detail in this section.

The following source types generate the majority of emissions at the airport: aircraft, GSE, GAV, and construction equipment. Other emission source categories at the airport include fuel storage and aircraft refueling, flight kitchens, aircraft and GSE maintenance, surface coating, cooling towers, and restaurants.

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 the LAX Master Plan Draft EIS/EIR (Draft EIS/EIR), Technical Report 4, *Air Quality Technical Report,* (FAA/LAWA 2001) and the Supplement to the Draft EIS/EIR, Technical Report S-4, *Supplemental Air Quality Technical Report,* Attachment B.

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), and particulate matter with an equivalent aerodynamic diameter less than 10 micrometers (PM_{10}).

2.1 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.

Construction activity data used to develop the construction emissions inventory for Alternative D is presented in the LAX Master Plan Supplement to the Draft EIS/EIR Technical Report S-4 Attachment D. 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 the No Action/No Project Alternative is presented in the LAX Master Plan Draft EIS/EIR Technical Report 4. 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 (SCAQMD Handbook) (SCAQMD, 1993).

The various construction crews were grouped together to determine the weekly emissions generated by development of the project component. The weekly emissions were multiplied by 13 weeks per quarter to obtain quarterly emissions in tons per quarter. These quarterly emissions were then distributed over the duration for which they occur along the time line of the LAX Master Plan. Emissions from each project component were calculated and placed along this time line to obtain a temporal profile for all construction activities. Construction activity start and end dates were used to take into account construction activity occurring in a partial quarter. Emissions from all project components occurring within the same quarter were then summed to calculate construction emissions on a quarterly basis for the LAX Master Plan construction time line. Finally, annual emissions were calculated from the quarterly estimates.

Combustion emission factors (CO, VOC, NO_x, and PM_{10}) for off-road construction equipment were revised based on the CARB OFFROAD Model (CARB 2003). 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, (AP-42) (USEPA, 2003) 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. The fugitive PM_{10} emissions estimates assume that water is applied to control fugitive dust, as required by SCAQMD Rule 403, with additional controls applied as needed. 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 (CARB 2002).

Emission rates were adjusted using load factors from the SCAQMD Handbook (SCAQMD, 1993) 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) (SCAQMD, 2003), thus minimizing VOC emissions.

2.2 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.

2.2.1 Mobile Sources

Mobile sources associated with future activities at LAX include both on-road vehicles and nonroad vehicles. On-road vehicles, also referred to as GAV, include those vehicles such as automobiles, trucks, and buses that operate on the public roadways, as well as within public parking lots and garages on LAX property. These public-access areas on airport property are referred to as "landside." Nonroad vehicles include aircraft, on-board APUs, and GSE that operate in the nonpublic access areas on LAX property. These nonpublic access areas on airport property are referred to as "airside." The GSE are surface vehicles used to service a flight while an aircraft is parked at a gate (e.g., baggage tugs, lavatory carts, push-back tractors). The APU is an on-board engine that operates primarily to provide power to an aircraft while it is parked at the gate when the main engines are off. This analysis does not address all mobile sources which may operate on the airside of the airport and which do not directly service aircraft, such as vehicles owned and operated by LAWA, since such vehicles operate on irregular schedules and they represent a relatively small number of the total airside vehicles. However, the analysis does include airside buses that transport passengers from the main terminals to remote or hard-stand aircraft gate locations, in direct service of aircraft.

Aircraft Operations

Emissions calculations presented in the Draft General Conformity Determination for aircraft were developed primarily using the Emissions and Dispersion Modeling System (EDMS) (FAA, 2001), the FAA-required model for airport air quality analysis (FR, 1998). Both EDMS 3.2 and EDMS 4.11 were used to determine emissions of CO, NO_X, and VOC 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 (EDMS 4.12) was released in October 2003, although most of this evaluation was performed using EDMS 4.11 which 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 Light Detection and Ranging (LIDAR) studies on plume dispersion (Wayson, et. al., 2002) 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:

- 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 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 hydrocarbon (HC) are estimated to be 80-90 percent higher with EDMS 4.11 versus EDMS 3.2. Because EDMS was not used to perform dispersion modeling for the general conformity evaluation for the reasons noted in Section 3 below, this document does not address changes in predicted concentrations between EDMS 3.2 and EDMS 4.11.

EDMS 3.2 was used to estimate emissions for the No Action/No Project Alternative and Alternative 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 other alternative and year combinations previously developed using EDMS 3.2. These ratioed results, along with the EDMS 4.11 results for Alternative D in 2015, are the values used in the draft general conformity determination.

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 produces 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 the No Action/No Project Alternative for 2005 and 2015 and 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) (FAA, 1995); (2) the *ICAO Engine Exhaust Emissions Data Bank*; (ICAO, 1995) (3) USEPA's *Procedures for Emission Inventory Preparation Vol. IV: Mobile Sources* (USEPA, 1992); 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 evaluation.

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 1**, LAX Passenger Aircraft Database Assumptions (EDMS 3.2), and **Table 2**, LAX Cargo Aircraft Database Assumptions (EDMS 3.2), respectively. 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 3**, LAX Passenger Aircraft Database Assumptions (EDMS 4.11), and **Table 4**, LAX Cargo Aircraft Database Assumptions (EDMS 4.11), respectively.

Table 1

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

Table 1

LAX Passenger Aircraft Database Assumptions (EDMS 3.2)

SIMMOD Aircraft (abbreviation)	EDMS Aircraft	# of Engines	Engine
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

Note: Listed aircraft are from all SIMMOD analyses for 2005, 2013, and 2015 horizon years. Individual alternative aircraft are a subset of this list. Times in mode for added aircraft are International Civil Aviation Organization (ICAO) defaults.

[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 2

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

Note: Cargo aircraft included for LAX Master Plan air quality impact analysis.
Listed aircraft are from all SIMMOD analyses for 2005, 2013, and 2015 horizon years. Individual alternative aircraft are a subset of this list. Times in mode for added aircraft are International Civil Aviation Organization (ICAO) defaults.

Source: Camp Dresser & McKee Inc., 2000.

Table 3

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

Note: Listed aircraft are from all SIMMOD analyses for 2013 and 2015 horizon years for Alternative D. 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 4

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

Note: 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. Times in mode for added aircraft are ICAO defaults.

Source: Camp Dresser & McKee Inc., 2003.

Neither EDMS 3.2 nor EDMS 4.11 contain emission indices for PM_{10} from aircraft or APUs and, therefore, neither model can be used to calculate PM_{10} mass emissions from aircraft or APUs or to disperse PM_{10} emissions attributable to aircraft or APUs. The PM_{10} emission indices used in the draft general conformity evaluation for aircraft were developed using the methodology described in the Draft EIS/EIR, Technical Report 4, *Air Quality Technical Report*, Attachment H. Emissions of PM_{10} from APUs are considered negligible.

Aircraft LTO Data Assumptions

Aircraft LTO data for Alternative D were obtained from SIMMOD data developed for the LAX Master Plan. **Table 5**, 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 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.

Table 5

Aircraft Landing/Takeoff Operations (LTO) Summary

Alternative / Forecast Year	Annual Passenger Aircraft LTOs	Annual Cargo Aircraft LTOs	Annual Total LTOs
No Action/No Project / 2005	370,889	20,244	391,133
No Action/No Project / 2015	371,241	20,244	391,485
Alternative D / 2013	371,577	20,243	391,820
Alternative D / 2015	371,577	20,243	391,820

Source: Camp Dresser & McKee Inc., 2000.

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

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. EDMS 3.2 performs an adjustment on the approach and climbout TIM based on the following equations.

Approach:

$$T_{new} = T_{old} \times \frac{H}{3000}$$

Climbout:

$$T_{new} = T_{old} \times \frac{(H - 500)}{2500}$$

Where:

T_{new} = adjusted time (min.)

T_{old} = ICAO default time (min.)

H = average mixing height (ft.)

An average mixing height of 625 meters (approximately 2,050 feet) was assumed based on data developed for SCAQMD for LAX to support the 1997 Air Quality Management Plan (Energy and Environmental Analysis, Inc., 1993). **Table 6**, 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.

Table 6

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]

Table 6

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**
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]
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]

[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 TIM 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 7**, 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.

Table 7

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.

Aircraft Emissions

Using aircraft engine emission indices from EDMS 3.2, supplemented as noted above, emissions were calculated for each aircraft type. The following algorithm included in EDMS 3.2 was used.

$$E_{ij} = NE_j * \Sigma [(TIM_{jk}) * (FF_{jk}) * (EI_{ijk})]$$

Where:

E_{ij} = total emissions of pollutant i produced by aircraft type j per LTO cycle (g/LTO)

NE_j = number of engines used on aircraft type j

TIM_{jk} = time in mode k for aircraft type j (s/LTO)

FF_{jk} = fuel flow for mode k for each engine used on aircraft type j (kg/s)

EI_{ijk} = emission index of pollutant i in mode k for engines used on aircraft type j (g/kg)

The total emissions for all aircraft types over the inventory period were calculated using the following procedure (USEPA, 1992).

$$E_{Ti} = \Sigma [(E_{ij}) \times (LTO_j)]$$

Where:

E_{Ti} = total emissions of pollutant i from aircraft operating at LAX (grams)

LTO_j = total number of LTO cycles for aircraft type j during the inventory period

Estimates for dust entrained from aircraft runways and taxiways were also included, using emission factors from the SCAQMD Handbook and AP-42 Volume 1 to calculate fugitive dust emissions.

Fleet mix data and airport operations were taken from the LAX Master Plan forecasts.

Ground Support Equipment/ Auxiliary Power Units

The GSE types and APU sizes used in emissions calculations vary depending upon the aircraft size and capacity, and whether the aircraft is used for the transportation of cargo or passengers. The GSE and APU emissions inventories were developed using LAX related data and the default GSE assignments included in the EDMS 3.2 model for various types of aircraft. The GSE include push-back tractors, baggage tugs, belt loaders, cabin service, cargo loaders, container loaders, food trucks, fuel trucks, lavatory carts, and water trucks. The use of GSE, such as Ground Power Units (GPUs), Air Conditioning Units (ACUs), Air Starter Units (ASUs), and their respective transporters, was limited to the No Action/No Project Alternative, since gate modifications under the Master Plan would make such equipment obsolete at LAX.

The LAX Master Plan team conducted studies to estimate existing conditions and the market penetration of alternative-fueled and electric-powered GSE for each alternative (CALSTART, 1998; CALSTART, 1999). The GSE fleet compositions were estimated using projections of future LAX purchasing trends that incorporate new clean vehicle technologies developed by manufacturers and introduced to the market. The fleet compositions were developed using available data and information on the existing GSE fleet, annual vehicle retirement and replacement rates, growth factors, regulatory authorities, fleet managers, and the current commitments of manufacturers. For modeling purposes, the vehicle technologies were categorized by fuel type including diesel, gasoline, natural gas, propane, electric, and hybrid vehicles. The findings from these studies were used to calculate GSE emissions using FAA and EPA accepted procedures.

In December 2002, CARB and most major domestic air carriers serving the South Coast Air Basin (SCAB) 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 SCAB to reduce NO_x emissions from this equipment. While LAWA is not a signatory party to the MOU, in preparing the draft general conformity evaluation for the LAX Master Plan, it was assumed that, for the No Action/No Project Alternative and Alternative D, the airlines will comply with the MOU.

Emission factors for gasoline and diesel powered GSE were obtained from EDMS 3.2. The emission factors identified by CARB (CARB, 1994) 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 Technical Report S-4, *Supplemental Air Quality Technical Report*, Attachment F, 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. 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 2005 and 2015 No Action/No Project Alternative, GSE assignments were made based on EDMS 3.2 default GSE assignments and the following assumptions:

- No GSE are required for either the passenger or cargo General Aviation Propeller aircraft.
- GPUs, ACUs, ASUs, and their respective equipment transporters were not assigned to passenger aircraft assigned an APU and located at modified terminal gates with central power hookups.
- GPUs and ACUs were only assigned to cargo aircraft and to small aircraft not assigned an APU. Cargo turboprops, specifically the BH-1900 Cargo aircraft, were not assigned GPUs or ACUs. All aircraft assigned GPUs were also assigned GPU transporters.
- ASUs were only assigned to cargo aircraft. All aircraft assigned ASUs were also assigned ASU transporters.
- Fuel trucks were assigned to all small commuter passenger and cargo jets.
- Hydrant trucks were assigned to all passenger and cargo aircraft not assigned fuel trucks.

For the 2013 and 2015 Alternative D, all GSE were assumed to have zero emissions.

Once specific GSE vehicle types were assigned, the fleet composition was determined. Fuel types were assigned according to the predicted penetration of alternative fuels (CALSTART, 2000; CALSTART, 1999). The following assumptions were used when determining the fleet composition:

- Although an airline may have identical GSE powered by different fuels servicing a single aircraft type, this level of information was not available. Therefore, each aircraft type was assigned one fuel type per GSE type.
- Cabin service or food truck vehicle fleet compositions were not available. Fleet compositions for step vans (Calstart, 1999) were used for both of these types of GSE.
- Fleet compositions were unavailable for water truck vehicles. The fleet composition for pickup trucks was used for this type of GSE.
- At LAX, it was determined that lavatory carts and not lavatory trucks are used. As these more closely resemble pickup trucks, the fleet composition for pickup trucks was used for this type of GSE.
- Under the No Action/No Project Alternative, the MOU was considered to be complete by 2010 and that fleet composition would be maintained through 2015. It was further assumed that this fleet would be approximately 30 percent zero-emission equipment.

Specific assignments of GSE to aircraft by project alternative horizon year are included in Technical Report 4, *Air Quality Technical Report,* Attachment L, of the Draft EIS/EIR. Assignments of APUs to aircraft types for all alternatives in each horizon year were based on EDMS 3.2 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.

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, *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 site-specific data used to estimate emissions include trip generation, vehicle trip distances, idle and soak times (time between engine starts), vehicle fleet mix, and average travel speeds based on specific roadway segments and parking facilities. CARB methodologies and SCAQMD data were used for unavailable on-site data (e.g., fugitive dust from roadways). The EMFAC2002 emission factors used are presented in Technical Report S-4, *Supplemental Air Quality Technical Report,* Attachment I, of the Supplement to the Draft EIS/EIR.

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 horizon years for the No Action/No Project Alternative and Alternative D. The on-airport traffic and parking data used to develop emission estimates include hourly traffic volumes, vehicle fleet mix, and peak hour vehicle counts. The peak hour for on-airport traffic volumes generally occurs between 11:00 AM and 12:00 noon. Exceptions to this peak hour include employee parking areas and the west side on-airport access areas, which have a peak hour between 12:00 noon and 1:00 PM.

Due to varying vehicle emissions characteristics, CARB divides GAV into distinct vehicle classes based upon vehicle weight and fuel type. 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 10 vehicle classes used in the CARB mobile-source emission models and in the on-airport vehicle fleet mix are listed below.

- LDA - light duty autos (non-catalyst, catalyst, and diesel), typical passenger car; does not include vans, pickup trucks or sport-utility vehicles (SUVs).
- LDT - light duty trucks, including vans, pickup trucks and SUVs (non-catalyst, catalyst, and diesel), with a gross vehicle weight (GVW) of 5,750 pounds or less.
- MDT - medium duty trucks (non-catalyst and catalyst) with a gross vehicle weight (GVW) between 5,751 and 8,500 pounds.
- LHGT - light-heavy gasoline trucks (non-catalyst and catalyst) with a GVW between 8,501 and 14,000 pounds.
- LHDT - light-heavy diesel trucks with a GVW between 8,501 and 14,000 pounds.
- MHGT - medium-heavy gasoline trucks (catalyst and non-catalyst) with a GVW between 14,001 and 33,000 pounds.
- MHDT - medium-heavy diesel trucks with a GVW between 14,001 and 33,000 pounds.
- HHDT - heavy-heavy diesel trucks with a GVW between 33,001 and 60,000 pounds.
- UBD - urban transit buses (diesel) and intra-city transit buses; does not include inter-city transit buses (e.g., Greyhound) or school buses.
- MCY - motorcycles (non-catalyst).

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 Technical Report S-4, *Supplemental Air Quality Technical Report,* Attachment J, 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 are predicted to have a higher percentage of medium and heavy duty vehicles than the passenger ramps.

The CARB mobile source emission model was used to generate emission factors for each vehicle class in grams per unit (i.e., hour, mile, or trip) for each criteria pollutant for the environmental baseline and the LAX Master Plan alternatives for each horizon year. The model was used to generate emission factors for the following types of emissions: running exhaust emissions, variable start emissions, and evaporative emissions, which consist of diurnal, hot soak, running, and resting losses. Diurnal and resting evaporative emissions were not included for CTA roadway traffic. The average emission factors were determined for the on-airport GAV fleet mix using the average of the summer (75°F) and winter (50°F) emission factors. The SCAQMD Handbook and AP-42 Volume 1 emission factors for entrained road dust were used to estimate fugitive dust emissions from major roads and highways. The emissions produced by GAV activity on on-airport roadways were calculated using the following equation:

$$E_t = {}_r\Sigma(E_r)$$

Where:

E_t = total on-airport roadway pollutant emissions (grams/year)

E_r = total link r pollutant emissions (grams/year)

${}_r\Sigma$ = summation through roadway links r

and

$$E_r = {}_v\Sigma[T_r]x[F_{vr}]x\{[L_r]x([EF_{rsv}]+[EF_{ersv}]+[EF_{tw}]+[EF_{bw}]+[EF_{rd}])+[EF_{iv}]x[T_{ivr}]+[EF_{svst}]x[F_{vsr}]+[EF_{hsv}]x[F_{vsr}] +[EF_{dv}]x[ST_{vr}]xF_{vsr}]+[EF_{rstv}]x[ST_{vr}]x[F_{vsr}]\}$$

Where:

${}_v\Sigma$ = summation through vehicle types v

T_r = annual vehicle trips for the roadway link r (trips/year)

F_{vr} = vehicle type v fraction for the roadway link r

L_r = length of roadway link r traveled per vehicle trip (miles/trip)

EF_{rsv} = running emission factor at the road link speed rs for the vehicle type v (grams/mile)

EF_{ersv} = evaporative running emission factor at the road link speed rs for the vehicle type v (grams/mile), for VOC emissions only

EF_{tw} = tire wear tw emission factor (grams/mile), for PM10 emissions only

EF_{bw} = brake wear bw emission factor (grams/mile), for PM10 emissions only

EF_{rd} = road dust rd emission factor (grams/mile), for PM10 emissions only

EF_{iv} = idle i emission factor for the vehicle type v (grams/minute)

T_{ivr} = idle i time for the vehicle type v at the roadway link r (minutes)

EF_{svst} = variable start s emissions for each vehicle type v for the designated soak time st (grams/start), for VOC, CO, and NO_x emissions only

F_{vsr} = fraction of vehicle type v that has variable starts s at the roadway link r

EF_{hsv} = hot soak hs emission factor (grams/trip) for vehicle type v, VOC emissions only

EF_{dv} = diurnal emission rates (grams/hour) for vehicle type v, VOC emissions only

ST_{vr} = soak time (hr) for vehicle type v on roadway link r

EF_{rstv} = resting losses (grams/hour) for vehicle type v, VOC emissions only

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 Technical Report S-4, *Supplemental Air Quality Technical Report,* Attachment L, 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 Technical Report S-4, *Supplemental Air Quality Technical Report,* Attachment K, of the Supplement to the Draft EIS/EIR.

In estimating GAV emissions for on-airport parking facilities, CDM used a similar methodology to the one used to estimate GAV roadway emissions. The CARB mobile-source emission models factors were used, incorporating site-specific data and resting evaporative emissions for the parking structure/areas. Fugitive emissions from road dust are considered to be negligible due to low vehicle speeds in the parking structure/areas; however, particulate emissions due to tire and brake wear are included. The emissions produced by GAV within the on-airport parking facilities were calculated as follows:

$$E_t = {}_p\Sigma(E_p)$$

Where:

E_t = total on-airport parking pollutant emissions (grams/year)

E_p = pollutant emissions per parking structure/area p (grams/year)

${}_p\Sigma$ = summation through parking facilities p

and

$$E_p = {}_v\Sigma[T_p]x[F_{vp}]x\{[L_p]x([EF_{psv}]+ [EF_{epsv}]+ [EF_{tw}]+ [EF_{bw}])+ [EF_{iv}]x[T_{ivp}]+[EF_{svst}]x[F_{vsp}]+[EF_{hsv}]x[F_{vsp}] +[EF_{dv}]x[ST_{vp}]x[F_{vsp}]+[EF_{rstv}]x[ST_{vp}]x[F_{vsp}]\}$$

Where:

${}_v\Sigma$ = summation through vehicle types v

T_p = annual vehicle trips for the parking structure/area p (trips/year)

F_{vp} = vehicle type v fraction for the parking structure/area

L_p = length of distance traveled in the parking structure/area per trip p (miles/trip)

EF_{psv} = running emission factor at the parking structure/area link speed ps for the vehicle type v (grams/mile)

EF_{epsv} = evaporative running emission factor at the parking structure/area speed ps for the vehicle type v (grams/mile), for VOC emissions only

EF_{tw} = tire wear tw emission factor (grams/mile), PM10 emissions only

EF_{bw} = brake wear bw emission factor (grams/mile), PM10 emissions only

EF_{iv} = idle i emission factor for the vehicle type v (grams/minute)

T_{ivp} = idle i time for the vehicle type v at the parking structure/area p (minutes)

EF_{svst} = variable start s emissions for each vehicle type v for the designated soak time st (grams/start), VOC, CO, and NO_x emissions only

F_{vsp} = fraction of vehicle type v that has variable starts s at the parking structure/area p

EF_{hsv} = hot soak hs emission factor (grams/trip) for vehicle type v, VOC emissions only

EF_{dv} = diurnal emission rate (grams/hour) for vehicle type v, VOC emissions only

ST_{vp} = soak time (hrs) for vehicle type v at parking structure p

EF_{rstv} = resting losses (grams/hour) for vehicle type v, VOC emissions only

The specific parking facility data used to estimate emissions from parking sources are given in Technical Report S-4, *Supplemental Air Quality Technical Report,* Attachment K, 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).

The regional traffic emission calculations were performed based on vehicle miles traveled (VMT) and average-daily trip (ADT) data developed for the LAX Master Plan. This analysis included emissions associated with vehicles of airport passengers, employees, cargo and ancillary operations, and collateral development.

Emissions were estimated for:

- Reactive Organic Gases (ROG)
- NO_x
- CO
- PM_{10} for:
  - Exhaust (PMEX)
  - Tire Wear (PMTW)
  - Brake Wear (PMBW)
  - Sulfur oxides (SO_x)
- VOC emissions were assumed to be equal to ROG emissions.

The peak hourly AM, PM, and airport peak (AP) VMT and VHT traffic numbers were developed for the No Action/No Project Alternative for 2005 and 2015 (see the Draft EIS/EIR, Technical Report 4. *Air Quality Impact Report*, Attachment P, FAA/LAWA 2001) and for Alternative D for the year 2015, (see Technical Report S-4, *Supplemental Air Quality Technical Report,* Attachment L, of the Supplement to the Draft EIS/EIR). Traffic values for Alternative D in 2013 were approximately equal to those developed for Alternative D in 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 (Parsons Transportation Group, 1998).

The EMFAC 2002 model was used in the emissions analysis. An EMFAC run adjusts the base emission rates for non-standard driving conditions, which are referred to as correction factors. These correction factors include driving conditions such as speed, temperature, fuel type, and driving cycles. Data input into the model include both VMT and vehicle speeds (Parsons Transportation Group, 1999). The model then calculates emissions for PM_{10}, CO, NO_x, SO_x, and ROG.

The BURDEN model, within the EMFAC 2002 suite, combines emission factors with county-specific activity data, including the population of vehicles, the VMT, and the number of vehicle starts. The corresponding emission rates are expressed as grams per vehicle, grams per mile, and grams per start. An inventory is then calculated by multiplying the emission factor by its associated activity. Emissions were evaluated for each county for the 10 vehicle classes listed previously.

These models also account for the penetration of alternative fuels (e.g., natural gas and electricity). California law regulates technology group sales fractions required for each vehicle model year. These vehicle model year sales fractions are implicit in the base emission rates used in the EMFAC 2002 model. For example, by 2005, two percent of sales by major motor vehicle manufacturers are required to be ZEVs. The regulated market penetration for each alternative fuel and alternative technology vehicle is provided in Technical Report 4, *Air Quality*, Attachment R, of the Draft EIS/EIR.

Regional emissions were calculated by multiplying the emission factor for each vehicle class by its associated activity (e.g., VMT). Emissions were calculated for running exhaust, variable starts, and evaporative emissions, which consist of diurnal, hot soak, running, and resting losses. Brake wear and tire wear emissions were also estimated.

Other parameters that are accounted for by the emission models include:

- Non-catalyst-equipped vehicles (NCAT)
- Catalyst-equipped vehicles (CAT)
- Diesel-fueled vehicles (DSL)

EMFAC2002 was run for the No Action/No Project Alternative and Alternative D using these parameters:

- 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 SCAB 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.

2.2.2 Stationary Point Sources

Stationary point sources that contribute to air quality in the vicinity of LAX exist on and off airport property. Available data and a comprehensive survey of Los Angeles World Airports (LAWA) and tenant facilities were used to develop an environmental baseline emissions inventory identifying existing stationary point sources at LAX; see Technical Report 4, *Air Quality Technical Report,* Attachment C, of the Draft EIS/EIR. The environmental baseline emissions inventory details equipment capacities, typical operating hours, existing control equipment, and emissions data. The existing stationary sources at LAX consist of a variety of source types such as fuel combustion units, coating and solvent activities (maintenance), organic liquid storage and transfer activities, and miscellaneous activities. The source types for the existing stationary sources are listed in **Table 8**, Stationary Sources at LAX. Large stationary sources off airport and near LAX that contribute to the air quality in the area are discussed qualitatively below.

Table 8

Stationary Sources at LAX

Source Category	Source classification	Future Year Multiplier
Central Utility Plant (CUP)	Boilers Gas Turbines Internal Combustion Engines	Based on the size of the future West Terminal Area (WTA) (Existing CTA CUP is assumed to stay at current capacity)
CUP Cooling Tower (CT)	Cooling Tower	Based on the size of the future WTA (Existing CT is assumed to stay at current capacity)
Engine Test Facilities	Jet Engine Testing	Future activity levels and parameter data provided by LAX Master Plan team.
Fire Training Facility	Training Fires	Training fires will not be conducted on site in the future.
Flight Kitchens	Boilers Charbroiling Cooking Cooling Towers Heaters Internal Combustion Engine	Ratio of future MAP to 1996 MAP
Fueling Facilities	Jet A Storage and Refueling/Gasoline Storage and Refueling	Future throughput and tank parameter data provided by LAX Master Plan team.
Maintenance Facilities	Boilers Degreasing Operations Furnaces Heaters Internal Combustion Engines Surface Coating	Ratio of future LTOs to 1996 LTOs
Restaurants	Charbroiling Cooking	Ratio of future MAP to 1996 MAP

Source: Camp Dresser & McKee Inc., 2000.

Fuel combustion units include external combustion equipment, internal combustion equipment, and fire-fighting training fires. Internal combustion engines are used to produce electrical power, such as turbine generators, emergency generators, and GPUs. External combustion equipment is used in boilers, water heaters, and food preparation equipment. Coating and solvent activities include the operation of spray painting booths and associated clean up of coating equipment with solvents, such as degreasing. Organic liquid storage and transfer includes primarily the storage of petroleum products, such as aircraft fuels (Jet A, AvGas), motor vehicle fuels (gasoline, diesel), and lubricants (oil), and handling of these materials, such as loading and unloading fuels.

CDM developed emissions estimates for individual source types based on methodologies accepted by EPA (USEPA, 1992) and the FAA's *Air Quality Procedures for Civilian Airports & Air Force Bases* (herein referred to as Air Quality Procedures) (FAA, 1997). Where appropriate, the current version of the SCAQMD Best Available Control Technology (BACT) Guideline requirements (herein referred to as the SCAQMD BACT Guideline) were incorporated into the emission estimates. The uncontrolled emission factors were obtained primarily from AP-42 Volume 1. Control efficiencies were applied to those units with control devices/technologies. The total stationary source emissions were calculated by taking the sum of the emissions calculated for each source type identified at the stationary source location.

The configurations of stationary sources at LAX for the alternatives in the horizon years were based upon the environmental baseline adjusted to future airport activity levels. In estimating future year emissions, environmental baseline emissions were multiplied by an appropriate growth factor for that source category. Future capacity and hours of operation for stationary sources were scaled based upon future-to-baseline ratios of either aircraft operations, number of passengers, or terminal area for each alternative. Future activity levels for fuel storage and refueling operations were based on specific data provided for the LAX Master Plan. For example, flight kitchens prepare the onboard aircraft food consumed by passengers; therefore, to determine future year emissions, the 1996 flight kitchen emissions levels were multiplied by the increase in annual passengers projected for horizon year 2015. The future year multiplier for each stationary source category is listed in **Table 8**. The stationary source emission calculation methodology for future years is as follows:

$$E_{oc} = E_{oc1996} \times M_{oc}$$

Where

E_{oc} = future year operating category oc emissions (grams)

E_{oc1996} = 1996 operating category oc emissions (grams)

M_{oc} = future year operating category oc multiplier

Several emission sources were deleted from the 1996 emission inventory for the purpose of emission forecasting. Stationary internal combustion engines that are also GSE (i.e., ACUs, ASUs, and GPUs) were eliminated from the stationary point source inventory to avoid double counting these emission source types. Specific sources that were identified in the LAX Master Plan to be replaced/decommissioned due to the reconstruction or elimination of their associated facilities were deleted from the estimates for the alternatives. The specific sources that are assumed to be replaced/removed from airport property include rental car facility gasoline storage tanks, inefficient old cooling towers (i.e., Delta Airlines cooling tower, US Post Office cooling tower), and the 96th Street Burger King.

Combustion Sources

Fuel combustion sources generate both criteria pollutants as well as toxic air pollutants (metals and polynuclear aromatic hydrocarbons, PAHs). Combustion is the primary source of CO, NO_x, PM_{10}, and SO_2 emissions from stationary sources located on airport property. The combustion sources resident at LAX include gas turbines, boilers, heaters, cooking and charbroiling equipment, and stationary internal combustion engines. The fuels used to power combustion equipment include natural gas, propane, gasoline, wood, and fuel oil. The type of fuel used for each type of combustion source is listed in **Table 9**, Combustion Source Fuel Type.

Table 9

Combustion Source Fuel Type

Combustion Source	Fuel Type
Gas Turbines	Natural Gas, Fuel Oil Backup
Boilers/Heaters	Natural Gas, Fuel Oil Backup
Cooking/Charbroiling	Natural Gas, Wood
Internal Combustion Engines	Diesel, Gasoline, Propane, Natural Gas

Source: Camp Dresser & McKee Inc., 2000.

Emissions for each source type were calculated based on fuel consumption and pollutant emission factors. Emissions calculations for stationary internal combustion engines are also based on the engine power rating (hp), usage rate, and pollutant emission indices determined from power output and fuel type developed from the available information collected during the baseline survey. Air pollution control equipment in use, or required in the future as identified in SCAQMD, CARB, or EPA rules and regulations, has been incorporated into the calculations. The emissions from combustion sources are calculated using emission factors from AP-42 Volume 1 as follows:

$$E_n = \sum_i [FxEI_i]$$

Where:

E_n = total emissions of pollutant i emitted from the source during the inventory period (grams)

${}_i\Sigma$ = summation through pollutants i

F = total amount of fuel consumed during the inventory period (million cubic meters of natural gas or propane or kiloliters of diesel/fuel oil or metric tons of wood)

EI_i = emission index for pollutant i (grams of pollutant per unit of fuel)

Central Utility Plants

Emissions from CUPs which house on-site power plants and heating and cooling facilities were calculated using natural gas as the primary fuel. Natural gas is the primary fuel for the existing CUP. The SCAQMD BACT Guideline requires that natural gas be used on any new utility boilers and turbines to minimize PM_{10} and SO_2 emissions. Several miscellaneous LAWA combustion emission sources (e.g., building comfort heating) were included as part of the existing CUP combustion source emission category.

The environmental baseline emissions inventory for the existing CUP includes continuous emissions monitoring data for NO_x and CO. The existing CUP is currently operating at or near peak load. For all alternatives in future years, it is assumed that the existing CUP will continue to operate at peak load and maintain the environmental baseline emissions levels. The SCAQMD will require that the total RECLAIM emissions from the existing CUP be reduced in the future; however, it is assumed that these reductions will be accomplished through emission offsets rather than modifying the equipment/emissions at the CUP.

Fire Training Facility

Air pollutants from training fires used in emergency fire fighting drills include PM_{10}, CO, NO_x, SO_2, and VOC. The emissions depend upon the type of fuel burned and the duration of the burn (quantity of fuel burned). Emissions from training fires were calculated for the No Action/No Project Alternative and Alternative D using the methodology described previously in this section for combustion sources. The training frequency and quantity of fuel burned was obtained from the Aircraft Rescue and Fire Fighting (ARFF) department at LAX.

Engine Test Facilities

Run-up testing of aircraft engines can occur at various locations around the airside portion of the airport property. For all alternatives, engine testing is assumed to be performed from aircraft on the ground at fixed locations with engine exhaust pointed toward blast gates. For the three build alternatives, ground run-up enclosures (GRE) are also constructed for engine maintenance and testing. Emissions for these facilities were determined following the methodology described for aircraft emissions using activity levels and TIM data provided for the LAX Master Plan.

Other Sources

Combustion source types at the on-airport flight kitchens and restaurants include the boilers, cooking facilities, emergency engines, and one power-producing natural gas-fired stationary internal combustion engine. The emissions from boiler/heater/cooking facilities were calculated based on the environmental baseline emissions inventory, assuming growth that is representative of their assigned source category. In addition to the natural gas combustion emissions, restaurants and flight kitchens have PM_{10} and VOC emissions from charbroiling and deep fat frying. On-airport restaurants are grouped separately from flight kitchen facilities due to their physical separation on the airport and because they are the only source to use wood as fuel for charbroiling, which requires a specific emission calculation procedure. The PM_{10} and VOC emissions from charbroiling and deep fat frying were estimated using SCAQMD emission factors (SCAQMD, 1997a).

Combustion source types found in maintenance facilities included emergency engines, miscellaneous non-GSE engines, and boilers/heaters.

Organic Liquid Storage and Transfer

Large quantities of organic liquids, primarily fuels, are stored and handled at LAX. Activities that contribute VOC emissions include those associated with tank filling and emptying (working losses), changes in ambient temperature/pressure (breathing losses) at each storage tank, and equipment fueling (fugitive losses). By volume, the main organic liquid handled at LAX is Jet A fuel. Storage facilities consist of large above ground tanks and numerous smaller above ground and underground tanks. These tanks are filled either by an underground pipeline or by tanker truck. Fueling of aircraft from these tanks is either by transfer through the underground pipeline to the hydrant system or by tanker truck. Aviation gasoline (AvGas) is also stored and handled at LAX. Storage facilities for AvGas consist of a single aboveground tank. This tank is filled by tanker truck. AvGas is used by piston-driven general aviation aircraft at LAX. Fueling of piston-driven aircraft is generally by tanker truck.

Gasoline and diesel are stored on the airport in numerous aboveground and underground tanks, which are considerably smaller than the tanks used to store Jet A fuel. Tanker trucks typically fill these tanks. Fueling of on-road and nonroad vehicles, including GSE, with gasoline or diesel is generally accomplished from permanent fuel dispensing stations.

The fuel storage and transfer operations include the main aircraft fuel storage and refueling operations, as well as on-airport maintenance facility and rental car facility gasoline tank storage and refueling. Storage tank requirements in the SCAQMD Rules and Regulations (SCAQMD, 1997) and the SCAQMD BACT Guidelines were addressed in the emissions estimates for this air quality analysis.

Emissions from the large aboveground jet fuel storage tanks (i.e., LAXFUEL Fuel Farm) were calculated using SCAQMD's emission inventory calculation procedure for internal floating roof tanks (SCAQMD, 2000) (USEPA, 2000), which is almost identical to EPA's TANKS Version 4.3 emissions estimation program (USEPA, 2000). Fuel farm related transfer losses were accounted for using methods presented in AP-42 Volume 1. These transfer losses primarily occur during the filling of fuel tanks, fuel tank trucks, aircraft, and GSE. Emissions from underground or small aboveground gasoline tanks were calculated using CARB-approved emission factors for Stage I and Stage II vapor control.

The emissions estimates for future years consider storage tank type (floating or fixed roof), fuel type, fuel throughput, and tank-specific characteristics (diameter, color, breather vent settings, etc.). The LAX Master Plan specifies new or expanded fuel farms for the three build alternatives, including relocation off-site for Alternative B in the 2015 horizon year. A number of gasoline tanks found during the environmental baseline survey, including all on-airport rental car facility tanks, were assumed to be removed under the build alternatives.

Surface Coating and Solvent Usage

Surface coating and solvent degreasing are performed in maintenance areas, as necessary, for the repair and upkeep of aircraft/aircraft parts, motor vehicles/GSE, and miscellaneous airport-related equipment. Additionally, architectural coatings are used for the repair and upkeep of signs and buildings.

Surface coating operations emit VOC into the atmosphere through evaporation of the vehicle paint, thinner, or solvent used to facilitate the application and through clean up of the coatings. PM_{10} emissions are assumed to be minimal due to paint booth filter control in spray booths and high efficiency application methods used for outdoor/architectural painting. Emissions of VOC from surface coating operations were calculated using methods recommended in FAA's Air Quality Procedures, taking into account requirements in the SCAQMD Rules and Regulations and the SCAQMD BACT Guideline:

$$E_{VOC} = {}_i\Sigma[Q_i \text{ x } VOC_i \text{x } (1\text{-}CF/100)]$$

Where:

E_{VOC} = total VOC emissions from painting operations (grams)

${}_i\Sigma$ = summation through coating types i

Q_I = total quantity of coating type i used in inventory period (kiloliters)

OC_i = VOC content for coating type i (grams VOC/kiloliter)

CF = air pollution control factor (%)

Information regarding the types and quantities of coatings used at on-site facilities, in addition to any air pollution control information, was based on the environmental baseline emissions inventory survey. The VOC contents of coatings and solvents were obtained from Material Safety Data Sheets (MSDS), with default values from FAA's Air Quality Procedures used when MSDS information was unavailable. The VOC limits specified in SCAQMD Rules and Regulations and SCAQMD BACT Guideline were also accounted for during the emission inventory development. The inventory does not account for any architectural coating applications or runway/taxiway striping at LAX performed during construction.

The use and storage of organic degreasing solvents, such as chlorinated hydrocarbons, petroleum distillates, ketones, and alcohols, results in the evaporation of VOC or other hydrocarbons. Spent degreasing fluids are generally collected and disposed of at a properly licensed treatment, storage and disposal (TSD) facility. Emissions from solvent degreasing operations were based on the assumption that the total amount of solvent used would either be disposed of as waste liquid, or released into the

atmosphere as evaporated VOC. Emissions from solvent degreasing were calculated using methods recommended in FAA's Air Quality Procedures:

$E_{VOC} = D \times (QC-QD)$

Where:

E_{VOC} = VOC emissions from the solvent degreasing unit (grams)

D = density of the solvent (grams/kiloliter)

QC = quantity of solvent consumed during a given time period (kiloliter)

QD = quantity of solvent disposal of as liquid in a given time period (kiloliter)

Quantities of consumed and disposed solvent were estimated for each alternative based on data from the environmental baseline emissions inventory survey. Sources and solvents that are not compliant with SCAQMD and EPA regulations were eliminated from emissions inventories for 2005 and 2015. For water-based or other inorganic degreasers, it was assumed that evaporation of VOC does not occur. The VOC limits specified in SCAQMD Rules and Regulations and the SCAQMD BACT Guideline were accounted for when developing these emissions inventories.

Cooling Towers

Cooling towers (CT), used to remove heat from process cooling water, are sources of PM_{10}. The two largest CTs would be located at the existing CUP. A number of smaller cooling towers are found in the maintenance and commercial facilities. Emissions calculations for cooling towers were based on the cooling tower re-circulation rate, water solids content, the particulate drift fraction, and the cooling tower type. AP-42 Volume 1 default factors were used when equipment/site-specific data were not available. The emission calculation methodology is as follows:

$E_{PM_{10}} = {}_i\Sigma[(Q_i x SC_i x D_i x H_i x 8.34 \text{ lbs/gallon}/1{,}000{,}000)]$

Where:

$E_{PM_{10}}$ = total PM_{10} emissions from cooling towers (lbs/year)

${}_i\Sigma$ = summation through cooling towers i

Q_i = water re-circulation rate of cooling tower i (gallons/hour)

SC_i = water solids content for cooling tower i (ppm)

D_i = drift fraction of cooling tower i

H_i = hours of operation per year of cooling tower i (hours)

Emissions from smaller CTs found at facilities that are not classified as CUPs (e.g., maintenance facilities, flight kitchens) were included in the emission totals for those source categories, unless that source was scheduled for removal from LAX.

Off-Airport Stationary Sources

Four major stationary sources located in the vicinity of LAX are the Chevron El Segundo Refinery, the Los Angeles Department of Water and Power (LADWP) Scattergood Generating Station, Southern California Edison (SCE) El Segundo Generating Station, and the Hyperion Treatment Plant. These four major sources are located along the Dockweiler State Beach shoreline in Los Angeles and El Segundo and are within a two-mile radius of the airport boundary. The refinery is a source of fugitive hydrocarbon emissions and combustion by-products during petroleum distillation. The Scattergood and El Segundo Generating Stations use natural gas as the primary fuel and No. 2 fuel oil as a backup, and the primary natural gas fuel is augmented by anaerobic digester biogas fuel piped from the Hyperion Treatment Plant. Criteria pollutants and toxic air pollutants are emitted during fuel combustion. Pollutants such as PM_{10} and disinfection byproducts are emitted from the Hyperion Treatment Plant and are transferred into the air at the air-water interface. Emissions from these sources are not included in this air quality analysis.

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 (Tucker). The emissions associated with 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 4.6.10, *Secondary Air Emissions - Electricity Production*, of the Supplement to the Draft EIS/EIR.

2.2.3 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.

Natural Gas Combustion

Emissions attributed to natural gas combustion were estimated using emission factors and the methodology outlined in the SCAQMD Handbook. The emission factors from this reference were applied to areas to be acquired under the LAX Master Plan and to existing area sources (residential and commercial units) that would be acquired and removed under the LAX Master Plan.

Some land owned by LAWA adjacent to LAX is part of an approved LAX Northside development that has not yet been commercially developed. It is assumed that under the No Action/No Project Alternative in the 2005 and 2015 horizon years, commercial development in this area would progress under the approved LAX Northside EIR project (the EIR was approved in 1984).

Landscaping Equipment

Nonroad engines at LAX that are associated with area sources are used primarily in landscaping applications. The equipment used in landscaping applications include lawn mowers, weed trimmers, and leaf blowers. The equipment are fitted with small gasoline-fueled engines with low horsepower and are used intermittently. Emissions from these engines are considered negligible and are not included quantitatively in the emissions inventory.

Deicing/Anti-Icing

Since the climate at LAX is usually mild and the chance of frozen precipitation is extremely rare, it is assumed that icing of aircraft and runways/taxiways does not occur. In some instances deicing fluid is used on a small portion of aircraft arriving from the East Coast that have ice over the wing fuel tanks. For emissions estimation purposes, however, emissions attributed to the application of deicing/anti-icing materials are considered negligible.

2.3 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 evaluation, well-accepted methods have been used in a consistent manner to develop the best estimates of emissions, based on those particular assumptions discussed above.

3. 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 Section 2 above, were input into an air dispersion model to predict ambient ground-level concentrations at LAX and in the areas surrounding the airport.

EDMS is the FAA-required model for airport air quality analysis. Since EDMS does not currently include dispersion modeling capabilities for PM_{10} from aircraft engines, and PM_{10} is the only pollutant for which dispersion modeling is required for this evaluation, the on-airport dispersion analysis of Alternative D for the Draft General Conformity Determination was conducted using the Industrial Source Complex-Short Term model (ISCST3) for all operational sources (aircraft, GSE, on-road mobile, and stationary point) at LAX. The ISCST3 model, as described in *User's Guide for the Industrial Source Complex (ISC3) Dispersion Models, Volumes 1 and 2* (USEPA, 1995) (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 an EPA-preferred dispersion model as identified in EPA's *Guideline on Air Quality Models (Revised)* (Guideline on Air Quality Models) (CFR, 2002) and is identified as an available model by the FAA's Air Quality Procedures.

The ISCST3 model was also used to estimate dispersion of emissions from construction sources since EDMS does not currently include dispersion modeling capabilities for PM_{10} from construction sources. The FAA has indicated that ISCST3 is acceptable for modeling construction emissions at the airport (FAA, 1997). Construction activities typically occur over a sizeable construction site; therefore, construction activities were modeled as area sources.

3.1 Meteorological Data

Modeling was performed using meteorological data collected at LAX and obtained from the SCAQMD. At the time of preparation of the Draft General Conformity Determination, 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 (SCAQMD, 1998). 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 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.

3.2 Receptors

The receptors used in the air dispersion modeling analysis consisted of two types: grid receptors and discrete receptors. The grid receptors help define the model area and are evenly spaced within the airport boundary and in the area surrounding the airport. The grid receptors provide a concentration matrix that locates concentration peaks and the direction of air contaminant dispersion from the LAX emission sources. Discrete receptor points are individually placed receptors identifying contaminant concentrations at critical points beyond the LAX boundary. For the air dispersion modeling analysis critical points include locations sensitive to the public interest, air quality monitoring stations, and major traffic intersections. The goal in selecting receptor locations in the air dispersion models was to cover enough space for the models to predict pollutant concentrations at a sufficient number of publicly accessible locations and to supply enough detail to identify the maximum ambient air quality impacts associated with airport operations. The height of all receptors was set to 1.8 meters above ground level, the approximate breathing height of adults standing on the ground. Since the area around the airport has relatively flat terrain, all receptor terrain elevations were set to zero (0) meter.

Approximately 1,100 to 1,400 receptors were used in each ISCST3 PM_{10} dispersion modeling scenario. A 250-meter spacing was used for the coarse receptor grid in the ISCST3 criteria pollutant model runs. The ISCST3 PM_{10} modeling grid extended 4 kilometers to the west, 5.5 kilometers to the east, and 2.5 kilometers to the north and south of the LAX Theme Building. For the ISCST3 modeling analyses additional fine grids, spaced every 80 meters, were added to the northeast and east airport fence line. These additional fine grids were located off-airport based on the fence line of each alternative, and were developed to identify the maximum ambient off-airport concentration locations for PM_{10}.

Discrete receptors were placed at sensitive receptor locations within approximately 3 kilometers to the north and south, 8 kilometers to the east, and 6 kilometers to the west of the LAX Theme Building. The sensitive receptors include schools, hospitals, nursing homes, the SCAQMD Hawthorne and on-site LAX air monitoring stations, and at selected roadway intersections. A listing of all discrete receptors modeled for the alternatives is presented in **Table 10**, Discrete Receptors used in the Air Quality Dispersion Modeling Analysis. The coordinates for all discrete receptors used in dispersion modeling are included so that the modeling results can be matched with the receptor name.

Table 10

Discrete Receptors used in the Air Quality Dispersion Modeling Analysis

Discrete Receptor Names	Receptor Locations, meters X	Y	Discrete Receptor Names	Receptor Locations, meters X	Y
Public and Private Schools			Trinity Lutheran Church Of Hawthorne	3,867	-3,245
Acacia Baptist School	4,039	-3,069	Visitation Catholic School	-117	1,555
Arena High School	-929	-2,157	Warren Lane Elementary School	7,227	819
Bennet-Kew Elementary School	6,464	-1,914	Washington School	4,779	-3,153
Boulah Payne Elementary School	4,145	829	Westchester High School and Magnet Center	-2,465	1,496
Buford Elementary School	3,351	-762	Westchester Lutheran Church	628	2,792
Center Street Elementary School	-93	-2,145	Westpoint Heights Elementary School	1,310	2,551
Centinela Elementary School	3,719	3,116	Whelan Elementary School	5,128	-337
Century Park Elementary School	7,644	-881	Worthington Elementary School	6,169	-1,109
Chabad of the Marina	-4,165	1,766	York School	5,373	-1,985
Clyde Woodworth Elementary / Albert Monroe Middle	6,838	-491	**Hospitals**		
Cowan Avenue Elementary School	-319	3,177	Robert F. Kennedy Medical Center	4,418	-1,851
Crozier Middle School	4,287	2,159	Catholic Healthcare West Southern California	4,303	-1,738
El Segundo High School	-1,423	-2,191	Crippled Children's Society	6,668	2,390
El Segundo Middle School	-1,523	-2,190	Desco Health Care Inc	5,324	1,012
Escuela De Montessori	744	1,375	Daniel Freeman Memorial Hospital	5,268	2,532
Eucalyptus School	4,048	-2,436	Golden West Convalescent Hospital	3,832	-2,001
Faith Lutheran Church School	6,749	1,805	Centinela Hospital Medical Center	5,017	674
Felton Elementary School	3,301	-354	**Convalescent and Nursing Homes**		
Hawthorne High School	3,589	-2,900	C & H Health Care	4,843	3,196
Hillcrest Continuation School	3,681	1,485	Carewest Nursing Center	-2,686	1,677
Hilltop Christian School	-524	-2,714	Centinela Valley Care Center	5,177	697
Hudnall Elementary School	3,881	1,869	Hawthorne Convalescent Center	4,431	-1,733
Imperial Ave. School Special Education Facility	-696	-1,578	Klokke Corp	4,091	1,850
Ingelwood Christian School	4,597	1,589	Mount Zion Baptist Church Of Los Angeles	4,374	3,483
Inglewood High School	4,291	1,816	Saint Erne Healthcare Center	3,442	2,311
Jefferson Elementary School	4,113	-175	Terrace Inglewood Brierwood	5,047	2,885
Juan De Anza Elementary School	2,893	-2,405	Urban Healthcare Project Inc	6,559	1,784
K-Anthony's Middle School	5,310	804	**Traffic Intersection Receptors**		
Kelso Elementary School	5,322	1,440	Airport Blvd. and Century Blvd.	1,524	132
Kentwood Elementary School	-243	1,986	Aviation Blvd. and Century Blvd.	2,225	120
La Southside Christian Church	5,510	-236	La Cienega Blvd. and Arbor Vitae St.	3,017	919
Lennox Middle School	3,435	-1,119	La Cienega Blvd. and Century Blvd.	3,007	113
Lindgren Partnership 1	3,686	1,981	La Cienega Blvd. and I-405 Ramps N/O Century Blvd	3,007	388
Loyola Village Elementary School	-1,709	1,504	La Cienega Blvd. and Florence Ave.	2,993	2,105
Moffet Elementary School	4,929	-977	La Cienega Blvd. and Manchester Ave.	3,029	1,911
Morningside High School	6,245	-663	Lincoln Blvd. and Manchester Ave.	-1,528	1,746
Morningside United Church of Christ	7,097	1,531	Lincoln Blvd. and 83rd St.	-1,761	2,081
Musical Hart Evangelistic Assn	6,972	1,881	Lincoln Blvd. and La Tijera Blvd.	-1,227	1,383
Oak Street Elementary School	3,238	1,235	Sepulveda Blvd. and Imperial Hwy.	571	-1,446
Orville Wright Junior High School	-125	2,622	Sepulveda Blvd. and I-105 Off Ramp N/O Imperial Hwy	581	-1,250
Paseo Del Rey Magnet School	-2,899	1,446	Sepulveda Blvd. and Manchester Ave.	603	1,729
Saint Anthony's Catholic School	-546	-2,852	Sepulveda Blvd. and La Tijera Blvd.	595	1,440
South Bay Lutheran High School	6,163	-1,540	Sepulveda Blvd. and Mariposa Ave.	543	-2,286
St Eugene's Catholic School	7,913	632	Sepulveda Blvd. and Rosecrans Ave.	519	-4,685
St Joseph's Catholic Church School	4,772	-2,037	Vista Del Mar and Imperial Hwy.	-3,039	-1,416
St Mary's Academy of L A	5,289	2,757	**Monitoring Station Receptors**		
St. Anastasia School	-2,137	1,622	SCAQMD Hawthorne Monitoring Station	2,942	-2,354
St. Bernard High School	-2,783	1,120	Project Ambient Monitoring Station	2,708	-409

Source: Camp Dresser & McKee Inc., 2000.

3.3 Land Use Classification

EPA's Guideline on Air Quality Models, Section 8.2.8, provides guidance on the selection of urban or rural dispersion coefficients to be used in dispersion modeling. The categorical classification scheme proposed by Auer (Auer, 1978) was used to determine the land use character in and around LAX. Descriptions of the urban land use classifications are provided in **Table 11**, Auer Land Use Classification Scheme. If land use types I1, I2, C1, R2, and R3 account for 50 percent or more of the area

circumscribed by a 3-kilometer radius circle about the source, then urban dispersion coefficients (Briggs-McElroy-Pooler curves) are used. Rural dispersion coefficients (Pasquill-Gifford curves) are used when the urban land use is less than 50 percent. LAX itself is classified as I2, light-medium industrial, which would correspond to the use of urban dispersion coefficients. Additionally, an objective inspection of a 3-kilometer radius surrounding LAX indicates that the local land use is predominantly compact residential/commercial. Therefore, the urban dispersion coefficients were used in the air dispersion modeling analysis.

Table 11

Auer Land Use Classification Scheme

Type	Use and Structures	Vegetation
I1	Heavy Industrial	
	Major chemical, steel, and fabrication industries; general 3-5 story buildings, flat roofs	Grass and tree growth extremely rare; < 5% vegetation
I2	Light-Moderate Industrial	
	Rail yard, truck depots, warehouses, industrial parks, minor fabrications; generally 1-3 story buildings, flat roofs	Very limited grass, trees almost absent; <5% vegetation
C1	Commercial	
	Office and apartment buildings, hotels; >10 story heights, flat roofs	Limited grass and trees; <15% vegetation
R2	Common Residential	
	Single family dwelling with normal easements; generally one story, pitched roof structures; frequent driveways	Limited grass and trees; <15% vegetation
R2	Compact Residential	
	Single, some multiple, family dwelling with close spacing; generally < 2 story, pitched roof structures; garages via alley, no driveways	Limited lawn sizes and shade trees; <30% vegetation
R3	Compact Residential	
	Old multi-family dwellings with close (<2m) lateral separation; generally 2 story, flat roof structures; garages (via alley) and ashpits, no driveways	Limited lawn sizes, old established shade trees; <35% vegetation
R4	Estate Residential	
	Expansive family dwelling on multi-acre tracts	Abundant grass lawns and lightly wooded; >80% vegetation
A1	Metropolitan Natural	
	Major municipal, state, or federal parks, golf courses, cemeteries, campuses; occasional single story structures	Nearly total grass and lightly wooded; >95% vegetation
A2	Agricultural Rural	Local crops (e.g. corn, soy bean); >95% vegetation
A3	Undeveloped	
	Uncultivated; wasteland	Mostly wild grasses and weeds, lightly wooded; >90% vegetation
A4	Undeveloped Rural	Heavily wooded; >95% vegetation
A5	Water Surfaces	Rivers and Lakes

Source: Auer, August H., Jr., Correlation of Land Use and Cover with Meteorological Anomalies, Journal of Applied Meteorology, 1978.

3.4 ISCST3 Model for PM_{10}

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 PM_{10} for evaluation of operations and construction emissions since EDMS is not configured to calculate either aircraft engine particulate emissions or construction emissions.

3.4.1 Construction

This discussion addresses the methods used in the air dispersion modeling for the construction emissions associated with the alternatives. Dispersion modeling was conducted to assess concentrations of PM_{10} produced during construction activities related to Alternative D. The dispersion modeling used the results from the construction emissions inventory, the proposed development areas for LAX, and meteorological information available from SCAQMD to estimate pollutant concentrations resultant from the construction activities. The results of this construction dispersion modeling were combined with other on-airport and off-airport modeling results to address the cumulative air quality impacts associated with Alternative D.

Construction activities create potential air pollutant impacts related to exhaust emissions and soil disturbance. Dispersion modeling was also conducted for PM_{10} from construction vehicle exhaust and soil disturbance by construction vehicles. SCAQMD Rule 403 provides a framework for PM_{10} control during substantial construction projects.

A receptor grid composed of 635 receptors extending 2 kilometers from the fence line with a grid spacing of 250 meters was used in the modeling. Additionally, 56 discrete fence-line receptors were established, and 3 school receptors were included in the model runs. These receptors were used to assess the potential impact of construction for PM_{10} for comparison to the NAAQS.

The ISCST3 model was used for the dispersion of PM_{10} emissions from the construction and demolition activities. The model was used to estimate 24-hour and annual PM_{10} concentrations at defined receptor locations. Emissions were modeled using the meteorological data supplied by SCAQMD from its LAX station. The data includes a full year of wind speed, wind direction, atmospheric stability, and mixing height information.

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

3.4.2 Operations

The impacts of operational emissions from mobile, stationary, and area sources were modeled as described below.

Mobile Sources

The emissions from the LAX operations discussed in Section 2.2 above were used in the dispersion modeling analysis.

Aircraft

Aircraft were modeled in ISCST3 as multiple volume sources for PM_{10}, 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 Alternative D, 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 12**, ISCST3 Number of Sources for Aircraft Operation Modes for Alternative D. The aircraft source coordinates for each mode are re-calculated based on the new airport design for runways and taxiways.

Table 12

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

Source: Camp Dresser & McKee Inc., 2003.

The volume source height for all on-ground aircraft emissions was assumed to be one-half of the initial volume vertical dimension. The source heights for the in-air portion of the approach, takeoff, and climbout emissions were determined using the beginning and end heights for each mode, the velocity for each mode, and the FAA specified/calculated TIM.

The aircraft size cutoff points for Small, Large, and Heavy aircraft were based on both airframe and engine size as shown in **Table 13**, Assigned Aircraft Size for ISCST3 Modeling, and are consistent with

similar aircraft size cutoff points established in EDMS 3.2. The grouping of aircraft by size in the ISCST3 dispersion model is a more accurate modeling methodology than grouping all aircraft located around the airport. Each aircraft size group has different emission properties (grams of emissions per kilogram of fuel) which are modeled more accurately in the different size groups than by averaging over all aircraft. The initial volume size was based on the initial dispersion coefficients presented in the EDMS Reference Manual Supplement (FAA, 1998).

Table 13

Assigned Aircraft Size for ISCST3 Modeling

Size	Aircraft	Engine Model No.	No. of Engines
Small	ATR42	PW121	2
	ATR72-200	PW124-B	2
	BAE146-300	ALF502R-5	4
	BH-1900	PT6A-65B	2
	BH-1900 Cargo	PT6A-65B	2
	Canadair RJ50	CF34-3A1	2
	Canadair RJ70	CF34-3A1	2
	DASH-7	PT6A-50	4
	EMB110KQ1	PT6A-27	2
	EMB-120	PW118	2
	FOKKER 50	PW125-B	2
	GenAvJet	JT15D-1	2
	GenAvProp	PT6A-67B	1
	GenAvProp Cargo	PT6A-67B	1
	Jetstream 31	TPE331-3	2
	Saab 2000	AE2100A	2
	SF-340A	CT7-5	2
	SHORT 360	PT6A-65AR	2
	Swearingen Metro 2	TPE331-3	2
Large	A319	CFM56-5A1	2
	A320	CFM56-5B4	2
	B727 Cargo	JT8D-15	3
	B727-200	JT8D-15	3
	B737-200	JT8D-9A	2
	B737-200C Cargo	JT8D-17A	2
	B737-300	CFM56-3C	2
	B737-400	CFM56-3C	2
	B737-500	CFM56-3C	2
	B757-200	PW2037	2
	B757-200 Cargo	PW2037	2
	DC9 Cargo	JT8D-17	2
	DC9-50	JT8D-17	2
	F-28-4000	RR SPEY-MK555	2
	FOKKER 100-100	TAY 650-15	2
	FOKKER 70	TAY620-15	2
	MD-80	JT8D-217A	2
	MD-80-87	JT8D-217	2
	MD-90-10	V2525-D5	2
	MD-90-95	BR700-710A1-10	2
Heavy	A300B	CF6-50C	2
	A300-C4-200 Cargo	CF6-50C2	2
	A310-200	CF6-80C2A2	2
	A310-200 Cargo	CF6-80C2A2	2
	A330	CF6-80E1A1	2
	A340-200	CFM56-5C2	4
	B747 Combination	PW4056	4
	B747-200	JT9D-7R4G2	4
	B747-200 Cargo	JT9D-7R4G2	4
	B747-400	PW4056	4
	B747-400 Cargo	PW4056	4
	B747-X	PW4056	4
	B767-200	JT9D-7R4D	2
	B767-200 Cargo	JT9D-7R4D	2
	B767-300	JT9D-7R4D	2

Table 13

Assigned Aircraft Size for ISCST3 Modeling

Size	Aircraft	Engine Model No.	No. of Engines
	B777-200	PW4084	2
	DC10-30	CF6-50C2	3
	DC10-30 Cargo	CF6-50C2	3
	DC8 Cargo	CFM56-2C5	4
	DC8-70	CFM56-2C5	4
	IL-96	PS-90A	4
	L1011-500	RB211-524B4	3
	MD-11	PW4460	3
	MD-11 Cargo	PW4460	3

Source: Camp Dresser & McKee Inc., 2000.

The PM_{10} emissions used for each aircraft source were calculated as noted in Section 2.1 above 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 (tpy) 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 temporal factors used in ISCST3 modeling for taxi/idle, approach, takeoff, and climbout are based on the actual hourly data for departures and arrivals as appropriate for each aircraft type. The hourly temporal factors are used for aircraft operation modes in the ISCST3 modeling since ISCST3 allows only one set of scaling factors per run.

The hourly temporal factors for departure were used for operation in climbout and queue mode. The queue temporal factors were calculated, for each queue position, using the hourly number of each aircraft type passing through each queue point, and the average hourly depth of queue. The depth of queue was determined through analysis of the SIMMOD model results developed for the LAX Master Plan. Data showing the arrival, departure, and queue aircraft assignments for Alternative D are presented in the LAX Master Plan Supplement to the Draft EIS/EIR Technical Report S-4 Attachment M. The depth of the queue for each runway is based on the number of aircraft in each queue during hourly intervals. Fractions in the queue depth represent aircraft moving through the queue in a shorter time interval.

The taxi temporal factors were determined for each taxi point based upon the location of the taxi segment in the site layout drawings for each alternative and horizon year. Taxi points in arrival and departure segments were assigned arrival or departure temporal factors, respectively. For taxi points in segments with cross-traffic, a combination of the departure and the arrival temporal factors for each aircraft size was assigned. The combined (mixed) arrival and departure temporal factors used for taxi sources is given in Technical Report S-4, *Supplemental Air Quality Technical Report,* Attachment B, of the Supplement to the Draft EIS/EIR.

Ground Support Equipment

Emissions from GSE actually occur over a broad area of the airport as the emissions calculated for many of the service equipment types include emissions incurred from travel from a support facility to the gate being serviced. However, for simplification and conservatism, the emissions are grouped into area sources around separate gate areas for the different alternative gate layouts. The GSE are assumed to operate near the aircraft within a 30-meter width starting 5 meters from the edge of the terminal/structure. The length of the area source is defined as the length of each specific gate area. Specific maximum hourly emissions and temporal factors were used for each of these gate areas through analysis of the SIMMOD arrival and departure data. The APU emissions of PM_{10} are considered negligible for Alternative D and are not included in the dispersion modeling.

GSE service aircraft that are arriving and departing from gate areas. Since the GSE operate for both arrivals and departures, mixed arrival and departure temporal factors for Small, Large, and Heavy aircraft

were used. The GSE temporal factors are included in Technical Report S-4, *Supplemental Air Quality Technical Report,* Attachment B, 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 14**, On-Airport Roadway Source Modeling Parameters for Central Terminal Area, **Table 15**, On-Airport Roadway Source Modeling Parameters for the Ground Transportation Center/Intermodal Transportation Center, Alternative D, and **Table 16**, On-Airport Roadway Source Modeling Parameters for Cargo/Ancillary Roadway Sources. Since ISCST3 does not include line sources, the ISCST3 User's Guide recommends the use of volume sources for modeling purposes to represent line sources. The initial lateral dimension of the volume source was determined to be the mixing zone of each roadway (width of the roadway lanes plus three-meter mixing zones on either side) divided by 2.15 as specified in the ISCST3 User's Guide. This initial vertical dimension was determined from following the CALINE mixing height equations (Benson, 1979), assuming a long-term average wind speed of 3.3 meters per second (Gale Research, 1985). The vertical dimension is calculated as follows:

$$\sigma_z = 1.8 + 0.11 \times TR$$

Where:

σ_z = initial vertical dimension (meters)

TR = mixing time residence time (sec) = W2/U

W2 = highway half-width (assumed to be 3 lanes or ~ 10 meters)

U = wind speed (m/s; average wind speed assumed to be 3.3 m/s)

Therefore:

$$\sigma_z = 1.8 + 0.11 \times 10/3.3 = 2.1 \text{ m}$$

The roadway emissions in grams per second were calculated for each defined roadway segment presented in Section 2 above. The temporal factors for roadways were used to calculate the short-term emissions for each link, in grams per second. The emissions calculated for each roadway link were divided evenly between the number of volume sources that comprise that segment, and temporal files calculated for the CTA, GTC, ITC, and cargo areas were applied to each of the volume sources. The traffic temporal files used in EDMS 3.2 modeling were used in the ISCST3 modeling analysis and are given in Technical Report 4, *Air Quality Technical Report,* Attachment D, of the Draft EIS/EIR.

The emissions from parking areas and structures were modeled as volume sources using the initial lateral and vertical dimension corrections provided by the ISCST3 User's Guide. Each parking structure/area was divided into squares or rectangles that defined the specific area to be modeled by each volume source. Some of the parking areas were nearly square and could be modeled using one volume source, while complex shaped parking structures/areas were divided into several equivalent volume sources. To determine the initial lateral dimension of each volume source, the side of the square area was divided by 4.3. The initial vertical dimension for multistory parking structures is the height of the parking structure divided by 2.15 as recommended by the ISCST3 User's Guide. The same initial vertical dimension that was used for the roadways (i.e., 2.1 meters) was applied for ground-level parking areas.

The maximum hourly emissions for each parking area were calculated based on the estimated maximum parking projections. The emissions calculated for each parking structure/area were divided evenly between the number of volume sources that comprise each parking structure/area. The areas and number of on-airport parking facilities used in ISCST3 for Alternative D are provided in **Table 17**, Parking Facility Modeling Parameters for Alternative D. The parking temporal factors presented in Technical Report 4, *Air Quality Technical Report,* Attachment D, of the Draft EIS/EIR, were used to calculate the emission rate in grams per second as part of the ISCST3 data input.

Table 14

On-Airport Roadway Source Modeling Parameters for Central Terminal Area

Link Name	All Project Alternatives		
	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

Source: Camp Dresser & McKee Inc., 2000.

Table 15

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

Link Name	Alternative D		
	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

Table 15

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**
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
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

Table 15

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**
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 16

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

	Alternative D	
Link Name	**Length Miles**	**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 17

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

Dispersion modeling of the stationary source emissions discussed in Section 2 above was performed based on the project source configurations and the source types found during the environmental baseline survey. Conservatively, and for simplification of dispersion modeling, emissions were combined into a single source (e.g., maintenance, flight kitchens, restaurants) for smaller source types found at single source facilities. Source locations were determined from a review of the proposed airport layouts for each alternative. Typical stack dimensions and heights were used for the specific source types and these stacks were then compared to assumed building heights at each stationary source location to assure engineering consistency of their relative heights. The stationary source modeling parameters used in ISCST3 are shown in **Table 18**, ISCST3 Stationary Source Modeling Parameters. The engine testing sites are included in the table since they were modeled as stationary point sources.

Table 18

ISCST3 Stationary Source Modeling Parameters

Source Category	Number of Sources	Height, m	Temperature, ^{o}K	Velocity, m/s	Diameter, m
CUP CT	1	15	293	2	10
CUP (East, CTA)	1	12	450	14	1.5
Engine Tests	1	12	561	0.5	10
Flight Kitchens	1	10	422	5	0.6
Maintenance	3	20	422	10	0.6
Restaurants	4	15	320	5	2

Source Camp Dresser & McKee Inc., 2000.

Engine testing sources, like the other aircraft operations, were modeled with ISCST3 as stationary sources. The location and type of run-up engine testing enclosure is unique to Alternative D. The vertical exit velocity after deflection from the blast gates has been conservatively estimated at 0.5 meter per second. The stack diameter is assumed to be 10 meters after deflection from the blast gate. The "stack" temperature is assumed to be the same as other aircraft engine sources (561°K). The release height for dispersion is assumed to be height of the GRE (12 meters) for Alternative D.

Area Sources

The deicing/anti-icing and landscaping equipment area sources discussed in Section 2.2.3 above were not modeled in ISCST3 since the emissions from these sources were considered to be negligible.

3.5 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, *Air Quality Technical Report,* of the Draft EIS/EIR. Refer to the *Guideline on Air Quality Models* (CFR, 2002) for additional discussion of dispersion modeling uncertainties and sensitivities.

4. MITIGATION MEASURES

Alternative D has been developed by incorporating various air quality mitigation measures as required under the California Environmental Quality Act (CEQA) to reduce project-related air quality impacts both in and around LAX and throughout the SCAB, and as such these measures are considered part of the design of Alternative D for purposes of this draft general conformity evaluation. 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. Those 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.

Under CEQA, mitigation measures must meet the following criteria in order to be considered feasible and quantifiable (SCAQMD, 1993a).

- 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.

The air quality mitigation measures are discussed in detail in Section 4.6.8, *Mitigation Measures*, and Appendix S-E, *Supplemental Air Quality Impact Analysis,* Section 2.3, of the Supplement to the Draft EIS/EIR.

Mitigation as defined in the general conformity regulations (40 CFR 93.160) and general conformity guidance (EPA 1994) is not required for this evaluation.

5. FUTURE BACKGROUND CONCENTRATIONS

The modeling undertaken for the LAX Master Plan could not reflect all pollutant sources that contribute to total air pollutant levels in the area. Therefore, it was necessary to estimate future background concentrations that reflect the emissions from nearby and distant off-airport sources. These background concentrations, when added to the airport modeling results, reflect the predicted total ambient concentrations at a specific site.

The future background concentration of PM_{10} at LAX was estimated by multiplying the current PM_{10} concentrations at the airport by the ratio of the future-year PM_{10} concentrations to the existing-year PM_{10} concentrations for downtown Los Angeles (nearest station for which future year PM_{10} concentrations had been estimated). This approach assumes that changes in PM_{10} concentrations at downtown locations are equivalent to changes in background concentrations in the LAX vicinity. For the future-year PM_{10} concentrations for downtown Los Angeles the values developed by SCAQMD (SCAQMD, 1996) for the

years 2000, 2006, and 2010 were used. The estimated value for 2005 was interpolated from data for 2000 and 2006, while the estimated value for 2015 was extrapolated using the least squares method from the available data. The calculated future background concentrations are presented in **Table 19**, Future Background Concentrations.

Table 19

Future Background Concentrations

Pollutant	Averaging Period	Future Background Concentration[1]		
		2005	2013	2015
PM_{10} (µg/m³) [2]	AAM[3]	28	25	24
	24 Hour	61	47	43

[1] 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] $\mu g/m^3$ = micrograms per cubic meter

[3] AAM = Annual Arithmetic Mean.

Source: Camp Dresser & McKee Inc., 2003.

Future background concentrations were estimated based on monitored ambient air quality measurements, which include the current contribution from LAX sources. Therefore, this methodology is conservative since airport sources are implicitly included in the calculated future background concentrations. To evaluate predicted ambient concentrations, the modeled airport contributions were added to the future background values and then these future total concentrations were compared to the NAAQS.

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