5.B AIR QUALITY

This section describes the following issues pertaining to the analysis of air quality:

1. The air quality environment in the Study Area,
2. The air quality standards set out in the various applicable environmental statutes and regulations, and
3. The air quality analyses associated with those statutes and regulations.

An airport air quality assessment requires consideration under both the Clean Air Act, including the 1990 Amendments (CAA), and the National Environmental Policy Act (NEPA). These two unique legislative acts require distinct analyses and may be separately applicable to an airport project. For either NEPA or a CAA analysis, the emission sources that must be analyzed at airports are aircraft, ground support equipment (GSE), solvents and painting operations, fuel storage, motorized stationary equipment, and motor vehicles. All of these sources cause emissions of pollutants that the U.S. Environmental Protection Agency (USEPA) has determined to be potentially harmful to human health.

This section evaluates emissions caused by sources operating at the Fort Lauderdale-Hollywood International Airport (FLL) that contribute to the overall air quality conditions existing in Broward County in 2005 (2005 Existing Conditions). The air quality information provided in this section is supplemented by the technical report in Appendix G, *Air Quality*, Attachment G.1, *Technical Report: Air Quality Assessment Methodology and Procedure* (Technical Report). The Technical Report documents Federal Aviation Administration (FAA) coordination with Federal, State, and local air quality agencies and includes Appendix G.1.A, *Agency Coordination,* Appendix G.1.B, *Hazardous Air Pollutant (HAP) Evaluation*, and Appendix G.1.C, *Technical Data*. Future air quality conditions are analyzed in Chapter Six, *Environmental Consequences*, Section 6.B, *Air Quality*.

The airport is located entirely within Broward County, in the Southeast Florida Airshed (Airshed). All the counties within the Airshed meet the air quality standards established by the Federal government, referred to as the National Ambient Air Quality Standards (NAAQS). However, emissions of nitrogen oxides (NO_x) and volatile organic compounds (VOC) are of continuing interest in Broward County because these pollutants are precursors to ozone formation[1] and are caused primarily by motor vehicle traffic and other mobile sources such as aircraft.

Emissions of NO_x and VOC, and the formation of ozone, are important to Broward County because the County is operating under a maintenance plan for ozone emissions based on the USEPA-approved *Southeast Florida Area Maintenance Plan Update* (Florida 2004 Plan Update). Therefore, the implementation of a proposed Federal action in Broward County requires compliance with the provisions of the

[1] Code of Federal Regulations, Title 40, Part 93.152 (40 CFR 93.152), refer to the definition of "Precursors of a Criteria Pollutant."

State Implementation Plan (SIP), which includes the current ozone maintenance plan. This subject is discussed in Section 5.B.1.2, *State Implementation Plan*, and Section 5.B.1.3, *Broward County Air Quality Status*.

The evaluation of air quality impacts at FLL under the 2005 Existing Conditions was prepared pursuant to the FAA *Air Quality Procedures for Civilian Airports and Air Forces Bases* (Air Quality Handbook),[2] using both the FAA Emissions and Dispersion Modeling System (EDMS)[3] and the USEPA CAL3QHC roadway dispersion model. The guidelines provided in the Air Quality Handbook are consistent with FAA Order 5050.4B, *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions;*[4] FAA Order 1050.1E, *Environmental Impacts: Policies and Procedures*;[5] and the State of Florida air pollution control provisions in the SIP.

5.B.1 REGULATORY OVERVIEW

An assessment conducted to satisfy air quality requirements for a Federal action under either NEPA or the CAA must demonstrate compliance with CAA Title 1, Section 176(c)(1) before the Federal action may be approved or funded.[6] Compliance with Section 176(c)(1) requires an evaluation of project-related emissions as compared to the NAAQS. The USEPA regulates and monitors the concentration of potentially harmful air emissions in the ambient air[7] with respect to the NAAQS[8] of the seven criteria[9] pollutants:

- Carbon monoxide (CO),
- Nitrogen dioxide (NO_2),
- Sulfur dioxide (SO_2),
- Coarse particulate matter[10] (PM_{10}),
- Fine particulate matter ($PM_{2.5}$),
- Ozone, and
- Lead (Pb).

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2 FAA, *Air Quality Procedures for Civilian Airports and Air Forces Bases* (Air Quality Handbook), April 1997.

3 FAA Emissions and Dispersion Modeling System (EDMS), Version 4.5, 2006.

4 FAA Order 5050.4B, *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions*, April 28, 2006.

5 FAA Order 1050.1E, *Environmental Impacts: Policies and Procedures* (including Change 1), March 20, 2006.

6 Refer to Appendix G, *Air Quality*, Attachment G.1, *Air Quality*, Section 2.1, *National Environmental Policy Act (NEPA)*, Table G-8, *General Conformity Compliance and Analyses Requirements.*

7 Ambient air is defined as the freely moving air of the outdoor environment in areas where the general public has access.

8 Refer to Appendix G, *Air Quality*, Attachment G.1 *Technical Report*, Section 2.1, *National Environmental Policy Act (NEPA)*, Table G-5, *National Ambient Air Quality Standards (NAAQS).*

9 Collectively, the pollutants CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, ozone, and lead are referred to as the "criteria" pollutants because the quality of the air, with regard to these pollutants, is regulated relative to numerical criteria, or standards (the NAAQS).

10 Particulate matter emissions are categorized by size. Coarse particles are defined as having a diameter of 10 micrometers or less and are referred to as PM_{10}; fine particles are defined as having a diameter of 2.5 micrometers or less and are referred to as $PM_{2.5}$.

The NAAQS that are effective as of the EIS issue date are summarized in **Table 5.B-1**. The USEPA requires that states having areas exceeding the NAAQS take action to reduce emissions and maintain the standards. For this reason, Federal actions such as the improvements proposed for FLL are not permitted to interfere with Florida's plan for maintaining air quality, as mandated by NEPA and the CAA.

Under NEPA, the assessment[11] is required to include the preparation of an emission inventory for each "build" and "no-build"[12] alternative considered in the EIS to determine the overall air quality impact. The inventory would include emissions of NO_x, VOC, sulfur oxides (SO_x), PM_{10}, $PM_{2.5}$, and CO. Although not a criteria pollutant, VOC emissions are included as part of the emission inventory because VOC, along with NO_x, is one of the ozone precursor pollutants. Further, particular attention would be given to emissions of CO at selected roadway intersections in the vicinity of an airport because the USEPA considers CO to be of particular importance at airports where the increase in the number of vehicles accessing the airport may have the potential to cause significant adverse air quality impacts. In such cases, air quality impacts are assessed by conducting a "NAAQS assessment." A NAAQS assessment refers to dispersion modeling to predict ambient concentrations of air pollutants due to a Federal action and the comparison of the results to the NAAQS to determine compliance to CAA Section 176(c)(1). Computer modeling conducted for a NAAQS assessment must comply with Title 40 of the Code of Federal Regulations (CFR) Part 159,[13] and the results of the modeling must demonstrate compliance with 40 CFR Part 93.158(b)(1 and 2), as shown in **Table 5.B-2**.

[11] The "NEPA assessment" refers to the comparative analysis of the emission inventories of the "build" and "no-build" alternatives. FAA, *Air Quality Procedures for Civilian Airports and Air Force Bases Addendum (FAA-AEE-04-03)*, Page AD-7, September 2004.

[12] The "build" alternatives refer to projected airport conditions following the completion of the Federal action. The "no-build" alternatives refer to projected airport operations projected to be in the future without the action's implementation. The "build" and "no-build" alternatives are compared to determine the overall emissions impact of the Federal action. FAA, *Air Quality Procedures for Civilian Airports and Air Force Bases (FAA-AEE-97-03)*, Section 2.1.1, *Project Definition*, April 1997.

[13] In 40 CFR Part 93.159 (July 1, 2006), the USEPA outlines the procedures to be followed for the preparation of dispersion analyses, such as what planning assumptions the analyses should be based on, what version of motor vehicle emissions models to use, required compliance to the USEPA *Guideline on Air Quality Models*, which is found in Appendix W of 40 CFR Part 51 (July 1, 2006), and the future years for which an analysis should be prepared.

Table 5.B-1
NATIONAL AMBIENT AIR QUALITY STANDARDS (NAAQS)

POLLUTANT	AVERAGING PERIOD	PRIMARY STANDARDS	SECONDARY STANDARDS
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean 24-Hour Average 3-Hour Average	0.03 PPM (80 $\mu g/m^3$) 0.14 PPM (365 $\mu g/m^3$) None	None None 0.50 PPM (1300 $\mu g/m^3$)
Particulate Matter (PM_{10})	24-Hour Average	150 $\mu g/m^3$	150 $\mu g/m^3$
Particulate Matter ($PM_{2.5}$)	Annual Arithmetic Mean 24-Hour Average	15 $\mu g/m^3$ 35 $\mu g/m^3$	15 $\mu g/m^3$ 35 $\mu g/m^3$
Carbon Monoxide (CO)	8-Hour Average 1-Hour Average	9 PPM (10 mg/m^3) 35 PPM (40 mg/m^3)	None None
Ozone (O_3)	8-Hour Average (1997 Std)[1] 8-Hour Average (2008 Std)[2] 1-Hour Average	0.084 PPM 0.075 PPM 0.12 PPM	0.084 PPM 0.075 PPM 0.12 PPM
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	0.053 PPM (100 $\mu g/m^3$)	0.053 PPM
Lead (Pb) [3]	3-Month Arithmetic Mean	1.5 $\mu g/m^3$	1.5 $\mu g/m^3$

Notes: PPM is parts per million.
$\mu g/m^3$ is micrograms per cubic meter.

[1] USEPA, current effective 1997 standard.

[2] The USEPA revised the eight-hour ozone standard on March 12, 2008. The effective date of the final rule is May 27, 2008. States are expected to submit recommendations for attainment of the new standard by March 2009 with identification of nonattainment areas by USEPA expected in 2010. Reference USEPA, "National Ambient Air Quality Standards for Ozone," available at http://www.epa.gov/air/ozonepollution/pdfs/2008_03_ finalrule.pdf; and USEPA "Fact Sheet: Final Revisions to the National Ambient Air Quality Standards for Ozone," available at http://www.epa.gov/air/ozonepollution/pdfs/2008_03_ factsheet.pdf.

[3] Airborne lead in urban areas is primarily emitted by vehicles using leaded fuels. The chief source of lead emissions at airports would be the combustion of leaded aviation gasoline in small piston-engine general aviation aircraft. However, the USEPA and FAA have determined that an exceedance of the lead standard would be unlikely at an airport because of the use of low-lead fuel for piston-engine aircraft. Therefore, emissions of lead were not considered in this analysis.

Sources: USEPA, *Code of Federal Regulations Title 40*, Part 50 *National Primary and Secondary Ambient Air Quality Standards*, Section 50.4 – Section 50.12.
71 FR 61144, October 17, 2006, *Final Rule National Ambient Air Quality Standards for Particulate Matter*, revisions to the standards for PM_{10} and $PM_{2.5}$.
73 FR 16436, Thursday, March 27, 2008, *Final Rule National Ambient Air Quality Standards for Ozne*.
Federal CAA Toolbox, http://www.afcee.brooks.af.mil/products/air/federal/compdet/naaqs_tbl1.htm accessed on April 21, 2008.

Table 5.B-2
CFR TITLE 40: PROTECTION OF ENVIRONMENT
PART 93.158(B)(1 AND 2)
CRITERIA FOR DETERMINING CONFORMITY OF GENERAL FEDERAL ACTIONS

93.158(b) The areawide and/or local air quality modeling analyses must:
(1) Meet the requirements in 40 CFR Part 93.159; and
(2) Show that the action does not:
(i) cause or contribute to any new violation of any standard in any area; or
(ii) increase the frequency or severity of any existing violation of any standard in any area.

Source: 40 CFR Part 93.158 .

Under the CAA, a General Conformity evaluation is required when the Federal action is located in a nonattainment or maintenance area for one of the criteria pollutants and is then applicable only to the agency's preferred alternative. The evaluation would only be required to consider the impact of the criteria pollutants or precursor pollutants for which the area is nonattainment or maintenance. Similar to the NEPA assessment, a comparison of the "build" and "no-build" emission inventories would discern the potential to equal or exceed the *de minimis* thresholds given in **Table 5.B-3**, ***Clean Air Act De Minimis Thresholds***. When net emissions do not equal or exceed the applicable *de minimis* thresholds no additional analysis is required under the CAA with respect to General Conformity. The following sections describe NEPA and General Conformity requirements with respect to FAA airport projects, the FLL EIS 2005 Existing Conditions, and the proposed expansion at FLL.

5.B.1.1 National Environmental Policy Act (NEPA)

The FAA, as a Federal agency, is required to establish procedures to be used to meet the requirements of NEPA for determining airport air quality impacts. The FAA did this by establishing screening criteria to limit the NAAQS assessment to only those airports with the potential to exceed the NAAQS.[14] Normally, for projects where the total of direct and indirect emissions does not exceed the General Conformity thresholds,[15] further analysis is not required unless the size of the airport exceeds the FAA operations and passenger screening criteria published in FAA Order 1050.E.[16]

[14] FAA Order 1050.1E, *Environmental Impacts: Policies and Procedures* (including Change 1), Appendix A, *Analysis of Environmental Impact Categories*, March 20, 2006.
[15] Refers to the General Conformity *de minimis* thresholds. The *de* minimis thresholds are discussed in Section 5.B.1.4, *Clean Air Act General Conformity Rule*, and in Appendix G, *Air Quality*, Attachment G.1, *Technical Report*, Section 2.2.1, *General Conformity Rule Applicability.*
[16] FAA Order 1050.1E, *Environmental Impacts: Policies and Procedures* (including Change 1), Appendix A, *Analysis of Environmental Impact Categories*, March 20, 2006.

Table 5.B-3
CLEAN AIR ACT *DE MINIMIS* THRESHOLDS

CRITERIA AND PRECURSOR POLLUTANTS	NONATTAINMENT AREA THRESHOLD EMISSIONS (tons per year)	MAINTENANCE AREA THRESHOLD EMISSIONS (tons per year)
Carbon Monoxide (CO)	100	100
Particulate Matter (PM_{10})		100
Moderate Nonattainment Area	100	
Serious Nonattainment Area	70	
Particulate Matter ($PM_{2.5}$) (direct emissions)	100	100
Precursor pollutants SO_2, NO_x, VOC, & NH_3[1]	100	100
Sulfur Dioxide (SO_2)	100	100
Nitrogen Dioxide (NO_2)	100	100
Lead (Pb)	25	25
Ozone[2] (O_3)	*VOC/NO_x*	*VOC/NO_x*
Serious Nonattainment Area	50/50	
Severe Nonattainment Area	25/25	
Extreme Nonattainment Area	10/10	
Inside an ozone transport region[3]:		50/100
Marginal Nonattainment Area	50/100	
Moderate Nonattainment Area	50/100	
Outside an ozone transport region[3]**:**		100/100
Marginal Nonattainment Area	100/100	
Moderate Nonattainment Area	100/100	

[1] For the purposes of general conformity applicability, VOC's and ammonia (NH_3) emissions are only considered $PM_{2.5}$ precursors in nonattainment areas where either a State or EPA has made a finding that the pollutants significantly contribute to the $PM_{2.5}$ problem in the area. In addition, NO_X emissions are always considered a $PM_{2.5}$ precursor unless the State and EPA make a finding that NO_X emissions from sources in the State do not significantly contribute to the $PM_{2.5}$ in the area. Reference: 74 FR 17003, April 5, 2006.

[2] The rate of increase of ozone emissions is not usually evaluated in a localized project-level environmental review because the formation of ozone occurs on a regional level and is the result of the photochemical reaction of NO_x and VOC in the presence of abundant sunlight and heat. Therefore, USEPA considers the rates of increase of NO_x and VOC emissions to reflect the likelihood of ozone formation on a project level.

[3] An ozone transport region (OTR) is a single transport region for ozone, comprised of the states of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and the Consolidated Metropolitan Statistical Area that includes the District of Columbia.

Sources: USEPA, Code of Federal Regulations (CFR) Title 40 Part 93.153(b)(1)&(2), March 25, 2008.
USEPA, 40 CFR Part 51.853, March 25, 2008.
USEPA, 40 CFR Part 51.852, March 25, 2008, definition of "precursors of a criteria pollutant."
USEPA, Federal Register Volume 71 Page 17003 (71 FR 17003), April 5, 2006, *$PM_{2.5}$ De Minimis Emission Levels for General Conformity Applicability*.
71 FR 61144, October 17, 2006, *Final Rule National Ambient Air Quality Standards for Particulate Matter*.

The screening criteria are applied to the operations and passenger characteristics of an airport. Under FAA Order 1050.1E, an airport may have the potential to exceed the NAAQS when the airport: (1) accommodates or projects to accommodate more than 2.6 million passengers annually (or 1.3 million annual enplanements), or (2) has current or projected combined general aviation and air taxi aircraft operations exceeding 180,000 annually. In either of these cases, a NAAQS assessment would be recommended.

The number of annual enplanements at FLL exceeds the FAA criteria for annual enplanements. Therefore, a NAAQS assessment was conducted for the 2005 Existing Conditions. A NAAQS assessment for all of the alternatives carried forward in the analysis of environmental consequences is provided in Chapter Six, *Environmental Consequences*, Section 6.B, *Air Quality*.

5.B.1.2 State Implementation Plan (SIP)

According to the CAA, each state must provide the USEPA with a SIP. The SIP must include a strategy for air quality improvement in local areas for each criteria pollutant that exceeds the NAAQS. The SIP must also include a plan to maintain acceptable air quality in areas that do not exceed the NAAQS. For purposes of this EIS, the relevant portion of the Florida SIP for Broward County contains a maintenance plan for the one-hour ozone standard.[17]

Historically, in 1979, Broward County was designated nonattainment for the one-hour ozone standard[18] based on data provided through the USEPA air quality monitoring network. During the period from 1990 to 1994, ambient air quality monitoring in the Airshed showed no violations of the one-hour ozone standard.[19] As a result, effective April 25, 1995 the USEPA approved the Florida Department of Environmental Protection's (DEP's) request for redesignation to attainment of the one-hour standard within the Airshed. The USEPA then approved the DEP's ten-year (1995 to 2005) maintenance plan for inclusion in the Florida SIP.

As the expiration of the first ten-year one-hour ozone maintenance plan approached, the DEP submitted the second ten-year update for the Southeast Florida area. Florida DEP submitted this update in December 2002, based on the continued satisfactory ozone levels detected by the USEPA's monitoring network. The USEPA approved the *Southeast Florida Area Maintenance Plan Update* (Florida 2004 Plan Update) on February 13, 2004. The Florida 2004 Plan Update remains an enforceable element of the Florida SIP through 2015 or until the SIP is revised.

Subsequent to approval of the Florida 2004 Plan Update, the USEPA established the new eight-hour ozone standard and revoked the one-hour ozone standard when the agency published the *Final Phase 1 Rule to Implement the 8-Hour Ozone National Ambient Air Quality Standard* on April 30, 2004 (USEPA 2004 Rule).[20]

The USEPA 2004 Rule became effective on June 15, 2004. The rule appeared to effectively eliminate the applicability of the CAA General Conformity regulations to areas previously considered maintenance for the one-hour standard and subsequently designated attainment for the eight-hour standard.

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17 The Florida Administrative Code (FAC) Chapter 62, *Air Pollution Control*, contains the SIP and incorporates the NAAQS and the relevant provisions of the CAA by reference.

18 The moderate nonattainment designation was made pursuant to Section 107(d)(1)(C)(i) and Section 181(a)(1) of the CAA.

19 Florida Department of Environmental Protection (DEP), *Air Quality Maintenance Plan (2005-2015) Dade, Broward, and Palm Beach Counties*, December 2002.

20 USEPA, 69 FR 23951, dated April 30, 2004, *Final Phase 1 Rule to Implement the 8-Hour Ozone National Ambient Air Quality Standard*.

However, in a court ruling dated December 22, 2006, the USEPA 2004 Rule was overturned. The USEPA was required to keep in place the measures intended to limit ozone formation, even though the measures were based on the now outdated one-hour standard. The opinion specifically required the evaluation of General Conformity in areas were the measures were already in place for the one-hour ozone standard.[21] As a result of the court's opinion, Broward County would be considered included in an ozone maintenance area through 2015.

On March 12, 2008, USEPA again revised the eight-hour ozone standard to a level of 0.075 parts per million (PPM) applicable to both the primary and secondary levels. The previous standard, set in 1997, was 0.08 PPM. Because the new ozone standard is measured out to three decimal places, the 1997 standard effectively became 0.084 PPM (refer to Table 5.B-1). An area will meet the revised standard if the three-year average of the annual fourth-highest daily maximum eight-hour average at ozone monitors is less than or equal to the level of the standard (i.e., 0.075 PPM). States must make recommendations to USEPA no later than March 2009 for areas to be designated attainment, nonattainment and unclassifiable. The USEPA will publish nonattainment areas under the new standard no earlier than 2010. Consequently, the new standard is not applicable to the project proposed for FLL or effective at the time EIS was prepared.

5.B.1.3 Broward County Air Quality Status

The Airshed includes Broward, Miami-Dade, and Palm Beach counties, which encompass a portion of the Southeast Florida Intrastate Air Quality Control Region.[22] The Airshed is in attainment for all the Federally-regulated standards as of the EIS publication. This would include the standards for emissions of CO, SO_2, NO_2, PM_{10}, $PM_{2.5}$, lead, and the 1997 eight-hour standard for ozone.[23]

Broward County was designated in 1995 as a maintenance area for the now outdated one-hour ozone standard and the Florida 2004 Plan Update remains effective through 2015, as required following the December 2006 court opinion.[24] Therefore, even though the Florida 2004 Plan Update was based on an outdated standard, the County would still be considered included in an ozone maintenance area.

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[21] U.S. Court of Appeals for the District of Columbia Circuit, *South Coast Air Quality Management District V. USEPA, et al.*, 472 F.3d 882 (D.C. Cir. 2006).

[22] USEPA, 40 CFR Part 81, Section 81.49, *Southeast Florida Intrastate Air Quality Control Region*, July 1, 2006.

[23] The USEPA revised the eight-hour ozone standard on March 12, 2008. The USEPA has not yet published an effective date for the new standard. States are expected to submit recommendations for attainment of the new standard by March 2009 with identification of nonattainment areas by USEPA expected in 2010. Reference USEPA, *National Ambient Air Quality Standards for Ozone,* available at: http://www.epa.gov/air/ ozonepollution/ pdfs/2008_03_ finalrule.pdf; and USEPA *Fact Sheet: Final Revisions to the National Ambient Air Quality Standards for Ozone*, available at http://www.epa. gov/air/ozonepollution/pdfs/2008_03_ factsheet.pdf.

[24] Refer to Section 5.B.1.2, *State Implementation Plan*, for a complete explanation of the December 2006 court ruling.

5.B.1.4 Clean Air Act General Conformity Rule

The CAA includes provisions to ensure emissions from Federal actions will comply with the goals of the SIP and will not interfere with the plans to improve air quality in a nonattainment or maintenance area. Compliance with the SIP requires the sponsoring Federal agency to prepare an analytical demonstration of the potential for significant adverse air quality impacts from Federal actions located in nonattainment or maintenance areas. The analytical demonstration would be prepared pursuant to the General Conformity Rule (the Rule), published at 40 CFR Part 93.[25] The rule applies only to Federal actions that are:

- Federally-funded or Federally-approved,
- Not a highway or transit project,
- Not identified as "exempt"[26] under the CAA and not identified on the approving Federal agency's "Presumed to Conform" list,[27]
- Located within a nonattainment or maintenance area, and
- Identified as the Federal agency's preferred alternative.

The Rule establishes minimum values, referred to as *de minimis* thresholds, for the criteria and precursor pollutants for which the area is nonattainment or maintenance, referred to as the pollutants of concern. When the General Conformity Rule is applicable to the Federal action, a comparative emission inventory and evaluation is prepared to determine net emissions caused by the Federal agency's preferred alternative. Where the total of direct and indirect emissions (net emissions) of the pollutants of concern caused by the agency's preferred alternative equal or exceed the applicable *de minimis* values, a General Conformity Determination must be prepared to demonstrate conformity to the SIP.

Because the project proposed at FLL meets all the above requirements, a General Conformity evaluation for the FAA preferred alternative was prepared and is included in Chapter Eight, *FAA's Preferred Alternative*.

The evaluation of a Federal action under General Conformity need only consider those criteria or precursor pollutant thresholds for which the area is nonattainment or maintenance and only under the preferred alternative. Table 5.B-3 shows *de minimis* levels for all criteria and precursor pollutants effective as of the EIS issue date.

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[25] 40 CFR Part 93, Subpart B *Determining Conformity of General Federal Actions to State or Federal Implementation Plans*, July 1, 2006.

[26] The FLL Proposed Action is not listed as an action exempt from a conformity determination pursuant to 40 CFR Part 93.153(c) (July 1, 2006). An exempt project is one that the USEPA has determined would clearly have no impact on air quality at the facility, and any net increase in emissions would be so small as to be considered negligible.

[27] The provisions of the CAA allow a Federal agency to submit a list of actions demonstrated to have low emissions that would have no potential to cause an exceedance of the NAAQS and are presumed to conform to the CAA conformity regulations. This list would be referred to as the "Presumed to Conform" list. The FAA Presumed to Conform list was published in the Federal Register on February 12, 2007 (72 FR 6641-6656) and includes airport projects that would not require evaluation under the General Conformity regulations.

Broward County is considered maintenance for ozone for purposes of applicability to General Conformity and is located outside an "ozone transport region."[28] Ozone is not emitted by any single source; rather, ozone is a regional phenomena resulting from the photochemical reaction of NO_x and VOC emissions in the presence of abundant sunlight and heat. As such, NO_x and VOC are referred to as the ozone precursor pollutants. Since 1990, the USEPA has developed several programs that would limit ozone formation by controlling the emission rates of the key precursors, NO_x and VOC.

These programs, such as the NO_x State Implementation Plan (SIP) Call, are used in conjunction with State and local efforts to attain the NAAQS for ozone.[29] Consequently, the emission rates of NO_x and VOC are regulated under the General Conformity Rule to reflect the likely impact of ozone (refer to Table 5.B-3).[30]

The airport sources of NO_x and VOC include engines that burn fossil fuels (cars, equipment, aircraft, etc.), solvents and paint, and fuel storage. Therefore, the *de minimis* thresholds applicable for the preferred alternative at FLL would be 100 tons per year, each, of NO_x and VOC emissions, the pollutants of concern in Broward County.

5.B.2 ASSESSMENT OF 2005 EXISTING CONDITIONS

An emission inventory for FLL was prepared for the 2005 Existing Conditions using the most current data available, which consisted of data from 2004 and 2005 (the latest full-calendar year of available data). The emission inventory was prepared using the FAA EDMS Version 4.5. The inventory provided an estimate of the mass-rate increase of criteria and precursor pollutant emissions in tons per year. The sources of emissions evaluated for the inventory include aircraft; GSE; auxiliary power units (APUs); other mobile sources using airport roadways, access roadways, parking lots, and parking garages; and stationary sources such as fuel storage tanks, solvents, and paint; and diesel-fueled generators.

To compare the concentration of airport emissions that were quantified in the inventory to the NAAQS, FAA guidelines recommend dispersion modeling. Dispersion modeling for the 2005 Existing Conditions was conducted using the FAA EDMS Version 4.5 and CAL3QHC, the USEPA roadway emissions dispersion model that calculates the concentration of CO from vehicles at intersections. The dispersion analyses provided an estimate of the concentration of airport-related criteria pollutants relative to time and space in micrograms per cubic meter ($\mu g/m^3$)

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[28] The ozone transport region (OTR) is a single transport region for ozone [within the meaning of Section 175B (a) of the Clean Air Act], comprised of the States of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and the Consolidated Metropolitan Statistical Area that includes the District of Columbia, as given at Section 184 of the CAA. The proper application of the General Conformity Rule with respect to projects located in ozone nonattainment and maintenance areas depends on whether the project is located in the OTR.

[29] The SIP Call is a program designed to reduce the regional transport of ozone and ozone-forming pollutants in the eastern half of the United States. USEPA, *Evaluating Ozone Control Programs in the Eastern United States*, 2005.

[30] 40 CFR 93.153(b)(2). The *de minimis* threshold rates in an ozone maintenance area apply to emissions of NO_x and VOC.

for NO_x, CO, PM_{10}, $PM_{2.5}$, and SO_x using EDMS,[31] and for CO emissions due to motor vehicles at off-airport roadway intersections using CAL3QHC. The sources of emissions evaluated for the NAAQS assessment are the same as those evaluated for the emission inventory. A detailed description of the procedure and methodology to prepare the emission inventory and the NAAQS assessment are provided in Appendix G, *Air Quality*.

There is no requirement under the CAA to prepare an analysis of existing conditions under the General Conformity Rule, which is concerned only with the potential impact from the agency's preferred alternative. The evaluation of General Conformity is given in Chapter Eight, *FAA's Preferred Alternative*, and Appendix Q.3, *Air Quality General Conformity Evaluation of FAA's Preferred Alternative.*

5.B.2.1 Criteria and Precursor Pollutant Emission Inventory

As noted earlier, the pollutants of concern in Broward County with regard to ozone formation are NO_x and VOC. These two pollutants are ozone precursor pollutants because they contribute to the formation of ozone in the presence of abundant sunlight and heat; and ozone emissions have been a concern of Broward County in the recent past.[32] Emissions of CO are a concern due to potential impacts at roadway intersections.

The results of the emission inventory are provided in **Table 5.B-4**, ***Criteria and Precursor Pollutant Emission Inventory - 2005 Existing Conditions***. The emissions are comprised primarily of CO and NO_x, and the majority of those emissions are caused by operation of GSE, APUs, aircraft, and motor vehicles on roadways:

- Emissions of CO dominate the emission inventory, particularly from the use of GSE/APUs. The majority of emissions of CO from aircraft come from piston-engine aircraft that use AvGas, and jet-powered aircraft using JET A fuel during idle.
- Emissions of NO_x are mostly from aircraft that use JET A fuel, particularly during takeoff.
- Emissions of VOC are produced primarily by aircraft and GSE/APUs.
- Emissions of SO_x and PM are produced primarily by aircraft engines.

[31] There are no NAAQS for VOC emissions. Therefore, VOCs were not included in the NAAQS analysis.

[32] Refer to Appendix G, *Air Quality*, Attachment G.1, *Technical Report: Air Quality Assessment Methodology and Procedure*, Section 3.2, *Criteria and Precursor Pollutant Emission Inventory*.

Table 5.B-4
CRITERIA AND PRECURSOR POLLUTANT EMISSION INVENTORY
2005 EXISTING CONDITIONS
Fort Lauderdale-Hollywood International Airport

EMISSION SOURCES	ANNUAL EMISSIONS (tons per year)						
	CO	VOC	NO_X	SO_X	PM_{10}[1]	$PM_{2.5}$[1]	TOTAL
Aircraft	1,632.12	281.87	1,203.49	93.20	48.81	48.81	**3,308.31**
GSE/APUs	4,639.13	174.83	256.72	26.14	6.67	6.42	**5,109.91**
Roadways	1,221.83	125.95	117.71	1.44	3.33	2.32	**1,472.58**
Parking Facilities	501.09	88.40	37.98	0.33	0.78	0.54	**629.12**
Stationary Sources	4.39	17.58	20.17	1.34	1.44	1.44	**46.36**
TOTAL	**7,998.56**	**688.62**	**1,636.08**	**122.46**	**61.03**	**59.53**	**10,566.28**

Note: GSE is ground support equipment and APUs are the auxiliary power units.
Columns and rows may not sum exactly due to rounding.

[1] Particulate matter emissions estimated in EDMS were supplemented by adding emissions calculated using the PM_{10} emission factors from the USEPA AP-42 guidance for aircraft not having PM emission factors available in the EDMS database. All emissions of PM_{10} calculated using data from the AP-42 database were conservatively assumed to be equal to emissions of $PM_{2.5}$ for the same aircraft.

Sources: FAA, Emissions and Dispersion Modeling System (EDMS) Version 4.5, 2006.
USEPA, *Compilation of Air Pollutant Emission Factors (AP-42) Volume II: Mobile Sources, 4th ed.*, Section II-1, *Aircraft*.

5.B.2.2 Dispersion Analysis

Dispersion analysis predicts pollutant concentrations with respect to space and time. Ambient background concentrations must be added to dispersion results to determine the design concentrations.[33] The design concentrations are then compared to the NAAQS to determine compliance to the SIP. The applicable ambient background concentrations used for the dispersion analysis of criteria pollutants at FLL under the 2005 Existing Conditions are provided in Appendix G, *Air Quality*.[34]

[33] Design concentration refers to the total concentration of each criteria pollutant that would be compared to the NAAQS to determine compliance to the SIP. The estimated pollutant concentration derived from computer modeling would be added to the actual monitored ambient background concentration to provide the most accurate representation of the entire contribution of pollutants to a specific location. Refer to 40 CFR Part 51, Appendix W, Section 7.2.1.1 *Design Concentrations for SO_2, PM_{10}, CO, Pb, and NO_2*, and Section 7.2.1.2, *Design Concentrations for O_3 and $PM_{2.5}$, March 1, 2007.*

[34] Refer to Appendix G, *Air Quality*, Attachment G.1, *Technical Report*, Section 3.3.4, *Background Concentrations*, Table G-18, *Background Concentrations for 2005.*

Two dispersion analyses were conducted for comparison to the NAAQS: (1) the criteria pollutant dispersion analysis based on the EDMS emission inventory,[35] and (2) the CAL3QHC roadway intersection "hot spot" CO dispersion analysis based on the results of the roadway volume analysis for four off-airport roadway intersections. The results of each analysis were added to the average ambient background concentrations to determine the design concentration for comparison to the NAAQS.

5.B.2.2.1 CRITERIA POLLUTANT DISPERSION ANALYSIS

Ten receptor locations were applied in dispersion modeling to disclose the areas of highest pollutant concentrations near sensitive areas of public access, schools, and churches, etc. The results of the dispersion analysis of the 2005 Existing Conditions emission inventory are provided in **Table 5.B-5, *Criteria Pollutant Design Concentrations 2005 Existing Conditions***. Refer to Appendix G, *Air Quality*, Attachment G.1, *Technical Report*, Section 3.3.3, *Dispersion Receptors*, for a full explanation of the number and location of dispersion receptors used in dispersion modeling.

None of the design concentrations at any of the ten receptor locations were estimated to equal or exceed the NAAQS. The highest concentrations of CO and NO_x would be caused mainly by emissions from operations of GSE in the terminal gate areas adjacent to Terminal 3 at Receptor T13. Annual average concentrations of $PM_{2.5}$ and SO_x were also highest at Receptor T13.

5.B.2.2.2 ROADWAY INTERSECTION CARBON MONOXIDE (CO) DISPERSION ANALYSIS

A "hot spot" dispersion analysis is indicated for Airport-related traffic that may have the potential to cause CO emissions that would exceed the NAAQS. Four intersections were chosen for the CO analysis for the FLL EIS. While each of the four intersections is controlled by a traffic light, other characteristics unique to each of the four were required for modeling, such as the number of turning lanes, volume of vehicles on each turning movement, and signal timing. The four intersections are:

- Griffin Road and U.S. Highway 1,
- Southeast 30th Street and U.S. Highway 1,
- Griffin Road and the Interstate-95 Ramps, and
- Ravenswood and SW 42nd Street.

[35] The dispersion analysis was based on the EDMS criteria pollutant inventory using only the emissions data estimated using the EDMS database and did not include the additional particulate matter emissions calculated and added to the inventory using the USEPA AP-42 emission factors.

Table 5.B-5
CRITERIA POLLUTANT DESIGN CONCENTRATIONS
2005 EXISTING CONDITIONS
Fort Lauderdale-Hollywood International Airport

RECEPTORS	POLLUTANT CONCENTRATIONS ($\mu g/m^3$)								
	CO		NO_x	SO_x			PM_{10}	$PM_{2.5}$	
	1-HR	8-HR	ANNUAL	3-HR[1]	24-HR	ANNUAL	24-HR	24-HR	ANNUAL
USEPA STANDARDS[1] (in $\mu g/m^3$)	**40,000**	**10,000**	**100**	**1,300**	**365**	**80**	**150**	**35**	**15**
Receptor G10	16,397.30	4,915.13	50.46	45.58	10.25	2.47	4.59	3.85	1.19
Background	4,650.65	3,436.44	16.56	74.18	13.09	3.49	54.78	20.75	8.43
TOTAL	**21,047.95**	**8,351.57**	**67.02**	**119.76**	**23.34**	**5.96**	**59.37**	**24.60**	**9.62**
Receptor R2	20,712.92	4,887.08	33.45	48.83	13.63	2.49	7.35	3.49	1.03
Background	4,650.65	3,436.44	16.56	74.18	13.09	3.49	54.78	20.75	8.43
TOTAL	**25,363.57**	**8,323.52**	**50.01**	**123.01**	**26.72**	**5.98**	**62.13**	**24.24**	**9.46**
Receptor T4	18,397.95	5,605.75	65.49	46.86	13.85	3.61	6.52	5.40	1.48
Background	4,650.65	3,436.44	16.56	74.18	13.09	3.49	54.78	20.75	8.43
TOTAL	**23,048.60**	**9,042.19**	**82.05**	**121.04**	**26.94**	**7.10**	**61.30**	**26.15**	**9.91**
Receptor T9	17,046.58	4,756.57	73.34	51.69	14.27	2.75	6.96	5.73	1.80
Background	4,650.65	3,436.44	16.56	74.18	13.09	3.49	54.78	20.75	8.43
TOTAL	**21,697.23**	**8,193.01**	**89.90**	**125.87**	**27.36**	**6.24**	**61.74**	**26.48**	**10.23**
Receptor T13	22,269.25	5,724.08	80.37	50.95	13.56	3.70	6.09	5.05	1.81
Background	4,650.65	3,436.44	16.56	74.18	13.09	3.49	54.78	20.75	8.43
TOTAL	**26,919.89**	**9,160.52**	**96.93**	**125.13**	**26.65**	**7.20**	**60.87**	**25.80**	**10.24**
Receptor T14	18,397.95	5,605.75	65.49	46.86	13.85	3.61	6.52	5.40	1.48
Background	4,650.65	3,436.44	16.56	74.18	13.09	3.49	54.78	20.75	8.43
TOTAL	**23,048.60**	**9,042.19**	**82.05**	**121.04**	**26.94**	**7.10**	**61.30**	**26.15**	**9.91**
Receptor 45	4,151.39	851.30	15.81	16.13	5.56	1.05	6.09	6.02	0.78
Background	4,650.65	3,436.44	16.56	74.18	13.09	3.49	54.78	20.75	8.43
TOTAL	**8,802.04**	**4,287.74**	**32.37**	**90.31**	**18.66**	**4.54**	**60.87**	**26.77**	**9.21**
Receptor 57	7,224.40	1,195.95	5.53	19.65	4.54	0.45	1.66	1.59	0.18
Background	4,650.65	3,436.44	16.56	74.18	13.09	3.49	54.78	20.75	8.43
TOTAL	**11,875.04**	**4,632.39**	**22.09**	**93.83**	**17.63**	**3.94**	**56.44**	**22.34**	**8.61**
Receptor 117	12,835.75	2,062.23	5.72	29.96	4.85	0.42	1.63	1.54	0.16
Background	4,650.65	3,436.44	16.56	74.18	13.09	3.49	54.78	20.75	8.43
TOTAL	**17,486.40**	**5,498.67**	**22.28**	**104.14**	**17.94**	**3.91**	**56.41**	**22.29**	**8.59**
Receptor 118	13,246.82	2,099.94	5.10	23.48	4.04	0.37	1.59	1.45	0.16
Background	4,650.65	3,436.44	16.56	74.18	13.09	3.49	54.78	20.75	8.43
TOTAL	**17,897.47**	**5,536.38**	**21.66**	**97.67**	**17.13**	**3.86**	**56.37**	**22.20**	**8.60**

Table 5.B-5, *Continued*
CRITERIA POLLUTANT DESIGN CONCENTRATIONS
2005 EXISTING CONDITIONS
Fort Lauderdale-Hollywood International Airport

Notes: $\mu g/m^3$ is micrograms per cubic meter.
"Background" refers to regional background pollutant concentrations for 2005.
Does not include the additional PM emissions estimated using USEPA AP-42 data, as was given for the emission inventory in Table 5.B-4. Refer to Appendix G, *Air Quality*, Attachment G.1, *Technical Report*, Section 3.2, *Criteria and Precursor Pollutant Emission Inventory*.

[1] All USEPA standards given are primary standards, which incidentally match the secondary standards, with the exception of sulfur dioxide. The annual and 24-hour average concentrations of SO_x are primary standards, whereas the three-hour standard is the secondary standard. Refer to Table 5.B-1, *National Ambient Air Quality Standards (NAAQS)*.

Source: FAA, Emissions and Dispersion Modeling System (EDMS) Version 4.5, 2006.

An aerial photograph of the modeled intersections is shown in Appendix G, *Air Quality*.[36] The results of the CAL3QHC" CO dispersion analysis are provided in **Table 5.B-6**, ***Roadway Intersection Carbon Monoxide Design Concentrations - 2005 Existing Conditions***. The design concentrations given in Table 5.B-6 include the same CO background concentrations used for the criteria pollutant dispersion analysis in Table 5.B-5. The highest estimated concentration of CO calculated for each intersection is reported in Table 5.B-6. None of the design concentrations projected for the intersection analysis was estimated to equal or exceed the CO NAAQS at any of the intersection locations.

The highest concentration of CO at the intersection of Griffin and U.S. Highway 1 occurs at the southeast corner of the intersection, outside the northbound approach lanes of U.S. Highway 1. This intersection experiences the highest volume of vehicles and the longest queuing, which results in the highest CO concentrations compared to the other three intersections.

At the intersection of Southeast 30th Street and U.S. Highway 1, the highest concentration of CO is along the west side of the U.S. Highway 1 southbound approach lanes, caused by the high number of vehicles approaching the intersection and queuing for right and left turns.

The maximum concentration of CO at the intersection of Griffin Road and the Interstate-95 ramps occurs at the northwest corner of the intersection, outside the Interstate-95 southbound exit ramp onto the eastbound departure lanes on Griffin Road.

[36] Refer to Appendix G, *Air Quality*, Attachment G.1, *Technical Report*, Section 3.4, *Roadway Intersection Carbon Monoxide (CO) Dispersion Analysis*.

Table 5.B-6
ROADWAY INTERSECTION CARBON MONOXIDE DESIGN CONCENTRATIONS
2005 EXISTING CONDITIONS
Fort Lauderdale-Hollywood International Airport

INTERSECTIONS	CARBON MONOXIDE DESIGN CONCENTRATIONS ($\mu g/m^3$)	
	1-HOUR	8-HOUR
USEPA STANDARDS[1] (in $\mu g/m^3$)	**40,000**	**10,000**
Griffin and U.S. Highway 1	7,557.89	5,584.65
Background	4,650.65	3,436.44
TOTAL	**12,208.54**	**9,021.09**
Southeast 30th Street and U.S Highway 1	7,214.35	5,330.80
Background	4,650.65	3,436.44
TOTAL	**11,865.00**	**8,767.24**
Griffin and Interstate-95 Ramps	4,351.51	3,215.40
Background	4,650.65	3,436.44
TOTAL	**9,002.16**	**6,651.84**
Ravenswood and SW 42nd Street	1,717.70	1,269.24
Background	4,650.65	3,436.44
TOTAL	**6,368.35**	**4,705.68**

Note: $\mu g/m^3$ is micrograms per cubic meter.
"Background" refers to regional background pollutant concentrations for 2005.

Sources: USEPA, CAL3QHC.
The Corradino Group analysis, 2006.
Landrum & Brown analysis, 2006.

The highest concentration of CO at the intersection of Ravenswood and SW 42nd Street is caused by the queue of vehicles making a left turn onto eastbound 42nd Street. This intersection experiences the lowest CO concentrations, compared to the other three intersections.

5.B.3 CONCLUSION

Broward County is designated as attainment for all the NAAQS as of the EIS publication. However, an evaluation of General Conformity for the agency's preferred alternative would still be required because the SIP currently in effect designates Broward County as a maintenance area. (*See* Section 5.B.1.3, *Broward County Air Quality Status*.)

The relatively high number of passengers served at the airport requires a comparative assessment of airport emissions to the NAAQS, pursuant to NEPA and FAA guidelines. As such, an emission inventory of 2005 Existing Conditions was prepared and a dispersion analysis was conducted to determine the contribution of airport emissions to local air quality. The analyses showed that concentrations of criteria pollutants under the 2005 Existing Conditions would be less than the NAAQS at all of the airport receptor locations included in the analysis and at all of the receptors evaluated for the four roadway intersections.