APPENDIX J
AIR QUALITY

This Appendix contains background material which supplements the material contained in the **Section 5.6, Air Quality,** of **Chapter 5, Environmental Consequences**. This Appendix consists of the following sections:

- J.1 Air Quality Analysis Protocol - Criteria Air Pollutants: Discusses the suggested guideline for conducting the O'Hare Modernization Environmental Impact Statement (EIS).
- J.2 Technical Memorandum: Provides the modeling methodology and input data used in the air quality analysis.

The following attachments are also provided at the end of this Appendix:

- **Attachment J-1: Draft Air Quality Analysis Protocol – Criteria Pollutants**, page J-192. Provides guidelines for conducting the O'Hare Modernization EIS air quality analysis.
- **Attachment J-2: Final General Conformity Determination**, page J-225. The FAA's determination that air pollutant emissions, that would result from the proposed improvements at O'Hare, conform to the State of Illinois' 1-hour ozone attainment demonstration State Implementation Plan (SIP).
- **Attachment J-3: Final General Conformity Determination – Correspondence**, page J-344. Includes correspondence and meeting minutes related to the General Conformity evaluation/determination.
- **Attachment J-4: Final General Conformity Determination – Transportation Conformity Documentation**, page J-348. Includes letters from/to the FAA regarding proposed and planned (by others) transportation (roadway) improvements.
- **Attachment J-5: Final General Conformity Determination– Comments/Responses**, page J-352. Includes comments on, and responses by, the FAA with respect to the Draft General Conformity Determination (published by the FAA in May, 2005).

J.1 AIR QUALITY ANALYSIS PROTOCOL - CRITERIA AIR POLLUTANTS

The following attachment (**Attachment J-1, Draft Air Quality Analysis Protocol – Criteria Pollutants**) was the suggested guideline for conducting the O'Hare Modernization EIS air quality analyses. The United States Environmental Protection Agency (USEPA) and the Illinois Environmental Protection Agency (IEPA) are Cooperating Agencies for this EIS. Prior to Scoping, FAA met with USEPA and IEPA representatives to identify their concerns and to initiate the development of the air quality assessment methodologies structured to best address those concerns. Thereafter, FAA maintained close coordination with the USEPA and IEPA as each step of the air quality analyses was initiated. FAA's coordination included development of this air quality protocol that established rigorous analytic methodologies which were discussed, and subsequently modified, based on input from these Agencies.

J.2 TECHNICAL MEMORANDUM

J.2.1 Introduction

This Technical Memorandum presents the modeling methodology and input data used to prepare the air quality analysis for the O'Hare Modernization EIS and its alternatives assuming the City Contactor Team's (CCT's) Original, Compressed, and Delayed Schedules for the improvements.

Implementation of the proposed airport improvement alternatives would result in both short-term and long-term air quality effects. Over the short-term, local air quality conditions would be temporarily affected due to construction activities. Over the long-term, the alternatives have the potential to affect air quality conditions due to increases in the number of aircraft operations and airport support operations, and changes to aircraft and motor vehicle circulation patterns (including delay and congestion). To evaluate the effect of these changes on local and regional air quality conditions, two types of air quality analyses were performed -- emission inventories and dispersion modeling.

Emission inventories provide an indication of increases and decreases in air pollutant or pollutant precursor emissions by providing an estimate of total pollutants generated by the affected sources with and without the proposed alternatives. Dispersion modeling provides predicted concentrations of ambient pollutant levels that can be compared directly to the National Ambient Air Quality Standards (NAAQS). For the proposed alternatives, two "scales" of dispersion analysis were performed -- macroscale and microscale.

The airport operation and construction-related emission inventories and dispersion modeling estimates were prepared for the years 2002, 2007, 2009, 2013, and 2018. The 2007, 2009, 2013, and 2018 analysis was performed for Alternative A (No Action Alternative) and Alternative C. Alternatives D and G were also evaluated in the years 2013 and 2018. Additional construction-related inventories were prepared for the years 2004 through 2006, 2008, and 2010 through 2012.

The modeling methodologies and input data are described in detail in the following sections.

Original Schedule

Emission Inventories

Prior to Scoping, FAA met with USEPA and IEPA representatives to identify their concerns and to initiate the development of the air quality assessment methodologies structured to best address those concerns. FAA's ongoing coordination included development of the air quality protocols[1] that established rigorous analytic methodologies which were discussed and subsequently modified based on input from these Agencies.

For the purpose of this EIS, the Original Schedule assumes that the construction would begin in the year 2004 and continue through the year 2014, that the years 2007, 2009, and 2013 represent the last year of Construction Phase I, Construction Phase II, and Build Out, and the year 2018 represents Build Out +5 conditions.

Airport Operations - Emission inventories provide an indication of increases and decreases in air pollutant or pollutant precursor emissions by providing an estimate of total emissions from sources with and without project implementation.

Construction - Pollutant emissions resulting from activities associated with the construction of the proposed runways, extended runways, proposed and extended taxiways, proposed terminals, parking facilities, and roadways were also estimated. Data regarding the number of pieces and types of construction equipment to be used on the project, the deployment schedule of equipment (monthly and annually), and the approximate daily operating time (including power level or usage factor) were estimated for each individual construction project based on a schedule of construction activity. These estimates were prepared by the City's consulting team (CCT) and used in the analysis after review and acceptance by the Third Party Contractor (TPC). The estimates were provided by project phase, by subcomponent, and by month.

Construction activities for individual projects were assumed to begin in the year 2004 and extend through the year 2014. The construction emissions estimated to occur during the project years of 2007, 2009, and 2013 were included in the emission inventories and the dispersion analysis.

Compressed Schedule

Emission Inventories

Airport Operations – As discussed in **Section 5.0 Introduction** of this EIS, the Compressed Schedule assumes that the first runway would be operational in the fall of 2007. To be conservative, the air quality analysis assumes that the runway would be in place for the entire year of 2007. As such, the methodologies used to estimate emissions with the Compressed Schedule were the same as those described for the Original Schedule.

Construction - When compared to the Original Schedule, the Compressed Schedule would change the level of pollutant and pollutant precursor emissions estimated for Construction Phase I only. The emission estimates for the Compressed Schedule were based on a schedule of

[1] Protocols for Air Quality Criteria Pollutants and Hazardous Air Pollutants (HAPS) were completed.

construction activity prepared by the City of Chicago's consulting team (CCT) after review and acceptance by the FAA's TPC. The emission factors, models, and assumptions regarding demolition and fugitive particulate matter were the same as for the Compressed Schedule. Construction activities for individual projects were assumed to begin in the year 2005 and extend through the year 2014.

Dispersion Analysis

The macroscale dispersion analysis for the Compressed Schedule used, as a base, results of the dispersion analysis for the Original Schedule and estimated increases in the level of construction-related emissions with the Compressed Schedule during the year 2007. This methodology can be considered conservative because no adjustments were made to account for the forecast decrease in the rate of construction equipment emissions from one year to the next.

The surface transportation analysis that was used to perform the microscale dispersion analysis for the Original Schedule conservatively assumed the maximum number of construction-related employee trips for all evaluated intersections. This number of trips exceeds the estimated number of construction-related trips at any of the evaluated intersections with the Compressed Schedule during Construction Phase I.[2] As such, the results of the microscale dispersion analysis for the Compressed Schedule were assumed to be the same as the results for the Original Schedule.

Delayed Schedule

Emission Inventories

The Delayed Schedule assumes that construction would begin in the year 2005 and continue through the year 2015 with the years 2008, 2010, and 2014 representing the last year of Construction Phase I, Construction Phase II, and Build Out, and the year 2019 representing Build Out +5 conditions. Forecast operations for the original schedule were adjusted to estimate the operations for the Delayed Schedule. These forecast operations were then included in the EDMS analysis to estimate the emission inventories. Adjustments to the Original Schedule data were also made to develop aircraft ground time estimates for the Delayed Schedule.

Dispersion Analysis

The dispersion analysis for the Delayed Schedule used the Delayed Schedule emission inventory analysis to determine dispersion modeling results. The operational profiles used in the Delayed Schedule analysis were the same as those used for the analysis of the Original Schedule.

J.2.2 Emission Inventories

Estimates of air pollutant and pollutant precursor emissions by source are known as emission inventories. Emission inventories provide an indication of the potential increase/decrease in air pollutants and precursors with proposed projects when compared to a no-action alternative. For airport-related assessments, emission inventories summarize the total quantity of each

[2] Memo, O'Hare Modernization Program: Revised Methodology for OMP Construction Traffic, CCT, April 7, 2004.

pollutant emitted by aircraft, motor vehicles, and other airport-related emission sources within a defined area. For the evaluation, annual emissions, expressed in tons, were estimated from airport-related sources and from motor vehicles on the major roadways in the vicinity of the Airport. The pollutants and pollutant precursors inventoried were volatile organic compounds, nitrogen oxides, carbon monoxide, sulfur dioxide, and respirable particulate matter with a diameter of 10 microns or less.

The airport-related sources that were included in the emissions inventory were aircraft, ground support equipment, motor vehicles (using on- and off-Airport roadways, parking facilities and terminal curbsides), fuel storage and handling, training fires, and on-site stationary combustion sources including the Heating and Refrigeration Plant, other miscellaneous boiler units, and emergency turbines.

The emission inventories were prepared using the FAA's Emissions and Dispersion Modeling System (EDMS - Version 4.12, dated October 22, 2003). EDMS calculates emission inventories using source-specific emission factors and user-provided source activity levels. The source-specific emission factors are expressed in units of measure by source activity type. For example, total aircraft emissions are a function of the time each aircraft spends in the approach, takeoff, taxi, and idle (or delay) modes of a landing and takeoff cycle. EDMS contains emission factors for each of these aircraft operational modes for individual types of aircraft.

The following provides information regarding the airport-specific information used in the EDMS to calculate the emission inventories.

J.2.2.1 Aircraft

Aircraft activity levels (aircraft arrival and departure operations) and aircraft/engine assignments were provided by Landrum & Brown, Inc., part of the City's Consultant Team (CCT), after a review by Leigh Fisher Associates, one of the FAA's Third Party Contractors (TPC). This data included the aircraft/engine combination currently at use at O'Hare and additional types of aircraft and candidate engines forecast to be in service at the Airport in the future. Aircraft emissions are based on specific engine types and times in each of the four aircraft operating modes: approach, landing, takeoff, and taxi/idle-delay. The taxi/idle-delay mode includes the landing roll, which is the movement of an aircraft from touchdown through deceleration to taxi speed or full stop. The aircraft fleet/operational level data used in the air quality analysis are consistent with those used to assess noise impacts with the proposed alternatives.

Activity Levels and Fleet Mixes

Table J.2-1A and **J.2-1B** provides the number of annual landing/takeoff cycles by aircraft type for each analysis year (2002, 2007, 2009, 2013, and 2018, respectively), for each alternative, and for the original, compressed, and delayed construction schedules.

O'Hare-specific peak month average week day operations were obtained from the FAA's EIS TAAM modeling, conducted by the CCT at the direction, oversight and review by FAA. The

peak month average week day aircraft operational data were extrapolated to annual aircraft landing/takeoff cycles using the design day ratio.

TABLE J.2-1A
AIRCRAFT FLEET MIX/NUMBER OF LANDING/TAKEOFF CYCLES – ORIGINAL AND COMPRESSED SCHEDULES

					2007		2009		2013		2018	
Aircraft Category	ARTS Code	Aircraft Type	Engine Type	2002	Alt. A	Alt. C, D, G	Alt. A	Alt. C, D, G	Alt. A	Alt. C, D, G	Alt. A	Alt. C, D, G
Passenger/ Wide	332	A330	CF6-80E1A4 (STD)	--	354	354	354	354	354	354	354	354
	332	A330	PW4168A	--	354	354	354	354	354	354	354	354
	332	A330	TRENT-772	349	354	354	354	354	354	354	354	354
	333	A330-300	CF6-80E1A2	349	--	--	--	--	--	--	--	--
	333	A330-300	PW4168A	--	177	177	354	354	354	354	354	354
	333	A330-300	TRENT-772 New Comb	--	354	354	354	354	708	707	708	708
	340	A340-300	CFM56-5C3	697	--	--	--	--	--	--	--	--
	340	A340-300	CFM56-5C4	349	--	--	--	--	--	--	--	--
	342	A340-200	CFM56-5C2	--	354	354	354	354	354	354	354	354
	343	A340-300	CFM56-5B5/P	349	--	--	--	--	--	--	--	--
	343	A340-300	CFM56-5C2	349	177	177	531	531	354	354	354	354
	343	A340-300	CFM56-5C3	--	--	--	--	--	177	530	--	531
	343	A340-300	CFM56-5C4	--	2,302	2,302	1,948	1,947	2,302	2,652	1,417	3,008
	346	A340-300	CFM56-5C4	--	--	--	354	354	354	354	354	354
	346	A340-642	TRENT 556-61	--	--	--	--	--	354	354	1,062	1,062
	380	A380	GE GP7200	--	--	--	354	354	708	708	1,417	1,770
	744	B747-400	CF6-80C2B1F	349	1,062	1,062	708	708	354	354	354	354
	744	B747-400	PW4056	2,962	2,126	2,124	2,125	2,124	2,480	2,475	3,542	2,654
	744	B747-400	RB211-524H	697	--	--	--	--	354	354	354	354
	744	B747-400F	CF6-80C2B1F	--	--	--	--	--	--	--	--	354
	747	B747-400	CF6-80C2B1F	348	--	--	--	--	--	--	--	--
	762	B767-200	JT9D-7A (MOD V)	349	--	177	--	--	--	--	--	--
	763	B767-300	CF6-80A2	349	177	177	--	--	--	--	--	--
	763	B767-300	CF6-80C2B6	1,917	--	--	--	--	--	--	--	--
	763	B767-300	CF6-80C2B6F	--	354	354	354	354	354	354	354	708
	763	B767-300	PW4060	4,008	5,136	5,135	5,313	5,310	6,021	6,011	7,260	2,832

TABLE J.2-1A
AIRCRAFT FLEET MIX/NUMBER OF LANDING/TAKEOFF CYCLES – ORIGINAL AND COMPRESSED SCHEDULES

					2007		2009		2013		2018	
Aircraft Category	ARTS Code	Aircraft Type	Engine Type	2002	Alt. A	Alt. C, D, G	Alt. A	Alt. C, D, G	Alt. A	Alt. C, D, G	Alt. A	Alt. C, D, G
	763	B767-300ER	CF6-80C2B6	697	4,782	4,781	5,667	6,194	6,906	7,426	7,084	7,255
	763	B767-300ER	CF6-80C2B7F	--	354	354	708	708	1,062	1,061	708	1,416
	763	B767-300ER	PW4060	697	531	531	885	885	1,062	1,061	708	885
	767	B767-200	CF6-80A2	1,742	--	--	--	--	--	--	--	--
	772	B777-200	GE90-76B	--	177	177	177	177	177	177	177	177
	772	B777-200	GE90-85B	--	354	354	354	354	708	707	354	708
	772	B777-200	GE90-90B	--	177	177	177	177	177	177	177	177
	772	B777-200	GE90-94B	--	177	177	--	--	--	--	--	--
	772	B777-200	PW4077	--	1,770	1,771	2,480	2,478	2,480	2,475	2,833	3,716
	772	B777-200	PW4090	349	3,188	3,187	3,365	4,248	3,365	4,243	6,552	6,724
	772	B777-200	Trent 892	--	2,480	2,479	2,480	2,478	2,480	2,475	4,959	4,600
	772	B777-200	Trent 895	--	354	354	354	354	708	707	708	708
	773	B777-300	GE90-115B	--	177	177	354	354	354	354	177	531
	773	B777-300	GE90-92B (DACII)	--	354	354	354	354	354	354	354	354
	773	B777-300	PW4090	--	--	--	--	--	--	--	531	177
	773	B777-300	Trent 892	--	531	531	354	354	354	354	--	--
	777	B777-200	PW4084	5,228	--	--	--	--	--	--	--	--
	777	B777-200	TRENT 892	2,091	--	--	--	--	--	--	--	--
	74M	B747-300	CF6-50E2	349	354	354	354	354	354	354	354	354
	M11	MD-11	PW4460	349	--	--	--	--	--	--	--	--
	M1M	MD-11-11F	CF6-80C2D1F	349	--	--	--	--	--	--	--	--
Subtotal Passenger/Wide				25,272	29,041	29,213	31,874	33,275	36,831	38,902	44,622	44,595
Passenger/ Narrow	100	Fokker 100	TAY650-15	35,547	--	--	--	--	--	--	--	--
	146	BAE146-200	ALF502R-5	10,455	--	--	--	--	--	--	--	--
	319	A319	CFM56-5A5	1,917	3,542	2,833	8,146	9,556	8,677	9,724	8,855	9,909
	319	A319	CFM56-5B6/P	--	1,594	1,594	4,958	5,840	5,490	7,249	2,125	3,539
	319	A319	V2522-A5	22,826	45,512	63,214	44,627	64,947	50,825	57,992	46,044	63,522

TABLE J.2-1A
AIRCRAFT FLEET MIX/NUMBER OF LANDING/TAKEOFF CYCLES – ORIGINAL AND COMPRESSED SCHEDULES

					2007		2009		2013		2018	
Aircraft Category	ARTS Code	Aircraft Type	Engine Type	2002	Alt. A	Alt. C, D, G	Alt. A	Alt. C, D, G	Alt. A	Alt. C, D, G	Alt. A	Alt. C, D, G
	319	A319	V2524-A5	697	1,417	1,417	1,417	--	1,417	6,895	1,416	1,416
	320	A320	V2500-A1	3,485	3,188	2,656	2,656	2,655	3,011	3,006	2,302	2,300
	320	A320	V2527-A5	--	48,346	30,102	37,543	30,084	39,314	57,109	34,887	61,753
	320	A320-100	CFM56-5A1	--	354	354	354	354	354	354	354	354
	320	A320-100	CFM56-5B4/2P	--	--	--	2,302	2,124	--	--	--	--
	320	A320-200	CFM56-5A1	1,394	1,771	1,771	2,479	1,770	2,480	2,829	1,948	2,300
	320	A320-200	CFM56-5A3	--	--	--	--	--	--	--	531	531
	320	A320-200	CFM56-5B4/P		708	708	708	708	708	707	708	708
	320	A320-200	V2527-A5	30,668	--	--	--	--	--	--	--	--
	320	A320-211	CFM56-5A1	697	--	--	--	--	--	--	--	--
	320	A321	CFM56-5B3/P	349	354	354	354	354	354	354	--	354
	321	A320	V2527-A5	--	--	--	30,991	19,467	43,210	19,449	51,710	19,464
	321	A321	CFM56-5B3/P	--	--	--	--	--	2,833	3,183	6,730	7,432
	717	B717-200	BR700-715C1-30	--	--	--	--	--	--	2,829	--	5,308
	732	B737-200	JT8D-15A	--	1,063	1,062	--	--	--	--	--	--
	733	B737-300	CFM56-3-B1	4,182	--	--	--	--	--	--	--	--
	733	B737-300	CFM56-3B-1	--	708	708	--	--	--	--	--	--
	733	B737-300	CFM56-3B-1	--	885	885	--	--	--	--	--	--
	733	B737-300	CFM56-3B-2	--	2,479	3,364	--	--	--	--	--	--
	733	B737-300	CFM56-3C-1	29,622	18,949	22,665	18,241	22,651	--	--	--	--
	734	B737-400	CFM56-3B-2	3,485	1,771	2,125	--	--	--	--	--	--
	734	B737-400	CFM56-3C-1	349	--	--	--	--	--	--	--	--
	735	B737-500	CFM56-3C-1	27,706	3,542	3,541	--	--	--	--	--	--
	737	B737-200	JT8D-15A	--	354	354	354	354	354	354	354	354
	737	B737-200	JT8D-17	697	--	--	--	--	--	--	--	--
	737	B737-200	JT8D-17A	697	--	--	--	--	--	--	--	--
	737	B737-200	JT8D-9A	697	--	--	--	--	--	--	--	--
	737	B737-700	CFM56-7B22	--	--	--	---	--	708	707	5,312	17,340

TABLE J.2-1A
AIRCRAFT FLEET MIX/NUMBER OF LANDING/TAKEOFF CYCLES – ORIGINAL AND COMPRESSED SCHEDULES

					2007		2009		2013		2018	
Aircraft Category	ARTS Code	Aircraft Type	Engine Type	2002	Alt. A	Alt. C, D, G	Alt. A	Alt. C, D, G	Alt. A	Alt. C, D, G	Alt. A	Alt. C, D, G
	737	B737-700	CFM56-7B24	--	354	354	3,896	3,893	3,896	3,890	3,542	3,893
	738	B737-800	CFM56-7B26	15,334	708	708	5,667	5,310	5,490	5,658	1,594	3,539
	738	B737-800	CFM56-7B27	349	28,334	13,103	29,751	16,989	80,931	103,785	66,940	105,280
	739	B737-900	CFM56-7B26	--	11,157	11,155	13,104	13,627	32,762	15,736	48,523	17,870
	757	B757-200	PW2037	27,008	19,834	19,832	--	708	--	--	--	--
	757	B757-200	PW2040	--	1,063	1,062	1,063	1,062	--	--	--	--
	757	B757-200	RB211-535E4	1,045	--	--	--	--	--	--	--	--
	757	B757-200	RB211-535E4B	5,227	--	--	--	--	--	--	--	--
	72S	B727-200	JT8D-17A	1,045	--	--	--	--	--	--	--	--
	73G	B737-700	CFM56-7B24	349	--	--	--	--	--	--	--	--
	D8F	D8-73F	CFM56-2C5	--	--	354	--	--	--	--	--	--
	D95	DC9-50	JT8D-17	--	1,771	1,771	--	--	--	--	--	--
	D9S	DC-9-14	JT8D-7B	--	177	354	--	--	--	--	--	--
	D9S	DC9-30	JT8D-15	7,318	--	--	--	--	--	--	--	--
	D9S	DC-9-31	JT8D-7B	--	885	1,239	--	--	--	--	--	--
	D9S	DC-9-31	JT8D-9A	--	708	885	--	--	--	--	--	--
	D9S	DC-9-32	JT8D-15	--	708	708	--	--	--	--	--	--
	D9S	DC-9-32	JT8D-7B	--	--	177	--	--	--	--	--	--
	D9S	DC-9-32	JT8D-9A	--	531	1,062	--	--	--	--	--	--
	D9S	DC-9-41	JT8D-11	--	531	531	--	--	--	--	--	--
	M80	MD-80-81	JT8D-217	--	177	177	177	177	177	177	--	--
	M80	MD-80-81	JT8D-217C	--	885	885	708	708	354	530	--	--
	M80	MD-80-82	JT8D-209	3,136	--	--	--	--	--	--	--	--
	M80	MD-80-82	JT8D-217	--	177	177	177	177	177	354	--	--
	M80	MD-80-82	JT8D-217A	523	6,552	7,614	6,198	7,079	708	1,061	--	--
	M80	MD-80-82	JT8D-217C	50,532	46,044	57,371	43,919	57,161	177	530	--	--
	M80	MD-80-82	JT8D-219	--	354	354	708	354	354	530	--	--
	M80	MD-80-83	JT8D-217	--	708	708	885	885	--	--	--	--

TABLE J.2-1A
AIRCRAFT FLEET MIX/NUMBER OF LANDING/TAKEOFF CYCLES – ORIGINAL AND COMPRESSED SCHEDULES

					2007		2009		2013		2018	
Aircraft Category	ARTS Code	Aircraft Type	Engine Type	2002	Alt. A	Alt. C, D, G	Alt. A	Alt. C, D, G	Alt. A	Alt. C, D, G	Alt. A	Alt. C, D, G
	M80	MD-80-83	JT8D-219	7,493	14,699	21,603	16,824	21,590	354	530	--	--
	M80	MD-80-87	JT8D-219	--	177	177	177	177	177	177	--	--
	M80	MD-80-88	JT8D-219	2,788	3,188	3,187	--	--	--	--	--	--
	M87	MD-80-87	JT8D-219	--	708	708	708	708	--	--	--	--
	M90	MD-90-30	V2525-D5	697	1,063	1,062	--	--	--	--	--	--
Subtotal Passenger/Narrow				298,314	278,030	287,025	279,092	291,469	285,292	305,699	283,876	327,166
Commuter	BE1	DHC-6	PT6A-20	4,182	1,063	1,062	1,063	1,062	1,063	1,061	--	--
	BE40	T-1A	JT15D-5 (A&B)	349	354	354	354	354	354	354	354	354
	BE58	Cessna 172	O-320	349	357	360	358	349	357	352	358	349
	C210	Cessna 208	PT6A-114	697	715	719	715	697	715	701	716	697
	C401	Cessna T337	IO-360-B	349	--	--	--	--	--	--	--	--
	C550	Citation II	JT15D-4 (B,C,D)	174	531	531	531	531	708	707	708	708
	C560	Citation V	JT15D-5 (A&B)	349	1,063	1,062	1,417	1,416	1,417	1,414	1,417	1,416
	C56X	Citation V	JT15D-5 (A & B)	--	708	708	708	708	708	707	708	708
	C650	Citation VII	TFE 731-2-2B	349	2,125	2,125	2,125	2,124	2,125	2,122	2,125	2,123
	C750	Citation X	AE3007C	697	2,479	2,479	2,479	2,478	2,479	2,475	2,479	2,477
	CL60	CL600	ALF 502L-2	349	354	354	354	354	354	354	708	708
	CR7	Canadair Reg-700	CF34-8C1	--	51,711	40,195	65,170	57,868	63,398	69,662	50,471	66,531
	CR9	Canadair Reg-900	CF34-8C5	--	3,719	3,187	10,803	8,494	18,949	20,156	41,262	43,882
	CRJ	Canadair Reg-100	CF34-3A1	2,091	2,125	2,125	2,125	2,124	2,125	2,122	3,188	3,185
	CRJ	CL604	CF34-3B	49,835	48,523	62,506	35,772	54,329	23,730	44,025	354	354
	CRJ	CL604	CF34-3B	--	--	--	--	--	--	--	14,167	34,857
	D38	DO 328	PW119-B	3,833	--	--	--	--	--	--	--	--
	E140	Embraer ERJ 135/140	AE3007A1/3 (Type 2)	--	14,167	23,019	6,198	12,388	--	--	--	--
	E145	Embraer ERJ 145	AE3007A1	--	31,522	38,247	26,918	39,641	26,564	49,683	19,480	46,889
	ER4	Embraer ERJ 145	AE3007A	1,394	--	--	--	--	--	--	--	--
	ER4	Embraer ERJ 135/140	AE3007A3 (TYPE 2)	40,077	--	--	--	--	--	--	--	--

TABLE J.2-1A
AIRCRAFT FLEET MIX/NUMBER OF LANDING/TAKEOFF CYCLES – ORIGINAL AND COMPRESSED SCHEDULES

Aircraft Category	ARTS Code	Aircraft Type	Engine Type	2002	2007 Alt. A	2007 Alt. C, D, G	2009 Alt. A	2009 Alt. C, D, G	2013 Alt. A	2013 Alt. C, D, G	2018 Alt. A	2018 Alt. C, D, G
	ERD	Embraer ERJ 135/140	AE3007A3 (TYPE 2)	17,425	--	--	--	--	--	--	--	--
	ERJ	Embraer ERJ 145	AE3007A1E	1,394	--	--	--	--	--	--	--	--
	F2TH	CL600	CF34-3B	--	708	708	708	708	708	707	708	708
	F900	Fokker 70	TAY620-15	523	531	531	531	531	531	530	531	531
	FA20	Falcon 20	CF700-2D	--	354	354	354	354	354	354	354	354
	FA50	Falcon 50	TFE731-3	174	177	177	177	177	531	530	531	531
	G2	Gulfstream II	SPEY MK511-8	174	177	177	177	177	--	--	--	--
	G4	Gulfstream IV	TAY MK611-8	349	354	354	354	354	354	354	354	354
	G5	Gulfstream V	BR700-710A1-10	349	1,063	1,062	1,063	1,062	1,240	1,238	1,240	1,239
	H25C	HS 125	TFE731-3	--	1,417	1,417	1,417	1,416	1,417	1,414	1,417	1,416
	LJ30	Learjet 31	TFE 731-2-2B	523	531	531	531	531	531	530	531	531
	LJ35	Learjet 35/36	TFE 731-2-2B	--	708	708	708	708	708	707	708	708
	LJ45	Learjet 35/36	TFE 731-2-2B	349	354	354	354	354	354	354	354	354
	LJ55	Learjet 35/36	TFE 731-2-2B	1,045	1,063	1,062	1,063	1,062	1,063	1,061	1,063	1,062
	LJ60	Learjet 35/36	TFE 731-2-2B	697	708	708	885	885	1,063	1,061	1,240	1,239
Subtotal Commuter				128,076	169,661	187,176	165,412	193,236	153,900	204,735	147,526	214,265
Cargo/ Wide	306	A300-B4-605R	CF6-80C2A5	349	--	--	--	--	--	--	--	--
	310	A310-200F	CF6-80A3	871	--	--	--	--	--	--	--	--
	742	B747-200	CF6-50E2	174	--	--	--	--	--	--	--	--
	742	B747-200	JT9D-7A	174	--	--	--	--	--	--	--	--
	742	B747-200F	CF6-50E2	349	--	--	--	--	--	--	--	--
	744	B747-400F	CF6-80C2B1F	349	--	--	--	--	--	--	--	--
	31F	A310-200F	CF6-80A3	--	177	177	177	177	354	354	354	354
	31F	A310-200F	JT9D-7R4E1	--	177	177	177	177	354	354	354	354
	38F	A380	GE GP7200	--	--	--	--	--	--	--	354	354
	74F	B747-100F	JT9D-7A	349	177		177	177	177	177	177	177
	74F	B747-200F	CF6-50E2	--	354	354	354	354	354	354	354	354

TABLE J.2-1A
AIRCRAFT FLEET MIX/NUMBER OF LANDING/TAKEOFF CYCLES – ORIGINAL AND COMPRESSED SCHEDULES

					2007		2009		2013		2018	
Aircraft Category	ARTS Code	Aircraft Type	Engine Type	2002	Alt. A	Alt. C, D, G	Alt. A	Alt. C, D, G	Alt. A	Alt. C, D, G	Alt. A	Alt. C, D, G
	74F	B747-200F	JT9D-7F	174	--	--	--	--	--	--	--	--
	74F	B747-200F	JT9D-7J	174	--	--	--	--	--	--	--	--
	74F	B747-400	CF6-80C2B1F	349	531	531	708	708	708	707	708	708
	74F	B747-400	CF6-80E1A4 (STD)	174	--	--	--	--	--	--	--	--
	74F	B747-400	PW4056	523	--	--	--	--	--	--	--	--
	74F	B747-400	RB211-524H	174	354	354	354	354	354	354	354	354
	74F	B747-400F	CF6-80C2B1F	697	1,594	1,594	1,417	1,416	1,417	1,414	1,417	1,416
	74F	B747-400F	CF6-80C2B5F	--	177	177	177	177	177	177	177	177
	74F	B747-400F	PW4056	--	885	885	885	885	885	884	885	885
	74G	B747-400	PW4056	174	--	--	--	--	--	--	--	--
	76F	B767-200	CF6-80A (A1)	--	--	--	--	--	708	707	531	531
	76F	B767-200	JT9D-7R4D	--	--	--	--	--	--	--	177	177
	76F	B767-300F	CF6-80C2B7F	--	354	354	354	354	708	707	708	708
	A3F	A300-600F	CF6-80C2A5	--	708	708	177	177	1,063	1,061	885	885
	A3F	A300-600F	CF6-80C2A6	--	--	--	177	177	--	--	--	--
	A3F	A300-600F	CF6-80C2A7	--	--	--	177	177	--	--	--	--
	A3F	A300-600F	CF6-80C2A8	--	--	--	177	177	--	--	--	--
	A3F	A300-600F	CF6-80C2A9	--	--	--	177	177	--	--	--	--
	A3F	A300-600F	PW4158	--	354	354			354	354	354	354
	A3F	A300-605F	CF6-80C2A5	--	--	--	177	177	--	--	177	177
	A3F	A300-F4-200	CF6-50C2	--	354	354	354	354	708	707	708	708
	A3F	A300-F4-200	CF6-80C2A5F	--	354	354	354	354	354	354	354	354
	ABF	A300-600	PW4158	174	--	--	--	--	--	--	--	--
	ABF	A300-B4-605R	CF6-80C2A5	174	--	--	--	--	--	--	--	--
	ABF	A300-F4-200	CF6-80C2A5F	697	--	--	--	--	--	--	--	--
	D1F	DC10-10F	CF6-6D	1,045	177	177	177	177	--	--	--	--
	D1F	DC10-30F	CF6-50C2	--	177	177	177	177	--	--	--	--
	M1F	MD-11-11F	CF6-80C2D1F	174	1,063	1,062	1,063	1,062	1,417	1,414	1,063	1,062

TABLE J.2-1A
AIRCRAFT FLEET MIX/NUMBER OF LANDING/TAKEOFF CYCLES – ORIGINAL AND COMPRESSED SCHEDULES

					2007		2009		2013		2018	
Aircraft Category	ARTS Code	Aircraft Type	Engine Type	2002	Alt. A	Alt. C, D, G	Alt. A	Alt. C, D, G	Alt. A	Alt. C, D, G	Alt. A	Alt. C, D, G
	M1F	MD-11-11F	PW4460	349	177	177	177	177	177	177	177	177
Subtotal Cargo/Wide				7,667	8,144	7,966	8,144	8,142	10,269	10,256	10,268	10,266
Cargo/ Narrow	72F	B727-200F	JT8D-17A	697	354	354	354	354	--	--	--	--
	72F	B727-200F	JT8D-7B	--	354	354	354	354	--	--	--	--
	75F	B757-200F	PW2040	--	--	--	177	177	354	354	354	354
	75F	B757-200F	RB211-535E4	--	--	--	177	177	354	354	354	354
	C9	C-9B	JT8D-9	174	--	--	--	--	--	--	--	--
	D8F	DC8	JT3D-7 SERIES	349	--	--	--	--	--	--	--	--
	D8F	DC8-61	JT3D-3B	--	177	177	177	177	--	--	--	--
	D8F	DC8-62	JT3D-3B	--	177	177	177	177	--	--	--	--
	D8F	DC8-63	JT3D-7 Series	--	177	177	177	177	--	--	--	--
	D8F	DC8-63F	JT3D-7 Series	--	177	177	177	177	--	--	--	--
	D8F	DC8-71F	CFM56-2C5	--	--	--	354	354	--	--	--	--
	D8F	DC8-73F	CFM56-2C5	697	708	354	354	354	--	--	--	--
	D8F	DC9-20	JT8D-11	174	--	--	--	--	--	--	--	--
Subtotal Cargo/Narrow				2,091	2,124	1,770	2,478	2,478	708	708	708	708
Grand Total				461,420	487,000	513,150	487,000	528,600	487,000	560,300	487,000	597,000

Note: Alternative A = No Action, Alternative C, D, and G are Build Alternatives.
"—" = zero landing/takeoff cycles.

Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 6 - Fleet Mix and Modeled Gates) and PMAD Assignments, 2004/2005.

TABLE J.2-1B
AIRCRAFT FLEET MIX/NUMBER OF LANDING/TAKEOFF CYCLES – DELAYED SCHEDULE

					2008		2010		2014		2019	
Aircraft Category	ARTS Code	Aircraft Type	Engine Type	2002	Alt. A	Alt. C, D, G	Alt. A	Alt. C, D, G	Alt. A	Alt. C, D, G	Alt. A	Alt. C, D, G
Passenger/ Wide	332	A330	CF6-80E1A4 (STD)	--	354	354	354	354	354	354	354	358
	332	A330	PW4168A	--	354	354	354	354	354	354	354	358
	332	A330	TRENT-772	349	354	354	354	354	354	354	354	358
	333	A330-300	CF6-80E1A2	349	--	--	--	--	--	--	--	--
	333	A330-300	PW4168A	--	266	280	354	354	354	354	354	358
	333	A330-300	TRENT-772 New Comb	--	354	354	444	445	708	707	708	716
	340	A340-300	CFM56-5C3	697	--	--	--	--	--	--	--	--
	340	A340-300	CFM56-5C4	349	--	--	--	--	--	--	--	--
	342	A340-200	CFM56-5C2	--	354	354	354	354	354	354	354	358
	343	A340-300	CFM56-5B5/P	349	--	--	--	--	--	--	--	--
	343	A340-300	CFM56-5C2	349	473	373	489	491	354	354	354	358
	343	A340-300	CFM56-5C3	--	--	--	--	--	143	530	0	537
	343	A340-300	CFM56-5C4	--	2,125	2,237	2,043	2,139	2,140	2,805	1,417	3,043
	346	A340-300	CFM56-5C4	--	--	--	354	354	354	354	354	358
	346	A340-642	TRENT 556-61	--	--	--	--	--	500	511	1,062	1,074
	380	A380	GE GP7200	--	--	--	444	446	856	948	1,417	1,790
	744	B747-400	CF6-80C2B1F	349	885	932	622	625	354	354	354	358
	744	B747-400	PW4056	2,962	2,126	2,124	2,221	2,229	2,711	2,586	3,542	2,685
	744	B747-400	RB211-524H	697	--	--	--	--	354	354	354	358
	744	B747-400F	CF6-80C2B1F	--	--	--	--	--	--	--	--	358
	747	B747-400	CF6-80C2B1F	348	--	--	--	--	--	--	--	--
	762	B767-200	JT9D-7A (MOD V)	349	--	94	--	--	--	--	--	--
	763	B767-300	CF6-80A2	349	119	94	--	--	--	--	--	--
	763	B767-300	CF6-80C2B6	1,917	--	--	--	--	--	--	--	--
	763	B767-300	CF6-80C2B6F	--	354	354	354	354	354	438	354	716
	763	B767-300	PW4060	4,008	5,225	5,223	5,507	5,528	6,313	5,536	7,260	2,865
	763	B767-300ER	CF6-80C2B6	697	5,225	5,777	5,995	6,552	6,991	7,392	7,084	7,339
	763	B767-300ER	CF6-80C2B7F	--	531	559	799	802	998	1,166	708	1,432

TABLE J.2-1B
AIRCRAFT FLEET MIX/NUMBER OF LANDING/TAKEOFF CYCLES – DELAYED SCHEDULE

					2008		2010		2014		2019	
Aircraft Category	ARTS Code	Aircraft Type	Engine Type	2002	Alt. A	Alt. C, D, G	Alt. A	Alt. C, D, G	Alt. A	Alt. C, D, G	Alt. A	Alt. C, D, G
	763	B767-300ER	PW4060	697	708	745	932	936	998	1,057	708	895
	767	B767-200	CF6-80A2	1,742	--	--	--	--	--	--	--	--
	772	B777-200	GE90-76B	--	177	177	177	177	177	177	177	179
	772	B777-200	GE90-85B	--	354	354	444	445	642	707	354	716
	772	B777-200	GE90-90B	--	177	177	177	177	177	177	177	179
	772	B777-200	GE90-94B	--	119	94	--	--	--	--	--	--
	772	B777-200	PW4077	--	2,125	2,237	2,480	2,477	2,569	2,805	2,833	3,759
	772	B777-200	PW4090	349	3,277	3,914	3,365	4,247	4,030	4,881	6,552	6,802
	772	B777-200	Trent 892	--	2,480	2,479	2,480	2,477	2,997	2,987	4,959	4,653
	772	B777-200	Trent 895	--	354	354	444	445	708	707	708	716
	773	B777-300	GE90-115B	--	266	280	354	354	321	401	177	537
	773	B777-300	GE90-92B (DACII)	--	354	354	354	354	354	354	354	358
	773	B777-300	PW4090	--	--	--	--	--	--	--	531	179
	773	B777-300	Trent 892	--	443	466	354	354	285	292	0	0
	777	B777-200	PW4084	5,228	--	--	--	--	--	--	--	--
	777	B777-200	TRENT 892	2,091	--	--	--	--	--	--	--	--
	74M	B747-300	CF6-50E2	349	354	354	354	354	354	354	354	358
	M11	MD-11	PW4460	349	--	--	--	--	--	--	--	--
	M1M	MD-11-11F	CF6-80C2D1F	349	--	--	--	--	--	--	--	--
Subtotal Passenger/Wide				25,272	30,287	31,802	32,957	34,532	38,512	40,704	44,622	45,108
Passenger/ Narrow	100	Fokker 100	TAY650-15	35,547	--	--	--	--	--	--	--	--
	146	BAE146-200	ALF502R-5	10,455	--	--	--	--	--	--	--	--
	319	A319	CFM56-5A5	1,917	7,806	6,522	8,305	9,672	8,775	9,761	8,855	10,024
	319	A319	CFM56-5B6/P	--	4,376	3,913	5,107	6,240	4,851	6,702	2,125	3,580
	319	A319	V2522-A5	22,826	45,070	64,081	46,320	63,698	50,221	60,873	46,044	64,257
	319	A319	V2524-A5	697	1,417	746	1,417	--	1,417	5,973	1,416	1,432
	320	A320	V2500-A1	3,485	2,922	2,656	2,753	2,764	2,889	2,951	2,302	2,327

TABLE J.2-1B
AIRCRAFT FLEET MIX/NUMBER OF LANDING/TAKEOFF CYCLES – DELAYED SCHEDULE

					2008		2010		2014		2019	
Aircraft Category	ARTS Code	Aircraft Type	Engine Type	2002	Alt. A	Alt. C, D, G	Alt. A	Alt. C, D, G	Alt. A	Alt. C, D, G	Alt. A	Alt. C, D, G
	320	A320	V2527-A5	--	42,945	30,093	38,103	37,126	38,701	59,781	34,887	62,468
	320	A320-100	CFM56-5A1	--	354	354	354	354	354	354	354	358
	320	A320-100	CFM56-5B4/2P	--	--	--	1,732	1,605	--	--	--	--
	320	A320-200	CFM56-5A1	1,394	2,125	1,771	2,479	2,051	2,391	2,805	1,948	2,327
	320	A320-200	CFM56-5A3	--	--	--	--	--	--	--	531	537
	320	A320-200	CFM56-5B4/P		708	708	708	708	708	707	708	716
	320	A320-200	V2527-A5	30,668	--	--	--	--	--	--	--	--
	320	A320-211	CFM56-5A1	697	--	--	--	--	--	--	--	--
	320	A321	CFM56-5B3/P	349	354	354	354	354	285	354	--	358
	321	A320	V2527-A5	--	--	--	34,151	19,463	45,227	19,452	51,710	19,689
	321	A321	CFM56-5B3/P	--	--	--	--	--	3,638	4,154	6,730	7,518
	717	B717-200	BR700-715C1-30	--	--	--	--	--	--	3,425	--	5,369
	732	B737-200	JT8D-15A	--	711	559	--	--	--	--	--	--
	733	B737-300	CFM56-3-B1	4,182	0	0	--	--	--	--	--	--
	733	B737-300	CFM56-3B-1	--	473	373	--	--	--	--	--	--
	733	B737-300	CFM56-3B-1	--	592	466	--	--	--	--	--	--
	733	B737-300	CFM56-3B-2	--	1,656	1,771	--	--	--	--	--	--
	733	B737-300	CFM56-3C-1	29,622	18,595	22,658	13,723	17,120	--	--	--	--
	734	B737-400	CFM56-3B-2	3,485	1,183	1,119	--	--	--	--	--	--
	734	B737-400	CFM56-3C-1	349	0	0	--	--	--	--	--	--
	735	B737-500	CFM56-3C-1	27,706	2,366	1,864	--	--	--	--	--	--
	737	B737-200	JT8D-15A	--	354	354	354	354	354	354	354	358
	737	B737-200	JT8D-17	697	--	--	--	--	--	--	--	--
	737	B737-200	JT8D-17A	697	--	--	--	--	--	--	--	--
	737	B737-200	JT8D-9A	697	--	--	--	--	--	--	--	--
	737	B737-700	CFM56-7B22	--	--	--	--	--	1,641	4,155	5,312	17,541
	737	B737-700	CFM56-7B24	--	2,838	2,236	3,896	3,892	3,852	3,891	3,542	3,938
	738	B737-800	CFM56-7B26	15,334	4,258	3,168	5,640	5,439	4,744	5,391	1,594	3,580

TABLE J.2-1B
AIRCRAFT FLEET MIX/NUMBER OF LANDING/TAKEOFF CYCLES – DELAYED SCHEDULE

					2008		2010		2014		2019	
Aircraft Category	ARTS Code	Aircraft Type	Engine Type	2002	Alt. A	Alt. C, D, G	Alt. A	Alt. C, D, G	Alt. A	Alt. C, D, G	Alt. A	Alt. C, D, G
	738	B737-800	CFM56-7B27	349	29,043	15,839	42,677	38,988	78,685	104,084	66,940	106,499
	739	B737-900	CFM56-7B26	--	12,131	13,044	18,075	14,264	36,168	16,649	48,523	18,077
	757	B757-200	PW2037	27,008	13,246	10,811	--	535	--	--	--	--
	757	B757-200	PW2040	--	1,063	1,062	799	803	--	--	--	--
	757	B757-200	RB211-535E4	1,045	--	--	--	--	--	--	--	--
	757	B757-200	RB211-535E4B	5,227	--	--	--	--	--	--	--	--
	72S	B727-200	JT8D-17A	1,045	--	--	--	--	--	--	--	--
	73G	B737-700	CFM56-7B24	349	--	--	--	--	--	--	--	--
	D8F	D8-73F	CFM56-2C5	--	0	186	--	--	--	--	--	--
	D95	DC9-50	JT8D-17	--	1,183	933	--	--	--	--	--	--
	D9S	DC-9-14	JT8D-7B	--	119	186	--	--	--	--	--	--
	D9S	DC9-30	JT8D-15	7,318	0	0	--	--	--	--	--	--
	D9S	DC-9-31	JT8D-7B	--	592	653	--	--	--	--	--	--
	D9S	DC-9-31	JT8D-9A	--	473	466	--	--	--	--	--	--
	D9S	DC-9-32	JT8D-15	--	473	373	--	--	--	--	--	--
	D9S	DC-9-32	JT8D-7B	--	0	94	--	--	--	--	--	--
	D9S	DC-9-32	JT8D-9A	--	355	559	--	--	--	--	--	--
	D9S	DC-9-41	JT8D-11	--	355	280	--	--	--	--	--	--
	M80	MD-80-81	JT8D-217	--	177	177	177	177	143	146	--	--
	M80	MD-80-81	JT8D-217C	--	797	839	622	669	285	437	--	--
	M80	MD-80-82	JT8D-209	3,136	--	--	--	--	--	--	--	--
	M80	MD-80-82	JT8D-217	--	177	177	177	223	143	292	--	--
	M80	MD-80-82	JT8D-217A	523	6,375	7,347	4,841	5,618	570	875	--	--
	M80	MD-80-82	JT8D-217C	50,532	44,982	57,266	33,086	43,337	143	437	--	--
	M80	MD-80-82	JT8D-219	--	531	354	622	401	285	437	--	--
	M80	MD-80-83	JT8D-217	--	797	839	666	669	--	--	--	--
	M80	MD-80-83	JT8D-219	7,493	15,762	21,597	12,746	16,452	285	437	--	--
	M80	MD-80-87	JT8D-219	--	177	177	177	177	143	146	--	--

TABLE J.2-1B
AIRCRAFT FLEET MIX/NUMBER OF LANDING/TAKEOFF CYCLES – DELAYED SCHEDULE

					2008		2010		2014		2019	
Aircraft Category	ARTS Code	Aircraft Type	Engine Type	2002	Alt. A	Alt. C, D, G	Alt. A	Alt. C, D, G	Alt. A	Alt. C, D, G	Alt. A	Alt. C, D, G
	M80	MD-80-88	JT8D-219	2,788	2,129	1,678	--	--	--	--	--	--
	M87	MD-80-87	JT8D-219	--	708	708	533	535	--	--	--	--
	M90	MD-90-30	V2525-D5	697	711	559	--	--	--	--	--	--
Subtotal Passenger/Narrow				298,314	273,459	281,970	280,594	293,688	286,898	315,023	283,875	330,953
Commuter	BE1	DHC-6	PT6A-20	4,182	1,063	1,062	1,063	1,062	856	875	--	--
	BE40	T-1A	JT15D-5 (A&B)	349	354	354	354	354	354	354	354	358
	BE58	Cessna 172	O-320	349	358	355	358	350	357	351	358	353
	C210	Cessna 208	PT6A-114	697	715	708	715	698	715	700	716	705
	C401	Cessna T337	IO-360-B	349	--	--	--	--	--	--	--	--
	C550	Citation II	JT15D-4 (B,C,D)	174	531	531	577	579	708	707	708	716
	C560	Citation V	JT15D-5 (A&B)	349	1,240	1,304	1,417	1,416	1,417	1,414	1,417	1,432
	C56X	Citation V	JT15D-5 (A & B)	--	708	708	708	708	708	707	708	716
	C650	Citation VII	TFE 731-2-2B	349	2,125	2,125	2,125	2,124	2,125	2,122	2,125	2,148
	C750	Citation X	AE3007C	697	2,479	2,479	2,479	2,477	2,479	2,475	2,479	2,506
	CL60	CL600	ALF 502L-2	349	354	354	354	354	428	438	708	716
	CR7	Canadair Reg-700	CF34-8C1	--	58,441	51,617	64,927	61,289	61,243	69,036	50,471	67,301
	CR9	Canadair Reg-900	CF34-8C5	--	9,699	6,149	12,880	11,499	23,577	25,649	41,262	44,390
	CRJ	Canadair Reg-100	CF34-3A1	2,091	2,125	2,125	2,125	2,124	2,355	2,405	3,188	3,222
	CRJ	CL604	CF34-3B	49,835	42,148	61,498	32,863	52,154	19,190	36,351	354	358
	CRJ	CL604	CF34-3B	--	--	--	--	--	--	--	14,167	35,260
	D38	DO 328	PW119-B	3,833	--	--	--	--	--	--	--	--
	E140	Embraer ERJ 135/140	AE3007A1/3 (Type 2)	--	13,602	18,637	4,663	9,363	--	--	--	--
	E145	Embraer ERJ 145	AE3007A1	--	29,220	38,944	26,913	42,479	25,325	49,124	19,480	47,432
	ER4	Embraer ERJ 145	AE3007A	1,394	--	--	--	--	--	--	--	--
	ER4	Embraer ERJ 135/140	AE3007A3 (TYPE 2)	40,077	--	--	--	--	--	--	--	--
	ERD	Embraer ERJ 135/140	AE3007A3 (TYPE 2)	17,425	--	--	--	--	--	--	--	--
	ERJ	Embraer ERJ 145	AE3007A1E	1,394	--	--	--	--	--	--	--	--

TABLE J.2-1B
AIRCRAFT FLEET MIX/NUMBER OF LANDING/TAKEOFF CYCLES – DELAYED SCHEDULE

Aircraft Category	ARTS Code	Aircraft Type	Engine Type	2002	2008 Alt. A	2008 Alt. C, D, G	2010 Alt. A	2010 Alt. C, D, G	2014 Alt. A	2014 Alt. C, D, G	2019 Alt. A	2019 Alt. C, D, G
	F2TH	CL600	CF34-3B	--	708	708	708	708	708	707	708	716
	F900	Fokker 70	TAY620-15	523	531	531	531	531	531	530	531	537
	FA20	Falcon 20	CF700-2D	--	354	354	354	354	354	354	354	358
	FA50	Falcon 50	TFE731-3	174	177	177	267	267	531	530	531	537
	G2	Gulfstream II	SPEY MK511-8	174	177	177	133	134	--	--	--	--
	G4	Gulfstream IV	TAY MK611-8	349	354	354	354	354	354	354	354	358
	G5	Gulfstream V	BR700-710A1-10	349	1,063	1,062	1,110	1,115	1,240	1,238	1,240	1,253
	H25C	HS 125	TFE731-3	--	1,417	1,417	1,417	1,416	1,417	1,414	1,417	1,432
	LJ30	Learjet 31	TFE 731-2-2B	523	531	531	531	531	531	530	531	537
	LJ35	Learjet 35/36	TFE 731-2-2B	--	708	708	708	708	708	707	708	716
	LJ45	Learjet 35/36	TFE 731-2-2B	349	354	354	354	354	354	354	354	358
	LJ55	Learjet 35/36	TFE 731-2-2B	1,045	1,063	1,062	1,063	1,062	1,063	1,061	1,063	1,074
	LJ60	Learjet 35/36	TFE 731-2-2B	697	797	839	933	936	1,106	1,130	1,240	1,253
Subtotal Commuter				128,076	173,396	197,224	162,984	197,500	150,734	201,617	147,526	216,742
Cargo/ Wide	306	A300-B4-605R	CF6-80C2A5	349	--	--	--	--	--	--	--	--
	310	A310-200F	CF6-80A3	871	--	--	--	--	--	--	--	--
	742	B747-200	CF6-50E2	174	--	--	--	--	--	--	--	--
	742	B747-200	JT9D-7A	174	--	--	--	--	--	--	--	--
	742	B747-200F	CF6-50E2	349	--	--	--	--	--	--	--	--
	744	B747-400F	CF6-80C2B1F	349	--	--	--	--	--	--	--	--
	31F	A310-200F	CF6-80A3	--	177	177	222	223	354	354	354	358
	31F	A310-200F	JT9D-7R4E1	--	177	177	222	223	354	354	354	358
	38F	A380	GE GP7200	--	--	--	--	--	--	--	354	358
	74F	B747-100F	JT9D-7A	349	177	0	177	177	177	177	177	179
	74F	B747-200F	CF6-50E2	--	354	354	354	354	354	354	354	358
	74F	B747-200F	JT9D-7F	174	--	--	--	--	--	--	--	--
	74F	B747-200F	JT9D-7J	174	--	--	--	--	--	--	--	--

TABLE J.2-1B
AIRCRAFT FLEET MIX/NUMBER OF LANDING/TAKEOFF CYCLES – DELAYED SCHEDULE

Aircraft Category	ARTS Code	Aircraft Type	Engine Type	2002	2008 Alt. A	2008 Alt. C, D, G	2010 Alt. A	2010 Alt. C, D, G	2014 Alt. A	2014 Alt. C, D, G	2019 Alt. A	2019 Alt. C, D, G
	74F	B747-400	CF6-80C2B1F	349	620	653	708	708	708	707	708	716
	74F	B747-400	CF6-80E1A4 (STD)	174	--	--	--	--	--	--	--	--
	74F	B747-400	PW4056	523	--	--	--	--	--	--	--	--
	74F	B747-400	RB211-524H	174	354	354	354	354	354	354	354	358
	74F	B747-400F	CF6-80C2B1F	697	1,506	1,584	1,417	1,416	1,417	1,414	1,417	1,432
	74F	B747-400F	CF6-80C2B5F	--	177	177	177	177	177	177	177	179
	74F	B747-400F	PW4056	--	885	885	885	885	885	884	885	895
	74G	B747-400	PW4056	174	--	--	--	--	--	--	--	--
	76F	B767-200	CF6-80A (A1)	--	--	--	--	--	678	692	531	537
	76F	B767-200	JT9D-7R4D	--	--	--	--	--	--	--	177	179
	76F	B767-300F	CF6-80C2B7F	--	354	354	444	445	708	707	708	716
	A3F	A300-600F	CF6-80C2A5	--	592	466	400	401	1,034	1,057	885	895
	A3F	A300-600F	CF6-80C2A6	--	--	--	133	134	--	--	--	--
	A3F	A300-600F	CF6-80C2A7	--	--	--	133	134	--	--	--	--
	A3F	A300-600F	CF6-80C2A8	--	--	--	133	134	--	--	--	--
	A3F	A300-600F	CF6-80C2A9	--	--	--	133	134	--	--	--	--
	A3F	A300-600F	PW4158	--	236	186	--	--	354	354	354	358
	A3F	A300-605F	CF6-80C2A5	--	--	--	133	134	--	--	177	179
	A3F	A300-F4-200	CF6-50C2	--	354	354	444	445	708	707	708	716
	A3F	A300-F4-200	CF6-80C2A5F	--	354	354	354	354	354	354	354	358
	ABF	A300-600	PW4158	174	--	--	--	--	--	--	--	--
	ABF	A300-B4-605R	CF6-80C2A5	174	--	--	--	--	--	--	--	--
	ABF	A300-F4-200	CF6-80C2A5F	697	--	--	--	--	--	--	--	--
	D1F	DC10-10F	CF6-6D	1,045	177	177	133	134	--	--	--	--
	D1F	DC10-30F	CF6-50C2	--	177	177	133	134	--	--	--	--
	M1F	MD-11-11F	CF6-80C2D1F	174	1,063	1,062	1,156	1,159	1,356	1,384	1,063	1,074
	M1F	MD-11-11F	PW4460	349	177	177	177	177	177	177	177	177
Subtotal Cargo/Wide				7,667	7,911	7,668	8,422	8,436	10,149	10,207	10,268	10,382

TABLE J.2-1B
AIRCRAFT FLEET MIX/NUMBER OF LANDING/TAKEOFF CYCLES – DELAYED SCHEDULE

Aircraft Category	ARTS Code	Aircraft Type	Engine Type	2002	2008 Alt. A	2008 Alt. C, D, G	2010 Alt. A	2010 Alt. C, D, G	2014 Alt. A	2014 Alt. C, D, G	2019 Alt. A	2019 Alt. C, D, G
Cargo/ Narrow	72F	B727-200F	JT8D-17A	697	354	354	267	268	--	--	--	--
	72F	B727-200F	JT8D-7B	--	354	354	267	268	--	--	--	--
	75F	B757-200F	PW2040	--	--	--	222	223	354	354	354	358
	75F	B757-200F	RB211-535E4	--	--	--	222	223	354	354	354	358
	C9	C-9B	JT8D-9	174	--	--	--	--	--	--	--	--
	D8F	DC8	JT3D-7 SERIES	349	--	--	--	--	--	--	--	--
	D8F	DC8-61	JT3D-3B	--	177	177	133	134	--	--	--	--
	D8F	DC8-62	JT3D-3B	--	177	177	133	134	--	--	--	--
	D8F	DC8-63	JT3D-7 Series	--	177	177	133	134	--	--	--	--
	D8F	DC8-63F	JT3D-7 Series	--	177	177	133	134	--	--	--	--
	D8F	DC8-71F	CFM56-2C5	--	0	0	267	268	--	--	--	--
	D8F	DC8-73F	CFM56-2C5	697	531	354	267	268	--	--	--	--
	D8F	DC9-20	JT8D-11	174	--	--	--	--	--	--	--	--
Subtotal Cargo/Narrow				2,091	1,947	1,770	2,044	2,054	708	708	708	716
Grand Total				461,420	487,000	520,435	487,000	536,210	487,000	568,257	487,000	603,901

Note: Alternative A = No Action, Alternative C, D, and G are Build Alternatives.
"—" = zero landing/takeoff cycles.

Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 6 - Fleet Mix and Modeled Gates) and PMAD Assignments, 2004/2005.

Aircraft Emission Factors

The FAA's EDMS contains a database of aircraft engine-specific emission factors based on engine make and model and the four engine operational modes (taxi/idle, takeoff, climb out, and approach). EDMS also contains a database of emission factors for ground support equipment and aircraft auxiliary power units. With the exception of the Airbus 380 (A380), the EDMS default aircraft engine emission factors were used in the analysis. The EDMS does not contain emission data for the A380. This wide body passenger aircraft (average seating capacity of 555 passengers) will enter airline service in the year 2006. To account for operations of this aircraft, a user-defined aircraft/engine was developed. Emission indices and time in mode data for the aircraft were developed based on data from the International Civil Aviation Organization (ICAO) Engine Exhaust Emissions Data Bank.[3]

Particulate matter emission factors for aircraft are not contained in the EDMS. To provide estimates of this pollutant from aircraft, mode-specific particulate matter emission factors were estimated for aircraft turbine (jet) engines based on methodologies contained in the FAA's methodology to determine such estimates. This methodology is known as the First Order Approximation.[4]

Using the First Order Approximation, particulate matter emissions were estimated using the following formula which relates aircraft engine specific smoke numbers.[5] The term "smoke number" is a dimensionless term to describe the quantification of smoke emissions, which relate to opacity, to black carbon particulate matter emissions:

$$ER_{\text{Mass of PM}} = 2.4 \times SN^{1.8} \times FF$$

where:

$ER_{\text{Mass of PM}}$ = Emission Rate for specific mode, in milligrams of particulate matter (PM)/second per engine type

SN = ICAO reported modal smoke number for engine, unitless

FF = ICAO fuel flow by mode and aircraft type, in kilograms per second

The equation only above provides an approximation of the amount of jet aircraft-related particulate matter but accounts for the fact that there is limited available emission testing data for aircraft engines. The calculation uses smoke numbers, which are available for most aircraft engines. Notably, it is the FAA's intent that the First Order Approximation be used until such time when enough measurement data is available that the approximation is no longer needed. To account for the volatile portion of the aircraft-related particulate matter emissions, the First Order Approximation increases the level of emissions calculated with smoke numbers by a

[3] ICAO Annex 16, Volume 2, Part III, Appendix 3, July 1993 with Amendments V13 (www.QinetiQ.com/aviation_emissions_databank)

[4] Derivation of a First Order Approximation of Particulate Matter from Aircraft, Roger Wayson, Gregg Fleming, and Julie Draper, July 2004, Proceedings for the Annual Air and Waste Management Conference and FAA Memorandum, Use of the First Order Approximation to Estimate Aircraft Engine Particulate Matter Emissions in NEPA Documents and Clean Air Act General Conformity Analyses, May 24, 2005.

[5] ICAO Annex 16, Volume 2, Part III, Appendix 3, July 1993 with Amendments V13 (www.QinetiQ.com/aviation_emissions_databank)

factor of four.[6] Turboprop and piston aircraft particulate matter emission factors were estimated from the one turboprop engine particulate matter emission index provided in the Fifth Edition of AP-42, Volume 2.[7] The fraction of particulate matter 10 microns or less in size which is considered to be particulate matter 2.5 microns or less in size was assumed to be 100 percent. Because the EDMS does not allow users to enter particulate matter emission indices, and in order to conduct dispersion modeling for particulate matter emissions from aircraft, a separate modeling analysis was conducted by inputting the aircraft fleet as user-defined aircraft with the appropriate particulate matter emission indices. Notably, to provide the necessary input for the EDMS, the First Order Approximation values were converted to grams per kilogram of fuel.

It should be noted that, in an effort to address engine noise, a primary public environmental issue, engine manufacturers developed quieter engines. These quieter, newer generation engines burn fuel hotter and more completely than older generation aircraft engines. As a result, the carbon-based products of incomplete combustion (including particulate matter) have greatly decreased in newer aircraft engines when compared to older engines, many of which are no longer in use.

It should also be noted that the dispersion modeling component of the EDMS used to perform the air quality assessment of the O'Hare improvements does not include algorithms that simulate the gravitational settling of particulates nor the removal of particulates from the ambient air by dry deposition.[8] The model also does not include algorithms to simulate the scavenging and removal by wet deposition (i.e., precipitation scavenging) of gases or particulates. As such, the dispersion modeling results for particulate matter 10 microns or less in size and 2.5 microns or less in size should be considered conservative as consideration of these factors would reduce the predicted results.

The EDMS uses atmospheric mixing height data to approximately the appropriate level in the atmosphere where aircraft emissions would have no discernable impact on ground level emissions. For this purpose, a Chicago-area specific mixing height of 2,510 feet[9] above ground level was used.

[6] FAA Memorandum, Use of the First Order Approximation to Estimate Aircraft Engine Particulate Matter Emissions in NEPA Documents and Clean Air Act General Conformity Analyses, May 24, 2005.

[7] Procedures for Emission Inventory Preparation, Volume IV: Mobile Sources. U.S. Environmental Protection Agency, Office of Mobile Sources, Ann Arbor, MI. 1992.

[8] Atmospheric deposition occurs when pollutants fall from the air on the land or water. Pollution deposited along with snow, fog, or rain is called wet deposition, while the deposition of pollutants as dry particles or gases is called dry deposition.

[9] Mixing Heights, Wind Speed, and Potential for Urban Air Pollution throughout the Contiguous United States, U.S. Environmental Protection Agency, January 1972.

Aircraft Refueling

Emissions from aircraft refueling occur when vapor-laden air in a partially empty fuel tank is displaced to the atmosphere as the tank is refilled. The quantity of vapor displaced depends in the fuel temperature, fuel vapor pressure, aircraft fuel tank temperature, fuel dispensing rate, and the type of fuel, utilization of any emission control equipment or processes.

O'Hare-related aircraft are fueled by Jet A (kerosene) and AvGas (aviation gasoline) fuel. Notably, AvGas is much more volatile than Jet A, and fuel in general is more volatile at greater temperatures.

Using formulas provided in IEPA's SIP documentation for the year 1990[10] and USEPA's AP-42 (Sections 5.2 and 7.1), the following was derived:

$$EF = [(12.46 \times S \times P \times M)/T]$$

where:

EF = Emission factor (pounds of VOC/1000 gallons of fuel)

S = Saturation factor (Table 5.2-1 of AP-42) of 1.45 for splash loading of a clean cargo tank

P = Fuel true vapor pressure (Table 7.1-2 of AP-42)

For Jet A (kerosene), P = 0.019 pounds per square inch atmosphere for daily emissions with an ambient temperature of 87.4ºF and 0.006 for annual emissions with an ambient temperature of 49.1ºF.

For AvGas (aviation gasoline), P= 5.8 pounds per square inch atmosphere for daily emissions with an ambient temperature of 87.4º F and 2.9 for annual emissions with an ambient temperature of 49.1ºF.

M = Fuel Molecular weight of 130 (for jet kerosene) and 68 (for aviation gasoline

T = Temperature of bulk liquid loaded, in Rankin (460 + ºF)

Using the above equation, the following uncontrolled emission factors (IEPA's 1990 estimates assumed no emission control devices) were estimated:

Jet A:	*Daily - 0.0815 pounds of volatile organic compounds/1000 gallons of fuel*
	Annual - 0.0257 pounds of volatile organic compounds/1000 gallons of fuel
AvGas:	*Daily - 13.02 pounds of volatile organic compounds/1000 gallons of fuel*
	Annual - 6.51 pounds of volatile organic compounds/1000 gallons of fuel

Hydrant fueling systems and vapor recovery systems which are currently in place at 76 percent of the gates at O'Hare and would be used at all new gates associated with the improvements reduce/control emissions from aircraft refueling. The efficiency of these systems is typically

[10] Illinois State Implementation Plan, 1990 Ozone Precursors Emissions Inventory for the Chicago Area, November, 1993 (Section 4.3.8 – Aircraft Refueling).

estimated at 95 to 98 percent.[11] Thus, the uncontrolled emission factors were adjusted based on a control efficiency of 95 percent.

JetA: *Daily - 0.00408 pounds of volatile organic compounds/1000 gallons of fuel*
Annual - 0.00129 pounds of volatile organic compounds/1000 gallons of fuel

AvGas: *Daily - 0.651 pounds of volatile organic compounds/1000 gallons of fuel*

Annual - 0.325 pounds of volatile organic compounds/1000 gallons of fuel

The amount of fuel throughput was multiplied by the above emission factors for the appropriate fuel types. The annual values were converted to the daily emission estimates by using IEPA's activity adjustment factors; 0.00231 for AvGas and 0.00275 for Jet A.

To be conservative, the following estimated levels of daily and annual volatile organic compounds, based on the fuel throughput forecast for the Build Out + 5 phase assuming the Delayed Construction Schedule (see Table J.2-64), were assumed for each of the evaluated years:

Alternative A:	0.0055 tons/day	0.63 tons/year
Alternative C ,D, G:	0.0068 tons/day	0.78 tons/year

Notably, the estimated levels of volatile organic compounds due to aircraft refueling are small compared to total Airport-related emissions with or without the proposed improvements.

Aircraft Temporal Factors

Temporal factors are used to describe the relationship of one period of time to another period of time (i.e., the relationship of the activity during 1-hour to the activity during a 24-hour period). In EDMS, temporal factors are applied to represent varying levels of activity as a fraction of a peak hour. The use of temporal factors gives the model the ability to more accurately reflect real world conditions.

In order to represent actual aircraft activity at the Airport throughout the entire calendar year, hour-of-day, day-of-week, and month-of-year temporal factors were developed. These factors are used by the EDMS in its dispersion mode to calculate hourly concentrations at receptor locations. **Tables J.2-2** and **J.2-3** provide the hour of day aircraft temporal factors used in the air quality analysis. Notably, the same day or week and month of year temporal factors were used

[11] Comments of the AQMD Draft Environmental Impact Report No. 573, Civilian Reuse of MCAS El Toro and the Airport System Master Plan for John Wayne Airport and Proposed Orange County International Airport, South Coast Air Quality Management District, AQMD, February 2000.

TABLE J.2-2
AIRCRAFT HOURLY OPERATIONAL PROFILES

Hour	2002	2007/2008		2009/2010		2013/2014				2018/2019			
		Alt. A	Alt. C, D, G	Alt. A	Alt. C, D, G	Alt. A	Alt. C	Alt. D	Alt. G	Alt. A	Alt. C	Alt. D	Alt. G
1	0.0317	0.0331	0.0272	0.0370	0.0272	0.0211	0.0159	0.0132	0.0140	0.0199	0.0195	0.0209	0.0206
2	0.0899	0.0199	0.0216	0.0229	0.0216	0.0220	0.0179	0.0210	0.0196	0.0210	0.0172	0.0206	0.0203
3	0.0317	0.0337	0.0217	0.0304	0.0217	0.0297	0.0219	0.0191	0.0196	0.0293	0.0221	0.0187	0.0183
4	0.0476	0.0195	0.0186	0.0199	0.0186	0.0222	0.0168	0.0169	0.0168	0.0221	0.0180	0.0190	0.0208
5	0.0317	0.0538	0.0510	0.0519	0.0510	0.0530	0.0415	0.0385	0.0388	0.0536	0.0402	0.0423	0.0412
6	0.1376	0.1312	0.1341	0.1495	0.1341	0.1495	0.1212	0.1240	0.1208	0.1370	0.1132	0.1141	0.1119
7	0.3651	0.2491	0.2394	0.2697	0.2394	0.2539	0.2468	0.2450	0.2434	0.2601	0.2607	0.2795	0.2789
8	0.7937	0.7117	0.6953	0.7217	0.6953	0.6997	0.6557	0.6578	0.6491	0.7177	0.6839	0.7117	0.7055
9	0.9048	0.8477	0.8372	0.8432	0.8372	0.8309	0.8060	0.8063	0.7969	0.8002	0.8274	0.8305	0.8422
10	0.8095	0.8262	0.8448	0.8364	0.8448	0.8124	0.8544	0.8469	0.8436	0.7840	0.8523	0.8845	0.8868
11	0.8413	0.8757	0.8388	0.8879	0.8388	0.8680	0.7835	0.7865	0.7699	0.8825	0.7721	0.8032	0.7985
12	0.7037	0.8496	0.8370	0.8617	0.8370	0.8468	0.8409	0.8243	0.8222	0.8349	0.8676	0.8939	0.8879
13	0.9312	0.8529	0.8269	0.8864	0.8269	0.8541	0.8111	0.8185	0.8124	0.8238	0.8244	0.8340	0.8331
14	0.8360	0.8675	0.9371	0.9043	0.9371	0.8363	0.9054	0.9000	0.8938	0.8825	0.8753	0.8994	0.9042
15	0.9471	0.9065	0.9054	0.9150	0.9054	0.9749	0.8475	0.8562	0.8446	0.9107	0.8927	0.9083	0.8852
16	0.8995	0.9969	0.9967	0.9756	0.9967	0.9765	0.9556	0.9459	0.9425	0.9475	0.9354	0.9669	0.9684
17	0.8783	0.9885	0.9535	0.9858	0.9535	0.9723	0.9176	0.9141	0.9018	0.9605	0.8811	0.9303	0.9262
18	0.9048	0.9756	0.9786	0.9878	0.9786	0.9899	0.9410	0.9340	0.9296	0.9574	0.9141	0.9214	0.9332
19	1.0000	0.9405	1.0000	1.0000	1.0000	0.9796	1.0000	1.0000	1.0000	1.0000	0.9857	0.9765	0.9898
20	0.9471	1.0000	0.9915	0.9767	0.9915	1.0000	0.9554	0.9476	0.9418	0.9602	1.0000	1.0000	1.0000
21	0.9101	0.9952	0.9316	0.9949	0.9316	0.9869	0.9330	0.9319	0.9167	0.9682	0.9000	0.9579	0.9486
22	0.6190	0.6590	0.5696	0.6885	0.5696	0.6695	0.4942	0.4932	0.4910	0.6669	0.5436	0.5811	0.5599
23	0.2222	0.3104	0.2067	0.3175	0.2067	0.3479	0.1722	0.1838	0.1779	0.3186	0.1908	0.1993	0.1970
24	0.1323	0.1635	0.1290	0.1753	0.1290	0.1782	0.0889	0.1205	0.0976	0.2122	0.1138	0.1472	0.1412

Note: Alternative A = No Action, Alternative C, D, and G are Build Alternatives.
Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 4 – Travel and Delay Times), 2004/2005.

TABLE J.2-3
AIRCRAFT DAILY AND MONTHLY OPERATIONAL PROFILES

Day	Fraction	Month	Fraction
Monday	0.9995	January	0.84281
Tuesday	0.9933	February	0.78238
Wednesday	0.9884	March	0.87025
Thursday	0.9908	April	0.87574
Friday	1.0000	May	0.91243
Saturday	0.8516	June	0.89423
Sunday	0.9296	July	0.87864
		August	0.96000
		September	0.94836
		October	0.95911
		November	0.87973
		December	1.00000

Note: The same daily and monthly operational profiles were used for all analysis years and alternatives.
Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Airport Temporals - Daily Weekly), 2004/2005.

regardless of analysis year or alternative. These aircraft temporal factors (sometimes referred to as operational profiles) were developed using data from the FAA's EIS TAAM modeling conducted by the CCT at the direction, oversight and reviewed by FAA.

Time-in-Mode Data

Time-in-mode data are also used as input for the EDMS. With the exception of taxi-in, taxi-out, apron idling, and time spent in runway queues, the default operating times in EDMS were used. The O'Hare specific taxi-in, taxi-out, apron idling, and runway queue delay data were obtained from the results of the FAA's EIS TAAM modeling conducted by the CCT at the direction, oversight and reviewed by FAA. The taxi and apron idling data are presented in **Table J.2-4**. These data are representative of the original, compressed, and delayed construction schedules. The greatest difference between the No Action Alternative (Alternative A) and the Build Alternatives are in the unimpeded travel time and queue delay.

TABLE J.2-4
AIRCRAFT TAXI AND QUEUE TIME IN MODE (MINUTES)

Year	Alternative	Arrival Unimpeded Travel Time	Arrival Gate Delay	Arrival Standoff	Departure Unimpeded Travel Time	Departure Gate Delay	Departure Taxi Delay	Departure Queue
2002		6.2	0.3	0.0	9.9	0.7	0.8	3.9
2007	A	6.6	0.4	0.0	9.4	0.8	0.9	4.2
	C, D, G	8.6	0.4	0.0	9.5	1.1	0.6	4.2
2008	A	6.6	0.4	0.0	9.4	0.8	0.9	4.2
	C, D, G	9.2	0.4	0.0	10.2	1.2	0.6	4.5
2009	A	6.6	0.4	0.0	9.3	0.7	0.8	4.1
	C, D, G	11.0	0.5	0.0	9.7	0.9	1.0	4.1
2010	A	6.6	0.4	0.0	9.3	0.7	0.8	4.1
	C, D, G	11.4	0.5	0.0	10.1	0.9	1.0	4.3
2013	A	6.7	0.4	0.0	9.4	1.0	1.3	4.8
	C	14.3	0.5	0.0	10.2	0.5	0.8	2.7
	D	14.4	0.5	0.0	10.2	0.5	1.0	4.0
	G	14.2	0.4	0.0	10.1	0.4	0.5	2.6
2014	A	6.7	0.4	0.0	9.4	1.0	1.3	4.8
	C	14.3	0.5	0.0	10.2	0.5	0.8	2.7
	D	14.5	0.5	0.0	10.2	0.5	1.0	4.0
	G	14.2	0.4	0.0	10.1	0.4	0.5	2.6
2018	A	6.6	0.4	0.0	9.4	0.8	1.2	4.6
	C	14.2	0.7	0.0	10.3	0.5	1.3	2.7
	D	14.3	0.7	0.0	10.3	0.9	1.2	5.2
	G	14.1	0.8	0.0	10.1	0.6	0.5	3.4
2019	A	6.6	0.4	0.0	9.4	0.8	1.2	4.6
	C	14.3	0.7	0.0	10.4	0.5	1.3	2.7
	D	14.4	0.7	0.0	10.4	0.9	1.2	5.3
	G	14.2	0.8	0.0	10.2	0.6	0.5	3.4

Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 4 – Time and Delay Times), 2004/2005.

Queue length calculations were based on an estimated aircraft length of 250 feet, which includes a nominal space between aircraft. **Tables J.2-5, J.2-6** through **J.2-7, J.2-8** through **J.2-9, J.2-10** through **J.2-13,** and **J.2-14** through **J.2-17** present the 2002, 2007, 2009, 2013, and 2018 hour-of-day departure queue time temporal factors, respectively, for the alternatives under consideration. The estimated maximum aircraft delay time per runway and the estimated queue length per runway are also provided in these tables. The takeoff departure queue lengths were provided by airfield simulation modeling data reviewed and accepted by the FAA. The queue length hourly temporal factors are provided in **Tables J.2-18** through **J.2-30.**

TABLE J.2-5
HOURLY DEPARTURE QUEUE TIME PROFILES - 2002

Hour	Profiles by Runway						
	14L-32R	14R-32L	32l(T10)	04L-22R	4R-22L	9L-27R	9R-27L
1	0.00	0.00	0.00	0.00	0.00	0.00	0.01
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.01
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.93
7	0.03	0.00	0.00	0.00	0.06	0.03	0.06
8	0.04	1.00	0.30	0.12	0.22	0.24	0.09
9	0.15	0.00	0.39	0.23	0.35	0.06	0.26
10	0.48	0.53	0.33	0.16	0.30	0.08	0.41
11	0.13	0.00	0.22	0.14	0.17	0.03	0.22
12	0.17	0.20	0.09	0.11	0.21	0.04	0.05
13	0.51	0.46	1.00	0.22	0.46	0.10	0.50
14	0.39	0.34	0.65	0.33	0.27	0.16	0.22
15	0.69	0.77	0.90	0.79	1.00	0.71	0.28
16	0.69	0.00	0.95	0.06	0.20	0.08	0.50
17	0.33	0.04	0.23	0.20	0.43	0.07	1.00
18	0.19	0.03	0.46	0.22	0.32	0.13	0.52
19	1.00	0.06	0.68	1.00	0.81	1.00	0.21
20	0.52	0.09	0.49	0.16	0.79	0.98	0.58
21	0.97	0.07	0.85	0.17	0.44	0.13	0.91
22	0.73	0.06	0.32	0.06	0.20	0.04	0.64
23	0.06	0.00	0.08	0.00	0.02	0.02	0.22
24	0.02	0.01	0.00	0.00	0.01	0.01	0.06
Peak Queue Time (min)	2.67	12.03	4.28	3.25	6.07	4.42	3.08

Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 7 – Departure Runway Queues), 2004/2005.

TABLE J.2-6
HOURLY DEPARTURE QUEUE TIME PROFILES – 2007/2008 - ALTERNATIVE A (NO ACTION ALTERNATIVE)

Hour	Profiles by Runway							
	04L-22R	09L-27R	09R-27L	14L-32R	14R-32L	04R-22L	32L(T10)	32R(V)
1	0.0000	0.1527	0.0475	0.0201	0.0244	0.0846	0.0314	0.0000
2	0.0000	0.0000	0.0091	0.0000	0.0000	0.0000	0.0000	0.0000
3	0.0000	0.0000	0.0242	0.0000	0.0000	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0000	0.0000	0.0024	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0579	0.0000	0.0013	0.0000	0.0000	0.0000
6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7	0.0000	0.0364	0.0650	0.0233	0.0000	0.0308	0.0179	0.0000
8	0.0583	0.1855	0.1300	0.2004	0.0000	0.2423	0.1480	0.0000
9	0.2152	0.5636	0.2821	0.0606	0.0639	0.4462	0.2982	0.1211
10	0.0777	0.4182	0.7100	0.4729	0.0563	0.2500	0.5493	0.0000
11	0.0000	0.1164	0.8431	0.5306	0.3384	0.1346	0.1547	0.0000
12	0.5728	0.1855	0.5515	0.2569	0.1461	0.6846	0.2937	0.0349
13	0.1133	0.2218	0.7480	0.2699	0.1704	0.4038	0.5897	0.9035
14	0.1149	0.6109	0.3930	0.9967	0.0703	0.4519	0.3520	0.3573
15	0.3916	0.9164	1.0000	0.5889	0.1247	0.9462	0.3946	0.1766
16	0.1958	0.5127	0.3756	1.0000	0.0000	0.4096	0.5471	0.1786
17	0.9660	0.6073	0.2678	0.5687	0.0000	0.7058	0.7130	1.0000
18	0.1489	0.8509	0.3344	0.2232	0.3550	0.1827	0.5830	0.9589
19	1.0000	0.6036	0.7433	0.4856	1.0000	1.0000	0.7377	0.9815
20	0.8188	1.0000	0.7876	0.7630	0.0999	0.7962	1.0000	0.4374
21	0.1440	0.5673	0.4818	0.1211	0.0078	0.3808	0.7152	0.5832
22	0.1650	0.2909	0.2599	0.3828	0.1278	0.3385	0.1345	0.8727
23	0.0000	0.9273	0.5417	0.1787	0.0345	0.8154	0.1547	0.0000
24	0.0000	0.7927	0.2490	0.0375	0.0024	0.0577	0.1726	0.0000
Peak Queue Time (min)	10.30	4.58	10.52	20.73	41.72	8.67	7.43	8.12

Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 7 – Departure Runway Queues), 2004/2005.

TABLE J.2-7
HOURLY DEPARTURE QUEUE TIME PROFILES – 2007/2008 - ALTERNATIVE C

Hour	Profiles by Runway						
	04L-22R	09L-27R	09R-27L	10L-28R	10C-28C	04R-22L	32L-14R
1	0.0000	0.0000	0.3833	1.0000	0.0000	0.0000	0.0000
2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	0.0000	0.0000	0.0000	0.0032	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000	0.0067	0.0000	0.0000	0.0000
6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7	0.0000	0.0000	0.0035	0.0387	0.0000	0.0053	0.0122
8	0.0558	0.0000	0.0853	0.0318	0.0000	0.0789	0.0892
9	0.0558	0.1084	0.0571	0.2222	0.0000	0.2708	0.0455
10	0.1523	0.1163	0.2323	0.2348	0.0000	0.2004	0.1346
11	0.0513	0.0621	0.2576	0.1045	0.0000	0.0928	0.0262
12	0.0950	0.1760	0.2795	0.2842	0.0000	0.1151	0.1853
13	0.4057	0.1626	0.4761	0.3423	0.0000	0.1375	0.5227
14	0.1297	0.2757	0.2548	0.2647	0.0000	0.2420	0.2525
15	0.0814	0.0000	0.1746	0.1401	0.0000	0.1866	0.1521
16	0.0664	0.2474	0.1378	0.2616	0.0000	0.2164	0.0769
17	0.1131	0.0998	0.2882	0.2077	1.0000	0.6429	0.3724
18	0.1161	0.1469	0.5775	0.5867	0.0000	0.2420	0.2500
19	1.0000	0.4006	0.4628	0.4347	0.0000	0.5480	1.0000
20	0.4012	1.0000	0.5256	0.3163	0.0000	0.1983	0.0944
21	0.0739	0.8570	0.4709	0.2334	0.0000	0.2569	0.0664
22	0.1237	0.0408	0.4795	0.2364	0.0000	0.1983	0.0682
23	0.0000	0.0000	1.0000	0.2763	0.0000	1.0000	0.0000
24	0.0000	0.0000	0.6075	0.2890	0.0000	0.8870	0.0000
Peak Queue Time (mins)	11.05	21.22	28.92	15.22	1.44	15.63	9.53

Note: Alternative C, D, and G are Build Alternatives.

Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 7 – Departure Runway Queues), 2004/2005.

TABLE J.2-8
HOURLY DEPARTURE QUEUE TIME PROFILES – 2009/2010 - ALTERNATIVE A (NO ACTION ALTERNATIVE)

Hour	Profiles by Runway							
	04L-22R	09L-27R	09R-27L	14L-32R	14R-32L	04R-22L	32L(T10)	32R(V)
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000
3	0.0000	0.0000	0.0212	0.0000	0.0000	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0019	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000	0.0000	0.0103	0.0000	0.0000	0.0000
6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7	0.0000	0.0772	0.0135	0.0087	0.0129	0.0481	0.0083	0.0000
8	0.1068	0.0752	0.4332	0.1129	0.0000	0.3212	0.0750	0.0853
9	0.1966	0.4594	0.5364	0.0509	0.1580	0.5096	0.5028	0.0359
10	0.0869	0.3822	0.4281	0.4126	0.2712	0.2769	0.5889	0.0000
11	0.0185	0.0396	0.5398	0.5780	0.0000	0.1038	0.1194	0.0000
12	0.2365	0.0832	0.7580	0.1710	0.3033	0.7019	0.3917	0.0000
13	0.1182	0.1287	0.7919	0.1394	0.2040	0.5673	1.0000	0.0976
14	0.3077	0.1980	0.5178	0.8525	0.2864	0.4808	0.1778	0.1661
15	0.5299	0.3168	0.6108	0.5592	1.0000	1.0000	0.2028	0.3176
16	0.1182	0.1980	0.3858	1.0000	0.0000	0.3865	0.7833	0.0550
17	0.9943	1.0000	0.6074	0.5430	0.2377	0.8654	0.5361	0.4085
18	0.1368	0.2297	0.3469	0.2531	0.3498	0.2635	0.3472	1.0000
19	1.0000	0.9267	0.6159	0.7359	0.0000	0.9096	0.9806	0.1953
20	0.7593	0.3861	0.7783	0.5540	0.0079	0.6327	0.9250	0.3659
21	0.0655	0.2733	1.0000	0.1539	0.0599	0.4654	0.7528	0.1403
22	0.2165	0.1168	0.3215	0.1602	0.0608	0.2981	0.1917	0.3412
23	0.0000	0.4515	0.3034	0.4233	0.1253	0.2038	0.2722	0.1728
24	0.0000	0.1208	0.1224	0.0427	0.0354	0.1904	0.2722	0.0000
Peak Queue Time (min)	11.70	8.42	9.85	20.15	23.21	8.67	6.00	14.85

Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 7 – Departure Runway Queues), 2004/2005.

TABLE J.2-9
HOURLY DEPARTURE QUEUE TIME PROFILES – 2009/2010 - ALTERNATIVE C

Hour	Profiles by Runway						
	04L-22R	09L-27R	09R-27L	10L-28R	10C-28C	04R-22L	32L-14R
1	0.0000	0.0000	0.3833	1.0000	0.0000	0.0000	0.0000
2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	0.0000	0.0000	0.0000	0.0032	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000	0.0067	0.0000	0.0000	0.0000
6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7	0.0000	0.0000	0.0035	0.0387	0.0000	0.0053	0.0122
8	0.0558	0.0000	0.0853	0.0318	0.0000	0.0789	0.0892
9	0.0558	0.1084	0.0571	0.2222	0.0000	0.2708	0.0455
10	0.1523	0.1163	0.2323	0.2348	0.0000	0.2004	0.1346
11	0.0513	0.0621	0.2576	0.1045	0.0000	0.0928	0.0262
12	0.0950	0.1760	0.2795	0.2842	0.0000	0.1151	0.1853
13	0.4057	0.1626	0.4761	0.3423	0.0000	0.1375	0.5227
14	0.1297	0.2757	0.2548	0.2647	0.0000	0.2420	0.2525
15	0.0814	0.0000	0.1746	0.1401	0.0000	0.1866	0.1521
16	0.0664	0.2474	0.1378	0.2616	0.0000	0.2164	0.0769
17	0.1131	0.0998	0.2882	0.2077	1.0000	0.6429	0.3724
18	0.1161	0.1469	0.5775	0.5867	0.0000	0.2420	0.2500
19	1.0000	0.4006	0.4628	0.4347	0.0000	0.5480	1.0000
20	0.4012	1.0000	0.5256	0.3163	0.0000	0.1983	0.0944
21	0.0739	0.8570	0.4709	0.2334	0.0000	0.2569	0.0664
22	0.1237	0.0408	0.4795	0.2364	0.0000	0.1983	0.0682
23	0.0000	0.0000	1.0000	0.2763	0.0000	1.0000	0.0000
24	0.0000	0.0000	0.6075	0.2890	0.0000	0.8870	0.0000
Peak Queue Time (min)	11.05	21.22	28.92	15.22	1.44	15.63	9.53

Note: Alternative C, D, and G are Build Alternatives.
Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 7 – Departure Runway Queues), 2004/2005.

TABLE J.2-10
HOURLY DEPARTURE QUEUE TIME PROFILES – 2013/2014 - ALTERNATIVE A (NO ACTION ALTERNATIVE)

Hour	Profiles by Runway							
	04L-22R	09L-27R	09R-27L	14L-32R	14R-32L	04R-22L	32L(T10)	32R(V)
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.0000	0.0000	0.0028	0.0000	0.0000	0.0000	0.0000	0.0000
3	0.0000	0.0000	0.0027	0.0000	0.0000	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0031	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.1243	0.0000	0.0133	0.0000	0.0000	0.0000
6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7	0.0000	0.0000	0.0542	0.0415	0.0154	0.0179	0.0434	0.0000
8	0.0361	0.0858	0.1193	0.1565	0.0000	0.2753	0.1301	0.6043
9	0.1578	0.0648	0.2525	0.0434	0.1880	0.2266	0.3189	1.0000
10	0.1537	0.2154	0.3540	0.1521	0.2999	0.2266	0.2730	0.0000
11	0.0388	0.0452	0.2771	0.4156	0.1120	0.1306	0.1964	0.5704
12	0.2166	0.0633	1.0000	0.4505	0.4176	0.4866	0.9490	0.1622
13	0.3770	0.0602	0.8047	0.2911	0.3071	0.2484	0.7423	0.3761
14	0.4291	0.1928	0.6972	0.0886	0.5191	0.3470	0.7041	0.2906
15	0.7206	0.3494	0.9763	0.6942	1.0000	1.0000	0.6531	0.4029
16	0.1430	0.1250	0.7258	1.0000	0.0000	0.2894	0.6454	0.1569
17	0.7995	0.5286	0.2929	0.2613	0.3103	0.6351	0.6148	0.2888
18	0.1537	0.4714	0.2377	0.4047	0.4258	0.6146	1.0000	0.1604
19	0.8623	1.0000	0.5641	0.7407	0.0000	0.4046	0.8495	0.6898
20	1.0000	0.7500	0.3728	0.3627	0.2248	0.9411	0.3010	0.4439
21	0.0789	0.2681	0.4329	0.2433	0.1403	0.5493	0.2423	0.3102
22	0.1070	0.1114	0.2988	0.1756	0.1132	0.3150	0.1990	0.0446
23	0.0000	0.0000	0.2943	0.2568	0.1656	0.4750	0.8776	0.4617
24	0.0000	0.0000	0.1597	0.0721	0.1073	0.1063	0.7194	0.0000
Peak Queue Time (min)	12.47	11.07	16.90	19.95	12.95	13.02	6.53	9.35

Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 7 – Departure Runway Queues), 2004/2005.

TABLE J.2-11
HOURLY DEPARTURE QUEUE TIME PROFILES – 2013/2014 - ALTERNATIVE C

Hour	Profiles by Runway					
	9C-27C	09R-27L	10L-28R	10C-28C	10R-28L	04R-22L
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.0000	0.0000	0.0020	0.0000	0.0000	0.0000
3	0.0000	0.0000	0.0055	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0351	0.0000	0.0000	0.0000
6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7	0.0000	0.2280	0.2358	0.0000	0.026	0.0191
8	0.0000	0.1514	0.1082	0.0000	0.1219	0.2038
9	0.0000	0.1527	0.1607	0.0000	0.4451	0.5828
10	0.0000	0.4249	0.8549	0.0000	1.0000	0.8344
11	0.0000	0.1941	0.2137	0.0000	0.3997	0.1943
12	0.0000	0.3629	1.0000	0.0000	0.6235	0.7293
13	0.0000	0.6612	0.5652	0.0000	0.1861	0.3089
14	0.0000	0.4533	0.3729	0.0000	0.1686	0.5764
15	0.0000	0.6428	0.0728	0.0000	0.5491	0.5605
16	0.0000	0.3727	0.2107	0.0000	0.7930	0.3694
17	1.0000	0.5020	0.2150	0.0000	0.2494	0.8535
18	0.0000	0.5840	0.6383	1.0000	0.9007	0.7134
19	0.0000	0.7673	0.4139	0.0000	0.3837	0.4682
20	0.0000	0.4902	0.4284	0.0000	0.4434	1.0000
21	0.0000	0.7063	0.3157	0.0000	0.2073	0.3280
22	0.0000	0.3430	0.1162	0.0000	0.2225	0.1815
23	0.0000	1.0000	0.1840	0.0000	0.0000	0.0382
24	0.0000	0.0000	0.2369	0.0000	0.0000	0.0000
Peak Queue Time (min)	5.98	7.06	6.13	8.40	4.04	5.23

Note: Alternative C, D, and G are Build Alternatives.

Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 7 – Departure Runway Queues), 2004/2005.

TABLE J.2-12
HOURLY DEPARTURE QUEUE TIME PROFILES – 2013/2014 - ALTERNATIVE D

Hour	Profiles by Runway				
	9C-27C	09R-27L	10L-28R	10C-28C	04R-22L
1	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.0000	0.0000	0.0016	0.0000	0.0000
3	0.0000	0.0000	0.0050	0.0000	0.0000
4	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0245	0.0000	0.0000
6	0.0000	0.0000	0.0000	0.0000	0.0000
7	0.0000	0.0777	0.2038	0.0000	0.0369
8	0.0000	0.0400	0.0540	0.0000	0.1364
9	0.0000	0.0542	0.1434	0.0000	0.8580
10	0.0000	0.1425	0.4943	0.0000	0.3892
11	0.0000	0.0443	0.3745	0.0000	0.1477
12	0.0000	0.0710	0.9347	0.0000	0.1477
13	0.0000	0.1114	0.7828	0.0000	0.2585
14	0.0000	0.1195	0.5603	0.0000	0.4517
15	0.0000	0.1488	0.3438	0.0000	0.4290
16	0.0000	0.0728	0.4818	0.0000	0.1477
17	1.0000	0.1104	0.4411	0.0000	0.7159
18	0.0000	0.0976	0.5980	1.0000	0.5653
19	0.0000	0.1623	0.5105	0.0000	0.4688
20	0.0000	0.1171	0.3787	0.0000	1.0000
21	0.0000	0.1398	0.3214	0.0000	0.2898
22	0.0000	0.0985	0.2953	0.0000	0.1847
23	0.0000	0.5164	0.6878	0.0000	0.0341
24	0.0000	1.0000	1.0000	0.0000	0.0000
Peak Queue Time (min)	5.74	44.65	7.46	18.75	5.87

Note: Alternative C, D, and G are Build Alternatives.
Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 7 – Departure Runway Queues), 2004/2005.

TABLE J.2-13
HOURLY DEPARTURE QUEUE TIME PROFILES – 2013/2014 - ALTERNATIVE G

Hour	Profiles by Runway					
	9C-27C	09R-27L	10L-28R	10C-28C	12-30	04R-22L
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.0000	0.0000	0.0021	0.0000	0.0000	0.0000
3	0.0000	0.0000	0.0012	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0022	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0264	0.0000	0.0000	0.0000
6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7	0.0000	0.3460	0.4031	0.0000	0.0000	0.0369
8	0.0000	0.0877	0.0740	0.0000	0.0219	0.1364
9	0.0000	0.0736	0.1497	0.0000	0.2226	0.8580
10	0.0000	0.2071	0.6669	0.0000	0.1803	0.3892
11	0.0000	0.0672	0.2296	0.0000	0.1850	0.1477
12	0.0000	0.1296	1.0000	0.0000	0.1332	0.1477
13	0.0000	0.2404	0.5501	0.0000	0.2288	0.2585
14	0.0000	0.3379	0.4759	0.0000	0.2085	0.4517
15	0.0000	0.4271	0.1094	0.0000	0.2618	0.4290
16	0.0000	0.1637	0.2137	0.0000	0.5737	0.1477
17	1.0000	0.2733	0.4121	0.0000	0.1755	0.7159
18	0.0000	0.2256	0.3814	0.3888	0.5345	0.5653
19	0.0000	0.3937	0.4702	1.0000	0.6411	0.4688
20	0.0000	0.2377	0.3267	0.0000	0.5376	1.0000
21	0.0000	0.2577	0.3014	0.0000	1.0000	0.2898
22	0.0000	0.2841	0.2341	0.0000	0.1850	0.1847
23	0.0000	1.0000	0.3023	0.0000	0.7743	0.0341
24	0.0000	0.0168	0.0878	0.0000	0.9436	0.0000
Peak Queue Time (min)	5.92	11.65	6.05	62.98	10.63	5.87

Note: Alternative C, D, and G are Build Alternatives.
Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 7 – Departure Runway Queues), 2004/2005.

TABLE J.2-14
HOURLY DEPARTURE QUEUE TIME PROFILES – 2018/2019 - ALTERNATIVE A (NO ACTION ALTERNATIVE)

Hour	Profiles by Runway							
	04L-22R	09L-27R	09R-27L	14L-32R	14R-32L	04R-22L	32L(T10)	32R(V)
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.0000	0.0000	0.0065	0.0000	0.0006	0.0000	0.0000	0.0000
3	0.0000	0.0000	0.0752	0.0000	0.0000	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0000	0.0000	0.0043	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.1299	0.0000	0.0018	0.0000	0.0000	0.0000
6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7	0.0000	0.0000	0.0205	0.0154	0.0076	0.0367	0.0382	0.0000
8	0.0249	0.0660	0.3288	0.0767	0.0000	0.3870	0.1272	0.1622
9	0.2914	0.0694	0.3836	0.0434	0.0477	0.1653	0.1450	0.9790
10	0.0615	0.2483	0.5575	0.0584	0.0587	0.2302	0.4097	0.0000
11	0.0644	0.1424	0.2466	0.3153	0.0000	0.0650	0.1934	0.1183
12	0.3880	0.0972	0.4781	0.2059	0.3477	0.6059	0.7888	0.1603
13	0.1420	0.1181	0.6301	0.0620	0.1710	0.6328	0.5903	0.1431
14	0.1303	0.0000	0.4356	0.3351	0.2730	0.5720	0.4097	0.2252
15	0.1054	0.3976	1.0000	0.2280	0.0981	0.9294	0.2748	0.0363
16	0.1991	0.1302	0.9753	0.3371	0.1754	0.3333	0.7964	0.5344
17	0.6618	0.5712	0.4726	0.1932	1.0000	0.7585	1.0000	1.0000
18	0.1669	0.4045	0.3973	0.3116	0.5762	0.4435	0.7506	0.6527
19	1.0000	1.0000	0.3836	0.3820	0.5265	0.7627	0.6845	0.5477
20	0.8463	0.2135	0.3055	0.1299	0.1581	0.4816	0.6234	0.4256
21	0.2196	0.2865	0.4164	0.6473	0.5711	0.4379	0.4911	0.0000
22	0.1391	0.2188	0.2932	0.0497	0.2291	0.3602	0.1781	0.2863
23	0.0000	0.0000	0.2967	1.0000	0.4201	1.0000	0.3537	0.7004
24	0.0000	0.0000	0.3909	0.0243	0.1047	0.4944	0.1094	0.0000
Peak Queue Time (min)	4.17	2.68	12.17	30.36	54.55	11.80	6.55	8.73

Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 7 – Departure Runway Queues), 2004/2005.

TABLE J.2-15
HOURLY DEPARTURE QUEUE TIME PROFILES – 2018/2019 - ALTERNATIVE C

Hour	Profiles by Runway					
	9C-27C	9R-27L	10L-28R	10C-28C	10R-28L	4R-22L
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0479	0.0898	0.0000	0.0000	0.0000
6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7	0.0000	0.3125	0.1614	0.0000	0.0442	0.0067
8	0.0000	0.3319	0.1266	0.0000	0.0549	0.3725
9	0.0000	0.2021	0.2560	0.0000	0.2399	0.4832
10	0.0000	0.4416	0.6092	0.0000	0.6009	0.8859
11	0.0000	0.1764	0.4608	0.0000	0.3220	0.3154
12	0.0000	0.7210	0.4795	0.0000	0.6537	0.7919
13	0.0000	0.5647	0.6080	0.0000	0.2279	0.6275
14	0.0000	0.4399	0.7508	0.0000	0.2099	0.3893
15	0.0000	0.7284	1.0000	0.0000	0.4487	0.4161
16	0.0000	0.2629	0.6043	0.0000	0.3655	0.3826
17	0.4841	0.5570	0.3212	0.0000	0.5080	0.7215
18	0.0000	0.5617	0.7307	0.1550	0.5844	0.8154
19	0.0000	1.0000	0.4540	0.4279	0.6480	0.3557
20	0.0000	0.4714	0.5461	1.0000	1.0000	0.5537
21	1.0000	0.6116	0.4206	0.0000	0.7384	1.0000
22	0.0000	0.4199	0.1313	0.0000	0.8367	0.4060
23	0.5370	0.8257	0.2103	0.0000	0.6377	0.0772
24	0.0000	0.0539	0.1966	0.0000	0.0000	0.0000
Peak Queue Time (min)	10.35	5.57	5.29	30.30	5.28	4.97

Note: Alternative C, D, and G are Build Alternatives.
Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 7 – Departure Runway Queues), 2004/2005.

TABLE J.2-16
HOURLY DEPARTURE QUEUE TIME PROFILES – 2018/2019 - ALTERNATIVE D

Hour	Profiles by Runway				
	9C-27C	9R-27L	10L-28R	10C-28C	4R-22L
1	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.0000	0.0000	0.0000	0.0000	0.0000
3	0.0000	0.0000	0.0145	0.0000	0.0000
4	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0214	0.0000	0.0000
6	0.0000	0.0000	0.0000	0.0000	0.0000
7	0.0000	0.0405	0.2686	0.0000	0.0045
8	0.0000	0.0423	0.1624	0.0000	0.6726
9	0.0000	0.0666	0.2241	0.0000	0.8565
10	0.0000	0.1843	0.5685	0.0000	0.6368
11	0.0000	0.2027	0.4870	0.0000	0.5740
12	0.0000	0.2255	0.7117	0.0000	0.4574
13	0.0000	0.2196	0.9648	0.0000	0.9865
14	0.0000	0.2068	0.7813	0.0000	0.5291
15	0.0000	0.2510	0.9970	0.0000	0.6637
16	0.0000	0.0801	0.9464	0.0000	0.3498
17	0.1455	0.1343	0.3805	0.0000	0.5695
18	0.0000	0.1035	0.5946	1.0000	1.0000
19	0.0000	0.2278	0.6594	0.9430	0.4933
20	0.0000	0.1964	0.5713	0.0000	0.5964
21	1.0000	0.1935	0.3235	0.0000	0.7489
22	0.0000	0.3075	0.4279	0.0000	0.4709
23	0.5265	0.6665	0.7283	0.0000	0.1031
24	0.0000	1.0000	1.0000	0.0000	0.0000
Peak Queue Time (min)	12.26	37.17	7.39	8.28	3.72

Note: Alternative C, D, and G are Build Alternatives.
Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 7 – Departure Runway Queues), 2004/2005.

TABLE J.2-17
HOURLY DEPARTURE QUEUE TIME PROFILES – 2018/2019 - ALTERNATIVE G

Hour	Profiles by Runway					
	9C-27C	9R-27L	10L-28R	10C-28C	12-30	4R-22L
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	0.0000	0.0000	0.0022	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.1349	0.0000	0.0000	0.0000
6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7	0.0000	0.0550	0.7061	0.0000	0.0000	0.0045
8	0.0000	0.0344	0.1737	0.0000	0.0225	0.6726
9	0.0000	0.0272	0.2126	0.0000	0.1476	0.8565
10	0.0000	0.1089	0.7677	0.0000	0.1501	0.6368
11	0.0000	0.0398	0.2520	0.0000	0.2175	0.5740
12	0.0000	0.1383	0.6349	0.0000	0.1039	0.4574
13	0.0000	0.1404	0.9274	0.0000	0.2163	0.9865
14	0.0000	0.1403	0.6595	0.0000	0.1100	0.5291
15	0.0000	0.1360	0.9349	0.0000	0.2375	0.6637
16	0.0000	0.0736	0.6398	0.0000	0.7904	0.3498
17	0.6091	0.1054	0.4928	0.0000	0.1835	0.5695
18	0.0000	0.0830	0.6138	0.8634	0.4666	1.0000
19	0.0000	0.1888	0.8130	1.0000	0.2339	0.4933
20	0.0000	0.1314	0.5003	0.0000	0.2230	0.5964
21	1.0000	0.1335	0.3905	0.0000	0.3098	0.7489
22	0.0000	0.1157	0.5336	0.0000	0.1416	0.4709
23	0.9400	0.7439	0.6836	0.0000	0.2047	0.1031
24	0.0000	1.0000	1.0000	0.0000	1.0000	0.0000
Peak Queue Time (min)	5.71	31.93	5.45	8.28	27.43	3.72

Note: Alternative C, D, and G are Build Alternatives.
Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 7 – Departure Runway Queues), 2004/2005.

TABLE J.2-18
HOURLY DEPARTURE QUEUE LENGTH PROFILES - 2002

Hour	Profiles by Runway						
	14L-32R	14R-32L	32l(T10)	04L-22R	4R-22L	9L-27R	9R-27L
1	0.00	0.35	0.00	0.00	0.01	0.01	0.15
2	0.00	0.00	0.00	0.00	0.01	0.01	0.01
3	0.00	0.41	0.00	0.00	0.00	0.00	0.35
4	0.00	0.41	0.00	0.00	0.00	0.00	0.35
5	0.00	0.34	0.00	0.00	0.00	0.00	0.19
6	0.00	0.41	0.00	0.00	0.00	0.00	0.17
7	0.20	0.31	0.16	0.08	0.21	0.23	0.15
8	0.26	0.55	0.36	0.25	.038	0.30	0.21
9	0.27	0.00	0.64	0.67	0.80	0.24	0.52
10	0.27	0.55	0.47	0.25	0.45	0.24	0.54
11	0.16	0.00	0.47	0.33	0.40	0.19	0.47
12	0.37	0.71	0.29	0.25	0.43	0.25	0.14
13	0.51	1.00	0.82	0.67	0.66	0.19	0.75
14	0.51	0.97	0.68	0.83	0.67	0.58	0.46
15	0.74	0.55	0.70	0.92	1.00	0.70	0.46
16	0.53	0.00	1.00	0.17	0.38	0.24	0.84
17	0.29	0.32	0.37	0.58	0.56	0.18	0.92
18	0.24	0.32	0.52	0.33	0.58	0.18	0.54
19	1.00	0.62	0.80	1.00	0.93	1.00	0.46
20	0.74	0.29	0.61	0.42	0.99	0.70	0.96
21	0.47	0.59	0.89	0.33	0.92	0.30	1.00
22	0.20	0.66	0.56	0.17	0.34	0.12	0.67
23	0.04	0.32	0.13	0.00	0.11	0.01	0.86
24	0.02	0.45	0.01	0.00	0.01	0.01	0.36
Peak Length (ft)	2,098	352	2,250	1,092	2,001	1,591	725

Note: Alternative C, D, and G are Build Alternatives.
Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 7 – Departure Runway Queues), 2004/2005.

TABLE J.2-19
HOURLY DEPARTURE QUEUE LENGTH PROFILES – 2007/2008 - ALTERNATIVE A (NO ACTION ALTERNATIVE)

Hour	Profiles by Runway							
	04L-22R	09L-27R	09R-27L	14L-32R	14R-32L	04R-22L	32L(T10)	32R(V)
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.0000	0.0000	0.1696	0.0000	0.2615	0.0000	0.0000	0.0000
3	0.0000	0.0000	0.3176	0.0000	0.2615	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.2985	0.0000	0.2615	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.1400	0.0000	0.2615	0.0000	0.0000	0.0000
6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7	0.0000	0.2237	0.2966	0.0747	0.3723	0.1376	0.1428	0.0000
8	0.1250	0.3009	0.2277	0.1978	0.0000	0.4087	0.3669	0.3103
9	0.3750	0.6581	0.3887	0.1339	0.3723	0.7429	0.5209	0.3793
10	0.1875	0.5656	0.5640	0.6560	0.4677	0.3050	0.6092	0.3103
11	0.1875	0.2365	0.5830	0.3533	0.0800	0.2651	0.3848	0.0000
12	0.6250	0.3677	0.4430	0.3425	1.0000	0.8536	0.5460	0.3793
13	0.1875	0.4731	0.6497	0.2940	0.5786	0.5639	0.8249	0.6897
14	0.1875	0.8407	0.6393	0.4564	0.4832	0.6429	0.5179	0.3793
15	0.4375	0.5913	0.7768	0.4533	0.3723	0.7272	0.3372	0.3103
16	0.3125	0.4473	0.5262	0.5826	0.0000	0.6765	0.7179	0.3103
17	0.8125	0.6171	0.5157	0.9577	0.2180	0.7673	0.6091	1.0000
18	0.2500	0.6967	0.5805	0.7832	0.1235	0.2960	0.7476	0.3103
19	1.0000	1.0000	1.0000	1.0000	0.1263	1.0000	0.6765	0.6897
20	0.7500	0.9871	0.8704	0.8545	0.0154	0.7686	1.0000	0.3103
21	0.1875	0.5656	0.7768	0.5677	0.0435	0.6018	0.8880	0.3103
22	0.3125	0.3548	0.4405	0.6447	0.3297	0.4102	0.2925	0.3103
23	0.0000	0.0644	0.8292	0.1293	0.5875	0.2196	0.0224	0.0000
24	0.0000	0.0515	0.6119	0.0393	0.2460	0.0367	0.0224	0.0000
Peak Length (ft)	1,080	641	787	975	535	2,654	2,682	218

Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 7 – Departure Runway Queues), 2004/2005.

TABLE J.2-20
HOURLY DEPARTURE QUEUE LENGTH PROFILES – 2007/2008 - ALTERNATIVE C

Hour	Profiles by Runway						
	04L-22R	09L-27R	09R-27L	10L-28R	10C-28C	04R-22L	14R-32L
1	0.0000	0.0000	0.1916	0.0549	0.0000	0.0000	0.0000
2	0.0000	0.0000	0.0000	0.0642	0.0000	0.0000	0.0769
3	0.0000	0.0000	0.0000	0.0642	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0000	0.0642	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000	0.0642	0.0000	0.0000	0.0000
6	0.0000	0.0000	0.0000	0.0642	0.0000	0.0000	0.0000
7	0.0667	0.0000	0.0734	0.0000	0.0000	0.1515	0.0769
8	0.2667	0.0000	0.4611	0.1001	0.0000	0.3989	0.3846
9	0.2000	0.2381	0.3057	0.1045	0.0000	0.6969	0.1538
10	0.5333	0.1429	0.7092	0.5310	0.0000	0.4290	0.3846
11	0.2000	0.0952	0.4894	0.4156	0.0000	0.3382	0.1538
12	0.4000	0.1905	0.6618	0.2348	0.0000	0.3684	0.4615
13	0.7333	0.2381	0.7012	0.4912	0.0000	0.4646	0.6154
14	0.4667	0.2381	0.3994	0.6664	0.0000	0.5504	0.5385
15	0.2667	0.0000	0.4268	0.4322	0.0000	0.5605	0.3846
16	0.2667	0.2857	0.4800	0.1629	0.0000	0.6869	0.2308
17	0.4000	0.1429	0.7006	0.6060	1.0000	1.0000	0.6154
18	0.2667	0.1905	0.6634	0.3888	0.0000	0.6714	0.3846
19	1.0000	0.5238	0.7539	1.0000	0.0000	0.9544	1.0000
20	0.6667	1.0000	1.0000	0.8065	0.0000	0.3985	0.2308
21	0.4000	0.4286	0.6786	0.6245	0.0000	0.6764	0.2308
22	0.4667	0.0952	0.6764	0.5371	0.0000	0.3278	0.1538
23	0.0000	0.0476	0.4627	0.3970	0.0000	0.1005	0.0000
24	0.0000	0.0000	0.2275	0.2550	0.0000	0.0753	0.0769
Peak Length (ft)	671	273	940	3,894	250	2,389	2,197

Note: Alternative C, D, and G are Build Alternatives.
Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 7 – Departure Runway Queues), 2004/2005.

TABLE J.2-21
HOURLY DEPARTURE QUEUE LENGTH PROFILES – 2009/2010 - ALTERNATIVE A (NO ACTION ALTERNATIVE)

Hour	Profiles by Runway							
	04L-22R	09L-27R	09R-27L	14L-32R	14R-32L	04R-22L	32L(T10)	32R(V)
1	0.0000	0.0194	0.2133	0.0148	0.2348	0.0134	0.0058	0.0000
2	0.0000	0.0000	0.1658	0.0000	0.2348	0.0000	0.0000	0.0000
3	0.0000	0.0000	0.3105	0.0000	0.2348	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.2918	0.0000	0.2209	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.1369	0.0000	0.2486	0.0000	0.0000	0.0000
6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7	0.0000	0.3269	0.2266	0.0568	0.3343	0.0884	0.0771	0.0000
8	0.1875	0.2361	0.4350	0.1601	0.0000	0.6233	0.2197	0.5000
9	0.2500	0.6634	0.4964	0.0863	0.3343	0.7537	0.5865	0.6111
10	0.1875	0.5938	0.4229	0.5719	0.6052	0.4741	0.6319	0.5000
11	0.0625	0.1780	0.6026	0.4079	0.0000	0.2832	0.3608	0.0000
12	0.4375	0.3559	0.5821	0.2294	1.0000	0.9033	0.5237	0.5000
13	0.2500	0.3057	0.5821	0.3386	0.9836	0.7781	1.0000	0.6111
14	0.4375	0.4256	0.3595	0.4942	0.7325	0.7905	0.2720	0.6111
15	0.5625	0.3463	0.6430	0.5038	0.2104	0.8046	0.3040	0.6111
16	0.4375	0.4256	0.6104	0.5731	0.0000	0.6562	0.7055	0.5000
17	0.9375	0.9806	0.7839	0.7925	0.3091	0.8880	0.4978	1.0000
18	0.1250	0.3656	0.5144	0.9712	0.2104	0.5037	0.3753	0.5000
19	1.0000	1.0000	0.8227	1.0000	0.0000	1.0000	0.8851	0.6111
20	0.6875	0.5744	0.6104	0.6899	0.0139	0.6340	0.9347	0.5000
21	0.1875	0.4256	1.0000	0.5493	0.0391	0.6208	0.8124	0.5000
22	0.5000	0.1877	0.4735	0.4487	0.2961	0.4771	0.3433	0.5000
23	0.0000	0.0291	0.8823	0.2597	0.6711	0.1027	0.0436	0.1111
24	0.0000	0.0194	0.4921	0.0524	0.3205	0.0368	0.0233	0.0000
Peak Length (ft)	1,080	851	805	1,017	595	2,345	2,581	135

Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 7 – Departure Runway Queues), 2004/2005.

TABLE J.2-22
HOURLY DEPARTURE QUEUE LENGTH PROFILES – 2009/2010 - ALTERNATIVE C

Hour	Profiles by Runway						
	04L-22R	09L-27R	09R-27L	10L-28R	10C-28C	04R-22L	14R-32L
1	0.0000	0.0000	0.1916	0.0549	0.0000	0.0000	0.0000
2	0.0000	0.0000	0.0000	0.0642	0.0000	0.0000	0.0769
3	0.0000	0.0000	0.0000	0.0642	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0000	0.0642	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000	0.0642	0.0000	0.0000	0.0000
6	0.0000	0.0000	0.0000	0.0642	0.0000	0.0000	0.0000
7	0.0667	0.0000	0.0734	0.0000	0.0000	0.1515	0.0769
8	0.2667	0.0000	0.4611	0.1001	0.0000	0.3989	0.3846
9	0.2000	0.2381	0.3057	0.1045	0.0000	0.6969	0.1538
10	0.5333	0.1429	0.7092	0.5310	0.0000	0.4290	0.3846
11	0.2000	0.0952	0.4894	0.4156	0.0000	0.3382	0.1538
12	0.4000	0.1905	0.6618	0.2348	0.0000	0.3684	0.4615
13	0.7333	0.2381	0.7012	0.4912	0.0000	0.4646	0.6154
14	0.4667	0.2381	0.3994	0.6664	0.0000	0.5504	0.5385
15	0.2667	0.0000	0.4268	0.4322	0.0000	0.5605	0.3846
16	0.2667	0.2857	0.4800	0.1629	0.0000	0.6869	0.2308
17	0.4000	0.1429	0.7006	0.6060	1.0000	1.0000	0.6154
18	0.2667	0.1905	0.6634	0.3888	0.0000	0.6714	0.3846
19	1.0000	0.5238	0.7539	1.0000	0.0000	0.9544	1.0000
20	0.6667	1.0000	1.0000	0.8065	0.0000	0.3985	0.2308
21	0.4000	0.4286	0.6786	0.6245	0.0000	0.6764	0.2308
22	0.4667	0.0952	0.6764	0.5371	0.0000	0.3278	0.1538
23	0.0000	0.0476	0.4627	0.3970	0.0000	0.1005	0.0000
24	0.0000	0.0000	0.2275	0.2550	0.0000	0.0753	0.0769
Peak Length (ft)	671	273	940	3,894	250	2,389	2,197

Note: Alternative C, D, and G are Build Alternatives.
Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 7 – Departure Runway Queues), 2004/2005.

TABLE J.2-23
HOURLY DEPARTURE QUEUE LENGTH PROFILES – 2013/2014 - ALTERNATIVE A (NO ACTION ALTERNATIVE)

Hour	Profiles by Runway							
	04L-22R	09L-27R	09R-27L	14L-32R	14R-32L	04R-22L	32L(T10)	32R(V)
1	0.0000	0.0000	0.2393	0.0000	0.0172	0.0000	0.0000	0.0000
2	0.0000	0.0000	0.1207	0.0000	0.1604	0.0000	0.0000	0.0000
3	0.0000	0.0000	0.3669	0.0000	0.1604	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.2309	0.0000	0.2113	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.1207	0.0000	0.1604	0.0000	0.0000	0.0000
6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7	0.0000	0.0720	0.1858	0.0613	0.2285	0.1130	0.1159	0.0000
8	0.0714	0.1675	0.3215	0.1118	0.0000	0.8695	0.3412	0.3103
9	0.4286	0.2081	0.4155	0.1099	0.2285	0.5288	0.4411	0.3793
10	0.1429	0.4476	0.4071	0.2970	0.3361	0.4733	0.6079	0.0000
11	0.1429	0.2801	0.2681	0.2665	0.0000	0.2582	0.5635	0.3793
12	0.7143	0.2316	0.3368	0.2071	0.6834	0.9135	1.0000	0.3103
13	0.4286	0.3599	0.4674	0.2197	1.0000	0.9675	0.6862	0.3793
14	0.3571	0.3835	0.4254	0.3025	0.7954	0.9646	0.4067	0.3793
15	0.1429	0.4398	0.7449	0.2747	0.2870	0.9664	0.4852	0.3103
16	0.5714	0.1440	0.8725	0.5519	0.2001	0.8750	0.9732	0.3103
17	0.9286	0.6165	0.5876	0.6184	0.2207	1.0000	0.9280	1.0000
18	0.4286	0.3913	0.5326	1.0000	0.2870	0.6354	0.8036	0.3103
19	1.0000	1.0000	0.5158	0.7775	0.0775	0.8970	0.7386	0.6207
20	0.6429	0.2801	0.3615	0.9009	0.0267	0.8169	0.6583	0.3103
21	0.2857	0.3193	0.6176	0.8198	0.2379	0.5472	0.7318	0.3103
22	0.2857	0.2473	0.4218	0.5028	0.2024	0.6108	0.3480	0.3103
23	0.0000	0.0235	1.0000	0.4382	0.3154	0.2657	0.0326	0.0690
24	0.0000	0.0157	0.9114	0.0322	0.2586	0.1736	0.0489	0.0000
Peak Length (ft)	945	1.052	982	1,188	871	2,286	2,299	218

Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 7 – Departure Runway Queues), 2004/2005.

TABLE J.2-24
HOURLY DEPARTURE QUEUE LENGTH PROFILES – 2013/2014 - ALTERNATIVE C

Hour	Profiles by Runway					
	09C-27C	09R-27L	10L-28R	10C-28C	10R-28L	04R-22L
1	0.0000	0.0423	0.0822	0.0000	0.0000	0.0000
2	0.0000	0.0423	0.0822	0.0000	0.0000	0.0000
3	0.0000	0.0423	0.0822	0.0000	0.0000	0.0000
4	0.0000	0.0423	0.0822	0.0000	0.0000	0.0000
5	0.0000	0.0423	0.1039	0.0000	0.0000	0.0000
6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7	0.0000	0.2019	0.2389	0.0000	0.0904	0.1103
8	0.2500	0.3457	0.2867	0.0000	0.2289	0.3821
9	0.0000	0.4066	0.4563	0.0000	0.3404	0.7724
10	0.7500	1.0000	0.8018	0.0000	1.0000	0.6455
11	0.0000	0.4285	0.3973	0.0000	0.3614	0.4579
12	0.5000	0.9441	1.0000	0.0000	0.8614	0.4717
13	0.2500	0.8453	0.6925	0.0000	0.4096	0.8386
14	0.5000	0.7208	0.6233	0.0000	0.4789	1.0000
15	1.0000	0.5653	0.2029	0.0000	0.3614	0.7793
16	0.2500	0.6069	0.5075	0.0000	0.7440	0.5683
17	0.9348	0.8020	0.4496	1.0000	0.4096	0.6938
18	0.6673	0.8140	0.8795	0.4428	0.2169	0.9710
19	1.0000	0.6922	0.7235	0.0000	0.2018	0.9131
20	0.5000	0.8114	0.6835	0.0000	0.7500	0.7186
21	0.5000	0.6583	0.5082	0.0000	0.2711	0.9490
22	0.000	0.5199	0.2832	0.0000	0.2500	0.5255
23	0.0000	0.2787	0.3227	0.0000	0.0000	0.0703
24	0.0000	0.0469	0.1598	0.0000	0.0000	0.0069
Peak Length (ft)	414	2,447	1,450	173	1,494	1,631

Note: Alternative C, D, and G are Build Alternatives.
Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 7 – Departure Runway Queues), 2004/2005.

TABLE J.2-25
HOURLY DEPARTURE QUEUE LENGTH PROFILES – 2013/2014 - ALTERNATIVE D

Hour	Profiles by Runway				
	09C-27C	09R-27L	10L-28R	10C-28C	04R-22L
1	0.0000	0.0000	0.0744	0.0000	0.0000
2	0.0000	0.0000	0.0744	0.0000	0.0000
3	0.0000	0.0000	0.0744	0.0000	0.0000
4	0.0000	0.0000	0.0744	0.0000	0.0000
5	0.0000	0.0000	0.0778	0.0000	0.0000
6	0.0000	0.0000	0.0000	0.0000	0.0000
7	0.0000	0.2534	0.1933	0.0000	0.1013
8	0.0000	0.2702	0.2074	0.0000	0.2363
9	0.0000	0.4743	0.3260	0.0000	1.0000
10	0.0000	0.7903	0.5980	0.0000	0.7094
11	0.0000	0.4087	0.3623	0.0000	0.3040
12	0.0000	0.4581	1.0000	0.0000	0.3175
13	0.0000	0.7605	0.8428	0.0000	0.5946
14	0.0000	1.0000	0.6202	0.0000	0.6283
15	0.0000	0.8258	0.2404	0.0000	0.4256
16	0.0000	0.6064	0.4260	0.0000	0.4054
17	1.0000	0.8599	0.4218	0.0000	0.7565
18	0.0000	0.5450	0.7552	1.0000	0.6619
19	0.0000	0.8518	0.7009	0.0000	0.7229
20	0.0000	0.7501	0.5385	0.0000	0.8919
21	0.0000	0.6655	0.4010	0.0000	0.4054
22	0.0000	0.5372	0.2633	0.0000	0.4256
23	0.0000	0.2199	0.3790	0.0000	0.0067
24	0.0000	0.1534	0.2095	0.0000	0.0067
Peak Length (ft)	250	3,305	3,358	250	1,784

Note: Alternative C, D, and G are Build Alternatives.
Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 7 – Departure Runway Queues), 2004/2005.

TABLE J.2-26
HOURLY DEPARTURE QUEUE LENGTH PROFILES – 2013/2014 - ALTERNATIVE G

Hour	Profiles by Runway					
	09C-27C	09R-27L	10L-28R	10C-28C	12-30	04R-22L
1	0.0000	0.0000	0.0793	0.0000	0.0000	0.0000
2	0.0000	0.0000	0.0793	0.0000	0.0000	0.0000
3	0.0000	0.0000	0.0793	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0793	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0793	0.0000	0.0000	0.0000
6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7	0.0000	0.2717	0.3109	0.0000	0.0000	0.1013
8	0.0000	0.2434	0.2301	0.0000	0.0701	0.2363
9	0.0000	0.3473	0.3181	0.0000	0.4044	1.0000
10	0.0000	0.5202	0.7141	0.0000	0.2007	0.7094
11	0.0000	0.2989	0.2646	0.0000	0.3370	0.3040
12	0.0000	0.3342	1.0000	0.0000	0.2321	0.3175
13	0.0000	0.6019	0.6088	0.0000	0.4579	0.5946
14	0.0000	1.0000	0.6306	0.0000	0.2599	0.6283
15	0.0000	0.7833	0.1311	0.0000	0.2119	0.4256
16	0.0000	0.5646	0.2983	0.0000	0.5309	0.4054
17	1.0000	0.7275	0.4675	0.0000	0.2005	0.7565
18	0.0000	0.4756	0.5455	1.0000	0.5835	0.6619
19	0.0000	0.6967	0.6166	0.3021	0.6730	0.7229
20	0.0000	0.5939	0.4975	0.0000	0.4095	0.8919
21	0.0000	0.5017	0.3200	0.0000	1.0000	0.4054
22	0.0000	0.5178	0.2183	0.0000	0.2002	0.4256
23	0.0000	0.1814	0.2852	0.0000	0.1472	0.0067
24	0.0000	0.0072	0.0829	0.0000	0.0496	0.0067
Peak Length (ft)	250	2,859	3,151	192	1,028	1,784

Note: Alternative C, D, and G are Build Alternatives.
Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 7 – Departure Runway Queues), 2004/2005.

TABLE J.2-27
HOURLY DEPARTURE QUEUE LENGTH PROFILES – 2018/2019 - ALTERNATIVE A (NO ACTION ALTERNATIVE)

Hour	Profiles by Runway							
	04L-22R	09L-27R	09R-27L	14L-32R	14R-32L	04R-22L	32L(T10)	32R(V)
1	0.0000	0.0000	0.0086	0.0242	0.1758	0.1338	0.0000	0.0000
2	0.0000	0.0000	0.0086	0.0900	0.1758	0.1605	0.0000	0.0000
3	0.0000	0.0000	0.0031	0.0900	0.1758	0.0267	0.0000	0.0000
4	0.0000	0.0000	0.0086	0.0900	0.1758	0.1433	0.0000	0.0000
5	0.0000	0.0000	0.0000	0.0900	0.3516	0.0095	0.0000	0.0000
6	0.0000	0.0000	0.0056	0.0085	0.0781	0.0172	0.0054	0.0000
7	0.0000	0.0289	0.1522	0.2036	0.3906	0.1829	0.1009	0.1111
8	0.0714	0.2605	0.2965	0.3073	0.1172	0.0491	0.3932	0.6111
9	0.3571	0.0289	0.5112	0.4427	0.1172	0.0491	0.4995	1.0000
10	0.2857	0.4105	0.4576	0.4291	0.6257	0.2153	0.4065	0.6111
11	0.0714	0.0868	0.2527	0.4599	0.1172	0.4513	0.4511	0.5000
12	0.5714	0.0868	1.0000	0.9207	0.4121	0.3910	0.4591	0.6111
13	0.5714	0.1447	0.6554	0.7806	0.6406	0.2153	0.4174	0.6111
14	0.8571	0.2026	0.6950	0.5728	0.6797	0.4005	0.7392	0.5000
15	0.9286	0.4105	0.6272	0.7567	0.1895	0.6604	0.7756	0.5000
16	0.3571	0.2947	0.5560	1.0000	0.1172	0.8875	0.5534	0.6111
17	0.7857	0.5895	0.5993	0.6068	0.5202	0.3965	0.8185	0.5000
18	0.2857	0.6763	0.8036	0.6326	0.9173	1.0000	0.6987	0.6111
19	1.0000	1.0000	0.7804	0.4260	0.6198	0.7585	1.0000	1.0000
20	0.9286	0.9711	0.5069	0.3769	0.5202	0.7545	0.7647	1.0000
21	0.2143	0.9711	0.4880	0.4260	0.4245	0.6207	0.7998	0.5000
22	0.1429	0.7053	0.5027	0.4120	0.7038	0.3491	0.3676	0.6111
23	0.0000	0.3237	0.2164	0.4645	1.0000	0.2415	0.0161	0.0000
24	0.0000	0.0579	0.0464	0.2519	0.5625	0.1527	0.0108	0.0000
Peak Length (ft)	945	285	2,699	1,769	384	871	2,790	135

Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 7 – Departure Runway Queues), 2004/2005.

TABLE J.2-28
HOURLY DEPARTURE QUEUE LENGTH PROFILES – 2018/2019 - ALTERNATIVE C

Hour	Profiles by Runway					
	9C-27C	9R-27L	10L-28R	10C-28C	10R-28L	4R-22L
1	0.0199	0.0386	0.0677	0.0000	0.0000	0.0000
2	0.0199	0.0386	0.0677	0.0000	0.0000	0.0000
3	0.0199	0.0386	0.0677	0.0000	0.0000	0.0000
4	0.0199	0.0000	0.0677	1.0000	0.0000	0.0000
5	0.0199	0.0386	0.0741	0.0000	0.0000	0.0000
6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7	0.0436	0.1283	0.3707	0.0000	0.1032	0.1533
8	0.2720	0.2732	0.3866	0.0000	0.1134	0.6813
9	0.4793	0.3626	0.4394	0.0000	0.6802	0.7251
10	0.5552	1.0000	0.6799	0.0000	1.0000	0.7616
11	0.2340	0.6367	0.3444	0.0000	0.2045	0.4161
12	0.8047	0.7437	0.8112	0.0000	0.7530	0.8552
13	0.7693	0.6935	0.7692	0.0000	0.5263	0.7311
14	0.4500	0.8247	0.8626	0.0000	0.4433	0.7579
15	0.5725	0.8283	0.8852	0.0000	0.4433	0.7908
16	0.5440	0.8010	0.6422	0.0000	0.5466	0.4818
17	0.5502	0.6368	0.4716	0.0000	0.6255	0.6214
18	0.4369	0.7059	0.6380	1.0000	0.2551	1.0000
19	0.9696	0.4750	1.0000	0.9549	0.2551	0.8698
20	1.0000	0.7243	0.5707	0.0451	0.7206	0.7920
21	0.6525	0.6806	0.6237	0.0000	0.2935	0.5243
22	0.1865	0.3001	0.3362	0.0000	0.2874	0.5414
23	0.0659	0.1635	0.5697	0.0000	0.0789	0.0122
24	0.0000	0.0428	0.2499	0.0000	0.0000	0.0000
Peak Length (ft)	1,331	2,683	1,761	249	1,112	1,850

Note: Alternative C, D, and G are Build Alternatives.
Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 7 – Departure Runway Queues), 2004/2005.

TABLE J.2-29
HOURLY DEPARTURE QUEUE LENGTH PROFILES – 2018/2019 - ALTERNATIVE D

Hour	Profiles by Runway				
	9C-27C	9R-27L	10L-28R	10C-28C	4R-22L
1	0.0000	0.0000	0.0683	0.0000	0.0000
2	0.0000	0.0000	0.0683	0.0000	0.0000
3	0.0000	0.0000	0.0683	0.0000	0.0000
4	0.0000	0.0000	0.0683	1.0000	0.0000
5	0.0000	0.0000	0.0683	0.0000	0.0000
6	0.0000	0.0000	0.0000	0.0000	0.0000
7	0.0000	0.1718	0.2376	0.0000	0.1026
8	0.0000	0.2345	0.3198	0.0000	0.7179
9	0.0000	0.4781	0.3573	0.0000	1.0000
10	0.0000	1.0000	0.7124	0.0000	0.7436
11	0.0000	0.5448	0.3649	0.0000	0.6154
12	0.0000	0.8307	0.7473	0.0000	0.4295
13	0.0000	0.7811	0.9111	0.0000	0.7115
14	0.0000	0.7347	0.7885	0.0000	0.6218
15	0.0000	0.6368	1.0000	0.0000	0.5385
16	0.0000	0.4310	0.8341	0.0000	0.4487
17	1.0000	0.6518	0.3286	0.0000	0.4808
18	0.0000	0.3975	0.5903	0.7673	0.9359
19	0.0000	0.6499	0.7174	1.0000	0.6218
20	0.0000	0.7474	0.5071	0.0000	0.4808
21	0.9549	0.8490	0.3845	0.0000	0.1987
22	0.0451	0.6318	0.2859	0.0000	0.2756
23	0.7673	0.1489	0.4621	0.0000	0.0158
24	0.0000	0.1083	0.2044	0.0000	0.0000
Peak Length (ft)	249	4,156	3,651	249	1,755

Note: Alternative C, D, and G are Build Alternatives.
Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 7 – Departure Runway Queues), 2004/2005.

TABLE J.2-30
HOURLY DEPARTURE QUEUE LENGTH PROFILES – 2018/2019 - ALTERNATIVE G

Hour	Profiles by Runway					
	9C-27C	9R-27L	10L-28R	10C-28C	12-30	4R-22L
1	0.0000	0.0000	0.0860	0.0000	0.0000	0.0000
2	0.0000	0.0000	0.0860	0.0000	0.0000	0.0000
3	0.0000	0.0000	0.0860	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0860	1.0000	0.0000	0.0000
5	0.0000	0.0000	0.0889	0.0000	0.0000	0.0000
6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7	1.0000	0.2293	0.3922	0.0000	0.0000	0.1026
8	0.0000	0.3176	0.3651	0.0000	0.1477	0.7179
9	0.0000	0.4303	0.3549	0.0000	0.6639	1.0000
10	0.0000	1.0000	1.0000	0.0000	0.4027	0.7436
11	0.0000	0.4470	0.2738	0.0000	0.6304	0.6154
12	0.0000	0.8702	0.7565	0.0000	0.3130	0.4295
13	0.0000	0.9080	0.8805	0.0000	0.6870	0.7115
14	0.0000	0.8361	0.7672	0.0000	0.4709	0.6218
15	0.0000	0.5949	0.9740	0.0000	0.5393	0.5385
16	0.0000	0.5900	0.7153	0.0000	1.0000	0.4487
17	0.0906	0.7549	0.4866	0.0000	0.4109	0.4808
18	0.0000	0.4632	0.6204	1.0000	0.9913	0.9359
19	0.0000	0.6566	0.8086	1.0000	0.8793	0.6218
20	0.0000	0.9665	0.4823	0.0000	0.5529	0.4808
21	0.0865	0.8685	0.4356	0.0000	0.6691	0.1987
22	0.0041	0.5856	0.3302	0.0000	0.3107	0.2756
23	0.0906	0.2213	0.5386	0.0000	0.1682	0.0128
24	0.0000	0.0843	0.2732	0.0000	0.1395	0.0000
Peak Length (ft)	2,750	2,620	2,899	249	975	1,755

Note: Alternative C, D, and G are Build Alternatives.
Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 7 – Departure Runway Queues), 2004/2005.

Aircraft Assignments to Terminals and Taxiways

The airfield simulation modeling presented in **Appendix D, Simulation Modeling,** assigns the aircraft to the appropriate terminal; based on airline lease agreements, forecast future gate use strategies, and known operations at O'Hare. The simulation taxiway assignments were based on the common and forecast routing paths known to be assigned by ground traffic controllers at O'Hare.

In addition to aircraft activity at the existing and proposed terminal buildings, the future year analysis assumed that some aircraft would be parked remotely, due to the unavailability of terminal gates. For the purpose of transporting passengers to/from the remote parking locations, the air quality analysis assumed that remote gate operations would require a bus service. These activities are accounted for in the aircraft operations data, the ground support equipment use data; and the motor vehicle (bus) data used in the air quality analyses.

Runway Use

The air quality analysis assignments for taxiway and runway configurations were primarily based on the results of the simulation modeling. These data included percentages of departures and arrivals for each runway for each type of aircraft. Runway use data are used by EDMS to perform the dispersion modeling. Departure runway use percentages, or the percent of the time that the various runways are used for departures, were also obtained from the results of the airfield simulation modeling. These percentages were used to distribute the landing-takeoff cycles to each runway end point. The departure runway use data used in the analysis are provided in **Tables J.2-31** through **J.2-43**. The arrival runway use data used in the analysis are provides in **Tables J.2-44** through **J.2-56**.

TABLE J.2-31
RUNWAY USE - DEPARTURES – 2002

ARTS Code	Percent Runway Use									
	04L	09L	09R	14L	14R	22L	27L	32L	32L(T10)	32R
100	16.77	10.63	0.36	3.99	0.00	39.89	3.06	0.00	21.88	3.42
146	13.35	6.32	0.00	8.41	0.00	7.59	2.73	0.25	51.55	9.81
306	0.00	0.00	36.40	0.00	0.00	0.00	18.30	45.30	0.00	0.00
310	0.00	1.10	18.20	2.15	0.00	31.80	5.90	20.10	20.75	0.00
319	8.48	11.07	0.00	2.68	0.00	27.68	6.37	0.21	42.17	1.35
320	9.62	10.31	0.34	1.95	0.00	25.75	8.34	0.11	42.37	1.22
332	0.00	0.00	0.00	18.30	0.00	0.00	0.00	0.00	41.50	40.20
333	0.00	0.00	0.00	18.30	0.00	0.00	0.00	41.50	0.00	40.20
340	0.00	0.00	12.13	18.30	0.00	0.00	0.00	41.50	0.00	28.07
343	0.00	0.00	0.00	18.30	0.00	0.00	0.00	41.50	0.00	40.20
72F	0.00	1.10	36.40	0.00	0.00	0.00	39.85	22.65	0.00	0.00
72S	0.00	36.40	0.00	0.00	0.00	43.13	6.63	0.00	13.83	0.00
733	12.38	15.11	0.00	3.27	0.00	33.86	4.93	0.04	28.33	2.07
734	13.24	19.85	3.31	2.64	0.00	46.85	7.93	0.00	3.77	2.42
735	12.74	11.48	0.00	3.73	0.00	39.41	3.58	0.00	26.03	3.03
737	18.20	2.20	0.00	6.27	0.00	37.50	0.00	0.00	33.30	2.53
738	4.85	6.91	0.81	2.10	0.00	16.43	11.08	0.00	57.15	0.68
73G	0.00	2.20	0.00	4.30	0.00	11.80	0.00	0.00	81.70	0.00
742	0.00	0.00	36.40	0.00	7.00	0.00	11.30	45.30	0.00	0.00
744	0.00	0.00	2.80	4.05	6.54	4.85	6.05	38.10	31.42	6.18
747	0.00	0.00	0.00	18.30	0.00	41.50	0.00	0.00	0.00	40.20
74F	0.00	0.00	31.20	2.61	4.00	5.93	11.69	44.03	0.00	0.54
74G	0.00	0.00	31.20	2.61	4.00	5.93	11.69	44.03	0.00	0.54
74M	0.00	0.00	0.00	18.30	0.00	0.00	0.00	41.50	0.00	40.20
757	6.58	9.01	1.16	1.84	0.00	23.31	8.36	0.00	48.25	1.49
762	0.00	0.00	0.00	0.00	0.00	4.30	14.00	0.00	81.70	0.00
763	2.80	2.80	2.80	8.41	0.00	15.46	5.75	14.51	29.88	17.59
767	0.00	36.40	0.00	4.30	0.00	59.30	0.00	0.00	0.00	0.00
772	0.00	0.00	0.00	0.00	18.30	0.00	0.00	81.70	0.00	0.00
777	0.00	1.84	0.00	8.92	2.30	11.91	5.12	23.89	27.05	18.96
ABF	0.00	0.00	24.27	2.87	0.00	33.07	10.03	28.50	0.00	1.27
BE1	6.07	1.47	0.00	6.80	0.00	5.37	4.67	0.00	75.63	0.00
BE40	0.00	2.20	0.00	16.10	0.00	0.00	0.00	0.00	40.20	41.50
BE58	0.00	2.20	0.00	4.30	0.00	11.80	0.00	0.00	81.70	0.00
C210	0.00	36.40	0.00	0.00	0.00	63.60	0.00	0.00	0.00	0.00
C401	0.00	0.00	0.00	.000	0.00	4.30	14.00	0.00	81.70	0.00
C550	0.00	2.20	0.00	4.30	0.00	11.80	0.00	0.00	81.70	0.00
C560	0.00	0.00	0.00	0.00	0.00	4.30	14.00	0.00	81.70	0.00
C650	0.00	0.00	0.00	0.00	0.00	4.30	14.00	0.00	81.70	0.00
C750	18.20	1.10	0.00	8.05	0.00	22.90	7.00	0.00	40.85	1.90
C9	0.00	0.00	24.27	2.87	0.00	33.07	10.03	28.50	0.00	1.27
CL60	0.00	36.40	0.00	0.00	0.00	51.80	11.80	0.00	0.00	0.00
CRJ	10.50	16.10	0.00	3.74	0.00	29.82	5.34	0.03	32.29	2.19
D1F	0.00	0.00	24.27	1.43	0.00	0.00	30.70	43.60	0.00	0.00
D38	6.62	23.16	0.00	1.17	0.00	33.93	8.25	0.00	26.17	0.69
D8F	0.00	0.00	36.40	0.00	0.00	0.00	28.68	34.93	0.00	0.00

TABLE J.2-31 (CONTINUED)
RUNWAY USE - DEPARTURES – 2002

ARTS Code	Percent Runway Use									
	04L	09L	09R	14L	14R	22L	27L	32L	32L(T10)	32R
D9S	3.47	6.56	0.00	8.08	0.00	12.92	2.41	0.36	62.25	3.95
ER4	11.08	15.92	0.00	3.42	0.00	33.63	4.19	0.17	28.25	3.35
ERD	11.65	14.62	0.00	3.22	0.00	36.32	4.08	0.00	27.83	2.27
ERJ	22.75	9.10	4.55	3.23	0.00	56.58	0.00	0.48	0.00	3.33
F900	0.00	18.20	0.00	2.15	0.00	31.80	7.00	0.00	40.85	0.00
FA50	0.00	0.00	0.00	0.00	0.00	4.30	14.00	0.00	81.70	0.00
G2	0.00	0.00	0.00	0.00	0.00	4.30	14.00	0.00	81.70	0.00
G4	0.00	0.00	0.00	.0.00	0.00	4.30	14.00	0.00	81.70	0.00
G5	0.00	0.00	0.00	0.00	0.00	4.30	14.00	0.00	81.70	0.00
LJ30	18.20	19.30	0.00	2.15	0.00	31.80	5.90	0.00	20.75	1.90
LJ45	0.00	36.40	0.00	0.00	0.00	51.80	11.80	0.00	0.00	0.00
LJ55	0.00	12.13	0.00	0.00	0.00	24.07	9.33	0.00	54.47	0.00
LJ60	0.00	36.40	0.00	0.00	0.00	57.70	5.90	0.00	0.00	0.00
M11	0.00	0.00	0.00	18.30	0.00	0.00	0.00	41.50	0.00	40.20
M1F	0.00	0.00	36.40	0.00	0.00	0.00	18.30	45.30	0.00	0.00
M1M	0.00	0.00	0.00	18.30	0.00	0.00	0.00	41.50	0.00	40.20
M80	7.48	17.12	0.98	2.01	0.00	31.39	7.91	0.04	32.00	1.07
M90	0.00	0.00	0.00	0.00	0.00	4.30	14.00	0.00	81.70	0.00

Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 3 – Fleet Mix by Runway), 2004/2005.

TABLE J.2-32
RUNWAY USE - DEPARTURES – 2007/2008 - ALTERNATIVE A (NO ACTION ALTERNATIVE)

ARTS Code	Percent Runway Use										
	04L	09L	09R	14L	14R	22L	27L	32L	32L(T10)	32R	32R(V)
319	9.12	9.07	0.19	2.59	0.00	35.00	6.03	0.00	35.35	2.65	0.00
31F	0.00	0.00	0.00	0.00	0.00	67.00	0.00	33.00	0.00	0.00	0.00
320	7.96	7.64	0.17	1.12	0.00	29.20	9.60	0.00	41.61	2.70	0.00
332	0.00	0.00	0.00	19.30	0.00	0.00	16.63	0.00	0.00	64.07	0.00
333	0.00	0.00	0.00	20.40	0.00	0.00	0.00	0.00	0.00	79.60	0.00
342	0.00	0.00	0.00	17.10	3.30	0.00	46.60	6.00	0.00	27.00	0.00
343	0.00	0.00	7.71	18.04	0.00	0.00	35.65	6.66	0.00	31.94	0.00
72F	0.00	0.00	13.50	0.00	0.00	35.15	8.55	42.80	0.00	0.00	0.00
732	0.00	27.00	0.00	0.00	0.00	61.60	11.40	0.00	0.00	0.00	0.00
733	11.22	9.17	0.00	0.53	0.00	43.20	5.86	0.00	26.88	3.14	0.00
734	10.80	16.20	0.00	0.00	0.00	51.96	0.00	0.00	18.64	2.40	0.00
735	16.20	8.04	0.00	0.00	0.00	52.82	3.42	0.00	14.72	4.80	0.00
737	0.00	15.15	0.00	8.55	0.00	36.50	0.00	0.00	39.80	0.00	0.00
738	4.94	10.07	0.66	0.42	0.00	24.93	11.28	1.14	45.17	1.39	0.00
739	2.53	13.60	0.00	0.53	0.00	20.78	13.63	0.00	48.55	0.38	0.00
744	0.00	0.00	0.00	4.17	9.07	0.00	12.34	35.38	26.53	12.51	0.00
74F	0.00	0.00	19.64	1.85	4.91	5.21	14.30	54.09	0.00	0.00	0.00
74M	0.00	0.00	0.00	20.40	0.00	0.0	0.00	0.00	0.00	79.60	0.00
757	6.41	5.53	0.00	0.58	0.00	24.48	11.59	0.00	49.17	2.24	0.00
763	0.84	1.69	0.00	9.38	2.65	3.21	18.64	4.31	31.13	28.15	0.00
76F	0.00	0.00	27.00	0.00	0.00	3.30	17.10	52.60	0.00	0.00	0.00
772	1.08	1.08	1.08	10.34	3.26	3.05	9.57	14.60	20.97	34.97	0.00
773	0.00	0.00	0.00	13.60	6.80	0.00	0.00	26.53	0.00	53.07	0.00
A3F	0.00	0.00	27.00	0.00	0.66	0.00	38.38	33.96	0.00	0.00	0.00
BE30	0.00	11.20	0.00	5.70	0.00	30.03	0.00	0.00	31.07	2.00	20.00
BE40	0.00	3.30	0.00	17.10	0.00	0.00	0.00	0.00	46.60	0.00	33.00
BE58	0.00	3.30	0.00	17.10	0.00	0.00	0.00	0.00	46.60	0.00	33.00
C210	0.00	27.00	0.00	0.00	0.00	49.70	0.00	0.00	23.30	0.00	0.00
C550	0.00	1.65	0.00	8.55	0.00	0.00	10.20	0.00	49.60	3.00	27.00
C560	0.00	18.00	0.00	0.00	0.00	27.43	12.50	0.00	33.07	0.00	9.00
C56X	0.00	15.15	0.00	0.00	0.00	68.35	0.00	0.00	0.00	3.00	13.50
C650	0.00	9.00	0.00	0.00	0.00	13.72	16.45	0.00	42.83	0.00	18.00
C750	0.00	8.19	0.00	0.00	0.00	29.96	11.66	0.00	30.04	0.86	19.29
CL60	0.00	27.00	0.00	0.00	0.00	26.40	0.00	0.00	46.60	0.00	0.00
CR7	9.18	12.93	0.00	1.05	0.00	47.09	4.90	0.00	21.95	2.90	0.00
CR9	4.91	11.32	0.00	3.11	0.00	33.59	5.56	0.00	39.33	2.18	0.00
CRJ	8.19	11.31	0.00	1.69	0.00	31.85	6.55	0.00	38.34	2.07	0.00
D1F	0.00	0.00	27.00	0.00	3.30	0.00	63.70	6.00	0.00	0.00	0.00
D8F	0.00	0.00	27.00	0.00	0.00	0.00	20.40	49.60	0.00	3.00	0.00
D95	5.40	3.30	0.00	10.26	0.00	6.84	0.00	0.00	74.20	0.00	0.00
D9S	5.40	7.71	0.00	8.55	0.00	8.70	2.04	0.00	64.60	3.00	0.00
E140	1.38	13.85	0.00	0.00	0.00	22.09	13.18	0.00	49.04	0.46	0.00
E145	7.28	9.34	0.00	2.11	0.00	34.11	5.98	0.00	38.62	2.56	0.00
F2TH	0.00	1.65	0.00	0.00	0.00	31.85	10.20	0.00	26.30	0.00	30.00
F900	0.00	13.50	0.00	0.00	0.00	36.50	10.20	0.00	26.30	0.00	13.50
FA20	0.00	3.30	0.00	17.10	0.00	0.00	0.00	0.00	46.60	6.00	27.00
FA50	0.00	3.30	0.00	17.10	0.00	0.00	0.00	0.00	46.60	6.00	27.00
G2	0.00	0.00	0.00	0.00	0.00	0.00	20.40	0.00	52.60	0.00	27.00
G4	0.00	0.00	0.00	0.00	0.00	0.00	20.40	0.00	52.60	0.00	27.00
G5	0.00	1.10	0.00	5.70	0.00	0.00	13.60	0.00	50.60	2.00	27.00
H25C	0.00	7.58	6.75	0.00	0.00	6.60	14.48	11.65	37.94	0.00	13.50
LJ30	0.00	15.15	0.00	0.00	0.00	45.05	0.00	0.00	23.30	0.00	16.50
LJ35	0.00	1.65	0.00	8.55	0.00	31.85	4.65	23.30	13.50	0.00	16.50
LJ45	0.00	27.00	0.00	0.00	0.00	73.00	0.00	0.00	0.00	0.00	0.00
LJ55	0.00	9.00	0.00	0.00	0.00	17.53	20.40	0.00	35.07	0.00	18.00
LJ60	0.00	27.00	0.00	0.00	0.00	9.30	17.10	0.00	46.60	0.00	0.00
M1F	0.00	0.00	13.50	0.00	1.65	0.00	30.40	54.45	0.00	0.00	0.00
M80	7.04	11.93	0.26	0.91	0.00	35.45	7.77	0.23	34.12	2.29	0.00
M87	0.00	27.00	0.00	0.00	0.00	16.20	10.20	0.00	46.60	0.00	0.00
M90	0.00	0.00	0.00	0.00	0.00	0.00	20.40	0.00	79.60	0.00	0.00

Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 3 – Fleet Mix by Runway), 2004/2005.

TABLE J.2-33
RUNWAY USE - DEPARTURES – 2007/2008 - ALTERNATIVE C

ARTS Code	Percent Runway Use								
	4L	9L	9R	10L	10C	22L	28R	28C	32L
319	7.16	1.02	8.12	11.30	0.00	25.11	21.45	0.00	25.84
320	5.75	0.95	9.78	11.08	0.00	24.76	29.69	0.00	17.99
321	7.49	1.04	8.10	10.97	0.00	8.33	37.03	0.00	27.04
332	0.00	0.00	0.00	27.60	0.00	0.00	72.40	0.00	0.00
333	0.00	0.00	0.00	27.60	0.00	0.00	72.40	0.00	0.00
342	0.00	0.00	0.00	27.60	0.00	0.00	72.40	0.00	0.00
343	0.00	0.00	0.00	27.60	0.00	0.00	72.40	0.00	0.00
346	0.00	0.00	0.00	27.60	0.00	0.00	72.40	0.00	0.00
380	0.00	0.00	0.00	0.00	27.60	0.00	0.00	72.40	0.00
733	5.03	0.41	10.32	11.84	0.00	30.54	19.68	0.00	22.18
737	1.49	0.00	14.98	11.18	0.00	66.37	6.03	0.00	0.00
738	3.13	0.66	4.36	19.45	0.00	25.04	38.78	0.00	8.58
739	4.13	0.93	4.45	18.09	0.00	31.06	37.87	0.00	3.47
744	0.00	0.00	0.00	27.60	0.00	0.60	71.80	0.00	0.00
757	0.00	0.00	0.00	27.60	0.00	72.40	0.00	0.00	0.00
763	2.36	0.55	1.18	23.52	0.00	4.69	67.70	0.00	0.00
772	3.09	0.72	1.39	22.40	0.00	7.82	64.58	0.00	0.00
773	0.00	0.00	0.00	27.60	0.00	0.00	72.40	0.00	0.00
31F	0.00	0.00	27.60	0.00	0.00	72.40	0.00	0.00	0.00
72F	0.00	0.00	2.25	25.35	0.00	38.60	33.80	0.00	0.00
74F	0.00	0.00	0.00	27.60	0.00	1.31	71.09	0.00	0.00
74M	0.00	0.00	0.00	27.60	0.00	0.00	72.40	0.00	0.00
75F	0.00	0.00	0.00	27.60	0.00	0.00	72.40	0.00	0.00
76F	0.00	0.00	4.50	23.10	0.00	0.00	4.80	0.00	67.60
A3F	0.00	0.00	0.00	27.60	0.00	0.00	58.88	0.00	13.52
BE30	11.93	1.73	12.20	1.73	0.00	24.13	3.20	0.00	45.08
BE40	17.90	0.00	9.70	0.00	0.00	0.00	4.80	0.00	67.60
BE58	17.90	5.20	4.50	0.00	0.00	0.00	4.80	0.00	67.60
C210	0.00	0.00	7.10	20.50	0.00	72.40	0.00	0.00	0.00
C550	8.95	0.00	4.85	13.80	0.00	2.40	36.20	0.00	33.80
C560	4.48	1.30	3.38	18.45	0.00	37.39	18.10	0.00	16.90
C56X	0.00	0.00	16.05	11.55	0.00	36.20	2.40	0.00	33.80
C650	0.00	0.00	6.10	21.50	0.00	27.33	45.07	0.00	0.00
C750	2.56	0.74	3.31	20.99	0.00	33.09	39.31	0.00	0.00
CL60	0.00	0.00	4.50	23.10	0.00	4.80	67.60	0.00	0.00
CR7	6.11	0.54	10.24	10.71	0.00	37.85	9.41	0.00	25.14
CR9	10.44	1.73	9.68	5.75	0.00	18.90	14.07	0.00	39.43
CRJ	6.60	1.27	7.45	12.29	0.00	33.62	15.53	0.00	23.24
D1F	0.00	0.00	0.00	27.60	0.00	0.00	72.40	0.00	0.00
D8F	0.00	0.00	0.00	27.60	0.00	0.00	72.40	0.00	0.00
E140	4.97	1.30	5.46	15.87	0.00	35.53	31.24	0.00	5.63
E145	5.70	0.95	8.81	12.15	0.00	33.02	20.93	0.00	18.44
F2TH	0.00	0.00	13.80	13.80	0.00	38.60	33.80	0.00	0.00
F900	8.95	2.60	13.45	2.60	0.00	38.60	33.80	0.00	0.00
FA20	17.90	5.20	4.50	0.00	0.00	0.00	4.80	0.00	67.60
FA50	0.00	0.00	0.00	27.60	0.00	4.80	67.60	0.00	0.00
G2	0.00	0.00	0.00	27.60	0.00	4.80	67.60	0.00	0.00
G4	0.00	0.00	0.00	27.60	0.00	4.80	67.60	0.00	0.00
G5	5.97	0.00	3.23	18.40	0.00	1.60	48.27	0.00	22.53
H25C	4.48	1.30	3.38	18.45	0.00	21.70	50.69	0.00	0.00
LJ30	17.90	0.00	9.70	0.00	0.00	0.00	4.80	0.00	67.60
LJ35	0.00	0.00	16.05	11.55	0.00	36.20	2.40	0.00	33.80
LJ45	0.00	0.00	27.60	0.00	0.00	72.40	0.00	0.00	0.00
LJ55	0.00	0.00	2.25	25.35	0.00	38.60	33.80	0.00	0.00
LJ60	0.00	0.00	3.38	24.23	0.00	38.59	33.80	0.00	0.00
M1F	0.00	0.00	0.00	27.60	0.00	0.00	72.40	0.00	0.00
M80	5.01	0.52	7.98	14.09	0.00	29.73	21.04	0.00	21.63
M87	0.00	0.00	0.00	27.60	0.00	38.60	33.80	0.00	0.00

Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 3 – Fleet Mix by Runway), 2004/2005.

TABLE J.2-34
RUNWAY USE - DEPARTURES – 2009/2010 - ALTERNATIVE A (NO ACTION ALTERNATIVE)

ARTS Code	Percent Runway Use										
	04L	09L	09R	14L	14R	22L	27L	32L	32L(T10)	32R	32R(V)
319	7.69	9.79	0.16	2.49	0.00	33.54	6.32	0.00	37.32	2.69	0.00
31F	0.00	0.00	0.00	0.00	0.00	67.00	0.00	33.00	0.00	0.00	0.00
320	8.80	8.85	0.20	1.45	0.00	32.53	8.18	0.00	37.02	2.97	0.00
321	7.67	3.62	0.00	0.78	0.00	23.22	11.97	0.00	50.63	2.11	0.00
332	0.00	0.00	0.00	19.30	0.00	0.00	16.63	0.00	0.00	64.07	0.00
333	0.00	0.00	0.00	20.40	0.00	0.00	0.00	0.00	0.00	79.60	0.00
342	0.00	0.00	0.00	17.10	3.30	0.00	46.60	6.00	0.00	27.00	0.00
343	0.00	0.00	7.71	18.04	0.00	0.00	35.65	6.66	0.00	31.94	0.00
346	0.00	0.00	0.00	0.00	0.00	0.00	67.00	0.00	0.00	33.00	0.00
380	0.00	0.00	0.00	0.00	0.00	0.00	26.40	73.60	0.00	0.00	0.00
72F	0.00	0.00	13.50	0.00	0.00	43.70	0.00	42.80	0.00	0.00	0.00
733	10.06	7.26	0.00	0.67	0.00	39.88	7.41	0.00	31.78	2.94	0.00
737	15.75	9.23	0.00	1.43	0.00	49.81	3.13	0.00	16.15	4.50	0.00
738	4.05	12.82	0.54	0.17	0.00	26.29	11.09	0.93	42.91	1.20	0.00
739	1.46	14.68	0.00	0.46	0.00	23.96	12.98	0.00	46.14	0.32	0.00
744	0.00	0.00	0.00	2.55	10.20	0.00	7.65	39.80	29.85	9.95	0.00
74F	0.00	0.00	19.70	1.86	4.62	5.22	14.34	54.23	0.00	0.00	0.00
74M	0.00	0.00	0.00	20.40	0.00	0.00	0.00	0.00	0.00	79.60	0.00
757	0.00	27.00	0.00	0.00	0.00	15.00	11.40	0.00	46.60	0.00	0.00
75F	0.00	0.00	27.00	0.00	0.00	0.00	20.40	52.60	0.00	0.00	0.00
763	1.46	0.82	2.19	8.29	5.42	4.42	16.19	6.89	27.46	26.86	0.00
76F	0.00	0.00	27.00	0.00	0.00	3.30	17.10	52.60	0.00	0.00	0.00
772	1.04	1.04	0.00	9.95	4.71	2.93	8.42	20.16	17.10	34.65	0.00
773	0.00	0.00	0.00	6.80	13.60	0.00	0.00	53.07	0.00	26.53	0.00
A3F	0.00	0.00	27.00	0.00	1.32	0.00	37.72	33.96	0.00	0.00	0.00
BE30	0.00	11.20	0.00	5.70	0.00	30.03	0.00	0.00	31.07	0.00	22.00
BE40	0.00	3.30	0.00	17.10	0.00	0.00	0.00	0.00	46.60	0.00	33.00
BE58	0.00	3.30	0.00	17.10	0.00	0.00	0.00	0.00	46.60	0.00	33.00
C210	0.00	27.00	0.00	0.00	0.00	49.70	0.00	0.00	23.30	0.00	0.00
C550	0.00	1.65	0.00	8.55	0.00	0.00	10.20	0.00	49.60	3.00	27.00
C560	0.00	14.33	0.00	0.00	0.00	24.03	10.20	0.00	36.44	1.50	13.50
C56X	0.00	15.15	0.00	0.00	0.00	68.35	0.00	0.00	0.00	0.00	16.50
C650	0.00	9.00	0.00	0.00	0.00	13.72	16.45	0.00	42.83	0.00	18.00
C750	0.00	8.19	0.00	0.00	0.00	20.86	14.10	0.00	36.70	0.86	19.29
CL60	0.00	27.00	0.00	0.00	0.00	26.40	0.00	0.00	46.60	0.00	0.00
CR7	8.17	12.33	0.00	1.02	0.00	41.77	6.01	0.00	28.07	2.63	0.00
CR9	9.58	9.33	0.00	1.65	0.00	40.01	6.05	0.00	30.48	2.90	0.00
CRJ	8.07	10.91	0.00	2.40	0.00	30.55	5.95	0.00	39.99	2.13	0.00
D1F	0.00	0.00	27.00	0.00	3.30	0.00	63.70	6.00	0.00	0.00	0.00
D8F	0.00	0.00	27.00	0.00	0.00	0.00	20.40	49.60	0.00	3.00	0.00
E140	4.50	9.00	0.00	0.00	0.00	27.29	13.23	0.00	44.98	1.00	0.00
E145	5.84	10.79	0.00	1.62	0.00	31.24	8.32	0.00	40.24	1.95	0.00
F2TH	0.00	1.65	0.00	0.00	0.00	31.85	10.20	0.00	26.30	0.00	30.00
F900	0.00	13.50	0.00	0.00	0.00	36.50	10.20	0.00	26.30	0.00	13.50
FA20	0.00	3.30	0.00	17.10	0.00	0.00	0.00	0.00	46.60	6.00	27.00
FA50	0.00	3.30	0.00	17.10	0.00	0.00	0.00	0.00	46.60	6.00	27.00
G2	0.00	0.00	0.00	0.00	0.00	0.00	20.40	0.00	52.60	0.00	27.00
G4	0.00	0.00	0.00	0.00	0.00	0.00	20.40	0.00	52.60	0.00	27.00
G5	0.00	1.10	0.00	5.70	0.00	0.00	13.60	0.00	50.60	2.00	27.00
H25C	0.00	7.58	6.75	0.00	0.00	6.60	14.48	11.65	37.94	0.00	15.00
LJ30	0.00	3.30	0.00	0.00	0.00	63.70	0.00	0.00	0.00	0.00	33.00
LJ35	0.00	3.30	0.00	0.00	0.00	31.85	11.55	23.30	13.50	3.00	13.50
LJ45	0.00	27.00	0.00	0.00	0.00	73.00	0.00	0.00	0.00	0.00	0.00
LJ55	0.00	13.50	0.00	0.00	0.00	36.50	10.20	0.00	26.30	0.00	13.50
LJ60	0.00	20.25	0.00	0.00	0.00	22.90	13.65	0.00	36.45	0.00	6.75
M1F	0.00	0.00	13.50	0.00	0.83	0.00	31.23	54.44	0.00	0.00	0.00
M80	7.77	10.97	0.27	0.95	0.00	35.03	7.81	0.24	34.60	2.36	0.00
M87	0.00	27.00	0.00	0.00	0.00	14.55	11.85	0.00	46.60	0.00	0.00

Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 3 – Fleet Mix by Runway), 2004/2005.

TABLE J.2-35
RUNWAY USE - DEPARTURES – 2009/2010 - ALTERNATIVE C

ARTS Code	Percent Runway Use								
	4L	9L	9R	10L	10C	22L	28R	28C	32L
319	7.16	1.02	8.12	11.30	0.00	25.11	21.45	0.00	25.84
320	5.75	0.95	9.78	11.08	0.00	24.76	29.69	0.00	17.99
321	7.49	1.04	8.10	10.97	0.00	8.33	37.03	0.00	27.04
332	0.00	0.00	0.00	27.60	0.00	0.00	72.40	0.00	0.00
333	0.00	0.00	0.00	27.60	0.00	0.00	72.40	0.00	0.00
342	0.00	0.00	0.00	27.60	0.00	0.00	72.40	0.00	0.00
343	0.00	0.00	0.00	27.60	0.00	0.00	72.40	0.00	0.00
346	0.00	0.00	0.00	27.60	0.00	0.00	72.40	0.00	0.00
380	0.00	0.00	0.00	0.00	27.60	0.00	0.00	72.40	0.00
733	5.03	0.41	10.32	11.84	0.00	30.54	19.68	0.00	22.18
737	1.49	0.00	14.98	11.18	0.00	66.37	6.03	0.00	0.00
738	3.13	0.66	4.36	19.45	0.00	25.04	38.78	0.00	8.58
739	4.13	0.93	4.45	18.09	0.00	31.06	37.87	0.00	3.47
744	0.00	0.00	0.00	27.60	0.00	0.60	71.80	0.00	0.00
757	0.00	0.00	0.00	27.60	0.00	72.40	0.00	0.00	0.00
763	2.36	0.55	1.18	23.52	0.00	4.69	67.70	0.00	0.00
772	3.09	0.72	1.39	22.40	0.00	7.82	64.58	0.00	0.00
773	0.00	0.00	0.00	27.60	0.00	0.00	72.40	0.00	0.00
31F	0.00	0.00	27.60	0.00	0.00	72.40	0.00	0.00	0.00
72F	0.00	0.00	2.25	25.35	0.00	38.60	33.80	0.00	0.00
74F	0.00	0.00	0.00	27.60	0.00	1.31	71.09	0.00	0.00
74M	0.00	0.00	0.00	27.60	0.00	0.00	72.40	0.00	0.00
75F	0.00	0.00	0.00	27.60	0.00	0.00	72.40	0.00	0.00
76F	0.00	0.00	4.50	23.10	0.00	0.00	4.80	0.00	67.60
A3F	0.00	0.00	0.00	27.60	0.00	0.00	58.88	0.00	13.52
BE30	11.93	1.73	12.20	1.73	0.00	24.13	3.20	0.00	45.08
BE40	17.90	0.00	9.70	0.00	0.00	0.00	4.80	0.00	67.60
BE58	17.90	5.20	4.50	0.00	0.00	0.00	4.80	0.00	67.60
C210	0.00	0.00	7.10	20.50	0.00	72.40	0.00	0.00	0.00
C550	8.95	0.00	4.85	13.80	0.00	2.40	36.20	0.00	33.80
C560	4.48	1.30	3.38	18.45	0.00	37.39	18.10	0.00	16.90
C56X	0.00	0.00	16.05	11.55	0.00	36.20	2.40	0.00	33.80
C650	0.00	0.00	6.10	21.50	0.00	27.33	45.07	0.00	0.00
C750	2.56	0.74	3.31	20.99	0.00	33.09	39.31	0.00	0.00
CL60	0.00	0.00	4.50	23.10	0.00	4.80	67.60	0.00	0.00
CR7	6.11	0.54	10.24	10.71	0.00	37.85	9.41	0.00	25.14
CR9	10.44	1.73	9.68	5.75	0.00	18.90	14.07	0.00	39.43
CRJ	6.60	1.27	7.45	12.29	0.00	33.62	15.53	0.00	23.24
D1F	0.00	0.00	0.00	27.60	0.00	0.00	72.40	0.00	0.00
D8F	0.00	0.00	0.00	27.60	0.00	0.00	72.40	0.00	0.00
E140	4.97	1.30	5.46	15.87	0.00	35.53	31.24	0.00	5.63
E145	5.70	0.95	8.81	12.15	0.00	33.02	20.93	0.00	18.44
F2TH	0.00	0.00	13.80	13.80	0.00	38.60	33.80	0.00	0.00
F900	8.95	2.60	13.45	2.60	0.00	38.60	33.80	0.00	0.00
FA20	17.90	5.20	4.50	0.00	0.00	0.00	4.80	0.00	67.60
FA50	0.00	0.00	0.00	27.60	0.00	4.80	67.60	0.00	0.00
G2	0.00	0.00	0.00	27.60	0.00	4.80	67.60	0.00	0.00
G4	0.00	0.00	0.00	27.60	0.00	4.80	67.60	0.00	0.00
G5	5.97	0.00	3.23	18.40	0.00	1.60	48.27	0.00	22.53
H25C	4.48	1.30	3.38	18.45	0.00	21.70	50.69	0.00	0.00
LJ30	17.90	0.00	9.70	0.00	0.00	0.00	4.80	0.00	67.60
LJ35	0.00	0.00	16.05	11.55	0.00	36.20	2.40	0.00	33.80
LJ45	0.00	0.00	27.60	0.00	0.00	72.40	0.00	0.00	0.00
LJ55	0.00	0.00	2.25	25.35	0.00	38.60	33.80	0.00	0.00
LJ60	0.00	0.00	3.38	24.23	0.00	38.59	33.80	0.00	0.00
M1F	0.00	0.00	0.00	27.60	0.00	0.00	72.40	0.00	0.00
M80	5.01	0.52	7.98	14.09	0.00	29.73	21.04	0.00	21.63
M87	0.00	0.00	0.00	27.60	0.00	38.60	33.80	0.00	0.00

Note: Alternative C, D, and G are Build Alternatives.

Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 3 – Fleet Mix by Runway), 2004/2005.

TABLE J.2-36
RUNWAY USE - DEPARTURES – 2013/2014 - ALTERNATIVE A

ARTS Code	Percent Runway Use										
	04L	09L	09R	14L	14R	22L	27L	32L	32L(T10)	32R	32R(V)
319	9.15	10.13	0.15	2.76	0.00	32.95	5.94	0.00	36.15	2.77	0.00
31F	0.00	0.00	0.00	0.00	0.00	43.70	0.00	33.00	23.30	0.00	0.00
320	9.27	8.41	0.21	0.96	0.00	37.99	7.66	0.00	31.38	4.12	0.00
321	5.82	7.12	0.00	0.79	0.00	24.47	11.33	0.00	48.49	1.98	0.00
332	0.00	0.00	0.00	19.30	0.00	0.00	16.63	0.00	0.00	64.07	0.00
333	0.00	0.00	0.00	20.40	0.00	0.00	0.00	0.00	0.00	79.60	0.00
342	0.00	0.00	0.00	17.10	3.30	0.00	46.60	6.00	0.00	27.00	0.00
343	0.00	0.00	3.39	17.59	0.00	0.00	37.57	5.85	0.00	35.60	0.00
346	0.00	0.00	0.00	0.00	0.00	0.00	67.00	0.00	0.00	33.00	0.00
380	0.00	0.00	0.00	0.00	0.00	0.00	26.40	73.60	0.00	0.00	0.00
737	11.57	11.76	0.00	1.22	0.00	46.01	3.15	0.00	22.86	3.43	0.00
738	6.61	12.27	0.33	0.56	0.01	34.15	8.75	0.19	34.97	2.16	0.00
739	3.56	10.90	0.59	0.94	0.00	22.36	11.93	1.02	47.84	0.86	0.00
744	0.00	0.00	0.00	0.00	13.60	0.00	6.80	53.07	26.53	0.00	0.00
74F	0.00	0.00	19.64	1.85	4.91	3.65	15.85	54.10	0.00	0.00	0.00
74M	0.00	0.00	0.00	20.40	0.00	0.00	0.00	0.00	0.00	79.60	0.00
75F	0.00	0.00	27.00	0.00	0.00	1.65	18.75	52.60	0.00	0.00	0.00
763	0.61	0.61	1.84	9.38	4.64	2.94	21.59	5.93	23.70	28.76	0.00
76F	0.00	0.00	27.00	0.00	0.00	7.58	12.83	49.59	0.00	3.00	0.00
772	0.96	0.96	0.96	9.24	5.10	2.73	10.21	21.56	15.88	32.40	0.00
773	0.00	0.00	0.00	6.80	13.60	0.00	0.00	53.07	0.00	26.53	0.00
A3F	0.00	0.00	27.00	0.00	0.94	0.00	39.43	32.63	0.00	0.00	0.00
BE30	0.00	11.20	0.00	5.70	0.00	30.03	0.00	0.00	31.07	2.00	20.00
BE40	0.00	3.30	0.00	17.10	0.00	0.00	0.00	0.00	46.60	0.00	33.00
BE58	0.00	3.30	0.00	17.10	0.00	0.00	0.00	0.00	46.60	0.00	33.00
C210	0.00	27.00	0.00	0.00	0.00	49.70	0.00	0.00	23.30	0.00	0.0
C550	0.00	1.65	0.00	8.55	0.00	0.00	10.20	0.00	49.60	0.00	30.00
C560	0.00	14.33	0.00	0.00	0.00	16.65	5.93	0.00	48.09	1.50	13.50
C56X	0.00	15.15	0.00	0.00	0.00	59.80	8.55	0.00	0.00	3.00	13.50
C650	0.00	9.00	0.00	0.00	0.00	10.87	19.30	0.00	42.83	0.00	18.00
C750	0.00	8.19	0.00	0.00	0.00	20.86	14.10	0.00	36.71	0.00	20.14
CL60	0.00	27.00	0.00	0.00	0.00	9.30	17.10	0.00	46.60	0.00	0.00
CR7	7.39	11.97	0.00	1.15	0.00	37.24	6.37	0.00	33.37	2.51	0.00
CR9	9.00	11.59	0.00	1.27	0.00	48.52	5.54	0.00	20.86	3.22	0.00
CRJ	9.99	9.67	0.00	2.58	0.00	31.64	4.25	0.64	39.01	2.22	0.00
E145	4.01	11.94	0.00	1.39	0.00	24.49	10.02	0.00	46.85	1.30	0.00
F2TH	0.00	1.65	0.00	0.00	0.00	31.85	10.20	0.00	36.30	0.00	30.00
F900	0.00	13.50	0.00	0.00	0.00	36.50	10.20	0.00	26.30	0.00	13.50
FA20	0.00	3.30	0.00	17.10	0.00	0.00	0.00	0.00	46.60	6.00	27.00
FA50	0.00	3.30	0.00	0.00	0.00	63.70	0.00	0.00	0.00	0.00	33.00
G4	0.00	0.00	0.00	0.00	0.00	0.00	20.40	0.00	52.60	0.00	27.00
G5	0.00	1.10	0.00	5.70	0.00	0.00	13.60	0.00	50.60	0.00	29.00
H25C	0.00	7.58	6.75	0.00	0.00	6.60	14.48	11.65	37.94	0.00	15.00
LJ30	0.00	15.15	0.00	0.00	0.00	34.85	10.20	0.00	23.30	0.00	16.50
LJ35	0.00	1.65	0.00	8.55	0.00	31.85	4.65	23.30	13.50	3.00	13.50
LJ45	0.00	27.00	0.00	0.00	0.00	73.00	0.00	0.00	0.00	0.00	0.00
LJ55	0.00	9.00	0.00	0.00	0.00	23.23	14.70	0.00	35.07	0.00	18.00
LJ60	0.00	18.00	0.00	0.00	0.00	10.80	13.60	0.00	48.60	0.00	9.00
M1F	0.00	0.00	10.80	0.00	0.66	0.00	38.38	50.16	0.00	0.00	0.00
M80	0.00	19.29	0.00	0.00	0.00	13.97	10.71	0.00	56.03	0.00	0.00

Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 3 – Fleet Mix by Runway), 2004/2005.

TABLE J.2-37
RUNWAY USE - DEPARTURES – 2013/2014 - ALTERNATIVE C

ARTS Code	Percent Runway Use										
	09C	09R	10L	10C	10R	22L	27L	27C	28L	28C	28R
319	0.00	13.35	8.81	0.00	5.54	14.96	31.80	0.00	3.24	0.00	22.30
320	0.00	10.98	10.24	0.00	6.48	16.95	25.16	0.00	3.85	0.00	26.34
321	0.00	13.35	5.15	0.00	9.20	7.88	31.50	0.00	1.94	0.00	30.98
332	0.00	27.70	0.00	0.00	0.00	0.00	72.30	0.00	0.00	0.00	0.00
333	0.00	26.20	1.50	0.00	0.00	0.00	72.30	0.00	0.00	0.00	0.00
342	0.00	0.00	27.70	0.00	0.00	0.00	4.80	0.00	0.00	0.00	67.50
343	0.00	23.58	4.12	0.00	0.00	0.00	64.59	0.00	0.00	0.00	7.71
346	0.00	16.10	11.60	0.00	0.00	0.00	36.15	0.00	0.00	0.00	36.15
380	13.85	0.00	0.00	13.85	0.00	0.00	0.00	36.15	0.00	36.15	0.00
717	0.00	0.00	21.23	0.00	6.48	13.24	0.00	0.00	0.00	0.00	59.05
737	0.00	2.56	21.62	0.00	3.52	31.35	5.16	0.00	14.49	0.00	21.00
738	0.00	8.97	10.08	0.00	8.64	12.47	23.80	0.00	1.47	0.00	34.57
739	0.00	4.82	13.04	0.00	9.83	14.33	14.01	0.00	0.92	0.00	43.05
744	0.00	0.00	27.70	0.00	0.00	0.00	4.60	0.00	0.00	0.00	67.70
763	0.00	14.29	12.79	0.00	0.62	0.79	31.66	0.00	0.92	0.00	38.93
772	0.00	14.78	10.24	0.00	2.68	1.00	36.31	0.00	1.34	0.00	33.65
773	0.00	4.20	23.50	0.00	0.00	0.00	24.10	0.00	0.00	0.00	48.20
31F	0.00	0.00	27.70	0.00	0.00	72.30	0.00	0.00	0.00	0.00	0.00
74F	0.00	2.52	25.18	0.00	0.00	1.31	6.57	0.00	0.00	0.00	64.42
74M	0.00	27.70	0.00	0.00	0.00	0.00	72.30	0.00	0.00	0.00	0.00
75F	0.00	0.00	27.70	0.00	0.00	2.40	0.00	0.00	0.00	0.00	69.90
76F	0.00	0.00	27.70	0.00	0.00	2.40	1.20	0.00	0.00	0.00	68.70
A3F	0.00	0.00	27.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	72.30
BE30	0.00	18.47	9.23	0.00	0.00	10.30	1.60	0.00	13.80	0.00	46.60
BE40	0.00	27.70	0.00	0.00	0.00	0.00	72.30	0.00	0.00	0.00	0.00
BE58	0.00	27.70	0.00	0.00	0.00	0.00	72.30	0.00	0.00	0.00	0.00
C210	0.00	0.00	25.45	0.00	2.25	51.60	0.00	0.00	20.70	0.00	0.00
C550	0.00	13.85	0.00	0.00	13.85	0.00	20.70	0.00	0.00	0.00	51.60
C560	0.00	6.93	11.60	0.00	9.18	25.80	11.55	0.00	0.00	0.00	34.94
C56X	0.00	11.60	13.85	0.00	2.25	36.15	36.15	0.00	0.00	0.00	0.00
C650	0.00	0.00	8.48	0.00	19.22	5.15	0.00	0.00	0.00	0.00	67.15
C750	0.00	3.96	13.67	0.00	10.07	9.51	9.64	0.00	5.91	0.00	47.24
CL60	0.00	0.00	12.60	0.00	15.10	0.00	0.00	0.00	0.00	0.00	72.30
CR7	0.00	10.00	12.41	0.00	5.29	23.15	24.72	0.00	4.01	0.00	20.42
CR9	0.00	14.13	11.10	0.00	2.47	21.80	35.69	0.00	2.86	0.00	11.95
CRJ	0.00	12.43	11.29	0.00	3.97	22.65	28.21	0.00	2.84	0.00	18.61
E145	0.00	8.64	12.11	0.00	6.96	20.35	17.53	0.00	2.07	0.00	32.34
F2TH	0.00	11.60	2.25	0.00	13.85	36.15	0.00	0.00	0.00	0.00	36.15
F900	0.00	13.85	13.85	0.00	0.00	36.15	36.15	0.00	0.00	0.00	0.00
FA20	0.00	27.70	0.00	0.00	0.00	0.00	72.30	0.00	0.00	0.00	0.00
FA50	0.00	0.00	27.70	0.00	0.00	72.30	0.00	0.00	0.00	0.00	0.00
G4	0.00	9.23	0.00	0.00	27.70	0.00	0.00	0.00	0.00	0.00	72.30
G5	0.00	6.93	4.20	0.00	14.27	0.00	0.00	0.00	0.00	0.00	72.30
H25C	0.00	13.85	12.73	0.00	8.05	8.93	0.00	0.00	0.00	0.00	63.36
LJ30	0.00	2.25	5.30	0.00	8.55	13.05	36.15	0.00	0.00	0.00	23.10
LJ35	0.00	0.00	25.45	0.00	0.00	36.15	0.00	0.00	0.00	0.00	36.15
LJ45	0.00	0.00	23.20	0.00	4.50	30.90	0.00	0.00	0.00	0.00	41.40
LJ55	0.00	0.00	7.73	0.00	19.97	10.30	0.00	0.00	0.00	0.00	62.00
LJ60	0.00	0.00	15.47	0.00	12.23	11.90	0.00	0.00	0.00	0.00	60.40
M1F	0.00	0.00	27.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	72.30
M80	0.00	0.00	17.22	0.00	10.48	16.20	0.00	0.00	3.76	0.00	52.34

Note: Alternative C, D, and G are Build Alternatives.

Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 3 – Fleet Mix by Runway), 2004/2005.

TABLE J.2-38
RUNWAY USE - DEPARTURES – 2013/2014 - ALTERNATIVE D

ARTS Code	Percent Runway Use								
	09C	09R	10L	10C	22L	27L	27C	28C	28R
319	0.00	16.42	11.28	0.00	20.54	29.82	0.00	0.00	21.94
320	0.00	16.52	11.18	0.00	22.15	23.57	0.00	0.00	26.58
321	0.00	15.72	11.98	0.00	10.47	30.20	0.00	0.00	31.63
332	0.00	27.70	0.00	0.00	0.00	72.30	0.00	0.00	0.00
333	0.00	27.70	0.00	0.00	0.00	72.30	0.00	0.00	0.00
342	0.00	0.00	27.70	0.00	0.00	4.80	0.00	0.00	67.50
343	0.00	25.38	2.32	0.00	0.00	64.59	0.00	0.00	7.71
346	0.00	16.10	11.60	0.00	0.00	36.15	0.00	0.00	36.15
380	13.85	0.00	0.00	13.85	0.00	0.00	36.15	36.15	0.00
717	0.00	5.80	21.90	0.00	13.24	0.00	0.00	0.00	59.06
737	0.00	16.15	11.55	0.00	46.14	5.16	0.00	0.00	21.00
738	0.00	12.50	15.20	0.00	15.67	23.00	0.00	0.00	33.63
739	0.00	10.28	17.42	0.00	16.17	11.25	0.00	0.00	44.88
744	0.00	0.00	27.70	0.00	0.00	0.00	0.00	0.00	72.30
763	0.00	14.87	12.83	0.00	1.71	30.74	0.00	0.00	39.85
772	0.00	16.23	11.47	0.00	2.33	34.99	0.00	0.00	34.98
773	0.00	9.23	18.47	0.00	0.00	24.10	0.00	0.00	48.20
31F	0.00	13.85	13.85	0.00	72.30	0.00	0.00	0.00	0.00
74F	0.00	2.93	24.77	0.00	1.31	6.57	0.00	0.00	64.42
74M	0.00	27.70	0.00	0.00	0.00	72.30	0.00	0.00	0.00
75F	0.00	0.00	27.70	0.00	2.40	0.00	0.00	0.00	69.90
76F	0.00	3.38	24.33	0.00	2.40	1.20	0.00	0.00	68.69
A3F	0.00	0.00	27.70	0.00	0.00	0.00	0.00	0.00	72.30
BE30	0.00	26.20	1.50	0.00	24.10	1.60	0.00	0.00	46.60
BE40	0.00	27.70	0.00	0.00	0.00	72.30	0.00	0.00	0.00
BE58	0.00	27.70	0.00	0.00	0.00	72.30	0.00	0.00	0.00
C210	0.00	11.60	16.10	0.00	72.30	0.00	0.00	0.00	0.00
C550	0.00	13.85	13.85	0.00	0.00	0.00	0.00	0.00	72.30
C560	0.00	6.93	20.78	0.00	36.14	1.20	0.00	0.00	34.95
C56X	0.00	16.10	11.60	0.00	36.15	36.15	0.00	0.00	0.00
C650	0.00	4.62	23.08	0.00	12.05	0.00	0.00	0.00	60.25
C750	0.00	4.60	23.10	0.00	21.34	9.64	0.00	0.00	41.32
CL60	0.00	0.00	27.70	0.00	0.00	0.00	0.00	0.00	72.30
CR7	0.00	16.30	11.40	0.00	29.48	24.30	0.00	0.00	18.52
CR9	0.00	18.63	9.07	0.00	27.51	34.98	0.00	0.00	9.81
CRJ	0.00	16.70	11.00	0.00	29.29	27.56	0.00	0.00	15.45
E145	0.00	12.83	14.87	0.00	26.27	16.94	0.00	0.00	29.09
F2TH	0.00	13.85	13.85	0.00	36.15	0.00	0.00	0.00	36.15
F900	0.00	16.10	11.60	0.00	36.15	36.15	0.00	0.00	0.00
FA20	0.00	27.70	0.00	0.00	0.00	72.30	0.00	0.00	0.00
FA50	0.00	27.70	0.00	0.00	72.30	0.00	0.00	0.00	0.00
G4	0.00	0.00	27.70	0.00	0.00	0.00	0.00	0.00	72.30
G5	0.00	9.23	18.47	0.00	0.00	0.00	0.00	0.00	72.30
H25C	0.00	8.05	19.65	0.00	19.28	0.00	0.00	0.00	53.02
LJ30	0.00	13.85	13.85	0.00	33.75	36.15	0.00	0.00	2.40
LJ35	0.00	2.25	25.45	0.00	36.15	0.00	0.00	0.00	36.15
LJ45	0.00	23.20	4.50	0.00	72.30	0.00	0.00	0.00	0.00
LJ55	0.00	0.00	27.70	0.00	24.10	0.00	0.00	0.00	48.20
LJ60	0.00	0.00	27.70	0.00	25.70	0.00	0.00	0.00	46.60
M1F	0.00	0.00	27.70	0.00	0.00	0.00	0.00	0.00	72.30
M80	0.00	5.04	22.66	0.00	16.20	0.00	0.00	0.00	56.10

Note: Alternative C, D, and G are Build Alternatives.

Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 3 – Fleet Mix by Runway), 2004/2005.

TABLE J.2-39
RUNWAY USE - DEPARTURES – 2013/2014 - ALTERNATIVE G

ARTS Code	Percent Runway Use									
	09C	09R	10L	10C	12	22L	27L	27C	28C	28R
319	0.00	12.32	9.31	0.00	6.07	20.54	29.82	0.00	0.00	21.94
320	0.00	9.37	11.74	0.00	6.60	22.15	23.57	0.00	0.00	26.57
321	0.00	10.31	8.23	0.00	9.16	10.47	30.20	0.00	0.00	31.63
332	0.00	27.70	0.00	0.00	0.00	0.00	72.30	0.00	0.00	0.00
333	0.00	19.97	7.73	0.00	0.00	0.00	72.30	0.00	0.00	0.00
342	0.00	0.00	27.70	0.00	0.00	0.00	4.80	0.00	0.00	67.50
343	0.00	15.55	12.15	0.00	0.00	0.00	64.59	0.00	0.00	7.71
346	0.00	16.10	11.60	0.00	0.00	0.00	36.15	0.00	0.00	36.15
380	13.85	0.00	0.00	13.85	0.00	0.00	0.00	36.15	36.15	0.00
717	0.00	0.43	14.85	0.00	12.43	13.24	0.00	0.00	0.00	59.05
737	0.00	1.98	19.63	0.00	6.09	46.14	5.16	0.00	0.00	21.00
738	0.00	7.97	10.10	0.00	9.63	15.67	23.00	0.00	0.00	33.63
739	0.00	5.08	11.06	0.00	11.57	16.17	11.25	0.00	0.00	44.87
744	0.00	0.00	18.47	0.00	9.23	0.00	0.00	0.00	0.00	72.30
763	0.00	13.15	10.31	0.00	4.23	1.71	30.74	0.00	0.00	39.86
772	0.00	14.48	10.54	0.00	2.68	2.33	34.98	0.00	0.00	34.99
773	0.00	1.13	26.57	0.00	0.00	0.00	24.10	0.00	0.00	48.20
31F	0.00	0.00	27.70	0.00	0.00	72.30	0.00	0.00	0.00	0.00
74F	0.00	2.52	25.18	0.00	0.00	1.31	6.57	0.00	0.00	64.42
74M	0.00	27.70	0.00	0.00	0.00	0.00	72.30	0.00	0.00	0.00
75F	0.00	0.00	26.00	0.00	1.70	2.40	0.00	0.00	0.00	69.90
76F	0.00	0.85	26.85	0.00	0.00	2.40	1.20	0.00	0.00	68.70
A3F	0.00	0.00	27.70	0.00	0.00	0.00	0.00	0.00	0.00	72.30
BE30	0.00	18.47	9.23	0.00	0.00	24.10	1.60	0.00	0.00	46.60
BE40	0.00	27.70	0.00	0.00	0.00	0.00	72.30	0.00	0.00	0.00
BE58	0.00	27.70	0.00	0.00	0.00	0.00	72.30	0.00	0.00	0.00
C210	0.00	0.00	27.70	0.00	0.00	72.30	0.00	0.00	0.00	0.00
C550	0.00	13.85	0.00	0.00	13.85	0.00	0.00	0.00	0.00	72.30
C560	0.00	6.93	13.58	0.00	7.20	36.14	1.20	0.00	0.00	34.95
C56X	0.00	1.70	13.85	0.00	12.15	36.15	36.15	0.00	0.00	0.00
C650	0.00	0.00	8.48	0.00	19.22	12.05	0.00	0.00	0.00	60.25
C750	0.00	3.96	11.39	0.00	12.36	21.34	9.64	0.00	0.00	41.31
CL60	0.00	0.00	23.20	0.00	4.50	0.00	V	0.00	0.00	72.30
CR7	0.00	9.07	12.71	0.00	5.92	29.48	24.30	0.00	0.00	18.52
CR9	0.00	11.45	12.87	0.00	3.38	27.51	34.98	0.00	0.00	9.81
CRJ	0.00	11.88	10.57	0.00	5.25	29.29	27.56	0.00	0.00	15.45
E145	0.00	7.92	11.26	0.00	8.52	26.27	16.94	0.00	0.00	29.09
F2TH	0.00	1.70	12.15	0.00	13.85	36.15	0.00	0.00	0.00	36.15
F900	0.00	13.85	13.85	0.00	0.00	36.15	36.15	0.00	0.00	0.00
FA20	0.00	27.70	0.00	0.00	0.00	0.00	72.30	0.00	0.00	0.00
FA50	0.00	0.00	27.70	0.00	0.00	72.30	0.00	0.00	0.00	0.00
G4	0.00	0.00	0.00	0.00	27.70	0.00	0.00	0.00	0.00	72.30
G5	0.00	9.23	0.00	0.00	18.47	0.00	0.00	0.00	0.00	72.30
H25C	0.00	6.93	8.05	0.00	12.73	19.28	0.00	0.00	0.00	53.01
LJ30	0.00	13.85	1.70	0.00	12.15	33.75	36.15	0.00	0.00	2.40
LJ35	0.00	0.00	27.70	0.00	0.00	36.15	0.00	0.00	0.00	36.15
LJ45	0.00	0.00	27.70	0.00	0.00	72.30	0.00	0.00	0.00	0.00
LJ55	0.00	0.00	9.23	0.00	18.47	24.10	0.00	0.00	0.00	48.20
LJ60	0.00	0.00	15.47	0.00	12.23	25.70	0.00	0.00	0.00	46.60
M1F	0.00	0.00	26.58	0.00	1.12	0.00	0.00	0.00	0.00	72.30
M80	0.00	0.00	20.05	0.00	7.65	16.20	0.00	0.00	0.00	56.10

Note: Alternative C, D, and G are Build Alternatives.

Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 3 – Fleet Mix by Runway), 2004/2005.

TABLE J.2-40
RUNWAY USE - DEPARTURES – 2018/2019 - ALTERNATIVE A (NO ACTION ALTERNATIVE)

ARTS Code	Percent Runway Use										
	04L	09L	09R	14L	14R	22L	27L	32L	32L(T10)	32R	32R(V)
319	9.05	8.80	0.16	3.02	0.00	31.37	6.25	0.00	38.68	2.67	0.00
31F	0.00	0.00	0.00	0.00	0.00	67.00	0.00	33.00	0.00	0.00	0.00
320	10.01	7.69	0.23	1.24	0.00	33.55	8.22	0.00	34.92	4.14	0.00
321	7.81	8.46	0.00	0.72	0.00	30.44	9.82	0.00	40.51	2.24	0.00
332	0.00	0.00	0.00	19.30	0.00	0.00	16.63	0.00	0.00	64.07	0.00
333	0.00	0.00	0.00	20.40	0.00	0.00	0.00	0.00	0.00	79.60	0.00
342	0.00	0.00	0.00	17.10	3.30	0.00	46.60	6.00	0.00	27.00	0.00
343	0.00	0.00	5.40	18.42	0.00	0.00	29.94	9.32	0.00	36.92	0.00
346	0.00	0.00	0.00	0.00	0.83	0.00	54.52	19.90	0.00	24.75	0.00
380	0.00	0.00	0.00	0.00	0.00	0.00	26.40	73.60	0.00	0.00	0.00
38F	0.00	0.00	0.00	0.00	0.00	0.00	20.40	79.60	0.00	0.00	0.00
737	7.27	16.72	0.00	0.66	0.00	34.96	6.81	0.00	31.50	2.08	0.00
738	7.39	11.21	0.40	0.85	0.02	36.03	7.91	0.46	33.43	2.30	0.00
739	3.56	13.05	0.42	0.53	0.00	22.07	12.50	0.36	46.49	1.02	0.00
744	0.00	0.00	0.00	1.57	10.98	0.00	7.85	42.86	30.62	6.12	0.00
74F	0.00	0.00	19.64	1.85	4.91	2.10	25.88	45.62	0.00	0.00	0.00
74M	0.00	0.00	0.00	20.40	0.00	0.00	0.00	0.00	0.00	79.60	0.00
75F	0.00	0.00	27.00	0.00	0.00	1.65	18.75	52.60	0.00	0.00	0.00
763	1.17	4.40	2.35	8.67	4.59	10.01	17.00	5.09	18.52	28.20	0.00
76F	0.00	0.00	27.00	0.00	0.00	11.85	20.20	37.95	0.00	3.00	0.00
772	1.26	1.88	0.00	6.33	4.35	6.33	13.56	15.72	29.17	21.40	0.00
773	0.00	0.00	0.00	5.70	13.60	0.00	16.63	53.07	0.00	11.00	0.00
A3F	0.00	0.00	27.00	0.00	0.94	0.00	52.75	19.31	0.00	0.00	0.00
BE40	0.00	3.30	0.00	17.10	0.00	0.00	0.00	0.00	46.60	6.00	27.00
BE58	0.00	3.30	0.00	17.10	0.00	0.00	0.00	0.00	46.60	0.00	33.00
C210	0.00	27.00	0.00	0.00	0.00	73.00	0.00	0.00	0.00	0.00	0.00
C550	0.00	1.65	0.00	8.55	0.00	0.00	10.20	0.00	49.60	3.00	27.00
C560	0.00	14.33	0.00	4.28	0.00	12.38	5.93	0.00	48.08	1.50	13.50
C56X	0.00	15.15	0.00	0.00	0.00	68.35	0.00	0.00	0.00	3.00	13.50
C650	0.00	9.00	0.00	0.00	0.00	5.95	16.45	0.00	50.60	0.00	18.00
C750	0.00	8.19	0.00	0.00	0.00	20.86	14.10	0.00	36.70	0.86	19.29
CL60	0.00	13.50	0.00	0.00	0.00	4.65	18.75	0.00	49.60	0.00	13.50
CR7	7.23	11.65	0.00	1.57	0.00	32.61	7.11	0.00	37.68	2.15	0.00
CR9	10.07	11.61	0.00	1.16	0.00	45.03	5.39	0.00	23.84	2.90	0.00
CRJ	11.34	8.33	0.00	3.76	0.00	34.14	3.41	0.00	35.66	3.36	0.00
E145	4.00	11.61	0.00	1.27	0.00	25.96	10.54	0.00	45.40	1.22	0.00
F2TH	0.00	1.65	0.00	0.00	0.00	31.85	10.20	0.00	26.30	0.00	30.00
F900	0.00	13.50	0.00	0.00	0.00	36.50	10.20	0.00	26.30	0.00	13.50
FA20	0.00	3.30	0.00	17.10	0.00	0.00	0.00	0.00	46.60	0.00	33.00
FA50	0.00	3.30	0.00	0.00	0.00	63.70	0.00	0.00	0.00	0.00	33.00
G4	0.00	0.00	0.00	0.00	0.00	0.00	20.40	0.00	52.60	0.00	27.00
G5	0.00	1.10	0.00	5.70	0.00	0.00	13.60	0.00	50.60	0.00	29.00
H25C	0.00	7.58	6.75	0.00	0.00	6.60	14.48	11.65	37.94	0.00	15.00
LJ30	0.00	15.15	0.00	0.00	0.00	36.50	8.55	0.00	23.30	3.00	13.50
LJ35	0.00	3.30	0.00	0.00	0.00	31.85	11.55	23.30	13.50	3.00	13.50
LJ45	0.00	27.00	0.00	0.00	0.00	9.30	17.10	0.00	46.80	0.00	0.00
LJ55	0.00	9.00	0.00	0.00	0.00	8.80	13.60	0.00	50.60	0.00	18.00
LJ60	0.00	18.00	0.00	0.00	0.00	32.03	7.90	0.00	33.07	0.00	9.00
M1F	0.00	0.00	13.50	0.00	0.00	0.00	43.70	42.80	0.00	0.00	0.00

Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 3 – Fleet Mix by Runway), 2004/2005.

TABLE J.2-41
RUNWAY USE - DEPARTURES – 2018/2019 - ALTERNATIVE C

ARTS Code	Percent Runway Use										
	9C	9R	10L	10C	10R	22L	27L	27C	28L	28C	28R
319	0.00	13.82	8.40	0.00	5.49	11.84	32.48	0.00	3.01	0.00	24.96
320	0.00	9.98	9.40	0.00	8.31	15.08	22.15	0.00	5.12	0.00	29.96
321	0.00	12.96	7.01	0.00	7.73	10.03	31.96	0.00	4.90	0.00	25.41
332	0.00	27.70	0.00	0.00	0.00	0.00	72.30	0.00	0.00	0.00	0.00
333	0.00	24.70	3.00	0.00	0.00	.000	72.30	0.00	0.00	0.00	0.00
342	0.00	0.00	27.70	0.00	0.00	0.00	4.80	0.00	0.00	0.00	67.50
343	0.00	21.44	6.26	0.00	0.00	0.00	48.82	0.00	0.00	0.00	23.48
346	0.00	14.98	12.73	0.00	0.00	0.00	37.34	0.00	0.00	0.00	34.95
380	14.50	0.00	2.12	11.08	0.00	0.00	0.00	43.38	0.00	28.92	0.00
717	0.00	0.00	21.09	0.00	6.61	12.46	0.00	0.00	0.00	0.00	59.84
737	0.00	4.12	14.39	0.00	9.19	15.24	8.30	0.00	6.11	0.00	42.65
738	0.00	9.43	10.06	0.00	8.21	11.87	24.19	0.00	2.15	0.00	34.09
739	0.00	5.34	13.05	0.00	9.31	11.60	14.08	0.00	0.81	0.00	45.81
744	0.00	5.04	22.66	0.00	0.00	0.00	12.71	0.00	0.00	0.00	59.59
763	0.00	16.73	10.97	0.00	0.00	0.00	37.39	0.00	0.00	0.00	34.91
772	0.00	12.68	8.86	0.00	6.16	3.18	31.88	0.00	0.00	0.00	37.24
773	0.00	0.00	27.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	72.30
31F	0.00	0.00	27.70	0.00	0.00	72.30	0.00	0.00	0.00	0.00	0.00
38F	0.00	0.00	0.00	27.70	0.00	0.00	0.00	0.00	0.00	72.30	0.00
74F	0.00	7.34	20.36	0.00	0.00	0.00	6.57	0.00	0.00	0.00	65.73
74M	0.00	27.70	0.00	0.00	0.00	0.00	72.30	0.00	0.00	0.00	0.00
75F	0.00	0.00	27.70	0.00	0.00	2.40	0.00	0.00	0.00	0.00	69.90
76F	0.00	1.13	26.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	72.29
A3F	0.00	4.54	23.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	72.30
BE40	0.00	27.70	0.00	0.00	0.00	0.00	72.30	0.00	0.00	0.00	0.00
BE58	0.00	27.70	0.00	0.00	0.00	0.00	72.30	0.00	0.00	0.00	0.00
C210	0.00	0.00	27.70	0.00	0.00	51.60	0.00	0.00	20.70	0.00	0.00
C550	0.00	13.85	0.00	0.00	13.85	0.00	23.10	0.00	0.00	0.00	49.20
C560	0.00	6.93	11.60	0.00	9.18	25.80	10.35	0.00	0.00	0.00	36.14
C56X	0.00	11.60	13.85	0.00	2.25	36.15	36.15	0.00	0.00	0.00	0.00
C650	0.00	0.00	6.38	0.00	21.32	5.95	0.00	0.00	0.00	0.00	66.35
C750	0.00	3.96	12.74	0.00	11.00	15.43	3.73	0.00	0.00	0.00	53.14
CL60	0.00	0.00	11.60	0.00	16.10	0.00	0.00	0.00	0.00	0.00	72.30
CR7	0.00	9.67	12.37	0.00	5.67	20.62	21.57	0.00	5.95	0.00	24.15
CR9	0.00	13.48	11.29	0.00	2.93	23.72	33.08	0.00	3.00	0.00	12.50
CRJ	0.00	14.17	9.94	0.00	3.59	15.89	32.94	0.00	3.80	0.00	19.67
E145	0.00	8.70	12.03	0.00	6.97	18.10	19.47	0.00	2.82	0.00	31.91
F2TH	0.00	11.60	2.25	0.00	13.85	36.15	0.00	0.00	0.00	0.00	36.15
F900	0.00	13.85	11.60	0.00	2.25	36.15	36.15	0.00	0.00	0.00	0.00
FA20	0.00	27.70	0.00	0.00	0.00	0.00	72.30	0.00	0.00	0.00	0.00
FA50	0.00	12.60	15.10	0.00	0.00	72.30	0.00	0.00	0.00	0.00	0.00
G4	0.00	0.00	0.00	0.00	27.70	0.00	0.00	0.00	0.00	0.00	72.30
G5	0.00	9.23	0.00	0.00	18.47	0.00	1.60	0.00	0.00	0.00	70.70
H25C	0.00	6.93	12.73	0.00	8.05	7.73	0.00	0.00	0.00	0.00	64.56
LJ30	0.00	13.85	11.60	0.00	2.25	2.40	36.15	0.00	0.00	0.00	33.75
LJ35	0.00	11.60	16.10	0.00	0.00	36.15	15.45	0.00	0.00	0.00	20.70
LJ45	0.00	0.00	27.70	0.00	0.00	72.30	0.00	0.00	0.00	0.00	0.00
LJ55	0.00	0.00	7.73	0.00	19.97	10.30	0.00	0.00	0.00	0.00	62.00
LJ60	0.00	0.00	15.47	0.00	12.23	10.30	0.00	0.00	0.00	0.00	62.00
M1F	0.00	2.65	25.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	72.30

Note: Alternative C, D, and G are Build Alternatives.

Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 3 – Fleet Mix by Runway), 2004/2005.

TABLE J.2-42
RUNWAY USE - DEPARTURES – 2018/2019 - ALTERNATIVE D

ARTS Code	Percent Runway Use								
	9C	9R	10L	10C	22L	27L	27C	28C	28R
319	0.00	15.90	11.78	0.00	16.74	32.31	0.00	0.00	23.27
320	0.00	14.92	12.78	0.00	21.27	21.94	0.00	0.00	29.09
321	0.00	17.25	10.45	0.00	15.47	31.97	0.00	0.00	24.86
332	0.00	27.70	0.00	0.00	0.00	72.30	0.00	0.00	0.00
333	0.00	27.70	0.00	0.00	0.00	72.30	0.00	0.00	0.00
342	0.00	0.00	27.70	0.00	0.00	4.80	0.00	0.00	67.50
343	0.00	23.07	4.63	0.00	0.00	52.58	0.00	0.00	19.72
346	0.00	14.98	12.73	0.00	0.00	37.34	0.00	0.00	34.95
380	11.98	0.00	4.64	11.08	0.00	0.00	43.38	28.92	0.00
717	0.00	4.64	23.06	0.00	17.98	0.00	0.00	0.00	54.32
737	0.00	8.01	19.69	0.00	23.39	8.30	0.00	0.00	40.61
738	0.00	12.53	15.17	0.00	16.04	24.05	0.00	0.00	32.21
739	0.00	9.25	18.45	0.00	13.22	14.08	0.00	0.00	45.00
744	0.00	5.04	22.66	0.00	0.00	12.71	0.00	0.00	59.59
763	0.00	15.72	11.98	0.00	0.00	37.39	0.00	0.00	34.91
772	0.00	13.06	14.64	0.00	3.18	33.64	0.00	0.00	35.48
773	0.00	0.00	27.70	0.00	0.00	0.00	0.00	0.00	72.30
31F	0.00	13.85	13.85	0.00	72.30	0.00	0.00	0.00	0.00
38F	0.00	0.00	0.00	27.70	0.00	0.00	0.00	72.30	0.00
74F	0.00	2.93	24.77	0.00	0.00	6.57	0.00	0.00	65.73
74M	0.00	27.70	0.00	0.00	0.00	72.30	0.00	0.00	0.00
75F	0.00	0.00	27.70	0.00	2.40	0.00	0.00	0.00	69.90
76F	0.00	4.50	23.20	0.00	0.00	0.00	0.00	0.00	72.30
A3F	0.00	1.93	25.77	0.00	0.00	0.00	0.00	0.00	72.30
BE40	0.00	27.70	0.00	0.00	0.00	72.30	0.00	0.00	0.00
BE58	0.00	27.70	0.00	0.00	0.00	72.30	0.00	0.00	0.00
C210	0.00	11.60	16.10	0.00	72.30	0.00	0.00	0.00	0.00
C550	0.00	13.85	13.85	0.00	0.00	2.40	0.00	0.00	69.90
C560	0.00	6.93	20.78	0.00	36.15	0.00	0.00	0.00	36.14
C56X	0.00	16.10	11.60	0.00	36.15	36.15	0.00	0.00	0.00
C650	0.00	4.62	23.08	0.00	12.85	0.00	0.00	0.00	59.45
C750	0.00	4.60	23.10	0.00	21.34	9.64	0.00	0.00	41.32
CL60	0.00	0.00	27.70	0.00	0.00	0.00	0.00	0.00	72.30
CR7	0.00	15.00	12.70	0.00	28.76	21.13	0.00	0.00	22.41
CR9	0.00	19.25	8.45	0.00	30.40	33.08	0.00	0.00	8.82
CRJ	0.00	17.45	10.25	0.00	22.73	32.94	0.00	0.00	16.63
E145	0.00	13.19	14.51	0.00	24.06	18.84	0.00	0.00	29.40
F2TH	0.00	13.85	13.85	0.00	36.15	0.00	0.00	0.00	36.15
F900	0.00	16.10	11.60	0.00	36.15	36.15	0.00	0.00	0.00
FA20	0.00	27.70	0.00	0.00	0.00	72.30	0.00	0.00	0.00
FA50	0.00	27.70	0.00	0.00	72.30	0.00	0.00	0.00	0.00
G4	0.00	0.00	27.70	0.00	0.00	0.00	0.00	0.00	72.30
G5	0.00	9.23	18.47	0.00	0.00	1.60	0.00	0.00	70.70
H25C	0.00	8.05	19.65	0.00	18.08	0.00	0.00	0.00	54.22
LJ30	0.00	13.85	13.85	0.00	2.40	36.15	0.00	0.00	33.75
LJ35	0.00	2.25	25.45	0.00	36.15	36.15	0.00	0.00	0.00
LJ45	0.00	23.20	4.50	0.00	72.30	0.00	0.00	0.00	0.00
LJ55	0.00	0.00	27.70	0.00	24.10	0.00	0.00	0.00	48.20
LJ60	0.00	0.00	27.70	0.00	24.10	0.00	0.00	0.00	48.20
M1F	0.00	0.00	27.70	0.00	0.00	0.00	0.00	0.00	72.30

Note: Alternative C, D, and G are Build Alternatives.

Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 3 – Fleet Mix by Runway), 2004/2005.

TABLE J.2-43
RUNWAY USE - DEPARTURES – 2018/2019 - ALTERNATIVE G

ARTS Code	Percent Runway Use									
	9C	9R	10L	10C	12	22L	27L	27C	28C	28R
319	0.00	13.00	8.29	0.00	6.42	16.74	32.28	0.00	0.00	23.27
320	0.00	7.86	11.82	0.00	8.01	21.27	21.94	0.00	0.00	29.10
321	0.00	9.70	9.59	0.00	8.41	15.47	31.97	0.00	0.00	24.86
332	0.00	27.70	0.00	0.00	0.00	0.00	72.30	0.00	0.00	0.00
333	0.00	11.50	16.20	0.00	0.00	0.00	72.30	0.00	0.00	0.00
342	0.00	0.00	27.70	0.00	0.00	0.00	4.80	0.00	0.00	67.50
343	0.00	18.45	9.25	0.00	0.00	0.00	52.58	0.00	0.00	19.72
346	0.00	14.98	12.73	0.00	0.00	0.00	37.34	0.00	0.00	34.95
380	16.62	0.00	0.00	11.08	0.00	0.00	0.00	43.38	28.92	0.00
717	0.00	0.45	15.46	0.00	11.79	17.98	0.00	0.00	0.00	54.32
737	0.00	1.51	15.78	0.00	10.40	23.39	8.30	0.00	0.00	40.62
738	0.00	8.09	10.14	0.00	9.47	16.04	24.05	0.00	0.00	32.21
739	0.00	5.56	11.41	0.00	10.73	13.22	14.08	0.00	0.00	45.00
744	0.00	5.04	20.15	0.00	2.52	0.00	12.71	0.00	0.00	59.58
763	0.00	14.38	13.32	0.00	0.00	0.00	37.39	0.00	0.00	34.91
772	0.00	11.84	9.45	0.00	6.41	3.18	33.64	0.00	0.00	35.48
773	0.00	0.00	27.70	0.00	0.00	0.00	0.00	0.00	0.00	72.30
31F	0.00	0.00	27.70	0.00	0.00	72.30	0.00	0.00	0.00	0.00
38F	0.00	0.00	0.00	27.70	0.00	0.00	0.00	0.00	72.30	0.00
74F	0.00	2.83	24.87	0.00	0.00	0.00	6.57	0.00	0.00	65.73
74M	0.00	27.70	0.00	0.00	0.00	0.00	72.30	0.00	0.00	0.00
75F	0.00	0.00	26.00	0.00	1.70	2.40	0.00	0.00	0.00	69.90
76F	0.00	0.85	26.85	0.00	0.00	0.00	0.00	0.00	0.00	72.30
A3F	0.00	0.00	27.70	0.00	0.00	0.00	0.00	0.00	0.00	72.30
BE40	0.00	27.70	0.00	0.00	0.00	0.00	72.30	0.00	0.00	0.00
BE58	0.00	27.70	0.00	0.00	0.00	0.00	72.30	0.00	0.00	0.00
C210	0.00	0.00	27.70	0.00	0.00	72.30	0.00	0.00	0.00	0.00
C550	0.00	13.85	0.00	0.00	13.85	0.00	2.30	0.00	0.00	69.90
C560	0.00	6.93	13.58	0.00	7.20	36.15	0.00	0.00	0.00	36.14
C56X	0.00	0.00	15.55	0.00	12.15	36.15	36.15	0.00	0.00	0.00
C650	0.00	0.00	8.48	0.00	19.22	12.85	0.00	0.00	0.00	59.45
C750	0.00	3.96	11.87	0.00	11.87	21.34	9.64	0.00	0.00	41.32
CL60	0.00	0.00	1.70	0.00	26.00	0.00	0.00	0.00	0.00	72.30
CR7	0.00	8.44	12.59	0.00	6.66	28.77	21.13	0.00	0.00	22.41
CR9	0.00	10.96	12.50	0.00	4.24	30.40	33.08	0.00	0.00	8.82
CRJ	0.00	13.16	8.81	0.00	5.73	22.73	32.98	0.00	0.00	16.63
E145	0.00	8.29	12.16	0.00	7.25	24.06	18.84	0.00	0.00	29.40
F2TH	0.00	1.70	12.15	0.00	13.85	36.15	0.00	0.00	0.00	36.15
F900	0.00	13.85	13.85	0.00	0.00	36.15	36.15	0.00	0.00	0.00
FA20	0.00	27.70	0.00	0.00	0.00	0.00	72.30	0.00	0.00	0.00
FA50	0.00	3.40	24.30	0.00	0.00	72.30	0.00	0.00	0.00	0.00
G4	0.00	0.00	0.00	0.00	27.70	0.00	0.00	0.00	0.00	72.30
G5	0.00	9.23	0.00	0.00	18.47	0.00	1.60	0.00	0.00	70.70
H25C	0.00	6.93	7.78	0.00	13.00	18.08	0.00	0.00	0.00	54.21
LJ30	0.00	13.85	11.60	0.00	2.25	2.40	36.15	0.00	0.00	33.75
LJ35	0.00	0.00	27.70	0.00	0.00	36.15	36.15	0.00	0.00	0.00
LJ45	0.00	0.00	27.70	0.00	0.00	72.30	0.00	0.00	0.00	0.00
LJ55	0.00	0.00	9.23	0.00	18.47	24.10	0.00	0.00	0.00	48.20
LJ60	0.00	0.00	16.60	0.00	11.10	24.10	0.00	0.00	0.00	48.20
M1F	0.00	0.00	20.50	0.00	7.20	0.00	0.00	0.00	0.00	72.30

Note: Alternative C, D, and G are Build Alternatives.

Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 3 – Fleet Mix by Runway), 2004/2005.

TABLE J.2-44
RUNWAY USE - ARRIVALS - 2002

ARTS Code	Percent Runway Use								
	04R	09L	09R	14L	14R	22L	22R	27L	27R
100	14.99	6.07	16.95	1.44	6.92	1.62	13.63	18.03	20.36
146	4.85	6.07	25.91	0.59	14.24	0.00	37.62	7.42	3.29
306	0.00	0.00	36.40	0.00	18.30	0.00	0.00	0.00	45.30
310	0.00	0.00	38.55	0.00	10.25	0.00	26.65	1.90	22.65
319	14.96	1.99	21.10	1.23	8.10	1.62	23.89	18.15	8.96
320	17.15	3.15	17.92	1.10	8.93	1.70	22.70	21.89	5.45
332	0.00	0.00	40.70	2.20	0.00	0.00	53.30	0.00	3.80
333	0.00	0.00	36.40	2.20	0.00	0.00	57.60	0.00	3.80
340	0.00	0.00	45.57	2.55	0.00	0.00	31.41	1.47	18.99
343	0.00	0.00	38.55	2.20	0.00	0.00	13.95	1.90	43.40
72F	18.20	0.00	20.35	1.10	15.05	0.00	0.00	22.65	22.65
72S	24.27	0.00	13.57	0.00	9.00	3.93	3.93	45.30	0.00
733	20.26	4.88	13.39	1.31	7.48	1.34	23.58	26.27	1.49
734	33.09	0.00	5.26	1.80	3.43	6.44	4.68	41.53	3.77
735	13.82	2.76	21.39	1.28	7.13	1.19	36.01	14.05	2.36
737	0.00	0.00	37.83	1.47	4.67	0.00	31.48	0.63	23.92
738	12.94	5.66	19.23	0.73	11.13	0.79	14.36	13.51	21.65
73G	0.00	0.00	36.40	0.00	18.30	0.00	0.00	0.00	45.30
742	0.00	0.00	36.40	1.10	9.15	0.00	28.80	0.00	24.55
744	6.07	15.17	16.24	0.73	13.82	0.00	6.14	5.36	36.48
747	0.00	0.00	40.70	2.20	0.00	0.00	53.30	0.00	3.80
74F	4.55	0.00	32.39	0.28	15.48	0.00	7.20	5.66	34.45
74G	36.40	0.00	4.30	0.00	14.00	0.00	0.00	45.30	0.00
74M	0.00	0.00	36.40	2.20	0.00	0.00	57.60	0.00	3.80
757	14.26	4.88	18.99	0.72	10.36	1.09	24.50	16.85	8.34
762	0.00	0.00	36.40	0.00	18.30	0.00	0.00	0.00	45.30
763	11.20	4.20	22.16	1.77	6.38	0.00	13.78	13.94	26.57
767	36.40	0.00	4.30	0.00	14.00	0.00	0.00	45.30	0.00
772	0.00	0.00	40.70	0.00	14.00	0.00	0.00	3.80	41.50
777	8.67	0.00	28.76	1.25	9.59	0.00	14.34	5.22	32.18
ABF	12.13	0.00	25.70	0.73	16.13	0.00	0.00	15.10	30.20
BE1	0.00	6.07	30.33	0.92	12.38	0.00	46.51	0.00	3.80
BE40	0.00	0.00	36.40	2.20	0.00	0.00	57.60	0.00	3.80
BE58	0.00	0.00	36.40	0.00	18.30	0.00	0.00	0.00	45.30
C210	36.40	0.00	2.15	2.20	2.15	0.00	11.80	45.30	0.00
C401	0.00	0.00	40.70	0.00	14.00	0.00	41.50	0.00	3.80
C550	36.40	0.00	4.30	0.00	14.00	0.00	41.50	3.80	0.00
C560	36.40	0.00	4.30	0.00	14.00	0.00	41.50	3.80	0.00
C650	36.40	0.00	4.30	0.00	14.00	0.00	41.50	3.80	0.00
C750	36.40	0.00	4.30	0.00	8.10	0.00	47.40	1.90	1.90
C9	0.00	0.00	40.70	0.00	14.00	0.00	0.00	45.30	0.00
CL60	36.40	0.00	4.30	0.00	14.00	0.00	41.50	3.80	0.00
CRJ	20.52	2.20	16.02	1.27	7.11	1.90	22.39	24.60	3.99
D1F	0.00	12.13	24.27	0.00	18.30	0.00	13.83	0.00	31.47
D38	13.24	3.31	22.59	0.40	11.95	0.00	29.63	18.20	0.69
D8F	0.00	0.00	36.40	0.00	18.30	0.00	0.00	15.10	30.20
D9S	5.20	5.20	26.61	0.73	13.18	0.00	11.69	12.40	25.00
ER4	18.67	3.17	16.28	1.15	8.36	2.36	24.20	23.01	2.80
ERD	17.47	3.64	16.84	1.49	7.28	2.83	26.73	21.74	1.98
ERJ	31.85	0.00	7.24	1.38	2.44	7.38	4.43	45.30	0.00
F900	0.00	0.00	40.70	0.00	14.00	0.00	41.50	0.00	3.80
FA50	0.00	0.00	36.40	0.00	18.30	0.00	41.50	0.00	3.80
G2	0.00	0.00	36.40	2.20	0.00	0.00	57.60	0.00	3.80
G4	36.40	0.00	4.30	0.00	2.20	0.00	11.80	45.30	0.00
G5	0.00	0.00	40.70	0.00	14.00	0.00	41.50	0.00	3.80
LJ30	0.00	0.00	40.70	0.00	14.00	0.00	41.50	0.00	3.80
LJ45	36.40	0.00	4.30	0.00	14.00	0.00	41.50	3.80	0.00
LJ55	24.27	0.00	16.43	0.00	6.13	0.00	21.70	30.20	1.27
LJ60	36.40	0.00	4.30	0.00	2.20	0.00	11.80	45.30	0.00

TABLE J.2-44 (CONTINUED)
RUNWAY USE - ARRIVALS - 2002

ARTS Code	Percent Runway Use								
	04R	09L	09R	14L	14R	22L	22R	27L	27R
M11	0.00	0.00	36.40	6.50	0.00	0.00	53.30	0.00	3.80
M1F	0.00	18.20	18.20	1.10	11.30	0.00	47.40	0.00	3.80
M1M	0.00	0.00	40.70	2.20	0.00	0.00	53.30	0.00	3.80
M80	21.25	2.75	14.77	1.00	7.82	1.02	10.81	23.53	17.06
M90	0.00	0.00	36.40	0.00	18.30	0.00	41.50	0.00	3.80

Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 3 – Fleet Mix by Runway), 2004/2005.

TABLE J.2-45
RUNWAY USE - ARRIVALS – 2007/2008 - ALTERNATIVE A (NO ACTION ALTERNATIVE)

ARTS Code	Percent Runway Use								
	04R	09L	09R	14L	14R	22L	22R	27L	27R
319	11.60	3.26	12.14	1.59	9.39	1.61	28.76	20.80	10.85
31F	0.00	0.00	27.00	0.00	20.40	0.00	0.00	0.00	52.60
320	10.59	3.35	13.06	1.68	9.89	1.56	28.59	19.42	11.86
332	0.00	0.00	27.00	3.30	0.00	0.00	17.10	46.60	6.000
333	0.00	0.00	27.00	3.30	0.00	0.00	17.10	46.60	6.00
342	0.00	0.00	27.00	3.30	0.00	0.00	17.10	52.60	0.00
343	0.00	0.00	27.00	3.30	0.00	0.00	17.10	47.46	5.14
72F	0.00	0.00	27.00	1.65	18.75	0.00	0.00	3.00	49.60
732	27.00	0.00	0.00	2.20	1.10	11.40	5.70	52.60	0.00
733	14.12	4.57	8.31	2.08	7.01	2.89	29.93	22.40	8.69
734	27.00	0.00	0.00	3.30	3.42	6.84	6.84	52.60	0.00
735	5.40	2.70	18.90	2.64	4.08	0.00	50.96	5.26	10.06
737	13.50	0.00	13.50	0.00	20.40	0.00	0.00	26.30	26.30
738	14.82	2.30	9.88	1.25	10.19	1.04	12.47	19.35	28.70
739	14.81	3.48	8.71	1.28	10.85	1.65	8.12	23.03	28.07
744	0.00	0.00	27.00	0.73	15.87	0.00	24.52	7.84	24.04
74F	0.00	0.00	27.00	0.28	18.70	0.00	5.31	12.65	36.06
74M	0.00	0.00	27.00	3.30	0.00	0.00	63.70	0.00	6.00
757	10.07	0.00	16.93	1.29	10.71	0.58	33.09	13.40	13.93
763	5.06	0.00	21.94	1.86	8.39	1.07	9.08	11.51	41.09
76F	0.00	0.00	27.00	0.00	20.40	0.00	0.00	0.00	52.60
772	5.63	0.00	21.38	1.93	7.79	0.00	14.57	7.33	41.37
773	0.00	0.00	27.00	1.10	13.60	0.00	21.23	35.07	2.00
A3F	10.80	0.00	16.20	0.66	16.32	0.00	3.42	19.84	32.76
BE30	0.00	0.00	27.00	2.20	6.80	0.00	42.47	17.53	4.00
BE40	0.00	0.00	27.00	3.30	0.00	0.00	63.70	0.00	6.00
BE58	0.00	0.00	27.00	0.00	20.40	0.00	0.00	0.00	52.60
C210	27.00	0.00	0.00	3.36	0.00	17.10	0.0	52.60	0.00
C550	0.00	0.00	27.00	0.00	20.40	0.00	0.00	46.60	6.00
C560	9.00	0.00	18.00	1.10	13.60	0.00	5.70	50.60	2.00
C56X	13.50	0.00	13.50	3.30	0.00	8.55	8.55	49.60	3.00
C650	29.27	0.00	0.00	0.00	15.94	3.09	3.09	47.53	1.08
C750	15.43	0.00	11.57	0.94	14.57	4.89	0.00	41.66	10.94
CL60	0.00	0.00	27.00	0.00	20.40	0.00	0.00	52.60	0.00
CR7	13.03	3.35	10.61	2.23	5.90	3.89	28.31	27.26	5.42
CR9	13.50	0.00	13.50	1.32	10.53	2.43	28.43	16.38	12.92
CRJ	13.50	3.75	9.75	1.67	8.87	2.02	26.94	24.97	8.53
D1F	27.00	0.00	0.00	0.00	20.40	0.00	0.00	6.00	46.60
D8F	0.00	0.00	27.00	0.00	20.40	0.00	0.0	0.00	52.60
D95	0.00	16.20	10.80	1.98	8.16	0.00	10.26	0.00	52.60
D9S	5.40	5.40	16.20	0.66	14.61	0.00	5.13	6.46	46.14
E140	19.10	2.63	5.27	0.72	14.67	1.67	19.25	21.70	14.99
E145	11.83	2.43	12.74	1.67	9.51	2.31	28.90	23.25	7.36
F2TH	0.00	13.50	13.50	0.00	20.40	0.00	0.00	23.30	29.30
F900	0.00	0.00	27.00	0.00	20.40	0.00	0.00	46.60	6.00
FA20	0.00	0.00	27.00	0.00	20.40	0.00	46.60	0.00	6.00
FA50	0.00	0.00	27.00	0.00	20.40	0.00	0.00	46.60	6.00
G2	0.00	0.00	27.00	3.30	0.00	0.00	17.10	46.60	6.00
G4	27.00	0.00	0.00	0.00	3.30	0.00	17.10	52.60	0.00
G5	0.00	18.00	9.00	1.10	13.60	0.00	5.70	46.60	6.00
H25C	6.75	0.00	20.25	1.65	10.20	0.00	20.20	37.95	3.00
LJ30	0.00	0.00	27.00	0.00	20.40	0.00	0.00	46.60	6.00
LJ35	13.50	0.00	13.50	0.00	20.40	0.00	0.00	26.30	26.30
LJ45	27.00	0.00	0.00	0.00	20.40	0.00	0.00	52.60	0.00
LJ55	18.00	0.00	9.00	0.00	20.40	0.00	0.00	48.60	4.00
LJ60	27.00	0.00	0.00	0.00	20.40	0.00	0.00	52.60	0.00
M1F	0.00	0.00	27.00	0.00	20.40	0.00	0.00	0.00	52.60
M80	13.97	2.50	10.54	1.71	8.60	0.58	14.97	21.61	25.52
M87	27.00	0.00	0.00	0.00	11.85	0.00	8.55	52.60	0.00
M90	0.00	9.00	18.00	0.00	20.40	0.00	46.60	0.00	6.00

Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 3 – Fleet Mix by Runway), 2004/2005.

TABLE J.2-46
RUNWAY USE - ARRIVALS – 2007/2008 - ALTERNATIVES C, D, G

ARTS Code	Percent Runway Use						
	9L	9R	10L	10C	27L	27R	28C
319	9.39	5.30	1.55	11.36	28.39	23.08	20.93
320	12.00	3.81	2.43	9.36	27.59	28.96	15.85
321	12.74	6.91	1.51	6.45	18.87	25.80	27.72
332	18.17	0.00	0.00	9.43	25.73	46.67	0.00
333	13.45	0.00	0.00	14.15	38.60	33.80	0.00
342	27.60	0.00	0.00	0.00	4.80	67.60	0.00
343	24.40	0.00	0.00	3.20	21.37	51.03	0.00
346	27.60	0.00	0.00	0.00	0.00	72.40	0.00
380	0.00	0.00	0.00	27.60	0.00	0.00	72.40
733	10.60	3.85	0.00	13.15	28.80	26.17	17.43
737	15.61	3.85	2.30	5.84	18.90	35.40	18.10
738	7.75	6.56	1.09	12.20	19.69	13.56	39.15
739	5.27	5.61	3.39	13.33	38.11	8.63	25.66
744	16.43	10.61	0.00	0.56	0.60	20.50	51.30
757	0.00	10.74	0.00	16.86	28.96	1.92	41.52
763	12.26	2.10	7.28	5.97	31.11	26.80	14.48
772	17.63	4.08	2.86	3.03	18.47	37.45	16.48
773	27.60	0.00	0.00	0.00	0.00	49.87	22.53
31F	0.00	0.00	27.60	0.00	72.40	0.00	0.00
72F	2.25	0.00	25.35	0.00	72.40	0.00	0.00
74F	7.91	2.79	16.90	0.00	48.27	7.23	16.90
74M	9.70	0.00	0.00	17.90	0.00	72.40	0.00
75F	0.00	0.00	27.60	0.00	72.40	0.00	0.00
76F	0.00	0.00	27.60	0.00	72.40	0.00	0.00
A3F	0.90	1.04	15.66	10.00	57.92	0.96	13.52
BE30	16.67	0.00	0.00	10.93	0.00	48.27	24.13
BE40	27.60	0.00	0.00	0.00	67.60	4.80	0.00
BE58	0.00	0.00	27.60	0.00	72.40	0.00	0.00
C210	0.00	0.00	0.00	27.60	0.00	0.00	72.40
C550	4.50	23.10	0.00	0.00	0.00	4.80	67.60
C560	6.90	10.25	0.00	10.45	18.10	18.10	36.20
C56X	4.85	0.00	0.00	22.75	38.60	33.80	0.00
C650	0.00	12.42	0.00	15.18	12.07	1.60	58.73
C750	1.39	11.71	3.94	10.56	31.03	0.69	40.68
CL60	0.00	0.00	0.00	27.60	0.00	4.80	67.60
CR7	10.13	2.43	0.34	14.70	36.24	23.66	12.50
CR9	14.18	4.07	0.00	9.36	21.32	33.37	17.70
CRJ	10.46	5.02	0.17	11.94	26.81	24.01	21.59
D1F	0.00	5.20	0.00	22.40	0.00	0.00	72.40
D8F	0.00	0.00	27.60	0.00	72.40	0.00	0.00
E140	8.28	7.86	0.00	11.46	23.71	9.51	39.18
E145	8.81	6.33	0.24	12.22	24.43	20.45	27.52
F2TH	4.85	8.95	13.80	0.00	36.20	36.20	0.00
F900	27.60	0.00	0.00	0.00	0.00	72.40	0.00
FA20	27.60	0.00	0.00	0.00	0.00	72.40	0.00
FA50	4.50	23.10	0.00	0.00	0.00	4.80	67.60
G2	22.40	0.00	0.00	5.20	67.60	4.80	0.00
G4	0.00	17.90	0.00	9.70	0.00	0.00	72.40
G5	24.13	0.00	0.00	3.47	1.60	48.27	22.53
H25C	13.80	1.30	0.00	12.50	19.30	35.00	18.10
LJ30	4.85	8.95	0.00	13.80	0.00	38.60	33.80
LJ35	0.00	0.00	13.80	13.80	72.40	0.00	0.00
LJ45	0.00	23.10	0.00	4.50	0.00	0.00	72.40
LJ55	8.03	12.85	0.00	6.73	0.00	19.30	53.09
LJ60	0.00	23.10	0.00	4.50	0.00	0.00	72.40
M1F	0.00	0.00	27.60	0.00	72.40	0.00	0.00
M80	9.00	6.85	0.70	11.04	25.24	17.89	29.28
M87	0.00	17.90	0.00	9.70	0.00	0.00	72.40

Note: Alternative C, D, and G are Build Alternatives.

Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 3 – Fleet Mix by Runway), 2004/2005.

TABLE J.2-47
RUNWAY USE - ARRIVALS – 2009/2010 - ALTERNATIVES C, D, G

ARTS Code	Percent Runway Use								
	04R	09L	09R	14L	14R	22L	22R	27L	27R
319	11.50	2.88	12.62	1.52	8.86	3.04	27.11	21.52	10.95
31F	0.00	0.00	27.00	0.00	20.40	0.00	0.00	0.00	52.60
320	10.59	3.53	12.88	1.75	8.65	2.89	27.90	19.88	11.93
321	8.69	3.41	14.90	1.29	10.46	1.38	32.99	11.17	15.71
332	0.00	0.00	27.00	3.30	0.00	0.00	17.10	46.60	6.00
333	13.50	0.00	13.50	3.30	0.00	0.00	17.10	46.60	6.00
342	0.00	0.00	27.00	3.30	0.00	0.00	17.10	52.60	0.00
343	0.00	0.00	27.00	3.30	0.00	0.00	17.10	47.46	5.14
346	0.00	0.00	27.00	3.30	17.10	0.00	0.00	52.60	0.00
380	0.00	0.00	27.00	0.00	20.40	0.00	0.00	52.60	0.00
72F	0.00	0.00	27.00	0.00	20.40	0.00	0.00	3.00	49.60
733	12.98	5.19	8.83	2.03	6.86	2.30	34.31	22.48	5.02
737	4.50	4.50	18.00	2.20	5.38	0.00	43.88	8.77	12.77
738	16.20	1.62	9.18	1.35	9.81	1.37	11.13	23.29	26.05
739	10.95	3.65	12.41	1.25	11.29	1.39	7.73	21.97	29.36
744	3.38	0.00	23.63	0.41	17.85	0.00	19.61	9.58	25.54
74F	0.00	0.00	27.00	0.28	18.70	0.00	5.31	16.53	32.18
74M	0.00	0.00	27.00	3.30	0.00	0.00	17.10	46.60	6.00
757	27.00	0.00	0.00	0.00	3.30	0.00	17.10	52.60	0.00
75F	0.0	0.00	27.00	0.00	20.40	0.00	0.00	0.00	52.60
763	5.25	0.00	21.75	1.65	8.78	0.48	12.09	13.15	36.85
76F	0.00	0.00	27.00	0.00	20.40	0.00	0.00	0.00	52.60
772	4.00	0.00	23.00	1.71	8.56	0.63	16.40	6.96	38.74
773	0.00	0.00	27.00	1.10	13.60	0.00	36.77	19.53	2.00
A3F	10.80	0.00	16.20	0.00	16.98	3.42	0.00	10.52	42.08
BE30	9.00	0.00	18.00	2.20	6.80	5.70	36.77	17.53	4.00
BE40	0.00	0.00	27.00	3.30	0.00	0.00	63.70	0.00	6.00
BE58	0.00	0.00	27.00	0.00	20.40	0.00	0.00	0.00	52.60
C210	27.00	0.00	0.00	3.30	0.00	8.55	8.55	52.60	0.00
C550	0.00	0.00	27.00	0.00	20.40	0.00	0.00	46.60	6.00
C560	6.75	0.00	20.25	1.65	10.20	0.00	20.20	37.95	3.00
C56X	13.50	0.00	13.50	3.30	0.00	0.00	17.10	49.60	3.00
C650	23.16	0.00	4.63	0.00	15.13	0.00	2.93	52.09	2.06
C750	15.50	0.00	11.63	0.47	14.64	4.91	6.69	36.03	10.13
CL60	27.00	0.00	0.00	0.00	3.30	0.00	17.10	52.60	0.00
CR7	14.75	2.21	10.03	2.25	6.00	3.27	27.47	28.03	5.99
CR9	12.60	1.80	12.60	2.09	7.48	1.14	31.44	23.19	7.66
CRJ	14.13	3.79	9.08	1.54	9.27	1.76	27.00	24.70	8.73
D1F	27.00	0.00	0.00	0.00	20.40	0.00	0.00	6.00	46.60
D8F	0.00	0.00	27.00	0.00	20.40	0.00	0.00	0.00	52.60
E140	15.88	3.18	7.94	0.39	15.99	0.00	20.47	25.46	10.69
E145	12.12	2.08	12.81	1.23	11.72	0.66	30.68	20.69	8.01
F2TH	0.00	0.00	27.00	0.00	20.40	0.00	0.00	23.30	29.30
F900	0.00	27.00	0.00	0.00	20.40	0.00	46.60	0.00	6.00
FA20	0.00	27.00	0.00	0.00	20.40	0.00	0.00	46.60	6.00
FA50	0.00	27.00	0.00	0.00	20.40	0.00	46.60	0.00	6.00
G2	0.00	0.00	27.00	3.30	0.00	0.00	63.70	0.00	6.00
G4	27.00	0.00	0.00	0.00	20.40	0.00	0.00	52.60	0.00
G5	0.00	18.00	9.00	1.10	13.60	0.00	21.23	31.07	6.00
H25C	13.50	0.00	13.50	1.65	10.20	0.00	31.85	26.30	3.00
LJ30	13.50	0.00	13.50	0.00	11.85	0.00	31.85	26.30	3.00
LJ35	13.50	0.00	13.50	0.00	11.85	0.00	8.55	26.30	26.30
LJ45	27.00	0.00	0.00	0.00	20.40	0.00	0.00	52.60	0.00
LJ55	13.50	6.75	6.75	0.83	15.30	0.00	4.28	49.59	3.00
LJ60	27.00	0.00	0.00	0.00	20.40	0.00	0.00	52.60	0.00
M1F	0.00	0.00	27.00	0.00	20.40	0.00	0.00	0.00	52.60
M80	13.64	2.62	10.74	1.68	8.60	1.05	17.16	17.92	26.59
M87	27.00	0.00	0.00	0.00	20.40	0.00	0.00	52.60	0.00

Note: Alternative C, D, and G are Build Alternatives.

Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 3 – Fleet Mix by Runway), 2004/2005.

TABLE J.2-48
RUNWAY USE - ARRIVALS – 2009/2010 - ALTERNATIVES C, D, G

ARTS Code	Percent Runway Use						
	9L	9R	10L	10C	27L	27R	28C
319	9.39	5.30	1.55	11.36	28.39	23.08	20.93
320	12.00	3.81	2.43	9.36	27.59	28.96	15.85
321	12.74	6.91	1.51	6.45	18.87	25.80	27.72
332	18.17	0.00	0.00	9.43	25.73	46.67	0.00
333	13.45	0.00	0.00	14.15	38.60	33.80	0.00
342	27.60	0.00	0.00	0.00	4.80	67.60	0.00
343	24.40	0.00	0.00	3.20	21.37	51.03	0.00
346	27.60	0.00	0.00	0.00	0.00	72.40	0.00
380	0.00	0.00	0.00	27.60	0.00	0.00	72.40
733	10.60	3.85	0.00	13.15	28.80	26.17	17.43
737	15.61	3.85	2.30	5.84	18.90	35.40	18.10
738	7.75	6.56	1.09	12.20	19.69	13.56	39.15
739	5.27	5.61	3.39	13.33	38.11	8.63	25.66
744	16.43	10.61	0.00	0.56	0.60	20.50	51.30
757	0.00	10.74	0.00	16.86	28.96	1.92	41.52
763	12.26	2.10	7.28	5.97	31.11	26.80	14.48
772	17.63	4.08	2.86	3.03	18.47	37.45	16.48
773	27.60	0.00	0.00	0.00	0.00	49.87	22.53
31F	0.00	0.00	27.60	0.00	72.40	0.00	0.00
72F	2.25	0.00	25.35	0.00	72.40	0.00	0.00
74F	7.91	2.79	16.90	0.00	48.27	7.23	16.90
74M	9.70	0.00	0.00	17.90	0.00	72.40	0.00
75F	0.00	0.00	27.60	0.00	72.40	0.00	0.00
76F	0.00	0.00	27.60	0.00	72.40	0.00	0.00
A3F	0.90	1.04	15.66	10.00	57.92	0.96	13.52
BE30	16.67	0.00	0.00	10.93	0.00	48.27	24.13
BE40	27.60	0.00	0.00	0.00	67.60	4.80	0.00
BE58	0.00	0.00	27.60	0.00	72.40	0.00	0.00
C210	0.00	0.00	0.00	27.60	0.00	0.00	72.40
C550	4.50	23.10	0.00	0.00	0.00	4.80	67.60
C560	6.90	10.25	0.00	10.45	18.10	18.10	36.20
C56X	4.85	0.00	0.00	22.75	38.60	33.80	0.00
C650	0.00	12.42	0.00	15.18	12.07	1.60	58.73
C750	1.39	11.71	3.94	10.56	31.03	0.69	40.68
CL60	0.00	0.00	0.00	27.60	0.00	4.80	67.60
CR7	10.13	2.43	0.34	14.70	36.24	23.66	12.50
CR9	14.18	4.07	0.00	9.36	21.32	33.37	17.70
CRJ	10.46	5.02	0.17	11.94	26.81	24.01	21.59
D1F	0.00	5.20	0.00	22.40	0.00	0.00	72.40
D8F	0.00	0.00	27.60	0.00	72.40	0.00	0.00
E140	8.28	7.86	0.00	11.46	23.71	9.51	39.18
E145	8.81	6.33	0.24	12.22	24.43	20.45	27.52
F2TH	4.85	8.95	13.80	0.00	36.20	36.20	0.00
F900	27.60	0.00	0.00	0.00	0.00	72.40	0.00
FA20	27.60	0.00	0.00	0.00	0.00	72.40	0.00
FA50	4.50	23.10	0.00	0.00	0.00	4.80	67.60
G2	22.40	0.00	0.00	5.20	67.60	4.80	0.00
G4	0.00	17.90	0.00	9.70	0.00	0.00	72.40
G5	24.13	0.00	0.00	3.47	1.60	48.27	22.53
H25C	13.80	1.30	0.00	12.50	19.30	35.00	18.10
LJ30	4.85	8.95	0.00	13.80	0.00	38.60	33.80
LJ35	0.00	0.00	13.80	13.80	72.40	0.00	0.00
LJ45	0.00	23.10	0.00	4.50	0.00	0.00	72.40
LJ55	8.03	12.85	0.00	6.73	0.00	19.30	53.09
LJ60	0.00	23.10	0.00	4.50	0.00	0.00	72.40
M1F	0.00	0.00	27.60	0.00	72.40	0.00	0.00
M80	9.00	6.85	0.70	11.04	25.24	17.89	29.28
M87	0.00	17.90	0.00	9.70	0.00	0.00	72.40

Note: Alternative C, D, and G are Build Alternatives.

Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 3 – Fleet Mix by Runway), 2004/2005.

TABLE J.2-49
RUNWAY USE - ARRIVALS – 2013/2014 - ALTERNATIVE C

ARTS Code	Percent Runway Use								
	04R	09L	09R	14L	14R	22L	22R	27L	27R
319	12.14	3.57	11.29	1.66	8.79	2.35	21.69	9.21	9.21
31F	0.00	0.00	27.00	0.00	20.40	0.00	0.00	52.60	52.60
320	10.18	3.32	13.50	1.90	8.10	1.97	17.55	10.32	10.32
321	11.42	3.53	12.05	1.50	9.96	1.58	21.00	10.80	10.80
332	0.00	0.00	27.00	3.30	0.00	0.00	46.60	6.00	6.00
333	0.00	0.00	27.00	3.30	0.00	0.00	46.60	6.00	6.00
342	0.00	0.00	27.00	3.30	0.00	0.00	52.60	0.00	0.00
343	0.00	0.00	27.11	2.90	2.15	0.00	47.55	5.27	5.27
346	0.00	0.00	27.00	3.30	17.10	0.00	52.60	0.00	0.00
380	0.00	0.00	27.00	0.00	20.40	0.00	52.60	0.00	0.00
737	9.64	0.00	17.36	1.89	7.52	0.00	14.17	11.80	11.80
738	14.89	2.67	9.44	1.60	8.45	1.06	19.06	27.40	27.40
739	14.65	2.59	9.77	1.47	9.65	2.36	23.90	25.72	25.72
744	0.00	0.00	27.00	0.00	20.40	0.00	9.18	22.71	22.71
74F	0.00	0.00	27.00	0.28	18.70	0.00	16.03	36.56	36.56
74M	0.00	0.00	27.00	3.30	0.00	0.00	0.00	6.00	6.00
75F	0.00	0.00	27.00	0.00	20.40	0.00	0.00	52.60	52.60
763	4.40	0.00	22.60	1.84	8.22	0.40	12.09	39.42	39.42
76F	0.00	0.00	27.00	0.00	20.40	0.00	0.00	52.60	52.60
772	3.72	0.00	23.28	1.71	9.26	0.00	11.71	36.06	36.06
773	0.00	0.00	27.00	1.10	13.60	0.00	19.53	2.00	2.00
A3F	7.71	0.00	19.29	0.94	14.57	2.44	15.89	36.72	36.72
BE30	9.00	0.00	18.00	2.20	6.80	5.70	17.53	4.00	4.00
BE40	0.00	0.00	27.00	3.30	0.00	0.00	0.00	6.00	6.00
BE58	0.00	0.00	27.00	0.00	20.40	0.00	0.00	52.60	52.60
C210	27.00	0.00	0.00	1.65	1.65	8.55	52.60	0.00	0.00
C550	0.00	13.50	13.50	1.65	10.20	0.00	23.30	6.00	6.00
C560	13.50	0.00	13.50	1.65	14.48	0.00	51.09	1.50	1.50
C56X	13.50	0.00	13.50	3.30	0.00	8.55	49.60	3.00	3.00
C650	22.50	0.00	4.50	0.55	11.30	2.85	51.60	1.00	1.00
C750	15.56	0.00	11.67	0.95	14.70	2.46	43.76	8.44	8.44
CL60	27.00	0.00	0.00	0.00	20.40	0.00	0.00	52.60	0.00
CR7	14.93	2.26	9.80	2.05	6.99	3.15	28.26	26.50	6.06
CR9	11.72	3.57	11.72	2.62	4.23	1.94	36.22	23.05	4.93
CRJ	13.32	3.33	10.36	1.40	10.57	1.64	26.57	23.47	9.34
E145	11.37	4.26	11.37	0.96	12.92	1.13	31.14	20.17	6.68
F2TH	0.00	0.00	27.00	0.00	20.40	0.00	0.00	23.30	29.30
F900	0.00	0.00	27.00	0.00	20.40	0.00	46.60	0.00	6.00
FA20	0.00	0.00	27.00	0.00	20.40	0.00	46.60	0.00	6.00
FA50	0.00	0.00	27.00	1.65	10.20	0.00	31.85	23.30	6.00
G4	27.00	0.00	0.00	0.00	20.40	0.00	0.00	52.60	0.00
G5	0.00	6.75	20.25	1.65	10.20	0.00	31.85	23.30	6.00
H25C	13.50	0.00	13.50	1.65	10.20	0.00	20.20	37.95	3.00
LJ30	0.00	0.00	27.00	0.00	20.40	0.00	46.60	0.00	6.00
LJ35	0.00	0.00	27.00	0.00	11.85	8.55	0.00	26.30	26.30
LJ45	27.00	0.00	0.00	0.00	3.30	0.00	17.10	52.60	0.00
LJ55	18.00	9.00	0.00	0.00	20.40	0.00	0.00	48.60	4.00
LJ60	18.00	0.00	9.00	0.00	14.70	0.00	5.70	50.60	2.00
M1F	6.75	0.00	20.25	0.00	20.40	0.00	0.00	1.50	51.10
M80	19.29	0.00	7.71	2.36	8.27	4.89	11.54	37.57	8.37

Note: Alternative C, D, and G are Build Alternatives.

Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 3 – Fleet Mix by Runway), 2004/2005.

TABLE J.2-50
RUNWAY USE - ARRIVALS – 2013/2014 - ALTERNATIVE C

ARTS Code	Percent Runway Use									
	09L	09C	10L	10C	10R	27L	27C	27R	28L	28C
319	8.86	6.43	1.63	9.57	0.92	3.88	21.87	21.16	5.86	19.52
320	10.63	6.17	1.76	7.82	1.32	3.54	25.21	22.58	2.74	18.23
321	10.29	9.69	1.50	5.44	0.79	3.39	19.44	26.21	5.18	18.07
332	6.53	7.73	0.00	9.23	4.20	0.00	63.61	8.70	0.00	0.00
333	12.77	4.20	0.00	10.73	0.00	0.00	69.10	3.20	0.00	0.00
342	27.70	0.00	0.00	0.00	0.00	0.00	41.40	30.90	0.00	0.00
343	19.19	2.41	0.00	6.10	0.00	0.00	45.93	26.37	0.00	0.00
346	13.85	2.25	0.00	5.30	6.30	0.00	54.45	17.85	0.00	0.00
380	0.00	13.85	0.00	13.85	0.00	0.00	36.15	0.00	0.00	36.15
717	0.00	1.33	3.46	22.91	0.00	8.44	24.38	0.00	0.00	39.48
737	7.26	10.47	1.98	6.19	1.80	5.16	31.46	18.73	2.96	13.99
738	7.45	11.13	0.76	7.91	0.45	1.79	18.81	19.78	4.29	27.63
739	3.57	7.45	3.05	13.34	0.29	8.00	13.43	16.91	0.94	33.02
744	17.87	9.83	0.00	0.00	0.00	0.00	13.80	39.63	0.00	18.87
763	11.44	3.77	6.54	5.12	0.84	16.75	30.81	17.85	0.92	5.96
772	13.22	5.65	2.68	4.52	1.63	7.00	24.90	34.30	0.00	6.10
773	14.27	5.70	0.00	7.73	0.00	0.00	36.30	34.40	0.00	1.60
31F	0.00	0.00	27.70	0.00	0.00	72.30	0.00	0.00	0.00	0.00
74F	7.68	2.31	17.72	0.00	0.00	44.81	3.45	20.65	0.00	3.38
74M	15.10	0.00	0.00	12.60	0.00	0.00	67.50	4.80	0.00	0.00
75F	0.00	0.00	27.70	0.00	0.00	72.30	0.00	0.00	0.00	0.00
76F	0.00	0.00	27.70	0.00	0.00	72.30	0.00	0.00	0.00	0.00
A3F	0.00	3.31	19.14	5.24	0.00	50.97	5.10	0.00	0.00	16.24
BE30	9.23	1.50	0.00	16.97	0.00	0.00	36.30	10.30	13.80	11.90
BE40	27.70	0.00	0.00	0.00	0.00	0.00	41.40	30.90	0.00	0.00
BE58	0.00	0.00	27.70	0.00	0.00	72.30	0.00	0.00	0.00	0.00
C210	0.00	0.00	0.00	27.70	0.00	0.00	0.00	0.00	41.40	3.090
C550	8.55	13.85	0.00	5.30	0.00	0.00	20.70	49.20	0.00	2.40
C560	6.93	13.85	0.00	6.93	0.00	0.00	0.00	28.43	10.35	33.51
C56X	12.85	6.30	0.00	2.25	6.30	0.00	38.55	13.05	0.00	20.70
C650	0.00	18.47	0.00	9.23	0.00	0.00	5.15	34.50	0.00	32.65
C750	3.96	11.87	3.96	6.11	1.80	10.33	5.10	18.43	5.91	32.53
CL60	0.00	27.70	0.00	0.00	0.00	0.00	0.00	41.40	0.00	30.90
CR7	7.94	5.68	0.33	12.41	1.34	0.73	23.64	18.11	3.76	26.06
CR9	9.77	6.64	0.49	9.44	1.35	1.38	27.75	18.52	1.48	23.18
CRJ	9.86	8.40	0.00	8.37	1.07	0.00	18.80	22.85	3.82	26.83
E145	7.43	11.23	0.20	8.31	0.54	0.51	14.85	26.39	2.94	27.60
F2TH	2.25	11.60	13.85	0.00	0.00	36.15	0.00	33.75	0.00	2.40
F900	23.20	4.50	0.00	0.00	0.00	0.00	0.00	67.50	0.00	4.80
FA20	23.20	4.50	0.00	0.00	0.00	0.00	0.00	72.30	0.00	0.00
FA50	13.85	13.85	0.00	0.00	0.00	0.00	23.10	33.75	0.00	15.45
G4	0.00	23.20	0.00	4.50	0.00	0.00	0.00	41.40	0.00	30.90
G5	15.48	9.58	0.00	2.65	0.00	0.00	27.23	45.06	0.00	0.00
H25C	8.05	12.73	0.00	6.93	0.00	0.00	11.55	19.28	10.35	31.11
LJ30	27.70	0.00	0.00	0.00	0.00	0.00	0.00	72.30	0.00	0.00
LJ35	5.30	0.00	13.85	8.55	0.00	36.15	15.45	0.00	0.00	20.70
LJ45	0.00	27.70	0.00	0.00	0.00	0.00	0.00	41.40	0.00	30.90
LJ55	0.00	27.70	0.00	0.00	0.00	0.00	0.00	43.00	0.00	29.30
LJ60	0.00	27.70	0.00	0.00	0.00	0.00	0.00	51.70	0.00	20.60
M1F	0.00	5.80	20.78	1.13	0.00	54.21	0.00	10.35	0.00	7.73
M80	0.00	2.52	2.52	22.66	0.00	6.57	22.91	0.00	0.00	42.82

Note: Alternative C, D, and G are Build Alternatives.

Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 3 – Fleet Mix by Runway), 2004/2005.

TABLE J.2-51
RUNWAY USE - ARRIVALS – 2013/2014 - ALTERNATIVE D

ARTS Code	Percent Runway Use							
	09L	09C	10L	10C	27L	27C	27R	28C
319	9.00	7.46	1.55	9.70	3.70	27.70	22.40	18.99
320	11.71	6.56	1.64	7.79	3.54	22.23	29.67	16.86
321	12.40	8.01	1.30	5.99	3.39	18.15	28.17	22.59
332	19.97	0.00	0.00	7.73	0.00	49.80	22.50	0.00
333	19.97	0.00	0.00	7.73	0.00	69.10	3.20	0.00
342	27.70	0.00	0.00	0.00	0.00	0.00	72.30	0.00
343	18.94	4.12	0.00	4.64	0.00	8.67	63.63	0.00
346	27.70	0.00	0.00	0.00	0.00	33.75	38.55	0.00
380	0.00	13.85	0.00	13.85	0.00	36.15	0.00	36.15
717	0.00	2.90	2.90	21.90	8.44	55.42	0.00	8.44
737	10.86	9.89	1.98	4.97	5.16	19.63	21.69	25.82
738	7.66	11.37	0.72	7.94	1.79	19.75	18.58	32.19
739	4.39	7.78	2.94	12.59	8.00	28.47	13.15	22.68
744	23.12	4.58	0.00	0.00	0.00	0.00	39.63	32.67
763	14.56	3.08	6.67	3.39	17.67	18.85	26.14	9.64
772	17.56	2.83	2.68	4.64	7.00	15.55	39.64	10.10
773	9.23	10.73	0.00	7.73	0.00	22.50	48.21	1.60
31F	0.00	0.00	27.70	0.00	72.30	0.00	0.0	0.00
74F	6.87	5.80	15.03	0.00	41.37	0.00	24.10	6.83
74M	4.50	0.00	0.00	23.20	0.00	67.50	4.80	0.00
75F	0.00	0.00	27.70	0.00	72.30	0.00	0.00	0.00
76F	0.00	0.00	27.70	0.00	72.30	0.00	0.00	0.00
A3F	0.64	3.96	18.50	4.60	50.96	11.01	0.00	10.33
BE30	10.73	0.00	0.00	16.97	0.00	22.50	24.10	25.70
BE40	27.70	0.00	0.00	0.00	0.00	0.00	72.30	0.00
BE58	0.00	0.00	27.70	0.00	72.30	0.00	0.00	0.00
C210	0.00	0.00	0.00	27.70	0.00	0.00	0.00	72.30
C550	13.85	13.85	0.00	0.00	0.00	0.00	69.90	2.40
C560	6.93	13.85	0.00	6.93	0.00	0.00	18.08	54.21
C56X	13.85	0.00	0.00	13.85	0.00	38.55	33.75	0.00
C650	0.00	19.22	0.00	8.48	0.00	12.05	0.00	60.25
C750	4.60	11.87	3.96	7.27	10.33	11.01	0.69	50.27
CL60	0.00	27.70	0.00	0.00	0.00	0.00	0.00	72.30
CR7	8.29	5.55	0.28	13.58	0.73	32.43	20.20	18.94
CR9	11.94	5.12	0.49	10.15	1.38	24.79	29.60	16.53
CRJ	9.83	8.56	0.00	9.31	0.00	21.99	22.21	28.10
E145	8.34	11.14	0.20	8.03	0.51	18.66	21.98	31.14
F2TH	2.25	11.60	13.85	0.00	36.15	0.00	33.75	2.40
F900	0.00	27.70	0.00	0.00	0.00	0.00	67.50	4.80
FA20	27.70	0.00	0.00	0.00	0.00	0.00	72.30	0.00
FA50	27.70	0.00	0.00	0.00	0.00	2.40	33.75	36.15
G4	0.00	27.70	0.00	0.00	0.00	0.00	0.00	72.30
G5	16.10	5.80	0.00	5.80	0.00	16.88	55.42	0.00
H25C	12.73	8.05	0.00	6.93	0.00	1.20	19.28	51.81
LJ30	27.70	0.00	0.00	0.00	0.00	0.00	72.30	0.00
LJ35	0.00	0.00	13.85	13.85	36.15	36.15	0.00	0.00
LJ45	0.00	27.70	0.00	0.00	0.00	0.00	0.00	72.30
LJ55	1.50	26.20	0.00	0.00	0.00	0.00	1.60	70.70
LJ60	1.50	26.20	0.00	0.00	0.00	0.00	24.10	48.20
M1F	0.00	6.93	20.78	0.00	54.21	0.00	0.00	18.08
M80	0.00	4.63	2.52	20.55	6.57	53.02	0.00	12.71

Note: Alternative C, D, and G are Build Alternatives.

Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 3 – Fleet Mix by Runway), 2004/2005.

TABLE J.2-52
RUNWAY USE - ARRIVALS – 2013/2014 - ALTERNATIVE G

ARTS Code	Percent Runway Use							
	09L	09C	10L	10C	27L	27C	27R	28C
319	8.61	7.10	1.58	10.40	3.70	27.22	22.40	18.99
320	10.95	6.90	1.57	8.28	3.54	22.23	29.67	16.86
321	11.70	7.90	1.30	6.80	3.39	18.15	28.17	22.59
332	19.97	0.00	0.00	7.73	0.00	49.80	22.50	0.00
333	12.23	0.00	0.00	15.47	0.00	69.10	3.20	0.00
342	27.70	0.00	0.00	0.00	0.00	0.00	72.30	0.00
343	23.06	0.00	0.00	4.64	0.00	8.67	63.63	0.00
346	27.70	0.00	0.00	0.00	0.00	33.75	38.55	0.00
380	0.00	13.85	0.00	13.85	0.00	36.15	0.00	36.15
717	0.85	2.90	3.04	20.91	8.44	55.42	0.00	8.44
737	9.20	9.57	1.98	6.95	5.16	19.63	21.69	25.82
738	7.45	11.84	0.66	7.75	1.79	19.75	18.58	32.18
739	3.73	8.21	2.97	12.80	8.00	28.46	13.15	22.68
744	18.42	9.28	0.00	0.00	0.00	0.00	39.63	32.67
763	13.18	2.81	6.23	5.48	17.67	18.85	26.14	9.64
772	17.36	4.52	2.68	3.14	7.00	15.55	39.65	10.10
773	16.97	3.00	0.00	7.73	0.00	22.50	48.20	1.60
31F	0.00	0.00	27.70	0.00	72.30	0.00	0.00	0.00
74F	2.97	7.49	17.24	0.00	41.37	0.00	24.10	6.83
74M	4.50	0.00	0.00	23.20	0.00	67.50	4.80	0.00
75F	0.00	0.00	27.70	0.00	72.30	0.00	0.00	0.00
76F	0.00	0.00	27.70	0.00	72.30	0.00	0.00	0.00
A3F	0.49	4.44	18.66	4.11	50.96	11.01	0.00	10.33
BE30	9.23	1.50	0.00	16.97	0.00	22.50	24.10	25.70
BE40	27.70	0.00	0.00	0.00	0.00	0.00	72.30	0.00
BE58	0.00	0.00	27.70	0.00	72.30	0.00	0.00	0.00
C210	1.70	0.00	0.00	26.00	0.00	0.00	0.00	72.30
C550	13.85	13.85	0.00	0.00	0.00	0.00	69.90	2.40
C560	6.93	12.45	0.00	8.33	0.00	0.00	18.08	54.21
C56X	13.85	11.60	0.00	2.25	0.00	38.55	33.75	0.00
C650	0.00	18.47	0.00	9.23	0.00	12.05	0.00	60.25
C750	3.80	12.51	3.96	7.43	10.33	11.01	0.69	50.27
CL60	0.00	26.60	0.00	1.10	0.00	0.00	0.00	72.30
CR7	8.53	6.32	0.28	12.57	0.73	32.43	20.20	18.94
CR9	12.19	3.89	0.49	11.12	1.38	24.79	29.61	16.53
CRJ	9.34	9.35	0.00	9.01	0.00	21.99	22.21	28.10
E145	7.80	11.55	0.20	8.15	0.51	18.66	21.98	31.15
F2TH	11.60	2.25	13.85	0.00	36.15	0.00	33.75	2.40
F900	0.00	27.70	0.00	0.00	0.00	0.00	67.50	4.80
FA20	23.20	4.50	0.00	0.00	0.00	0.00	72.30	0.00
FA50	13.85	13.85	0.00	0.00	0.00	2.40	33.75	36.15
G4	0.00	26.60	0.00	1.10	0.00	0.00	0.00	72.30
G5	15.83	6.08	0.00	5.80	0.00	16.88	55.41	0.00
H25C	7.78	11.88	0.00	8.05	0.00	1.20	19.48	51.81
LJ30	27.70	0.00	0.00	0.00	0.00	0.00	72.30	0.00
LJ35	0.00	0.00	13.85	13.85	36.15	36.15	0.00	0.00
LJ45	0.00	24.30	0.00	3.40	0.00	0.00	0.00	72.30
LJ55	0.00	27.70	0.00	0.00	0.00	0.00	1.60	70.70
LJ60	7.73	18.83	0.00	1.13	0.00	0.00	24.10	48.21
M1F	0.00	6.65	20.78	0.28	54.21	0.00	0.00	18.08
M80	0.41	2.52	2.52	22.25	6.57	53.02	0.00	12.71

Note: Alternative C, D, and G are Build Alternatives.

Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 3 – Fleet Mix by Runway), 2004/2005.

TABLE J.2-53
RUNWAY USE - ARRIVALS – 2018/2019 – ALTERNATIVE A (NO ACTION ALTERNATIVE)

ARTS Code	Percent Runway Use								
	04R	09L	09R	14L	14R	22L	22R	27L	27R
319	11.87	4.55	10.57	1.61	9.21	2.16	31.86	19.93	8.24
31F	0.00	0.00	27.00	0.00	20.40	0.00	0.00	0.00	52.60
320	9.47	4.97	12.55	1.88	7.87	1.65	34.35	17.14	10.12
321	13.50	3.46	10.04	1.61	8.99	1.98	27.99	22.68	9.75
332	0.00	0.00	27.00	3.30	0.00	0.00	17.10	46.60	6.00
333	0.00	0.00	27.00	3.30	0.00	0.00	32.63	31.07	6.00
342	0.00	0.00	27.00	3.30	0.00	0.00	17.10	52.60	0.00
343	0.00	0.00	27.00	3.30	0.00	0.00	17.10	46.60	6.00
346	0.00	0.00	27.00	2.48	17.93	0.00	11.65	40.94	0.00
380	0.00	0.00	27.00	0.00	20.40	0.00	0.00	52.60	0.00
38F	0.00	0.00	27.00	0.00	20.40	0.00	0.00	52.60	0.00
737	12.46	1.04	13.50	1.65	8.88	1.32	24.68	23.82	12.65
738	13.03	2.15	11.82	1.72	8.21	1.53	15.89	20.49	25.16
739	14.96	1.66	10.39	1.37	10.32	2.50	9.41	23.68	25.71
744	2.45	0.00	24.55	0.00	20.40	0.00	21.18	8.60	22.82
74F	0.00	0.00	27.00	0.28	18.70	0.00	1.43	16.53	36.06
74M	0.00	0.00	27.00	3.30	0.00	0.00	63.70	0.00	6.00
75F	0.00	0.00	27.00	0.00	20.40	0.00	0.00	0.00	52.60
763	7.80	0.00	19.20	2.05	6.57	1.14	14.78	16.50	31.96
76F	0.00	0.00	27.00	0.00	20.40	0.00	0.00	0.00	52.60
772	4.70	0.00	22.30	1.36	10.86	0.74	15.54	10.94	33.56
773	0.00	0.00	27.00	1.10	13.60	0.00	36.77	19.53	2.00
A3F	7.71	0.00	19.29	0.94	14.57	2.44	2.44	15.03	37.58
BE40	0.00	0.00	27.00	3.30	0.00	0.00	63.70	0.00	6.00
BE58	0.00	0.00	27.00	0.00	20.40	0.00	0.00	0.00	52.60
C210	27.00	0.00	0.00	3.30	0.00	8.55	8.55	52.60	0.00
C550	0.00	13.50	13.50	1.65	10.20	0.00	31.85	23.30	6.00
C560	13.50	0.00	13.50	0.83	11.03	0.00	8.55	51.09	1.50
C56X	13.50	0.00	13.50	3.30	0.00	0.00	40.40	26.30	3.00
C650	29.27	0.00	0.00	0.00	9.76	0.00	12.36	46.44	2.17
C750	19.29	0.00	7.71	0.94	17.01	2.44	6.66	37.58	8.37
CL60	27.00	0.00	0.00	0.00	20.40	0.00	0.00	49.60	3.00
CR7	14.16	2.64	10.20	1.78	8.34	2.27	29.52	25.84	5.25
CR9	12.21	3.76	11.03	2.35	4.66	2.23	34.25	24.61	4.90
CRJ	12.96	3.78	10.26	1.39	10.81	0.34	27.43	23.96	9.07
E145	14.46	2.41	10.13	1.06	12.93	1.53	26.52	23.29	7.67
F2TH	0.00	0.00	27.00	0.00	20.40	0.00	0.00	23.30	29.30
F900	0.00	0.00	27.00	0.00	20.40	0.00	46.60	0.00	6.00
FA20	0.00	27.00	0.00	0.00	20.40	0.00	46.60	0.00	6.00
FA50	0.00	0.00	27.00	1.65	10.20	0.00	55.15	0.00	6.00
G4	27.00	0.00	0.00	0.00	20.40	0.00	0.00	52.60	0.00
G5	0.00	6.75	20.25	1.65	10.20	0.00	31.85	23.30	6.00
H25C	13.50	0.00	13.50	1.65	10.20	0.00	20.20	37.95	3.00
LJ30	0.00	0.00	27.00	0.00	20.40	0.00	46.60	0.00	6.00
LJ35	13.50	0.00	13.50	0.00	11.85	8.55	0.00	26.30	26.30
LJ45	27.00	0.00	0.00	0.00	3.30	0.00	17.10	52.60	0.00
LJ55	18.00	9.00	0.00	0.00	20.40	0.00	15.53	35.07	2.00
LJ60	20.25	6.75	0.00	0.83	15.30	0.00	15.93	39.44	1.50
M1F	9.00	0.00	18.00	0.00	14.70	0.00	5.70	2.00	50.60

Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 3 – Fleet Mix by Runway), 2004/2005.

TABLE J.2-54
RUNWAY USE - ARRIVALS – 2018/2019 - ALTERNATIVE C

ARTS Code	Percent Runway Use									
	9L	9C	10L	10C	10R	27L	27C	27R	28L	28C
319	9.28	7.52	1.71	8.18	1.02	4.08	19.77	22.79	5.57	20.08
320	10.53	6.25	1.88	7.40	1.64	4.25	24.48	23.22	2.59	17.76
321	9.22	7.60	1.09	8.79	0.99	2.85	19.61	22.26	5.45	22.14
332	16.43	0.00	0.00	7.07	4.20	0.00	60.40	11.90	0.00	0.00
333	12.23	0.00	0.00	11.27	4.20	0.00	58.80	13.50	0.00	0.00
342	27.70	0.00	0.00	0.00	0.00	0.00	46.20	26.10	0.00	0.00
343	17.26	0.41	0.00	5.45	4.58	0.00	46.06	25.80	0.00	0.44
346	6.43	12.73	0.00	2.25	6.30	0.00	33.45	37.64	0.00	1.20
380	0.00	14.50	0.00	13.20	0.00	0.00	43.38	0.00	0.00	28.92
717	0.71	1.41	1.55	22.35	1.68	4.82	25.36	0.00	0.00	42.12
737	3.42	9.36	4.17	9.50	1.24	10.86	19.71	13.11	4.07	24.56
738	7.52	10.96	0.65	7.87	0.70	1.85	19.96	18.92	4.59	26.98
739	4.11	8.17	3.05	11.86	0.50	7.13	11.41	18.92	2.48	32.37
744	15.63	12.07	0.00	0.00	0.00	0.00	16.56	44.55	0.00	11.19
763	11.40	0.12	5.54	7.92	2.72	17.59	36.33	12.36	0.00	6.02
772	12.25	7.98	3.46	3.75	0.26	9.04	22.48	30.05	0.86	9.87
773	19.00	8.70	0.00	0.00	0.00	0.00	13.80	46.60	0.00	11.90
31F	0.00	0.00	27.70	0.00	0.00	72.30	0.00	0.00	0.00	0.00
38F	0.00	0.00	0.00	27.70	0.00	0.00	0.00	0.00	0.00	72.30
74F	5.88	4.99	16.83	0.00	0.00	47.79	3.45	18.08	0.00	2.98
74M	4.50	0.00	0.00	23.20	0.00	0.00	67.50	4.80	0.00	0.00
75F	0.00	0.00	27.70	0.00	0.00	72.30	0.00	0.00	0.00	0.00
76F	0.00	0.00	27.70	0.00	0.00	72.30	0.00	0.00	0.00	0.00
A3F	0.00	3.96	19.14	4.60	0.00	50.96	5.10	0.00	0.00	16.24
BE40	27.70	0.00	0.00	0.00	0.00	0.00	67.50	4.80	0.00	0.00
BE58	0.00	0.00	27.70	0.00	0.00	72.30	0.00	0.00	0.00	0.00
C210	0.00	0.00	0.00	27.70	0.00	0.00	0.00	0.00	41.40	30.90
C550	19.15	2.25	0.00	0.00	6.30	0.00	20.70	36.15	0.00	15.45
C560	6.93	13.85	0.00	6.93	0.00	0.00	0.00	38.76	10.35	23.18
C56X	13.85	0.00	0.00	7.55	6.30	0.00	23.10	15.45	20.70	13.05
C650	0.00	22.33	0.00	5.37	0.00	0.00	5.15	20.70	13.80	32.65
C750	3.31	11.23	3.96	9.20	0.00	10.33	8.83	23.66	0.00	29.48
CL60	0.00	27.70	0.00	0.00	0.00	0.00	0.00	41.40	0.00	30.90
CR7	8.15	6.56	0.21	11.57	1.21	0.60	19.22	23.43	3.52	25.53
CR9	9.49	3.75	0.48	12.15	1.83	1.38	30.09	16.09	2.67	22.07
CRJ	10.16	8.76	0.10	7.64	1.05	0.00	20.25	25.05	3.07	23.92
E145	6.18	11.85	0.21	8.98	0.47	0.54	17.10	23.16	2.80	28.71
F2TH	2.25	11.60	13.85	0.00	0.00	36.15	0.00	36.15	0.00	0.00
F900	10.60	17.10	0.00	0.00	0.00	0.00	0.00	67.50	0.00	4.80
FA20	23.20	4.50	0.00	0.00	0.00	0.00	0.00	72.30	0.00	0.00
FA50	19.15	8.55	0.00	0.00	0.00	0.00	20.70	38.55	0.00	13.05
G4	0.00	23.20	0.00	4.50	0.00	0.00	0.00	41.40	0.00	30.90
G5	21.28	3.78	0.00	2.65	0.00	0.00	33.75	38.54	0.00	0.00
H25C	6.93	12.73	0.00	8.05	0.00	0.00	18.08	28.41	0.00	25.80
LJ30	27.70	0.00	0.00	0.00	0.00	0.00	0.00	72.30	0.00	0.00
LJ35	0.00	0.00	13.85	7.55	6.30	36.15	15.45	0.00	0.00	20.70
LJ45	0.00	27.70	0.00	0.00	0.00	0.00	0.00	41.40	0.00	30.90
LJ55	0.00	26.20	0.00	1.50	0.00	0.00	13.80	29.20	0.00	29.30
LJ60	0.00	20.78	0.00	6.93	0.00	0.00	7..73	38.76	0.00	25.80
M1F	0.00	9.23	18.47	0.00	0.00	48.20	0.00	13.80	0.00	10.30

Note: Alternative C, D, and G are Build Alternatives.

Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 3 – Fleet Mix by Runway), 2004/2005.

TABLE J.2-55
RUNWAY USE - ARRIVALS – 2018/2019 - ALTERNATIVE D

ARTS Code	Percent Runway Use							
	9L	9C	10L	10C	27L	27C	27R	28C
319	10.19	7.02	1.62	8.87	3.89	22.37	26.89	19.15
320	11.52	6.21	1.81	8..16	4.47	21.46	29.47	16.90
321	9.89	7.42	1.09	9.30	2.85	23.97	24.42	21.06
332	27.70	0.00	0.00	0.00	0.00	46.60	25.70	0.00
333	19.97	0.00	0.00	7.73	0.00	45.00	27.30	0.00
342	4.50	0.00	23.20	0.00	0.00	4.80	67.50	0.00
343	22.25	1.23	0.00	4.22	0.00	19.72	52.14	0.44
346	16.10	5.80	0.00	5.80	0.00	2.40	68.70	1.20
380	0.00	7.34	0.00	20.36	0.00	43.38	0.00	28.92
717	0.30	1.55	1.55	24.31	4.82	58.47	0.00	9.00
737	4.91	8.76	4.02	10.00	11.54	23.78	9.72	27.27
738	8.32	10.88	0.72	7.78	1.85	21.98	17.98	30.49
739	4.42	8.77	3.05	11.45	7.13	26.32	11.47	27.39
744	19.84	7.86	0.00	0.00	0.00	0.00	48.69	23.61
763	15.34	0.12	5.24	7.00	17.59	25.14	25.79	3.78
772	16.05	5.49	3.46	2.70	9.04	9.54	36.95	16.77
773	24.70	3.00	0.00	0.00	0.00	0.00	46.60	25.70
31F	0.00	0.00	27.70	0.00	72.30	0.00	0.00	0.00
38F	0.00	0.00	0.00	27.70	0.00	0.00	0.00	72.30
74F	6.87	5.80	15.03	0.00	47.79	0.00	18.08	6.43
74M	4.50	0.00	0.00	23.20	0.00	67.50	4.80	0.00
75F	0.00	0.00	27.70	0.00	72.30	0.00	0.00	0.00
76F	0.00	0.00	27.70	0.00	72.30	0.00	0.00	0.00
A3F	0.64	3.96	18.50	4.60	50.96	11.01	0.00	10.33
BE40	27.70	0.00	0.00	0.00	0.00	67.50	4.80	0.00
BE58	0.00	0.00	27.70	0.00	72.30	0.00	0.00	0.00
C210	2.25	0.00	0.00	25.45	0.00	0.00	0.00	72.30
C550	13.85	13.85	0.00	0.00	0.00	0.00	36.15	36.15
C560	6.93	13.85	0.00	6.93	0.00	0.00	18.08	54.21
C56X	13.85	0.00	0.00	13.85	0.00	2.40	36.15	33.75
C650	0.00	23.08	0.00	4.62	0.00	12.05	0.00	60.25
C750	0.64	15.19	3.96	7.91	10.33	20.66	0.00	41.31
CL60	0.00	27.70	0.00	0.00	0.00	0.00	0.00	72.30
CR7	9.28	6.69	0.15	11.59	0.38	27.58	24.97	19.36
CR9	10.60	3.43	0.45	13.23	1.71	35.09	21.77	13.72
CRJ	12.18	8.60	0.00	6.93	0.00	21.02	22.76	28.51
E145	6.37	12.19	0.21	8.93	0.54	20.84	16.31	34.61
F2TH	2.25	11.60	13.85	0.00	36.15	0.00	36.15	0.0
F900	23.20	4.50	0.00	0.00	0.00	0.00	67.50	4.80
FA20	27.70	0.00	0.00	0.00	0.00	0.00	72.30	0.00
FA50	13.85	13.85	0.00	0.00	0.00	0.00	38.55	33.75
G4	0.00	27.70	0.00	0.00	0.00	0.00	0.00	72.30
G5	16.10	5.80	0.00	5.80	0.00	33.75	38.55	0.00
H25C	8.05	12.73	0.00	6.93	0.00	18.08	18.08	36.13
LJ30	27.70	0.00	0.00	0.00	0.00	0.00	72.30	0.00
LJ35	0.00	0.00	13.85	13.85	36.15	36.15	0.00	0.00
LJ45	0.00	27.70	0.00	0.00	0.00	0.00	0.00	72.30
LJ55	1.50	26.20	0.00	0.00	0.00	0.00	1.60	70.70
LJ60	1.13	19.65	0.00	6.93	0.00	18.08	18.08	36.13
M1F	0.00	9.23	18.47	0.00	48.20	0.00	0.00	24.10

Note: Alternative C, D, and G are Build Alternatives.

Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 3 – Fleet Mix by Runway), 2004/2005.

TABLE J.2-56
RUNWAY USE - ARRIVALS – 2018/2019 - ALTERNATIVE G

ARTS Code	Percent Runway Use							
	9L	9C	10L	10C	27L	27C	27R	28C
319	9.32	8.06	1.65	8.67	3.89	22.37	26.89	19.15
320	9.75	7.01	1.87	9.06	4.47	21.46	29.48	16.90
321	10.52	6.87	1.09	9.22	2.85	23.97	24.42	21.06
332	12.23	0.00	0.00	15.47	0.00	46.60	25.70	0.00
333	19.97	0.00	0.00	7.73	0.00	45.00	27.30	0.00
342	27.70	0.00	0.00	0.00	0.00	4.80	67.50	0.00
343	22.15	0.41	0.00	5.15	0.00	19.72	52.13	0.44
346	19.93	6.08	0.00	1.70	0.00	2.40	68.69	1.20
380	0.00	16.62	0.00	11.08	0.00	43.38	0.00	28.92
717	0.68	1.55	1.62	23.85	4.82	58.48	0.00	9.00
737	5.00	8.64	4.08	9.98	11.54	23.78	9.72	27.26
738	7.79	11.21	0.66	8.04	1.85	21.98	17.98	30.49
739	2.73	9.55	2.61	12.81	7.13	26.32	11.47	27.38
744	14.25	13.45	0.00	0.00	0.00	0.00	48.69	23.61
763	15.87	0.12	5.36	6.34	17.59	25.14	25.80	3.78
772	12.85	7.24	3.46	4.15	9.04	9.54	36.95	16.77
773	15.47	12.23	0.00	0.00	0.00	0.00	46.60	25.70
31F	0.00	0.00	27.70	0.00	72.30	0.00	0.00	0.00
38F	0.00	0.00	0.00	27.70	0.00	0.00	0.00	72.30
74F	3.16	7.30	17.24	0.00	47.79	0.00	18.08	6.43
74M	4.50	0.00	0.00	23.20	0.00	67.50	4.80	0.00
75F	0.00	0.00	27.70	0.00	72.30	0.00	0.00	0.00
76F	0.00	0.00	27.70	0.00	72.30	0.00	0.00	0.00
A3F	0.49	3.96	18.66	4.60	50.95	11.01	0.00	10.33
BE40	27.70	0.00	0.00	0.00	0.00	67.50	4.80	0.00
BE58	0.00	0.00	27.70	0.00	72.30	0.00	0.00	0.00
C210	1.70	0.00	0.00	26.00	0.00	0.00	0.00	72.30
C550	13.85	13.85	0.00	0.00	0.00	0.00	36.15	36.15
C560	7.78	13.85	0.00	6.08	0.00	0.00	18.08	54.21
C56X	15.55	0.00	0.00	12.15	0.00	2.40	36.15	33.75
C650	0.00	23.08	0.00	4.62	0.00	12.05	0.00	60.25
C750	0.49	15.67	3.96	7.59	10.33	20.66	0.00	41.30
CL60	0.00	27.70	0.00	0.00	0.00	0.00	0.00	72.30
CR7	9.69	6.51	0.15	11.35	0.38	27.59	24.97	19.36
CR9	10.51	3.19	0.45	13.55	1.71	35.10	21.77	13.72
CRJ	9.71	9.85	0.00	8.14	0.00	21.02	22.76	28.52
E145	5.30	12.54	0.21	9.66	0.54	20.84	16.31	34.60
F2TH	0.00	13.85	13.85	0.00	36.15	0.00	36.15	0.00
F900	23.20	4.50	0.00	0.00	0.00	0.00	67.50	4.80
FA20	0.00	27.70	0.00	0.00	0.00	0.00	72.30	0.00
FA50	13.85	13.85	0.00	0.00	0.00	0.00	38.55	33.75
G4	0.00	23.20	0.00	4.50	0.00	0.00	0.00	72.30
G5	10.03	11.88	0.00	5.80	0.00	33.75	38.54	0.00
H25C	12.73	7.78	0.00	7.20	0.00	18.08	18.08	36.13
LJ30	27.70	0.00	0.00	0.00	0.00	0.00	72.30	0.00
LJ35	0.00	0.00	13.85	13.85	36.15	36.15	0.00	0.00
LJ45	0.00	23.20	0.00	4.50	0.00	0.00	0.00	72.30
LJ55	0.00	27.33	0.00	0.37	0.00	0.00	1.60	70.70
LJ60	1.13	20.23	0.00	6.35	0.00	18.08	18.08	36.13
M1F	0.00	9.23	18.47	0.00	48.20	0.00	0.00	24.10

Note: Alternative C, D, and G are Build Alternatives.

Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Table 3 – Fleet Mix by Runway), 2004/2005.

J.2.2.2 Ground Support Equipment/Auxiliary Power Units

Ground support equipment is a term used to describe the vehicles that service aircraft after arrival and before departure at an airport. Auxiliary power units are on-board engines that provide power to an aircraft while at the gate. Emissions from the ground support equipment and auxiliary power units were calculated using EDMS. The number, types of ground support equipment and auxiliary power units, fuel type, and operational times that are used to service each category of aircraft were based on O'Hare specific information. Emissions from these sources are based on the number and type of equipment used to service each aircraft along with the amount of time the equipment is in use per aircraft landing-takeoff cycle.

EDMS contains a database of the emission factors for each type of ground support equipment. The O'Hare specific data[12] that was used to determine the number and fuel type of the equipment servicing the various types of commercial aircraft and the amount of time each piece of equipment spends with individual aircraft were developed from onsite observations conducted by the City of Chicago. This data is presented in **Table J.2-57**. The type of ground support equipment at O'Hare includes aircraft tugs, baggage tugs, fuel trucks, food trucks, cargo trailers, water trucks, lavatory trucks, cabin service, belt loaders, and cargo loaders. The types, operational time, and use of ground support equipment are dependent on aircraft type (i.e., passenger wide body, passenger narrow body, commuter, or cargo).

The air quality analysis with the proposed Build Alternatives (Alternatives C, D, and G) assumes that terminal gate improvements will include the provision of preconditioned air and 400 Hertz power at every gate. Use of this equipment will eliminate the need for aircraft to use their own power at the gate except for short periods of time during engine start-up and shut-down. The operating time for the auxiliary power units was calculated for each terminal and applied accordingly.[13] It was assumed that operations involving cargo or general aviation aircraft, and those aircraft hard standing would have additional needs for this type of equipment. As such, the analysis of cargo, general aviation, and hardstand aircraft assumed the EDMS default time in use of 26 minutes. **Table J.2-58** provides the assigned auxiliary power unit operating times by terminal/activity.

[12] Ground Service Equipment Site Survey, Chicago O'Hare International Airport, Landrum & Brown, Inc., July 2000.

[13] U.S. Federal Aviation Administration, 1998. Personal communication between J. A. Draper (Federal Aviation Administration) to J. R. Pehrson (Camp Dresser & McKee Inc.), November 4, 1998. Subject: Air Quality Modeling Protocol for Criteria Pollutants for LAX Master Plan EIS/EIR.

TABLE J.2-57
TIMES IN MODE - GROUND SUPPORT EQUIPMENT

Aircraft Type	Ground Support Equipment	Minutes in Use per LTO(a)	
		Gasoline	Diesel
Narrow Body Passenger	Aircraft Tug Narrow	2	1
	Baggage Tug	21	6
	Belt Loader	32	15
	Cabin Service	11	3
	Food Truck	10	5
	Fuel Truck	11	3
	Lavatory Truck	4	2
	Water Truck	4	1
Wide Body Passenger	Aircraft Tug Wide	3	2
	Baggage Tug	34	9
	Belt Loader	33	16
	Cabin Service	35	9
	Container Loader	65	9
	Food Truck	21	11
	Fuel Truck	19	6
	Lavatory Truck	6	3
	Water Truck	5	1
Narrow Body Cargo	Aircraft Tug Narrow	2	1
	Baggage Tug	31	9
	Belt Loader	68	33
	Fuel Truck	26	8
	Cargo Loader	26	--
Wide Body Cargo	Aircraft Tug Wide	4	2
	Baggage Tug	87	24
	Belt Loader	40	19
	Container Loader	132	19
	Fuel Truck	37	10
	Cargo Loader	135	--
	Container Transporter	154	--
Commuter	Baggage Tug	8	3
	Belt Loader	5	2
	Cabin Service	2	1
	Food Truck	3	2
	Fuel Truck	5	1
	Lavatory Truck	2	1
	Ground Power Unit	26	--

Note: -- = not applicable
(a) LTO = landing/takeoff cycle (2 operations).
Source: Landrum and Brown GSE Survey, February 29, 2000.

TABLE J.2-58
TIME IN MODE - AUXILIARY POWER UNITS

Terminal	Number of Gates		APU Time in Mode (minutes)
	With Power	Without Power	
1	47	14	11.36
2	22	17	15.28
3	54	17	11.55
4	12	0	7.00
5/6	34	0	7.00
7	33	0	7.00

Source: Environmental Science Associates, Inc. [TPC] review of information received from Landrum and Brown [CCT], 2004/2005.

J.2.2.3 Motor Vehicle Emissions

The level of emissions that would result from the daily operation of motor vehicles with or without the proposed alternatives depends on several factors including the volume of vehicles, the vehicle fleet mix, the motor vehicle emission rates, travel distance, speed, the level of congestion/delay, the year of analysis, and meteorological factors. Notably, the evaluation of motor vehicle emissions does not attempt to segregate airport-related motor vehicle activity from background (non-airport-related) vehicles. Rather, the activities of all motor vehicles (Airport and background) were evaluated within the study area (**Exhibit J.2-1**).

Motor vehicle emissions for all on- and off-Airport roadways were a result of the emission factors corresponding to the roadway speed, the year of analysis, and the vehicle-miles-traveled on those roadways. Emissions occurring at terminal curbsides were calculated using estimates of the amount of time a vehicle spends idling at the curbside and the type of vehicle (shuttle, taxi, private auto, etc.). Emissions due to parking facilities were based on three components: 1) the amount of time a vehicle spends idling at the parking facility, 2) the distance a vehicle travels within the parking facility at a given speed, and 3) the type of vehicle.

As discussed previously, the future year analysis (2007, 2009, 2013, and 2018) also assumed that buses would be required to transport passengers to/from remotely parked aircraft. The number of buses required to service the remote gate locations was based on a capacity of 25 persons per bus and the capacity of the aircraft using the remote gate. The buses were assumed to travel from the remote gate (located to the east of Terminal 5) to Terminal 2.

For the purpose of the emissions inventory and dispersion analysis, EDMS calculates motor vehicles using area-specific temperature data. For this analysis, an annual average temperature of 49.1 degrees F[14] (the mean daily temperature over the period 1971-2000) was assumed.

Airport Area Roadways

Average 24-hour traffic volumes and speeds for the average weekday condition for the on- and off-Airport roadway network were used in the EDMS. O'Hare-specific on-airport traffic data were provided by Kimley-Horn and Associates, Inc. [CCT] after review and acceptance by the TPC.

[14] http://www.crh.noaa.gov/lot/climate/ord_norms.htm

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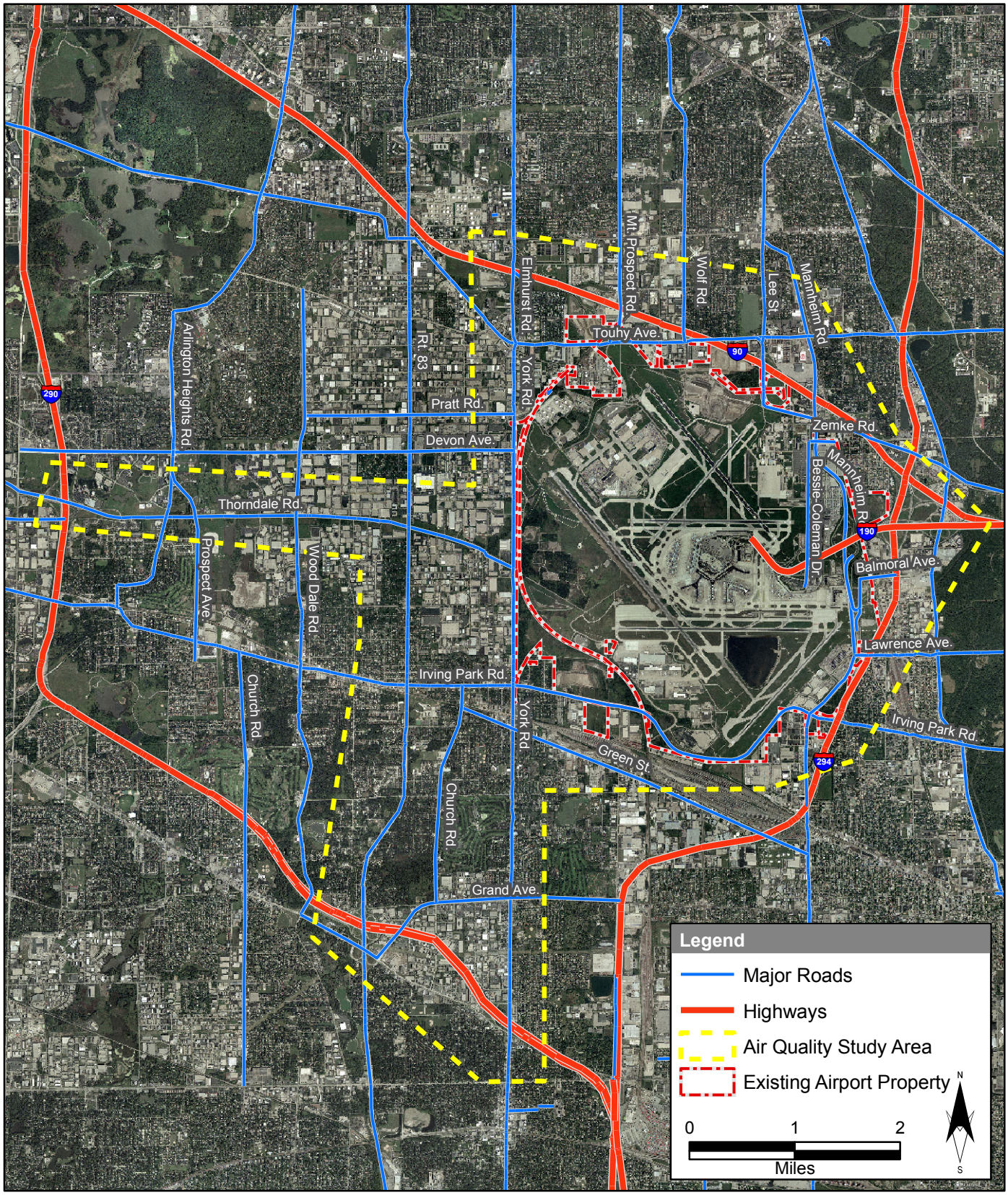

Source: Aerial Express, September 2002. StreetmapUSA, ESRI 2003. Environmental Science Associates [TPC], 2004.

Chicago O'Hare International Airport

O'Hare Modernization Environmental Impact Statement

Air Quality Study Area for Potential Surface Transportation Impacts

▶ **Exhibit J.2-1**

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The emission inventories include contributions from vehicles on major arterials in the vicinity of the Airport. Average weekday 24-hour volumes and average travel speeds were provided for arterials such as Interstate 190, Interstate 90, Bessie Coleman Drive, Elmhurst Road, Irving Park Road, Touhy Avenue, Mannheim Road, and many others. For future with improvement scenarios, the western airport access introduces new roadway configurations and regional arterials. The western access roadway network was assessed as part of the future build scenarios of the air quality analysis. O'Hare-specific regional traffic data was provided by the Chicago Department of Aviation's surface transportation modeling and planning group (Kimley-Horn and Associates, Inc. [CCT]) after review and acceptance by the TPC. The data included motor vehicle volumes and speeds for the roadways at the Airport and on roadways in the near vicinity. Terminal area motor vehicle curbside queues were also included in the roadway network. The traffic data used in the air quality analysis for Airport area roadways are in agreement with the approach and methodology in **Appendix G, Surface Transportation**.

Roadway Temporal Factors

In order to represent actual traffic activity throughout the entire calendar year; hour-of-day, day of-week, and month-of-year temporal factors were developed to scale the peak-hour roadway volumes so that the volumes also represent off-peak activity. These factors were used to calculate hourly concentrations at each sensitive receptor location for the refined dispersion modeling analysis. **Table J.2-59** provides the hourly roadway temporal factors used for each analysis year. Temporal factors are presented for off-airport and on-airport roadways. In 2013 and 2018, on-airport roadways were further designated as west or east terminal area for each of the Build Alternatives (Alternatives C, D and G). Curbsides and parking lots used on-airport temporal factors. Daily and monthly temporal factors were assumed to be the same as the aircraft temporal factors for all alternatives.

TABLE J.2-59
ROADWAY HOURLY OPERATIONAL PROFILES

Hour	2002		2007/2008				2009/2010			
			Alternative A		Alternatives C, D, and G		Alternative A		Alternatives C, D, and G	
	On-Airport	Off-Airport	On-Airport	Off-Airport	On-Airport	Off-Airport	On-Airport	Off-Airport	On-Airport	Off-Airport
1	0.0550	0.1585	0.0596	0.1587	0.0830	0.1587	0.0602	0.1587	0.0830	0.1587
2	0.0564	0.0982	0.0163	0.0983	0.0277	0.0983	0.0150	0.0983	0.0281	0.0983
3	0.0203	0.0813	0.0108	0.0815	0.0138	0.0815	0.0109	0.0815	0.0127	0.0815
4	0.0825	0.1024	0.0678	0.1025	0.0705	0.1025	0.0684	0.1025	0.0675	0.1025
5	0.3285	0.2174	0.2669	0.2177	0.2697	0.2177	0.2654	0.2177	0.2757	0.2177
6	0.5919	0.5358	0.5014	0.5365	0.5159	0.5365	0.5267	0.5365	0.5443	0.5365
7	0.6715	0.8682	0.6192	0.8680	0.6321	0.8680	0.6402	0.8680	0.7342	0.8680
8	0.8104	0.9537	0.7046	0.9551	0.7248	0.9551	0.7305	0.9551	0.7778	0.9551
9	0.9059	0.8640	0.8591	0.8652	0.8672	0.8652	0.8495	0.8652	0.8776	0.8652
10	0.9479	0.6886	0.8686	0.6896	0.8797	0.6896	0.8755	0.6896	0.8959	0.6896
11	0.8205	0.6325	0.7886	0.6334	0.7994	0.6334	0.7852	0.6334	0.7834	0.6334
12	0.8104	0.6816	0.7439	0.6826	0.7538	0.6826	0.7291	0.6826	0.7398	0.6826
13	0.8003	0.7377	0.7832	0.7388	0.7732	0.7388	0.7852	0.7388	0.7736	0.7388
14	1.0000	0.7700	0.8984	0.7711	0.9018	0.7711	0.9083	0.7711	0.8931	0.7711
15	0.9117	0.8640	0.9499	0.8652	0.9696	0.8652	0.9918	0.8652	0.9916	0.8652
16	0.9537	0.9467	0.9051	0.9480	0.9585	0.9480	0.9138	0.9480	0.9719	0.9480
17	0.9551	1.0000	0.9770	1.0000	1.0000	1.0000	0.9699	1.0000	0.9958	1.0000
18	0.9971	0.9804	1.0000	0.9817	0.9959	0.9817	1.0000	0.9817	1.0000	0.9817
19	0.9074	0.7307	0.8455	0.7317	0.8465	0.7317	0.8482	0.7317	0.8425	0.7317
20	0.8191	0.5344	0.7425	0.5351	0.7372	0.5351	0.7469	0.5351	0.7426	0.5351
21	0.5543	0.4446	0.5285	0.4452	0.5629	0.4452	0.5417	0.4452	0.5795	0.4452
22	0.2504	0.4502	0.2236	0.4508	0.2393	0.4508	0.2298	0.4508	0.2461	0.4508
23	0.1288	0.3997	0.1016	0.4003	0.1134	0.4003	0.1012	0.4003	0.1153	0.4003
24	0.0926	0.2847	0.0881	0.2851	0.0954	0.2851	0.0862	0.2851	0.0928	0.2851

Note: Alternative A = No Action, Alternative C, D, and G are Build Alternatives.
Source: Environmental Science Associates, Inc. [TPC] analysis of Surface Transportation (Kimley-Horn – Exhibit 9), 2004/2005.

TABLE J.2-59 (CONTINUED)
ROADWAY HOURLY OPERATIONAL PROFILES

	2013/2014					2018/2019				
	Alternative A		Alternative C, D, and G			Alternative A		Alternative C, D, and G		
Hour	On-Airport	Off-Airport	On-Airport (East)	On-Airport (West)	Off-Airport	On-Airport	Off-Airport	On-Airport (East)	On-Airport (West)	Off-Airport
1	0.0907	0.1587	0.0821	0.0634	0.1587	0.0542	0.1615	0.0994	0.0732	0.1615
2	0.1314	0.0983	0.0291	0.0172	0.0983	0.0132	0.0983	0.0327	0.0203	0.0983
3	0.1038	0.0815	0.0132	0.0040	0.0815	0.0092	0.0815	0.0128	0.0041	0.0815
4	0.0631	0.1025	0.0675	0.0555	0.1025	0.0687	0.1025	0.0781	0.0623	0.1025
5	0.2431	0.2177	0.2596	0.2312	0.2177	0.2563	0.2177	0.3026	0.2547	0.2177
6	0.4823	0.5365	0.4967	0.4927	0.5365	0.4954	0.5365	0.5369	0.4986	0.5365
7	0.5979	0.8680	0.6702	0.6790	0.8680	0.5865	0.8680	0.7017	0.6748	0.8680
8	0.6702	0.9551	0.7073	0.7358	0.9551	0.7054	0.9551	0.7528	0.7425	0.9551
9	0.7477	0.8652	0.8238	0.8705	0.8652	0.7820	0.8652	0.8608	0.8659	0.8652
10	0.7740	0.6896	0.8185	0.8402	0.6896	0.8098	0.6896	0.8565	0.8293	0.6896
11	0.7070	0.6334	0.8132	0.8283	0.6334	0.8203	0.6334	0.8736	0.8455	0.6334
12	0.6597	0.6826	0.7073	0.7279	0.6826	0.7398	0.6826	0.8153	0.8062	0.6826
13	0.7043	0.7388	0.7099	0.7001	0.7388	0.7450	0.7388	0.7855	0.7940	0.7388
14	0.8502	0.7711	0.8702	0.8692	0.7711	0.8177	0.7711	0.8764	0.8740	0.7711
15	0.9488	0.8652	1.0000	1.0000	0.8652	0.9273	0.8652	1.0000	1.0000	0.8652
16	0.9014	0.9480	0.9099	0.9022	0.9480	0.9247	0.9480	0.9545	0.8984	0.9480
17	0.9737	1.0000	0.9457	0.9260	1.0000	0.9855	1.0000	0.9815	0.9024	1.0000
18	1.0000	0.9817	0.9775	0.9419	0.9817	1.0000	0.9817	1.0000	0.8957	0.9817
19	0.8476	0.7317	0.8093	0.8018	0.7317	0.8587	0.7317	0.8807	0.8008	0.7317
20	0.7030	0.5351	0.6331	0.6684	0.5351	0.7199	0.5351	0.7585	0.7453	0.5351
21	0.5059	0.4452	0.4821	0.4848	0.4452	0.5020	0.4452	0.5526	0.5393	0.4452
22	0.2076	0.4508	0.2238	0.2087	0.4508	0.2061	0.4508	0.2486	0.2249	0.4508
23	0.1222	0.4003	0.1099	0.0938	0.4003	0.0978	0.4003	0.1222	0.1016	0.4003
24	0.1051	0.2851	0.0874	0.0700	0.2851	0.0845	0.2851	0.1207	0.0962	0.2851

Note: Alternative A = No Action, Alternative C, D, and G are Build Alternatives.
Source: Environmental Science Associates, Inc. [TPC] analysis of Surface Transportation Report (Kimley-Horn – Exhibit 6-10), 2004/2005.

Roadway Vehicle Mix

Network-specific motor vehicle fleet mixes were developed for use in MOBILE6.2. The off-Airport network regional fleet mix was provided by the IEPA. The on-Airport network used an O'Hare-specific mix provided by Kimley-Horn and Associates, Inc. [CCT] after review and acceptance by the TPC. **Table J.2-60A** and **J.2.60B** provide the on- and off-Airport motor vehicle fleet mix used in the analysis for the original/compressed and delayed schedules. The Airport-specific analysis considered all motor vehicles operating within the study area including passenger automobiles, shuttles, trucks, limousines, buses, and taxi cabs. The traffic data used in the air quality analysis for Airport area roadways are in agreement with the approach and methodology in **Appendix G, Surface Transportation.**

Terminal Curbside Facilities

Curbside volumes and vehicle dwell times[15] were developed for each Airport terminal. The same dwell times were used for all years of analysis. Demand volumes and average travel speeds for each terminal curbside location were developed by Kimley-Horn and Associates, Inc. [CCT] (after review and acceptance by the TPC) for the average 24-hour condition in each year of analysis. The traffic data used in the air quality analysis for Airport area roadways are in agreement with the approach and methodology in **Appendix G.**

Airport Parking Facilities

The parking facilities modeled in the emission inventories and dispersion analyses included the proposed and existing public and employee parking garages and surface lots. Some parking facilities also have exit toll booths that result in parking lot exit queues, which were modeled as line sources.

Peak-hour traffic volumes entering and exiting the parking facilities were developed using data provided by Kimley-Horn and Associates, Inc. [CCT] (after review and acceptance by the TPC). Motor vehicle volumes for the multi-level parking garages were provided for each level separately. Travel distances within parking facilities and travel speeds for all parking facilities were also provided by Kimley-Horn and Associates, Inc. [CCT] (after review and acceptance by the TPC). The traffic data used in the air quality analysis for all parking facilities are in agreement with the approach and methodology in **Appendix G**.

[15] OMP 2002 Surface Transportation Survey, Kimley-Horn and Associates, Inc. [CCT], Revised January 2003.

TABLE J.2-60A
MOTOR VEHICLE FLEET MIX – ORIGINAL AND COMPRESSED SCHEDULES

	Fleet Mix (Percentages)									
			2007				2009			
	2002		Alternative A		Alternatives C, D, and G		Alternative A		Alternatives C, D, and G	
Vehicle Type	Off-site	On-site	Off-site	On-Site	Off-site	On-Site	Off-site	On-Site	Off-site	On-Site
LDGV	48.72	76.91	41.55	80.92	41.55	80.92	38.61	80.93	38.61	80.93
LDGT12	32.07	18.00	37.43	15.00	37.43	14.00	39.62	15.00	39.62	14.00
LDGT34	10.94	3.94	12.76	2.96	12.76	3.94	13.51	2.96	13.51	3.94
HDGV	2.08	0.76	2.04	0.76	2.04	0.76	2.03	0.77	2.03	0.77
LDDV	0.06	0.09	0.04	0.08	0.04	0.08	0.04	0.07	0.04	0.07
LDDT	0.16	0.06	0.19	0.04	0.19	0.08	0.20	0.04	0.20	0.06
HDDV	5.41	0.24	5.43	0.24	5.43	0.24	5.43	0.23	5.43	0.23
MC	0.56	0.00	0.56	0.00	0.56	0.00	0.56	0.00	0.56	0.00

	Fleet Mix (Percentages)									
	2013					2018				
	Alternative A		Alternatives C, D, and G			Alternative A		Alternatives C, D, and G		
Vehicle Type	Off-site	On-site	Off-site	On-site: West	On-site: East	Off-site	On-site	Off-site	On-site: West	On-site: East
LDGV	34.09	81.93	34.09	80.93	79.93	30.46	81.93	30.46	81.93	80.93
LDGT12	42.95	15.00	42.95	18.00	15.00	45.67	15.00	45.67	18.00	15.00
LDGT34	14.68	2.96	14.68	0.99	4.93	15.58	2.96	15.58	0.00	3.94
HDGV	2.02	0.00	2.02	0.00	0.00	2.02	0.00	2.02	0.00	0.00
LDDV	0.03	0.07	0.03	0.07	0.07	0.03	0.07	0.03	0.07	0.07
LDDT	0.22	0.04	0.22	0.01	0.07	0.23	0.04	0.23	0.00	0.06
HDDV	5.45	0.00	5.45	0.00	0.00	5.45	0.00	5.45	0.00	0.00
MC	0.56	0.00	0.56	0.00	0.00	0.56	0.00	0.56	0.00	0.00

Notes LDGV - Light duty gasoline vehicle
LDGT12 - Light duty gasoline trucks less than 6,000 pounds
LDGT34 – Light duty gasoline trucks greater than 6,000 pounds
HDGV - Heavy duty gasoline vehicle
LDDV - Light duty diesel vehicle
LDDT - Light duty diesel truck
HDDV - Heavy duty diesel vehicle
MC - Motorcycle

Source: Environmental Science Associates, Inc. [TPC] analysis, 2004, based on off-site vehicle mix data provided by IEPA (Kimley-Horn Exhibit 6-9) and onsite vehicle mix data provided by Kimley-Horn (Exhibit 6-8).
Alternative A = No Action, Alternative C, D, and G are Build Alternatives.

TABLE J.2-60B
MOTOR VEHICLE FLEET MIX – DELAYED SCHEDULE

	Fleet Mix (Percentages)									
			2008				2010			
	2002		Alternative A		Alternatives C, D, and G		Alternative A		Alternatives C, D, and G	
Vehicle Type	Off-site	On-site	Off-site	On-Site	Off-site	On-Site	Off-site	On-Site	Off-site	On-Site
LDGV	48.72	76.91	40.08	80.93	40.08	80.93	37.48	81.18	37.48	80.81
LDGT12	32.07	18.00	38.53	15.00	38.53	14.00	40.45	15.00	40.45	14.63
LDGT34	10.94	3.94	13.14	2.96	13.14	3.94	13.80	2.96	13.80	3.70
HDGV	2.08	0.76	2.04	0.77	2.04	0.77	2.03	0.58	2.03	0.58
LDDV	0.06	0.09	0.04	0.08	0.04	0.08	0.04	0.07	0.04	0.07
LDDT	0.16	0.06	0.20	0.04	0.20	0.07	0.21	0.04	0.21	0.06
HDDV	5.41	0.24	5.43	0.24	5.43	0.24	5.44	0.17	5.44	0.17
MC	0.56	0.00	0.56	0.00	0.56	0.00	0.56	0.00	0.56	0.00

	Fleet Mix (Percentages)									
	2014					2019				
	Alternative A		Alternatives C, D, and G			Alternative A		Alternatives C, D, and G		
Vehicle Type	Off-site	On-site	Off-site	On-site: West	On-site: East	Off-site	On-site	Off-site	On-site: West	On-site: East
LDGV	33.18	81.93	33.18	81.18	80.18	29.55	81.93	29.55	82.18	81.18
LDGT12	43.63	15.00	43.63	18.00	15.00	46.35	15.00	46.35	18.00	15.00
LDGT34	14.91	2.96	14.91	0.74	4.68	15.81	2.96	15.81	0.00	3.69
HDGV	2.02	0.00	2.02	0.00	0.00	2.02	0.00	2.02	0.00	0.00
LDDV	0.03	0.07	0.03	0.07	0.07	0.03	0.07	0.03	0.07	0.07
LDDT	0.22	0.04	0.22	0.01	0.07	0.23	0.04	0.23	0.00	0.06
HDDV	5.45	0.00	5.45	0.00	0.00	5.45	0.00	5.45	0.00	0.00
MC	0.56	0.00	0.56	0.00	0.00	0.56	0.00	0.56	0.00	0.00

Notes LDGV - Light duty gasoline vehicle
LDGT12 - Light duty gasoline trucks less than 6,000 pounds
LDGT34 – Light duty gasoline trucks greater than 6,000 pounds
HDGV - Heavy duty gasoline vehicle
LDDV - Light duty diesel vehicle
LDDT - Light duty diesel truck
HDDV - Heavy duty diesel vehicle
MC - Motorcycle

Source: Environmental Science Associates, Inc. [TPC] analysis, 2004, based on off-site vehicle mix data provided by IEPA (Kimley-Horn Exhibit 6-9) and onsite vehicle mix data provided by Kimley-Horn (Exhibit 6-8).
Alternative A = No Action, Alternative C, D, and G are Build Alternatives.

Hourly on-airport roadway temporal factors were used for the parking lots. Daily and monthly temporal factors were assumed to be the same as the aircraft temporal factors for all alternatives. The parking lots use their own specific fleet mix, provided by Kimley-Horn and Associates, Inc. [CCT] (after review and acceptance by the TPC). Generally, the vehicle mix was assumed to be 100 percent passenger vehicles, 100 percent trucks, or 90 percent passenger vehicles and 10 percent trucks, depending on the purpose of the parking facility. Average 24-hour demand volumes, speeds, and average travel distances (or engine-on time) for each major parking facility (including the taxicab and limousine holding areas) were used.

Motor Vehicle Emission Factors

The MOBILE6.2 program was used to determine volatile organic compounds (as hydrocarbons), sulfur dioxide, particulate matter, nitrogen oxides, and carbon monoxide emission factors for free-flowing motor vehicles. MOBILE6.2 input parameters were selected in accordance with guidance provided by the IEPA.[16] Idle emission factors were calculated using the MOBILE6.2 program and the recommended procedure for idle factors contained in the MOBILE5 Information Sheet #2 (dated July 30 1993).[17] Particulate matter emissions include tire and brake wear. **Table J.2-61A** and **J.2-61B** provide the emission factors used in the analysis for the original/compressed and delayed schedules. The data includes emission factors for roadways, parking lots, and curbsides. Once pollutant emission factors for motor vehicles were determined, they were used as input into the EDMS program for both the emission inventory and dispersion modeling analyses.

The following Chicago non-attainment area-specific MOBILE6.2 files were obtained from the IEPA. These data were used in the analysis or used to develop O'Hare-specific data and are incorporated by reference in this EIS:[18]

- FVMTCH07.def – A file containing vehicle-miles-traveled data by facility type (freeway, arterial, local roads, and ramps) for each hour of the day. Data in this file were used to create O'Hare-specific data.
- CHIRD01.d – A file containing the registration distribution of vehicles by year within the Chicago non-attainment area. Differences in this file and default MOBILE6.2 files only exist for light-duty vehicles and light-duty trucks.

[16] M. Rogers, Illinois Environmental Protection Agency. November 2, 2000.
[17] MOBILE5 Information Sheet No. 2: Estimating Idle Emission Factors Using MOBILE5, U.S. Environmental Protection Agency, Office of Air Quality and Radiation, Office of Mobile Sources, Emission Planning and Strategies Division. Ann Arbor, MI. July 1993.
[18] Sam Long, IEPA, November 22, 2002.

TABLE J.2-61A
ROADWAY EMISSION FACTORS (GRAMS PER MILE) – ORIGINAL AND COMPRESSED SCHEDULES

Year	Vehicle Speed	Carbon Monoxide	Hydrocarbons	Nitrogen Oxides	Sulfur Dioxide	Particulate Matter 10 Microns or Less	Particulate Matter 2.5 Microns or Less
2002	20	10.78	1.040	1.900	0.0580	0.0540	0.0324
	25	10.42	0.940	1.790	0.0580	0.0540	0.0324
	30	10.38	0.880	1.720	0.0580	0.0540	0.0324
	35	10.63	0.840	1.870	0.0580	0.0540	0.0324
	40	11.28	0.810	1.900	0.0580	0.0540	0.0324
	45	11.96	0.790	1.950	0.0580	0.0540	0.0324
	50	12.67	0.780	2.030	0.0580	0.0540	0.0324
	55	13.40	0.760	2.150	0.0580	0.0540	0.0324
	60	14.20	0.750	2.310	0.0580	0.0540	0.0324
	65	15.04	0.750	2.540	0.0580	0.0540	0.0324
	Local	9.04	1.300	1.770	0.0580	0.0540	0.0324
	Ramp	18.04	0.980	1.790	0.0580	0.0540	0.0324
2007	20	7.41	0.659	1.210	0.0086	0.0415	0.0249
	25	7.09	0.599	1.133	0.0087	0.0415	0.0249
	30	7.00	0.560	1.088	0.0087	0.0414	0.0248
	35	7.10	0.533	1.071	0.0087	0.0414	0.0248
	40	7.48	0.515	1.091	0.0087	0.0414	0.0248
	45	7.88	0.500	1.130	0.0087	0.0414	0.0248
	50	8.29	0.487	1.189	0.0087	0.0414	0.0248
	55	8.73	0.477	1.272	0.0087	0.0414	0.0248
	60	9.22	0.471	1.389	0.0087	0.0414	0.0248
	65	9.74	0.467	1.554	0.0087	0.0414	0.0248
	Local	6.74	0.821	1.182	0.0086	0.0415	0.0249
	Ramp	10.34	0.588	1.152	0.0087	0.0414	0.0248
2009	20	6.72	0.538	0.975	0.0087	0.0373	0.0224
	25	6.42	0.490	0.913	0.0087	0.0373	0.0224
	30	6.31	0.459	0.876	0.0088	0.0372	0.0223
	35	6.39	0.436	0.863	0.0088	0.0372	0.0223
	40	6.73	0.422	0.879	0.0088	0.0372	0.0223
	45	7.08	0.411	0.912	0.0088	0.0372	0.0223
	50	7.44	0.401	0.960	0.0088	0.0372	0.0223
	55	7.82	0.393	1.030	0.0088	0.0372	0.0223
	60	8.26	0.390	1.120	0.0088	0.0372	0.0223
	65	8.71	0.387	1.260	0.0088	0.0372	0.0223
	Local	6.25	0.668	0.962	0.0087	0.0373	0.0224
	Ramp	9.01	0.478	0.924	0.0087	0.0372	0.0223
2013	20	5.65	0.357	0.583	0.0089	0.0320	0.0192
	25	5.36	0.325	0.546	0.0089	0.0320	0.0192
	30	5.25	0.304	0.524	0.0089	0.0320	0.0192
	35	5.29	0.288	0.516	0.0089	0.0320	0.0192
	40	5.55	0.280	0.526	0.0089	0.0320	0.0192
	45	5.83	0.272	0.545	0.0089	0.0320	0.0192
	50	6.11	0.267	0.574	0.0089	0.0320	0.0192
	55	6.41	0.263	0.614	0.0089	0.0320	0.0192
	60	6.76	0.262	0.671	0.0089	0.0320	0.0192
	65	7.13	0.262	0.749	0.0089	0.0320	0.0192
	Local	5.49	0.445	0.579	0.0089	0.0320	0.0192
	Ramp	7.16	0.312	0.550	0.0089	0.0320	0.0192
2018	20	4.91	0.275	0.324	0.0090	0.0284	0.0170
	25	4.64	0.249	0.303	0.0090	0.0284	0.0170
	30	4.52	0.231	0.291	0.0090	0.0284	0.0170
	35	4.53	0.219	0.285	0.0090	0.0284	0.0170
	40	4.74	0.211	0.291	0.0090	0.0284	0.0170
	45	4.97	0.205	0.302	0.0090	0.0284	0.0170
	50	5.19	0.201	0.317	0.0090	0.0284	0.0170
	55	5.44	0.198	0.338	0.0090	0.0284	0.0170
	60	5.74	0.198	0.367	0.0090	0.0284	0.0170
	65	6.05	0.199	0.407	0.0090	0.0284	0.0170
	Local	4.91	0.347	0.322	0.0090	0.0284	0.0170
	Ramp	6.03	0.233	0.309	0.0090	0.0284	0.0170

Source: Environmental Science Associates, Inc. [TPC] analysis, 2004/2005.

TABLE J.2-61B
ROADWAY EMISSION FACTORS (GRAMS PER MILE) – DELAYED SCHEDULE

Year	Vehicle Speed	Carbon Monoxide	Hydrocarbons	Nitrogen Oxides	Sulfur Dioxide	Particulate Matter 10 Microns or Less	Particulate Matter 2.5 Microns or Less
2002	20	10.78	1.040	1.900	0.0580	0.0540	0.0324
	25	10.42	0.940	1.790	0.0580	0.0540	0.0324
	30	10.38	0.880	1.720	0.0580	0.0540	0.0324
	35	10.63	0.840	1.870	0.0580	0.0540	0.0324
	40	11.28	0.810	1.900	0.0580	0.0540	0.0324
	45	11.96	0.790	1.950	0.0580	0.0540	0.0324
	50	12.67	0.780	2.030	0.0580	0.0540	0.0324
	55	13.40	0.760	2.150	0.0580	0.0540	0.0324
	60	14.20	0.750	2.310	0.0580	0.0540	0.0324
	65	15.04	0.750	2.540	0.0580	0.0540	0.0324
	Local	9.04	1.300	1.770	0.0580	0.0540	0.0324
	Ramp	18.04	0.980	1.790	0.0580	0.0540	0.0324
2008	20	7.09	0.598	1.086	0.0087	0.0392	0.0235
	25	6.77	0.544	1.018	0.0087	0.0392	0.0235
	30	6.67	0.510	0.976	0.0087	0.0391	0.0235
	35	6.75	0.484	0.962	0.0087	0.0391	0.0235
	40	7.11	0.468	0.980	0.0087	0.0391	0.0235
	45	7.49	0.455	1.015	0.0087	0.0391	0.0235
	50	7.88	0.443	1.068	0.0087	0.0391	0.0235
	55	8.28	0.434	1.144	0.0087	0.0391	0.0235
	60	8.75	0.430	1.250	0.0087	0.0391	0.0235
	65	9.23	0.427	1.399	0.0087	0.0391	0.0235
	Local	6.53	0.744	1.067	0.0087	0.0391	0.0235
	Ramp	9.66	0.532	1.032	0.0087	0.0391	0.0235
2010	20	6.42	0.483	0.864	0.0088	0.0357	0.0214
	25	6.11	0.440	0.809	0.0088	0.0357	0.0214
	30	6.01	0.412	0.776	0.0088	0.0356	0.0214
	35	6.07	0.392	0.765	0.0088	0.0356	0.0214
	40	6.39	0.379	0.779	0.0088	0.0356	0.0214
	45	6.72	0.369	0.808	0.0088	0.0356	0.0214
	50	7.06	0.361	0.851	0.0088	0.0356	0.0214
	55	7.41	0.354	0.912	0.0088	0.0356	0.0214
	60	7.82	0.352	0.998	0.0088	0.0356	0.0214
	65	8.25	0.350	1.117	0.0088	0.0357	0.0214
	Local	6.04	0.599	0.856	0.0088	0.0357	0.0214
	Ramp	8.45	0.427	0.817	0.0088	0.0356	0.0214
2014	20	5.45	0.330	0.510	0.0089	0.0309	0.0185
	25	5.17	0.300	0.478	0.0089	0.0309	0.0185
	30	5.06	0.280	0.458	0.0089	0.0309	0.0185
	35	5.09	0.266	0.451	0.0089	0.0309	0.0185
	40	5.33	0.257	0.460	0.0089	0.0309	0.0185
	45	5.59	0.251	0.477	0.0089	0.0309	0.0185
	50	5.87	0.245	0.501	0.0089	0.0309	0.0185
	55	6.15	0.242	0.536	0.0089	0.0309	0.0185
	60	6.48	0.242	0.585	0.0089	0.0309	0.0185
	65	6.84	0.242	0.652	0.0089	0.0309	0.0185
	Local	5.34	0.412	0.506	0.0089	0.0309	0.0185
	Ramp	6.84	0.286	0.481	0.0089	0.0309	0.0185
2019	20	4.82	0.267	0.297	0.0090	0.0282	0.0169
	25	4.55	0.242	0.278	0.0090	0.0282	0.0169
	30	4.44	0.224	0.266	0.0090	0.0282	0.0169
	35	4.45	0.212	0.261	0.0090	0.0282	0.0169
	40	4.66	0.204	0.267	0.0090	0.0282	0.0169
	45	4.87	0.198	0.276	0.0090	0.0282	0.0169
	50	5.10	0.194	0.290	0.0090	0.0282	0.0169
	55	5.34	0.191	0.309	0.0090	0.0282	0.0169
	60	5.63	0.191	0.335	0.0090	0.0282	0.0169
	65	5.94	0.192	0.370	0.0090	0.0282	0.0169
	Local	4.83	0.338	0.295	0.0090	0.0282	0.0169
	Ramp	5.92	0.225	0.285	0.0090	0.0282	0.0169

Source: Environmental Science Associates, Inc. [TPC] analysis, 2004/2005.

- HVMTCH7.sl – A file containing vehicle-miles-traveled by hour of the day. As with the FVMTCH07.def file, the information was used to create O'Hare-specific data.
- ILLOBDIM.d – A file containing specific data related to the Inspection and Maintenance program in the Chicago non-attainment area. It was assumed that 91.5 percent of the gasoline-powered on-highway traffic in the airport area is subject to the Inspection and Maintenance program (to be consistent with Illinois Environmental Protection Agency's regional analysis).[19]
- SVMTCH07.def – A file containing vehicle-miles-traveled data by speed by hour of the day. Information in this file was used to develop O'Hare-specific data.

Using MOBILE6.2, emission factors were developed for a set of vehicle speeds. In turn, each roadway segment was assigned a roadway type based on roadway description. Volume and vehicle speed data were assigned to each road portion by Kimley-Horn and Associates, Inc. [CCT]. Together, the vehicle volume, the coordinates (start and end), vehicle speed, and emission factors were incorporated into the EDMS system to determine the emissions and dispersion air quality impacts.

Operating modes, including hot/cold start percentages, were assumed as MOBILE6.2 national defaults, except parking lots used a 100 percent cold start, where the average stay was considered to be over two hours. General data (provided by IEPA)[20] for the calculation of motor vehicle emission factors through MOBILE6.2 included the following:

- Reid vapor pressure of 8.1
- Stage II refueling program applies
- Inspection and Maintenance program applies
- Anti-tampering program applies
- Low altitude location
- Ambient temperature range of 70 and 96º Fahrenheit
- 95 percent absolute humidity
- Gasoline sulfur content of 129 parts per million
- Diesel sulfur content of 500 parts per million (for 2002 condition) and 15 parts per million (for all future conditions).

J.2.2.4 Stationary Source Emissions

For stationary sources, such as fuel storage and handling, the Heating and Refrigeration Plant, and training fires, the emissions were based on an assumed amount of annual fuel use.

[19] Meeting with IEPA on December 20, 2002.
[20] Sam Long, IEPA, November 22, 2002.

Heating and Refrigeration Plant

The Heating and Refrigeration Plant at O'Hare Airport burns natural gas as its primary fuel and uses distillate No. 2 fuel oil as a back-up fuel. Emission factors for this facility were obtained from the Department of Aviation's Clean Air Act Permit Program Permit Application[21]. The Department of Aviation provided 2002 actual annual fuel use data for the facility. As such, the actual fuel use data was used to calculate emissions for the 2002 condition. Fuel usage rates in future years for the No Action Alternative (Alternative A) were assumed to be the same as the 2002 condition. With the proposed alternatives, the 2002 fuel use level was used to approximate future levels by scaling the existing fuel usage by the increase in floor space that would be added to the heating and cooling requirements (based on increases in square footage of the new terminals). It was also assumed that a new Heating Plant would be required for the proposed West Terminal facilities. The size of this plant was assumed to be proportional to the floor space for the new terminal. These data are presented in **Table J.2-62**. Additional miscellaneous boilers were also included; at the elevated parking structure and the former military property. Notably, the only difference in the assumptions for the original and delayed schedules that are related to stationary sources is the level of Jet A usage. This difference would result from differences in level of aircraft operations.

TABLE J.2-62
STATIONARY SOURCE FUEL THROUGHPUT

	Throughput				
Source	**2002 and Alternative A**	**2007/2008 Alternatives C, D, G**	**2009/2010 Alternatives C, D, G**	**2013/2014 Alternatives C, D, G**	**2018/2014 Alternatives C, D, G**
Elevated Parking Structure	8,562,100 ft3	8,562,100 ft3	8,562,100 ft3	8,562,100 ft3	8,562,100 ft3
Heating and Refrigeration Plant	983,154,418 ft^3 -NG 871 gallons -oil	998,310,961 ft^3 -NG 884 gallons-oil	1,106,831,808 ft^3 -NG 981 gallons- oil	1,540,713,111 ft^3 -NG 1,365 gallons-oil	1,540,713,111 ft^3 -NG 1,365 gallons -oil
Former Military Property	38,068 ft^3	38,068 ft^3	38,068 ft^3	38,068 ft^3	38,068 ft^3
Former Military Property	38,849 ft^3	38,849 ft^3	38,849 ft^3	38,849 ft^3	38,849 ft^3
Turbine	26 gallons	26 gallons	26 gallons	26 gallons	26 gallons
West Terminal	NA	NA	81,826,307 ft^3 -NG	163,652,614 ft^3 -NG	163,652,614 ft^3 -NG
Jet-A Storage Tank	920,727.000 gal 971,910.000 gal	1,024,210,000 gal 1,038,750,000 gal	1,055,110,000 gal 1,070,300,000 gal	1,118,510,000 gal 1,134,390,000 gal	1,191,910,000 gal 1,205,690,000 gal
AvGas Tank	11,309 gal	11,309 gal	11,309 gal	11,309 gal	11,309 gal

Notes: NA - Not applicable
NG – natural gas
gal = gallon
Alternative A = No Action, Alternative C, D, and G are Build Alternatives.

Source: Environmental Science Associates, Inc. [TPC] review of Growth Rates for Air Quality Stationary Sources, dated January 6, 2004 provided by Landrum and Brown, Inc. [CCT].

[21] Title V – CAAPP Permit, City of Chicago Department of Aviation, O'Hare International Airport, I.D. No. 031600FQP, Illinois Environmental Protection Agency, June 18, 2001.

Annual fuel consumption was combined with the appropriate emission factors to obtain power plant emissions. The Heating and Refrigeration Plant at the Airport was assumed to run continuously throughout the calendar year. Therefore, the peak hour fuel usage used in the dispersion modeling remained constant. The exhaust parameters used in the dispersion modeling analysis of the Heating and Refrigeration Plant are provided in **Table J.2-63**.

TABLE J.2-63
STATIONARY SOURCE EXHAUST PARAMETERS

Source	Number of Units	Size	Stack Height (m)	Stack Diameter (m)	Exit Temperature (F)	Exit Velocity (m/s)
Elevated Parking Structure	2	16.7 MBtu/hr	7.62	0.61	260	15.0
Heating and Refrigeration Plant	8	94.8 MBtu/hr	12.2	1.37	535	11.0
Former Military Property	2	24 MBtu/hr	26.2	0.610	500	15.0
Former Military Property	1	4.0 MBtu/hr	7.62	0.610	500	15.0
Turbine	1	1,800 kw	12.2	1.37	535	11.0
West Terminal	1	94.8 MBtu/hr	12.2	1.37	535	11.0
Jet-A Storage Tank	1	NA	14.6	10.0	NA	1
AvGas Tank	1	NA	1.00	2.44	NA	1

Note: NA - Not Applicable
Source: Title V – CAAPP Permit, City of Chicago Department of Aviation, O'Hare International Airport, I.D. No. 031600FQP, Illinois Environmental Protection Agency, June 18, 2001.

Fuel Storage and Handling Facilities

The sources of volatile organic compounds emissions from the storage and handling of fuel include breathing and working losses for storage tanks, and losses from the filling of tanker trucks. Volatile organic compounds emissions from fuel storage and handling were calculated using the EDMS model.

Annual fuel usage data for JetA fuel and aviation gasoline were provided by Landrum and Brown, Inc. based on City of Chicago records for the evaluation of year 2002 conditions. JetA and aviation gasoline fuel throughputs for future analysis years were projected based on the forecast growth in aircraft operations. The annual fuel throughputs used in this analysis are also provided in **Table J.2-63.** The annual fuel usage and the appropriate emission factors were used to calculate fuel storage and handling volatile organic compounds emissions.[22]

Training Fires

Training of Airport fire and rescue staff requires burning propane fuel to simulate fires from burning aircraft during an emergency. Annual fuel usage data for propane fuel consumed in training fires were obtained from City of Chicago Department of Aviation records, and were

[22] User's Guide to TANKS, Storage Tank Emissions Calculation Software Version 4.0. U.S. Environmental Protection Agency, Office of air Quality Planning and Standards, Research Triangle Park, NC, April 7, 1999.

determined to be 250,000 gallons per year[23] for the year 2002. As no changes in training are expected in future years, the fuel usage was assumed to be constant for all future conditions.

Emergency Turbine

The Airport has an emergency turbine for backup power. This turbine uses diesel fuel and is located at the Heating and Refrigeration Plant. Annual fuel usage data for diesel fuel consumed by the turbine were obtained from Chicago Department of Aviation records, and were determined to be approximately 700 gallons per year[24] for the year 2002. As no changes in usage are expected in future years, the fuel usage was maintained constant for all future conditions.

J.2.2.5 Construction Emissions

Data regarding the number of pieces and types of construction equipment to be used on the project, the deployment schedule of equipment (monthly and annually), and the approximate daily operating time (including power level or usage factor) were estimated for each individual construction project based on a schedule of construction activity. These estimates were prepared by the City of Chicago's consulting team (CCT) by project phase, by subcomponent, and by month. The evaluated project timeline (construction activity schedule) for the Original and Delayed Schedules is provided in **Table J.2-64** and **Table J.2-65.**

[23] Title V – CAAPP Permit, City of Chicago Department of Aviation, O'Hare International Airport, I.D. No. 031600FQP, Illinois Environmental Protection Agency, June 18, 2001.

[24] Title V – CAAPP Permit, City of Chicago Department of Aviation, O'Hare International Airport, I.D. No. 031600FQP, Illinois Environmental Protection Agency, June 18, 2001.

TABLE J.2-64
OVERVIEW OF PROPOSED CONSTRUCTION PLAN – ORIGINAL SCHEDULE

Proposed Project	Preliminary Construction Schedule	
	Start Date	End Date
PHASE 1A – New North Runway 9L/27R and Associated Taxiway Construction		
JAWA Water Main Relocation	July Year 1	May Year 2
Security Related Improvements	July Year 1	December Year 2
Willow Higgins Creek Relocation	July Year 1	June Year 3
Runway Pavement and Shoulders	July Year 2	November Year 3
Taxiway Pavement and Shoulders	July Year 2	November Year 3
New Roadways and Related Infrastructure	April Year 3	November Year 3
North Airfield Lighting Vault	November Year 1	October Year 3
FAA Control Tower	October Year 1	October Year 3
North Basin Expansion	May Year 2	November Year 2
PHASE 1B – Extension to Existing Runway 9R/27L (New Runway 10L/28R) and Associated Taxiway		
Runway Pavement and Shoulders Extension	April Year 4	November Year 4
Taxiway Pavement and Shoulders Extension	April Year 4	November Year 4
Irving Park/York Road Construction	September Year 1	June Year 3
Union Pacific Railroad Relocation	June Year 1	June Year 3
PHASE 1C – New Closely-Spaced South Runway 10C/28C and Associated Taxiways and Holdpads		
St. Johannes Cemetery and Resthaven Cemetery Relocations	June Year 3	November Year 5
Cargo and Maintenance Facility Relocation	July Year 1	December Year 4
South Detention Basin	July Year 1	August Year 3
Runway Pavement, Shoulders, and Holdpads	September Year 2	November Year 5
Taxiway Pavement and Shoulders	September Year 2	November Year 5
South Airfield Lighting Vault	July Year 2	July Year 4
New Roadways and Related Infrastructures	July Year 2	August Year 5
New Central Basin	March Year 4	July Year 5
Bensenville Ditch Relocation	July Year 1	March Year 3
Demolition: Buildings: fire station (602), cargo simulation (603), lighting vault (604), fueling station (606), electrical utilities (608), UAL Cargo (610), basement fill-in (610), Fed Ex metroplex (611), Fed Ex freight (612), MW Cargo (613)	March Year 2	August Year 2
PHASE 1 – West Terminal – West Satellite Concourse		
West Satellite Concourse (T4)	March Year 4	November Year 5
Energy Facility	July Year 4	February Year 5
ATS Station (Active AOA)	December Year 2	February Year 5
ATS Station (West Terminal)	December Year 2	August Year 4
ATS Station (Terminal No. 7)	April Year 3	April Year 4
ATS Tunnel (Bored)	March Year 3	October Year 3
ATS Maintenance Center	June Year 3	June Year 4
ATS System	July Year 4	January Year 6
Fuel Farm Improvements	July Year 1	October Year 3
PHASE 2A – Extension to Exiting Runway 9L/27R (New Runway 9R/27L) and Associated Taxiway		
Runway Pavement and Shoulders Extension	July Year 7	November Year 9
Taxiway Pavement and Shoulders Extension	July Year 7	November Year 9

TABLE J.2-64
OVERVIEW OF PROPOSED CONSTRUCTION PLAN – ORIGINAL SCHEDULE

Proposed Project	Preliminary Construction Schedule	
	Start Date	End Date
PHASE 2B – New Closely-Spaced North Runway 9C/27C and Associated Taxiways and Holdpad		
GPS Antenna	July Year 1	September Year 1
Cargo and Maintenance Facility Relocation – Site work, parking lots, concrete aprons for and including the construction of the following replacement buildings: Fire Station (702), Flight Kitchen (741), AAL Hangar Maintenance (725), UAL Hangar Maintenance (750), UAL Ground Maintenance (744), AAL Ground Maintenance (723), Flight Kitchen (742), UAL Personnel Building (746), Lift Station (728)	October Year 3	October Year 5
Demolition – moving from old bldgs to new buildings and demo of the old following bldgs: Fire Station (702), Flight Kitchen (741), AAL Hangar Maintenance (725), Lift Station (728) AAL Ground Maintenance (723), UAL Personnel Bldg (746), UAL Hangar Maintenance (750), Flight Kitchen (742) and UAL Ground Maintenance (744)	September Year 4	February Year 5
Runway Pavement and Shoulders and Holdpad	June Year 7	November Year 9
Taxiway Pavement and Shoulders	June Year 7	November Year 9
Runway 14R/32L Demolition	April Year 9	October Year 9
Runway 14R/32L Taxiway Pavement and Shoulder Demolition	April Year 9	October Year 9
New Roadways and Related Infrastructure	September Year 7	October Year 9
Willow Creek Relocation	April Year 6	November Year 7
New North Detention Basin	May Year 6	August Year 8
Future Airport Building move to OMP 9C/27C	July Year 7	October Year 9
New Roads and Related Parking	June Year 8	September Year 9
PHASE 2C – New South Runway 10R/28L		
Security Related Improvements	January Year 7	March Year 7
Runway Pavement and Shoulders	April Year 8	November Year 9
Taxiway Pavement and Shoulders	April Year 8	November Year 9
New Roadways and Related Infrastructure	August Year 8	July Year 9
FAA Control Tower	September Year 7	September Year 9
Rotating Beacon	July Year 1	September Year 1
Delta Cargo Facility	July Year 8	November Year 9
Apron Pavement	February Year 9	June Year 9
PHASE 2 – West Terminal		
Main West Terminal	April Year 6	October Year 10
Baggage Handling System	April Year 7	January Year 9
Parking Lot at Irving Park Road and York Road	July Year 7	April Year 9
Parking Structure	March Year 9	April Year 10
Western Terminal Access Roadway	June Year 6	January Year 8
Parking Lot	April Year 10	September Year 10
PHASE 2 – Projects Previously Approved Through the World Gateway Program		
Terminal 3, Concourse K Extension	July Year 4	December Year 5
Taxiway A and B Reconfiguration at Terminal 3	December Year 4	December Year 5
Reconstruction of Terminal 1/2 Connector	December Year 4	December Year 5
Terminal 4 – Demolition of Existing Concourse L	October Year 10	December Year 10
Construction of Terminal 4	August Year 7	December Year 10
Construction of Terminal 6	January Year 6	December Year 9
Redevelopment of Terminal 5	July Year 8	December Year 9

TABLE J.2-64
OVERVIEW OF PROPOSED CONSTRUCTION PLAN – ORIGINAL SCHEDULE

Proposed Project	Preliminary Construction Schedule	
	Start Date	End Date
PHASE 2 – Projects Previously Approved Through the World Gateway Program (Continued)		
Construction of ATS Station at Terminal 6 and ATS Realignment at Terminal 5/6	July Year 8	December Year 9
Construction of Terminal 6 Access Road	January Year 8	December Year 9
Terminal 5 & 6 Parking	August Year 9	December Year 9
Taxiway B East Extension	April Year 5	December Year 5
Construction of new Delta Air Freight and Related Facilities	October Year 8	December Year 9
Demolition of Existing Delta Air Freight and Related Facilities	November Year 9	December Year 9
Demolition of existing Lynxs Cargo and Related Facilities	November Year 9	December Year 9
Construction of new Skychef's Flight Kitchen and Related Facilities	July Year 8	December Year 9
Construction of Skychef's Parking Garage	September Year 8	December Year 9
Demolition of existing Skychef's Flight Kitchen and Related Facilities	November Year 9	December Year 9
Snow Dump Relocation	September Year 9	November Year 9
New Police Facility Construction	January Year 3	August Year 3
Old Police/Warehouse Demo	November Year 9	December Year 9
Construction of new H & R Plant and Related Facilities	December Year 9	December Year 9
Demolition of existing H & R Plant and Related Facilities	August Year 9	December Year 9
Parking Structures in Terminal Core	July Year 3	December Year 4
North LTP2 Construction	September Year 8	December Year 9
Construction of ATS Station at North LTP2	May Year 9	December Year 9
Construction of ATS Extension to North LTP2	May Year 9	December Year 9
Consolidated Rental Car Facility – Demolition of Existing Facilities	November Year 3	December Year 3
Construction of Consolidated Rental Car Facility	July Year 3	December Year 3
Construction of Mannheim Bridge	September Year 2	December Year 3
Construction of Rental Car Storage	March Year 3	December Year 3
ATS Station at New CONRAC	February Year 3	December Year 3
Construction of Balmoral Ave. (Phases II and III)	May Year 2	December Year 3
Construction of Commercial Vehicle Tunnel under I-190	January Year 3	December Year 3
Construction of Road Structure of Commercial Vehicle Tunnel under I-190	January Year 3	December Year 3
New ATS Maintenance Yard Construction	May Year 8	April Year 10
Old ATS Maintenance Yard Demolition	July Year 9	December Year 9
Construction of ATS Extension to new Maintenance Yard	May Year 8	April Year 10
Construction of Mannheim Lot E Fly over Northern Access Roads	October Year 2	February Year 4
Construction of Mannheim Lot E Fly over Southern Access Roads	February Year 3	January Year 4
Construction of Expansion of I-90 Interchange at Lee Street	May Year 2	December Year 3
Construction of Realignment of Bessie Coleman Drive	May Year 3	December Year 3
Zemke Road Extension	April Year 3	January Year 4
Fuel Farm Development in NW Airfield	February Year 3	January Year 4
Military Site Demo per Building #8001	June Year 3	December Year 3
Military Site Demo per Building #0001	November Year 2	December Year 3
Military Site Demo per Building #8023	October Year 3	December Year 3
Military Site Demo per Building #0060	February Year 3	December Year 3
Military Site Demo per Building #0002	July Year 3	December Year 3
Military Site Demo per Building #8002	August Year 3	December Year 3
Eastside Collateral Development pre 2007	May Year 4	April Year 6
Eastside Collateral Development post 2007	May Year 4	December Year 5
Parking Lots South of Zemke & North of I-190	July Year 1	December Year 3

TABLE J.2-64
OVERVIEW OF PROPOSED CONSTRUCTION PLAN – ORIGINAL SCHEDULE

Proposed Project	Preliminary Construction Schedule	
	Start Date	End Date
PHASE 2 – Projects Previously Approved Through the World Gateway Program (Continued)		
Arterial Roadway Improvements, Bessie Coleman, I-190, Mannheim Rd – Includes all slip ramps, access roads and required secondary roads	July Year 1	December Year 3
Aircraft Apron at Terminal 4	March Year 9	December Year 9
Terminal Upper & Lower level Roadways at Terminal 4 & 6	July Year 8	September Year 9
ALP Redevelopment Projects		
Future Employee Parking at Touhy Ave.	July Year 7	April Year 9

Source: Construction Impacts Draft Technical Working Report, AOR/TOK [CCT], September 2004.

TABLE J.2-65
OVERVIEW OF PROPOSED CONSTRUCTION PLAN – DELAYED SCHEDULE

Proposed Project	Preliminary Construction Schedule	
	Start Date	End Date
PHASE 1A – New North Runway 9L/27R and Associated Taxiway Construction		
JAWA Water Main Relocation	September Year 1	July Year 2
Security Related Improvements	September Year 1	February Year 3
Willow Higgins Creek Relocation	September Year 1	August Year 3
Runway Pavement and Shoulders	September Year 2	January Year 4
Taxiway Pavement and Shoulders	September Year 2	January Year 4
New Roadways and Related Infrastructure	June Year 3	January Year 4
North Airfield Lighting Vault	January Year 2	December Year 3
FAA Control Tower	December Year 1	December Year 3
North Basin Expansion	July Year 2	January Year 3
PHASE 1B – Extension to Existing Runway 9R/27L (New Runway 10L/28R) and Associated Taxiway		
Runway Pavement and Shoulders Extension	June Year 4	January Year 5
Taxiway Pavement and Shoulders Extension	June Year 4	January Year 5
Irving Park / York Road Construction	November Year 1	August Year 3
Union Pacific Railroad Relocation	August Year 1	August Year 3
PHASE 1C – New Closely-Spaced South Runway 10C/28C and Associated Taxiways and Holdpads		
St. Johannes Cemetery and Resthaven Cemetery Relocations	August Year 3	January Year 6
Cargo and Maintenance Facility Relocation	September Year 1	February Year 5
South Detention Basin	September Year 1	October Year 3
Runway Pavement, Shoulders, and Holdpads	November Year 2	January Year 6
Taxiway Pavement and Shoulders	November Year 2	January Year 6
South Airfield Lighting Vault	September Year 2	September Year 4
New Roadways and Related Infrastructures	September Year 2	October Year 5
New Central Basin	May Year 4	September Year 5
Bensenville Ditch Relocation	September Year 1	May Year 3
Demolition: Buildings: fire station (602), cargo simulation (603), lighting vault (604), fueling station (606), electrical utilities (608), UAL Cargo (610), basement fill-in (610), Fed Ex metroplex (611), Fed Ex freight (612), MW Cargo (613)	May Year 2	March Year 5
PHASE 1 – West Terminal – West Satellite Concourse		
West Satellite Concourse (T4)	May Year 4	January Year 6
Energy Facility	September Year 4	June Year 6
ATS Station (Active AOA)	February Year 3	June Year 6
ATS Station (West Terminal)	February Year 3	October Year 4
ATS Station (Terminal No. 7)	June Year 3	June Year 4
ATS Tunnel (Bored)	May Year 3	December Year 3
ATS Maintenance Center	August Year 3	August Year 4
ATS System	September Year 4	March Year 6
Fuel Farm Improvements	September Year 1	December Year 3
PHASE 2A – Extension to Exiting Runway 9L/27R (New Runway 9R/27L) and Associated Taxiway		
Runway Pavement and Shoulders Extension	September Year 7	January Year 10
Taxiway Pavement and Shoulders Extension	September Year 7	January Year 10

TABLE J.2-65
OVERVIEW OF PROPOSED CONSTRUCTION PLAN – DELAYED SCHEDULE

Proposed Project	Preliminary Construction Schedule	
	Start Date	End Date
PHASE 2B – New Closely-Spaced North Runway 9C/27C and Associated Taxiways and Holdpad		
GPS Antenna	September Year 1	November Year 1
Cargo and Maintenance Facility Relocation – Site work, parking lots, concrete aprons for and including the construction of the following replacement buildings: Fire Station (702), Flight Kitchen (741), AAL Hangar Maintenance (725), UAL Hangar Maintenance (750), UAL Ground Maintenance (744), AAL Ground Maintenance (723), Flight Kitchen (742), UAL Personnel Building (746), Lift Station (728)	December Year 3	December Year 5
Demolition – moving from old bldgs to new buildings and demo of the old following bldgs: Fire Station (702), Flight Kitchen (741), AAL Hangar Maintenance (725), Lift Station (728) AAL Ground Maintenance (723), UAL Personnel Bldg (746), UAL Hangar Maintenance (750), Flight Kitchen (742) and UAL Ground Maintenance (744)	November Year 4	June Year 6
Runway Pavement and Shoulders and Holdpad	August Year 7	January Year 10
Taxiway Pavement and Shoulders	August Year 7	January Year 10
Runway 14R/32L Demolition	June Year 9	December Year 9
Runway 14R/32L Taxiway Pavement and Shoulder Demolition	June Year 9	December Year 9
New Roadways and Related Infrastructure	November Year 7	December Year 9
Willow Creek Relocation	June Year 6	January Year 8
New North Detention Basin	July Year 6	October Year 8
Future Airport Building move to OMP 9C/27C	Sep Year 7	December Year 9
New Roads and Related Parking	August Year 8	November Year 9
PHASE 2C – New South Runway 10R/28L		
Security Related Improvements	March Year 7	May Year 7
Runway Pavement and Shoulders	June Year 8	January Year 10
Taxiway Pavement and Shoulders	June Year 8	January Year 10
New Roadways and Related Infrastructure	October Year 8	September Year 9
FAA Control Tower	November Year 7	November Year 9
Rotating Beacon	September Year 1	November Year 1
Delta Cargo Facility	September Year 8	January Year 10
Apron Pavement	April Year 9	August Year 9
PHASE 2 – West Terminal		
Main West Terminal	June Year 6	December Year 10
Baggage Handling System	June Year 7	March Year 9
Parking Lot at Irving Park Road and York Road	September Year 7	June Year 9
Parking Structure	May Year 9	June Year 10
Western Terminal Access Roadway	August Year 6	March Year 8
Parking Lot	June Year 10	November Year 10
PHASE 2 – Projects Previously Approved Through the World Gateway Program		
Terminal 3, Concourse K Extension	September Year 4	February Year 6
Taxiway A and B Reconfiguration at Terminal 3	February Year 5	February Year 6
Reconstruction of Terminal 1/2 Connector	February Year 5	February Year 6
Terminal 4 – Demolition of Existing Concourse L	December Year 10	February Year 11
Construction of Terminal 4	October Year 7	February Year 11
Construction of Terminal 6	Mar Year 6	February Year 10

TABLE J.2-65
OVERVIEW OF PROPOSED CONSTRUCTION PLAN – DELAYED SCHEDULE

Proposed Project	Preliminary Construction Schedule	
	Start Date	End Date
PHASE 2 – Projects Previously Approved Through the World Gateway Program (Continued)		
Redevelopment of Terminal 5	September Year 8	February Year 10
Construction of ATS Station at Terminal 6 and ATS Realignment at Terminal 5/6	September Year 8	February Year 10
Construction of Terminal 6 Access Road	March Year 8	February Year 10
Terminal 5 & 6 Parking	October Year 9	February Year 10
Taxiway B East Extension	June Year 5	February Year 6
Construction of new Delta Air Freight and Related Facilities	December Year 8	February Year 10
Demolition of Existing Delta Air Freight and Related Facilities	January Year 10	February Year 10
Demolition of existing Lynxs Cargo and Related Facilities	January Year 10	February Year 10
Construction of new Skychef's Flight Kitchen and Related Facilities	September Year 8	February Year 10
Construction of Skychef's Parking Garage	November Year 8	February Year 10
Demolition of existing Skychef's Flight Kitchen and Related Facilities	January Year 10	February Year 10
Snow Dump Relocation	November Year 9	January Year 10
New Police Facility Construction	March Year 3	October Year 3
Old Police/Warehouse Demo	January Year 10	February Year 10
Construction of new H & R Plant and Related Facilities	February Year 8	February Year 10
Demolition of existing H & R Plant and Related Facilities	October Year 9	February Year 10
Parking Structures in Terminal Core	September Year 3	February Year 5
North LTP2 Construction	November Year 8	February Year 10
Construction of ATS Station at North LTP2	July Year 9	February Year 10
Construction of ATS Extension to North LTP2	July Year 9	February Year 10
Consolidated Rental Car Facility – Demolition of Existing Facilities	January Year 4	February Year 4
Construction of Consolidated Rental Car Facility	September Year 3	February Year 4
Construction of Mannheim Bridge	November Year 2	February Year 4
Construction of Rental Car Storage	May Year 3	February Year 4
ATS Station at New CONRAC	April Year 3	February Year 4
Construction of Balmoral Ave. (Phases II and III)	July Year 2	February Year 4
Construction of Commercial Vehicle Tunnel under I-190	March Year 3	February Year 4
Construction of Road Structure of Commercial Vehicle Tunnel under I-190	March Year 3	February Year 4
New ATS Maintenance Yard Construction	July Year 8	June Year 10
Old ATS Maintenance Yard Demolition	September Year 9	February Year 10
Construction of ATS Extension to new Maintenance Yard	July Year 8	June Year 10
Construction of Mannheim Lot E Fly over Northern Access Roads	December Year 2	April Year 4
Construction of Mannheim Lot E Fly over Southern Access Roads	April Year 3	March Year 4
Construction of Expansion of I-90 Interchange at Lee Street	July Year 2	February Year 4
Construction of Realignment of Bessie Coleman Drive	July Year 3	February Year 4
Zemke Road Extension	June Year 3	March Year 4
Fuel Farm Development in NW Airfield	April Year 3	March Year 4
Military Site Demo per Building #8001	August Year 3	February Year 4
Military Site Demo per Building #0001	January Year 3	February Year 4
Military Site Demo per Building #8023	December Year 3	February Year 4
Military Site Demo per Building #0060	April Year 3	February Year 4
Military Site Demo per Building #0002	September Year 3	February Year 4
Military Site Demo per Building #8002	October Year 3	February Year 4
Eastside Collateral Development pre 2007	July Year 4	June Year 6
Eastside Collateral Development post 2007	July Year 4	February Year 6
Parking Lots South of Zemke & North of I-190	September Year 1	February Year 4

TABLE J.2-65
OVERVIEW OF PROPOSED CONSTRUCTION PLAN – DELAYED SCHEDULE

Proposed Project	Preliminary Construction Schedule	
	Start Date	End Date
PHASE 2 – Projects Previously Approved Through the World Gateway Program (Continued)		
Arterial Roadway Improvements, Bessie Coleman, I-190, Mannheim Rd – Includes all slip ramps, access roads and required secondary roads	September Year 1	February Year 4
Aircraft Apron at Terminal 4	May Year 9	February Year 10
Terminal Upper & Lower level Roadways at Terminal 4 & 6	September Year 8	November Year 9
ALP Redevelopment Projects		
Future Employee Parking at Touhy Ave.	September Year 7	June Year 9

Sources: Crawford, Murphy, and Tilly, Inc. [TPC], analysis of information received from the AOR/TOK, December 2004.

Emissions from construction activities were estimated based on the projected construction activity schedule, the number of vehicles/pieces of equipment, and vehicle/equipment utilization rates. Emissions from several components of construction activities were evaluated. These include emissions from on-site construction equipment (i.e., backhoes, bulldozers, graders, etc.); haul vehicles (i.e., cement trucks, dump trucks, etc.); and construction worker vehicles getting to and from the site. Construction activities for individual projects would begin in 2004 and extend through the year 2014. Therefore, emissions from these activities were identified separately for each calendar year. Construction emissions during the years 2007, 2009, and 2013 were included in the dispersion analysis.

The construction-related emission inventories were calculated using emission factors obtained from the USEPA's Nonroad Engine and Vehicle Emission Study,[25] the NONROAD model (2002)[26] databases and support information, the Compilation of Air Pollutant Emission Factors (AP-42), and/or MOBILE6.2.

A total of approximately 50 individual construction projects[27] comprise the proposed project. The analysis of construction activities evaluates the level of pollutant and pollutant precursor emissions directly related to construction. The main construction activities are:

- Clearing and grubbing;
- Site Excavation, Movement, Storage, and Removal;
- Grading of the site;
- Demolition;
- On-site Production of New Construction Materials;
- Providing for drainage throughout the site;
- Construction of runways at grade;

[25] Nonroad Engine and Vehicle Emission Study - Report. U.S. Environmental Protection Agency. Office of Transportation and Air Quality. Research Triangle Park, NC. Report number EPA-460/3-91-02, November 1991.
[26] NONROAD, Version 2002, U.S. Environmental Protection Agency, December 2002.
[27] Construction Logistics Equipment Plan based on the Airport Layout Plan, AOR/TOK [CCT], March 24, 2004.

- Constructing parking lots at grade; and
- Constructing the West Terminal and parking lots.

To calculate emissions that would result from the construction activities, an estimate of daily equipment requirements for each general construction activity (i.e., demolition, earthwork, building construction, subgrade preparation and paving). Equipment requirements were then assigned to each activity. The types of equipment include (but are limited to) motor graders, rollers, water trucks, loaders, cranes, drill rigs, pavers, asphalt spreaders, excavators, pickup trucks and dual tandem trucks. Emission factors for all equipment except pick-up and dual tandem trucks (i.e., on-road certified vehicles) were obtained from the NONROAD model[28] and documentation and databases prepared in support of the model.[29] Emission factors for each equipment type were applied to the anticipated equipment work output (horsepower-hours of expected equipment use or hours of operation). Operating times for the equipment were conservatively based on a six-day workweek and a ten-hour workday during which the equipment would be running continuously except for two 15-minute breaks and a 1-hour lunch break. A usage factor accounting for the percentage of daily operation was also used. Listings of the assumed equipment horsepower, load factors and emission factors are provided in **Tables J.2-66** through **J.2-70**.

TABLE J.2-66
EMISSION FACTORS: CONSTRUCTION EQUIPMENT - HYDROCARBONS

Equipment	Horse-power	Load Factor	Grams Per Horsepower Hour										
			2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Augers - Truck Mounted	50	0.43	0.309	0.276	0.244	0.213	0.184	0.157	0.134	0.122	0.112	0.104	0.097
Backhoes	100	0.21	0.27	0.259	0.248	0.238	0.224	0.211	0.198	0.185	0.172	0.160	0.148
	400	0.21	0.146	0.139	0.132	0.125	0.118	0.111	0.105	0.098	0.092	0.086	0.081
Backhoes/Loaders	250	0.21	0.146	0.139	0.132	0.125	0.118	0.111	0.105	0.098	0.092	0.086	0.081
Breakers - Concrete/Road	150	0.43	0.196	0.184	0.174	0.158	0.149	0.139	0.131	0.123	0.116	0.109	0.102
	200	0.43	0.176	0.163	0.148	0.139	0.131	0.123	0.117	0.110	0.105	0.099	0.094
	300	0.43	0.098	0.091	0.083	0.078	0.073	0.069	0.065	0.062	0.059	0.055	0.053
Bulldozers	300	0.59	0.122	0.119	0.112	0.105	0.099	0.092	0.086	0.081	0.076	0.073	0.071
Drilling Equipment	500	0.43	0.313	0.302	0.291	0.280	0.270	0.259	0.249	0.238	0.228	0.218	0.208
Compactors	8	0.43	0.547	0.512	0.476	0.441	0.408	0.376	0.347	0.324	0.307	0.293	0.281
	15	0.43	0.545	0.502	0.455	0.411	0.369	0.329	0.293	0.266	0.250	0.238	0.228
	25	0.43	0.571	0.502	0.455	0.411	0.369	0.329	0.293	0.266	0.250	0.238	0.228
Compressors - Air	100	0.43	0.201	0.188	0.176	0.164	0.149	0.134	0.121	0.111	0.102	0.094	0.087
Compressors - Hydraulic	150	0.43	0.246	0.233	0.220	0.201	0.184	0.169	0.159	0.15	0.141	0.134	0.127
Concrete Finishers	20	0.59	0.606	0.254	0.219	0.191	0.172	0.156	0.144	0.133	0.130	0.128	0.126
	40	0.59	0.322	0.254	0.219	0.191	0.172	0.156	0.144	0.133	0.130	0.128	0.126

[28] NONROAD, Version 2002, December, 2002. U.S. Environmental Protection Agency.

[29] Median Life, Annual Activity, and Load Factor Values for Nonroad Engine Emissions Modeling. Christian E. Lindhjem and Megan Beardsley. U.S. Environmental Protection Agency, Office of Mobile Sources (now Office of Transportation and Air Quality). Report No. NR-005A. December 9, 1997, revised June 15, 1998. (Documentation for NONROAD model development).

TABLE J.2-66
EMISSION FACTORS: CONSTRUCTION EQUIPMENT - HYDROCARBONS

Equipment	Horse-power	Load Factor	Grams Per Horsepower Hour										
			2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Cranes	100	0.43	0.297	0.274	0.252	0.233	0.212	0.195	0.177	0.161	0.146	0.132	0.120
	130	0.43	0.192	0.18	0.169	0.157	0.147	0.138	0.129	0.121	0.114	0.107	0.100
	150	0.43	0.192	0.18	0.169	0.157	0.147	0.138	0.129	0.121	0.114	0.107	0.100
	155	0.43	0.192	0.18	0.169	0.157	0.147	0.138	0.129	0.121	0.114	0.107	0.100
	200	0.43	0.169	0.157	0.146	0.137	0.130	0.122	0.115	0.109	0.103	0.097	0.092
	210	0.43	0.169	0.157	0.146	0.137	0.130	0.122	0.115	0.109	0.103	0.097	0.092
	250	0.43	0.169	0.157	0.146	0.137	0.130	0.122	0.115	0.109	0.103	0.097	0.092
	270	0.43	0.169	0.157	0.146	0.137	0.130	0.122	0.115	0.109	0.103	0.097	0.092
	275	0.43	0.169	0.157	0.146	0.137	0.130	0.122	0.115	0.109	0.103	0.097	0.092
	300	0.43	0.169	0.157	0.146	0.137	0.130	0.122	0.115	0.109	0.103	0.097	0.092
	400	0.43	0.186	0.171	0.158	0.145	0.132	0.121	0.11	0.101	0.096	0.093	0.09
	600	0.43	0.178	0.163	0.15	0.137	0.125	0.113	0.103	0.094	0.091	0.088	0.086
	750	0.43	0.254	0.242	0.228	0.214	0.200	0.186	0.172	0.159	0.147	0.135	0.124
Excavators	250	0.59	0.139	0.136	0.135	0.125	0.116	0.106	0.098	0.09	0.083	0.077	0.075
	300	0.59	0.123	0.121	0.113	0.105	0.099	0.092	0.085	0.08	0.075	0.073	0.072
	500	0.59	0.171	0.148	0.137	0.130	0.124	0.119	0.114	0.111	0.109	0.107	0.106
	100	0.59	0.207	0.195	0.184	0.174	0.156	0.139	0.122	0.109	0.097	0.087	0.080
Forklifts	150	0.59	0.216	0.215	0.215	0.192	0.170	0.148	0.130	0.123	0.119	0.118	0.117
Generators	100	0.43	0.250	0.244	0.237	0.230	0.222	0.213	0.205	0.197	0.188	0.18	0.172
	200	0.43	0.356	0.344	0.329	0.315	0.302	0.288	0.274	0.261	0.248	0.235	0.223
Graders	200	0.59	0.209	0.205	0.192	0.18	0.169	0.158	0.148	0.139	0.131	0.125	0.122
	500	0.59	0.208	0.184	0.162	0.143	0.134	0.128	0.122	0.118	0.114	0.111	0.109
Landscaping Equipment	150	0.43	0.320	0.306	0.292	0.275	0.258	0.242	0.227	0.212	0.199	0.188	0.179
	400	0.43	0.320	0.306	0.292	0.275	0.258	0.242	0.227	0.212	0.199	0.188	0.179
Loaders	150	0.21	0.292	0.278	0.264	0.249	0.235	0.221	0.208	0.196	0.183	0.172	0.161
	150	0.59	0.264	0.247	0.239	0.23	0.221	0.212	0.203	0.195	0.187	0.179	0.172
	250	0.59	0.231	0.216	0.208	0.201	0.195	0.188	0.182	0.175	0.169	0.164	0.159
Lowboys	500	0.21	0.146	0.139	0.132	0.125	0.118	0.111	0.105	0.098	0.092	0.086	0.081
Misc. Equipment	150	0.59	0.302	0.285	0.270	0.248	0.227	0.209	0.197	0.186	0.176	0.167	0.158
Mixers	20	0.43	0.614	0.613	0.585	0.558	0.530	0.504	0.477	0.452	0.427	0.402	0.378
	50	0.43	0.406	0.397	0.390	0.382	0.372	0.362	0.352	0.342	0.331	0.321	0.311
Motor Buggies	20	0.59	0.457	0.418	0.374	0.345	0.321	0.303	0.290	0.286	0.284	0.283	0.282
	25	0.59	0.281	0.257	0.230	0.212	0.197	0.186	0.178	0.176	0.175	0.174	0.174
Pavers	125	0.59	0.252	0.235	0.229	0.214	0.201	0.188	0.175	0.163	0.153	0.143	0.134
	150	0.59	0.252	0.235	0.229	0.214	0.201	0.188	0.175	0.163	0.153	0.143	0.134
	175	0.59	0.187	0.174	0.170	0.159	0.149	0.139	0.130	0.121	0.113	0.106	0.099
	400	0.59	0.240	0.218	0.197	0.177	0.158	0.142	0.135	0.129	0.124	0.119	0.116
Pumps	25	0.43	0.294	0.275	0.254	0.235	0.216	0.197	0.180	0.163	0.147	0.134	0.127
	120	0.43	0.342	0.328	0.314	0.298	0.282	0.266	0.251	0.236	0.222	0.208	0.197

TABLE J.2-66
EMISSION FACTORS: CONSTRUCTION EQUIPMENT - HYDROCARBONS

Equipment	Horse-power	Load Factor	Grams Per Horsepower Hour										
			2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
	500	0.43	0.361	0.348	0.337	0.325	0.314	0.303	0.291	0.280	0.269	0.258	0.248
Rollers/Compactors	110	0.59	0.265	0.248	0.016	0.219	0.206	0.193	0.181	0.170	0.159	0.149	0.140
	350	0.59	0.250	0.230	0.210	0.191	0.173	0.157	0.142	0.135	0.129	0.124	0.120
Saws - Concrete/Pavement	50	0.59	0.309	0.223	0.193	0.168	0.152	0.138	0.128	0.119	0.116	0.115	0.114
Scrapers	300	0.59	0.130	0.127	0.119	0.112	0.105	0.098	0.092	0.086	0.081	0.077	0.075
	500	0.59	0.207	0.186	0.166	0.148	0.137	0.131	0.125	0.121	0.117	0.114	0.111
Sheet Pile Driving Equipment	250	0.43	0.277	0.264	0.250	0.235	0.221	0.208	0.195	0.184	0.174	0.165	0.155
Trucks - Construction	300	0.59	0.115	0.112	0.105	0.099	0.093	0.087	0.081	0.076	0.072	0.068	0.067
	400	0.59	0.127	0.120	0.114	0.11	0.108	0.106	0.106	0.105	0.104	0.104	0.104
	500	0.59	0.127	0.120	0.114	0.11	0.108	0.106	0.106	0.105	0.104	0.104	0.104
Haul Trucks(a)	Off-site		18.64	17.36	16.28	15.28	14.28	13.44	12.56	11.88	11.04	10.56	10.08
Light Duty Vehicles(a)	Off-site		37.4	33.65	30.15	27.75	25.3	22.85	20.35	18.05	16.00	14.25	12.85
	On-Site		19.86	17.85	15.72	14.43	13.05	11.82	16.5	9.57	8.7	7.98	7.41
Buses(a)	On-Site		17.82	16.59	15.54	14.58	13.65	12.81	12	11.37	10.53	10.11	9.66
Non-Road Vehicles(a)	On-Site		16.52	15.38	14.42	13.52	12.66	11.9	11.12	10.54	9.78	9.36	8.94

Note: (a) Emission factors in grams per mile
Source: Environmental Science Associates, Inc. [TPC] analysis , 2004

TABLE J.2-67
EMISSION FACTORS: CONSTRUCTION EQUIPMENT - CARBON MONOXIDE

Equipment	Horse-power	Load Factor	Grams Per Horsepower Hour										
			2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Augers – Truck Mounted	50	0.43	1.009	0.929	0.849	0.774	0.700	0.633	0.573	0.542	0.515	0.496	0.479
Backhoes	100	0.21	1.200	1.177	1.155	1.131	1.108	1.086	1.064	1.043	1.022	1.002	0.982
	400	0.21	0.603	0.568	0.533	0.503	0.474	0.446	0.420	0.394	0.370	0.346	0.324
Backhoes/Loaders	250	0.21	0.603	0.568	0.533	0.503	0.474	0.446	0.420	0.394	0.370	0.346	0.324
Breakers - Concrete/Road	150	0.43	0.663	0.592	0.527	0.473	0.454	0.439	0.428	0.420	0.414	0.410	0.407
	200	0.43	0.553	0.484	0.425	0.404	0.388	0.375	0.367	0.361	0.356	0.352	0.350
	300	0.43	0.309	0.271	0.238	0.226	0.217	0.210	0.205	0.202	0.199	0.197	0.196
Bulldozers	300	0.59	0.481	0.459	0.444	0.433	0.425	0.420	0.417	0.417	0.418	0.420	0.420
Drilling Equipment	500	0.43	1.508	1.457	1.407	1.356	1.306	1.256	1.207	1.158	1.110	1.062	1.015
Compactors	8	0.43	2.188	2.150	2.110	2.070	2.031	1.993	1.958	1.931	1.915	1.903	1.893
	15	0.43	1.846	1.747	1.634	1.526	1.420	1.320	1.228	1.157	1.117	1.085	1.061
	25	0.43	1.877	1.747	1.634	1.526	1.420	1.320	1.228	1.157	1.117	1.085	1.061
Compressors - Air	100	0.43	0.846	0.817	0.790	0.763	0.738	0.716	0.697	0.691	0.686	0.684	0.681
Compressors - Hydraulic	150	0.43	0.875	0.797	0.722	0.653	0.589	0.538	0.517	0.503	0.492	0.483	0.478

TABLE J.2-67
EMISSION FACTORS: CONSTRUCTION EQUIPMENT - CARBON MONOXIDE

Equipment	Horse-power	Load Factor	Grams Per Horsepower Hour										
			2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Concrete Finishers	20	0.59	3.255	2.221	1.986	1.870	1.779	1.715	1.663	1.620	1.586	1.573	1.565
	40	0.59	1.764	1.500	1.371	1.269	1.198	1.140	1.092	1.054	1.040	1.031	1.027
Cranes	100	0.43	1.273	1.226	1.182	1.141	1.122	1.111	1.103	1.097	1.094	1.092	1.091
	130	0.43	0.624	0.556	0.495	0.465	0.448	0.435	0.425	0.418	0.412	0.407	0.405
	150	0.43	0.624	0.556	0.495	0.465	0.448	0.435	0.425	0.418	0.412	0.407	0.405
	155	0.43	0.624	0.556	0.495	0.465	0.448	0.435	0.425	0.418	0.412	0.407	0.405
	200	0.43	0.511	0.446	0.414	0.396	0.383	0.372	0.364	0.358	0.353	0.350	0.349
	210	0.43	0.511	0.446	0.414	0.396	0.383	0.372	0.364	0.358	0.353	0.350	0.349
	250	0.43	0.511	0.446	0.414	0.396	0.383	0.372	0.364	0.358	0.353	0.350	0.349
	270	0.43	0.511	0.446	0.414	0.396	0.383	0.372	0.364	0.358	0.353	0.350	0.349
	275	0.43	0.511	0.446	0.414	0.396	0.383	0.372	0.364	0.358	0.353	0.350	0.349
	300	0.43	0.511	0.446	0.414	0.396	0.383	0.372	0.364	0.358	0.353	0.350	0.349
	400	0.43	0.830	0.783	0.736	0.689	0.642	0.598	0.556	0.519	0.497	0.478	0.461
	600	0.43	0.884	0.848	0.814	0.780	0.747	0.716	0.687	0.662	0.652	0.645	0.639
	750	0.43	0.955	0.907	0.853	0.800	0.748	0.697	0.647	0.598	0.550	0.505	0.464
Excavators	250	0.59	0.569	0.549	0.533	0.523	0.517	0.514	0.513	0.515	0.517	0.519	0.520
	300	0.59	0.469	0.452	0.441	0.435	0.432	0.430	0.432	0.434	0.436	0.436	0.437
	500	0.59	1.348	1.208	1.128	1.061	1.005	0.955	0.912	0.884	0.866	0.853	0.843
	100	0.59	1.427	1.406	1.392	1.381	1.375	1.373	1.374	1.377	1.382	1.388	1.394
Forklifts	150	0.59	0.835	0.829	0.829	0.831	0.834	0.839	0.845	0.847	0.849	0.850	0.850
Generators	100	0.43	1.064	1.041	1.018	0.996	0.974	0.952	0.931	0.909	0.888	0.868	0.848
	200	0.43	1.485	1.423	1.361	1.301	1.240	1.180	1.122	1.064	1.008	0.952	0.896
Graders	200	0.59	0.823	0.787	0.761	0.742	0.730	0.722	0.717	0.719	0.721	0.724	0.725
	500	0.59	1.490	1.364	1.244	1.134	1.073	1.022	0.977	0.937	0.903	0.882	0.865
Landscaping Equipment	150	0.43	1.308	1.234	1.161	1.089	1.019	0.952	0.887	0.826	0.773	0.731	0.693
	400	0.43	1.308	1.234	1.161	1.089	1.019	0.952	0.887	0.826	0.773	0.731	0.693
Loaders	150	0.21	1.202	1.131	1.062	1.002	0.945	0.890	0.837	0.786	0.737	0.690	0.646
	150	0.59	1.259	1.112	0.992	0.950	0.918	0.896	0.880	0.867	0.857	0.849	0.847
	250	0.59	1.011	0.883	0.839	0.805	0.782	0.764	0.750	0.739	0.731	0.727	0.724
Lowboys	500	0.21	0.603	0.568	0.533	0.503	0.474	0.446	0.420	0.394	0.370	0.346	0.324
Misc. Equipment	150	0.59	1.592	1.448	1.314	1.189	1.074	0.990	0.954	0.927	0.905	0.890	0.878
Mixers	20	0.43	2.056	2.011	1.945	1.881	1.816	1.752	1.688	1.626	1.565	1.505	1.445
	50	0.43	1.815	1.791	1.763	1.735	1.708	1.680	1.653	1.626	1.599	1.572	1.546
Motor Buggies	20	0.59	2.707	2.559	2.400	2.294	2.209	2.141	2.092	2.078	2.070	2.066	2.063
	25	0.59	1.663	1.572	1.474	1.409	1.357	1.315	1.285	1.276	1.272	1.269	1.267
Pavers	125	0.59	1.151	1.006	0.950	0.915	0.891	0.873	0.859	0.850	0.845	0.842	0.841
	150	0.59	1.151	1.006	0.950	0.915	0.891	0.873	0.859	0.850	0.845	0.842	0.841
	175	0.59	0.854	0.746	0.705	0.679	0.661	0.648	0.637	0.631	0.627	0.625	0.624
	400	0.59	1.725	1.595	1.469	1.347	1.233	1.132	1.073	1.024	0.376	0.943	0.911

TABLE J.2-67
EMISSION FACTORS: CONSTRUCTION EQUIPMENT - CARBON MONOXIDE

Equipment	Horse-power	Load Factor	Grams Per Horsepower Hour										
			2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Pumps	25	0.43	0.978	0.935	0.886	0.838	0.791	0.745	0.702	0.660	0.620	0.585	0.567
	120	0.43	1.411	1.341	1.270	1.201	1.133	1.067	1.002	0.939	0.878	0.821	0.776
	500	0.43	1.617	1.568	1.520	1.472	1.424	1.376	1.329	1.282	1.235	1.189	1.143
Rollers / Compactors	110	0.59	1.264	1.115	0.993	0.950	0.918	0.896	0.880	0.867	0.857	0.849	0.847
	350	0.59	1.762	1.645	1.531	1.420	1.312	1.211	1.121	1.066	1.021	0.981	0.946
Saws - Concrete / Pavement	50	0.59	1.547	1.333	1.220	1.130	1.069	1.019	0.980	0.949	0.936	0.931	0.927
Scrapers	300	0.59	0.517	0.491	0.473	0.460	0.451	0.444	0.442	0.441	0.442	0.443	0.444
	500	0.59	1.548	1.421	1.300	1.183	1.107	1.052	1.003	0.960	0.923	0.897	0.879
Sheet Pile Driving Equipment	250	0.43	1.156	1.084	1.013	0.944	0.877	0.812	0.753	0.706	0.662	0.621	0.582
Trucks - Construction	300	0.59	0.451	0.431	0.416	0.406	0.400	0.395	0.393	0.394	0.395	0.396	0.397
	400	0.59	1.076	1.004	0.944	0.892	0.867	0.850	0.841	0.835	0.831	0.826	0.825
	500	0.59	1.076	1.004	0.944	0.892	0.867	0.850	0.841	0.835	0.831	0.826	0.825
Haul Trucks[a]	Off-site		91.8	87.4	83.2	76.2	66.32	57.8	50.3	43.9	38.3	29.5	26.2
Light Duty Vehicles(a)	Off-site		617	569	458	440	421	401	381	361	341	322	304
	On-Site		301	275	227	215	204.6	195	185	178	171	165	160
Buses(a)	On-Site		87.8	83.5	79.6	72.9	63.42	55.2	48.1	42	36.7	28.2	25.1
Non-Road Vehicles(a)	On-Site		89.6	85.2	81.1	74.3	64.66	56.3	49.1	42.8	37.4	28.8	25.5

Note: (a) Emission factors in grams per mile
Source: Environmental Science Associates, Inc. [TPC] analysis , 2004

TABLE J.2-68
EMISSION FACTORS: CONSTRUCTION EQUIPMENT – NITROGEN OXIDES

Equipment	Horse-power	Load Factor	Grams Per Horsepower Hour										
			2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Augers - Truck Mounted	50	0.43	1.585	1.539	1.494	1.452	1.411	1.374	1.341	1.323	1.308	1.297	1.287
Backhoes	100	0.21	1.071	1.036	1.003	0.979	0.945	0.913	0.879	0.847	0.816	0.786	0.757
	400	0.21	0.859	0.826	0.795	0.759	0.724	0.689	0.655	0.622	0.590	0.558	0.529
Backhoes / Loaders	250	0.21	0.859	0.826	0.795	0.759	0.724	0.689	0.655	0.622	0.590	0.558	0.529
Breakers - Concrete / Road	150	0.43	2.695	2.542	2.402	2.225	2.095	1.961	1.835	1.717	1.611	1.513	1.440
	200	0.43	2.579	2.435	2.256	2.124	2.003	1.876	1.758	1.649	1.548	1.456	1.390
	300	0.43	1.444	1.363	1.263	1.189	1.121	1.050	0.984	0.923	0.866	0.815	0.778
Bulldozers	300	0.59	1.771	1.694	1.575	1.462	1.356	1.248	1.151	1.081	1.023	0.976	0.952
Drilling Equipment	500	0.43	3.817	3.732	3.628	3.520	3.414	3.308	3.204	3.102	3.000	2.900	2.801
Compactors	8	0.43	3.538	3.353	3.145	2.947	2.755	2.575	2.409	2.277	2.188	2.113	2.049
	15	0.43	3.006	2.878	2.733	2.596	2.463	2.339	2.226	2.141	2.091	2.052	2.021
	25	0.43	3.020	2.878	2.733	2.596	2.463	2.339	2.226	2.141	2.091	2.052	2.021
Compressors - Air	100	0.43	1.658	1.615	1.571	1.528	1.459	1.392	1.325	1.269	1.218	1.168	1.122

TABLE J.2-68
EMISSION FACTORS: CONSTRUCTION EQUIPMENT – NITROGEN OXIDES

Equipment	Horse-power	Load Factor	Grams Per Horsepower Hour										
			2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Compressors - Hydraulic	150	0.43	3.206	3.055	2.910	2.720	2.539	2.364	2.229	2.106	1.989	1.878	1.776
Concrete Finishers	20	0.59	3.412	2.402	2.223	2.133	2.062	2.012	1.970	1.936	1.910	1.900	1.894
	40	0.59	2.120	2.036	1.991	1.955	1.929	1.907	1.888	1.875	1.870	1.866	1.865
Cranes	100	0.43	2.606	2.522	2.440	2.364	2.252	2.153	2.048	1.949	1.855	1.767	1.693
	130	0.43	2.650	2.498	2.357	2.204	2.070	1.934	1.806	1.687	1.577	1.490	1.417
	150	0.43	2.650	2.498	2.357	2.204	2.070	1.934	1.806	1.687	1.577	1.490	1.417
	155	0.43	2.650	2.498	2.357	2.204	2.070	1.934	1.806	1.687	1.577	1.490	1.417
	200	0.43	2.534	2.388	2.235	2.101	1.978	1.849	1.729	1.616	1.512	1.433	1.367
	210	0.43	2.534	2.388	2.235	2.101	1.978	1.849	1.729	1.616	1.512	1.433	1.367
	250	0.43	2.534	2.388	2.235	2.101	1.978	1.849	1.729	1.616	1.512	1.433	1.367
	270	0.43	2.534	2.388	2.235	2.101	1.978	1.849	1.729	1.616	1.512	1.433	1.367
	275	0.43	2.534	2.388	2.235	2.101	1.978	1.849	1.729	1.616	1.512	1.433	1.367
	300	0.43	2.534	2.388	2.235	2.101	1.978	1.849	1.729	1.616	1.512	1.433	1.367
	400	0.43	2.946	2.835	2.687	2.532	2.383	2.240	2.104	1.979	1.876	1.780	1.692
	600	0.43	2.937	2.819	2.670	2.526	2.377	2.235	2.099	1.975	1.875	1.783	1.695
	750	0.43	3.382	3.312	3.201	3.092	2.982	2.862	2.747	2.635	2.526	2.423	2.325
Excavators	250	0.59	1.878	1.789	1.708	1.567	1.440	1.313	1.220	1.140	1.071	1.017	0.991
	300	0.59	1.795	1.711	1.573	1.447	1.330	1.214	1.133	1.064	1.010	0.983	0.962
	500	0.59	3.305	3.129	2.922	2.717	2.526	2.349	2.184	2.054	1.941	1.842	1.754
	100	0.59	1.913	1.863	1.814	1.768	1.657	1.556	1.452	1.370	1.297	1.233	1.182
Forklifts	150	0.59	2.850	2.662	2.508	2.277	2.078	1.871	1.700	1.628	1.581	1.563	1.553
Generators	100	0.43	1.773	1.747	1.721	1.695	1.658	1.621	1.583	1.545	1.508	1.471	1.435
	200	0.43	3.155	3.098	3.023	2.950	2.878	2.800	2.724	2.650	2.576	2.502	2.430
Graders	200	0.59	3.043	2.912	2.701	2.505	2.325	2.137	1.970	1.854	1.755	1.676	1.635
	500	0.59	3.472	3.309	3.081	2.852	2.670	2.503	2.346	2.201	2.068	1.964	1.872
Landscaping Equipment	150	0.43	3.125	3.052	2.981	2.886	2.793	2.695	2.598	2.504	2.409	2.315	2.223
	400	0.43	3.125	3.052	2.981	2.886	2.793	2.695	2.598	2.504	2.409	2.315	2.223
Loaders	150	0.21	1.712	1.647	1.584	1.512	1.444	1.373	1.305	1.239	1.175	1.113	1.054
	150	0.59	3.393	3.190	3.012	2.823	2.648	2.469	2.302	2.145	2.003	1.898	1.806
	250	0.59	3.235	3.051	2.862	2.687	2.526	2.358	2.200	2.051	1.920	1.827	1.743
Lowboys	500	0.21	0.859	0.826	0.795	0.759	0.724	0.689	0.655	0.622	0.590	0.558	0.529
Misc. Equipment	150	0.59	3.680	3.496	3.324	3.103	2.892	2.695	2.538	2.393	2.257	2.132	2.015
Mixers	20	0.43	3.315	3.226	3.138	3.052	2.966	2.883	2.800	2.720	2.642	2.566	2.490
	50	0.43	3.824	3.751	3.680	3.608	3.523	3.437	3.349	3.263	3.177	3.093	3.009
Motor Buggies	20	0.59	3.006	2.896	2.770	2.684	2.614	2.559	2.521	2.510	2.504	2.500	2.498
	25	0.59	1.846	1.779	1.702	1.649	1.606	1.572	1.548	1.542	1.538	1.536	1.534

TABLE J.2-68
EMISSION FACTORS: CONSTRUCTION EQUIPMENT – NITROGEN OXIDES

Equipment	Horse-power	Load Factor	Grams Per Horsepower Hour										
			2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Pavers	125	0.59	3.286	3.082	2.950	2.755	2.575	2.388	2.211	2.052	1.933	1.829	1.741
	150	0.59	3.286	3.082	2.950	2.755	2.575	2.388	2.211	2.052	1.933	1.829	1.741
	175	0.59	2.438	2.286	2.189	2.044	1.910	1.772	1.641	1.522	1.434	1.357	1.292
	400	0.59	3.675	3.520	3.309	3.092	2.885	2.694	2.540	2.398	2.265	2.141	2.027
Pumps	25	0.43	1.584	1.525	1.461	1.399	1.339	1.281	1.227	1.175	1.126	1.084	1.062
	120	0.43	3.217	3.149	3.083	2.994	2.905	2.812	2.720	2.630	2.540	2.451	2.364
	500	0.43	3.105	3.063	3.005	2.944	2.882	2.821	2.761	2.701	2.641	2.582	2.523
Rollers / Compactors	110	0.59	3.389	3.188	3.011	2.823	2.648	2.469	2.302	2.145	2.003	1.898	1.806
	350	0.59	3.732	3.589	3.393	3.190	2.995	2.807	2.632	2.491	2.360	2.236	2.121
Saws - Concrete / Pavement	50	0.59	1.919	1.833	1.793	1.761	1.738	1.719	1.704	1.693	1.688	1.686	1.685
Scrapers	300	0.59	1.880	1.798	1.672	1.554	1.443	1.330	1.226	1.152	1.090	1.038	1.011
	500	0.59	3.511	3.353	3.134	2.907	2.720	2.555	2.401	2.256	2.122	2.012	1.918
Sheet Pile Driving Equipment	250	0.43	3.394	3.271	3.129	2.989	2.851	2.715	2.583	2.469	2.359	2.254	2.152
Trucks - Construction	300	0.59	1.666	1.594	1.479	1.371	1.273	1.170	1.079	1.015	0.961	0.918	0.895
	400	0.59	2.963	2.833	2.589	2.349	2.167	2.005	1.865	1.742	1.644	1.603	1.583
	500	0.59	2.963	2.833	2.589	2.349	2.167	2.005	1.865	1.742	1.644	1.603	1.583
Haul Trucks(a)	Off-site		423.1	387.8	354.3	327.0	294.0	266.2	235.8	203.4	175.8	152.3	130.1
Light Duty Vehicles(a)	Off-site		43.2	38.8	32.3	29.1	26.1	23.3	20.7	18.3	16.0	14.1	12.4
	On-Site		28.6	26.2	22.3	20.2	18.1	16.1	14.2	12.5	11.2	9.9	8.8
Buses(a)	On-Site		312.4	286.3	264.5	241.4	217.0	196.5	174.0	150.2	129.8	112.4	96.0
Non-Road Vehicles(a)	On-Site		233.8	214.5	198.3	181.0	162.8	147.5	130.7	112.8	97.4	84.4	72.1

Note: (a) Emission factors in grams per mile
Source: Environmental Science Associates, Inc. [TPC] analysis, 2004

TABLE J.2-69
EMISSION FACTORS: CONSTRUCTION EQUIPMENT – SULFUR DIOXIDE

Equipment	Horse-power	Load Factor	Grams Per Horsepower Hour										
			2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Augers - Truck Mounted	50	0.43	0.266	0.266	0.267	0.156	0.045	0.045	0.023	0.001	0.001	0.001	0.001
Backhoes	100	0.21	0.266	0.266	0.267	0.156	0.045	0.045	0.023	0.001	0.001	0.001	0.001
	400	0.21	0.240	0.240	0.240	0.140	0.040	0.040	0.021	0.001	0.001	0.001	0.001
Backhoes / Loaders	250	0.21	0.240	0.240	0.240	0.140	0.040	0.040	0.021	0.001	0.001	0.001	0.001
Breakers - Concrete / Road	150	0.43	0.419	0.419	0.244	0.070	0.070	0.036	0.002	0.002	0.002	0.002	0.002
	200	0.43	0.419	0.419	0.244	0.070	0.070	0.036	0.002	0.002	0.002	0.002	0.002
	300	0.43	0.581	0.581	0.581	0.339	0.097	0.097	0.050	0.003	0.003	0.003	0.003
Bulldozers	300	0.59	0.581	0.581	0.581	0.339	0.097	0.097	0.050	0.003	0.003	0.003	0.003

TABLE J.2-69
EMISSION FACTORS: CONSTRUCTION EQUIPMENT – SULFUR DIOXIDE

Equipment	Horse-power	Load Factor	Grams Per Horsepower Hour										
			2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Drilling Equipment	500	0.43	0.419	0.419	0.244	0.070	0.070	0.036	0.002	0.002	0.002	0.002	0.002
Compactors	8	0.43	0.464	0.464	0.464	0.271	0.077	0.077	0.040	0.002	0.002	0.002	0.002
	15	0.43	0.464	0.464	0.464	0.271	0.077	0.077	0.040	0.002	0.002	0.002	0.002
	25	0.43	0.464	0.464	0.464	0.271	0.077	0.077	0.040	0.002	0.002	0.002	0.002
Compressors - Air	100	0.43	0.392	0.392	0.392	0.229	0.065	0.065	0.034	0.002	0.002	0.002	0.002
Compressors - Hydraulic	150	0.43	0.326	0.326	0.326	0.190	0.054	0.054	0.028	0.002	0.002	0.002	0.002
Concrete Finishers	20	0.59	0.643	0.644	0.644	0.376	0.107	0.107	0.055	0.003	0.003	0.003	0.003
	40	0.59	0.644	0.645	0.645	0.376	0.108	0.108	0.055	0.003	0.003	0.003	0.003
Cranes	100	0.43	0.419	0.419	0.244	0.070	0.070	0.036	0.002	0.002	0.002	0.002	0.002
	130	0.43	0.419	0.419	0.244	0.070	0.070	0.036	0.002	0.002	0.002	0.002	0.002
	150	0.43	0.419	0.419	0.244	0.070	0.070	0.036	0.002	0.002	0.002	0.002	0.002
	155	0.43	0.419	0.419	0.244	0.070	0.070	0.036	0.002	0.002	0.002	0.002	0.002
	200	0.43	0.419	0.419	0.244	0.070	0.070	0.036	0.002	0.002	0.002	0.002	0.002
	210	0.43	0.419	0.419	0.244	0.070	0.070	0.036	0.002	0.002	0.002	0.002	0.002
	250	0.43	0.419	0.419	0.244	0.070	0.070	0.036	0.002	0.002	0.002	0.002	0.002
	270	0.43	0.419	0.419	0.244	0.070	0.070	0.036	0.002	0.002	0.002	0.002	0.002
	275	0.43	0.419	0.419	0.244	0.070	0.070	0.036	0.002	0.002	0.002	0.002	0.002
	300	0.43	0.419	0.419	0.244	0.070	0.070	0.036	0.002	0.002	0.002	0.002	0.002
	400	0.43	0.419	0.419	0.244	0.070	0.070	0.036	0.002	0.002	0.002	0.002	0.002
	600	0.43	0.419	0.419	0.244	0.070	0.070	0.036	0.002	0.002	0.002	0.002	0.002
	750	0.43	0.419	0.419	0.244	0.070	0.070	0.036	0.002	0.002	0.002	0.002	0.002
Excavators	250	0.59	0.581	0.581	0.581	0.339	0.097	0.097	0.050	0.003	0.003	0.003	0.003
	300	0.59	0.581	0.581	0.581	0.339	0.097	0.097	0.050	0.003	0.003	0.003	0.003
	500	0.59	0.581	0.581	0.581	0.339	0.097	0.097	0.050	0.003	0.003	0.003	0.003
	100	0.59	0.645	0.645	0.645	0.376	0.108	0.108	0.055	0.003	0.003	0.003	0.003
Forklifts	150	0.59	0.581	0.581	0.581	0.339	0.097	0.097	0.050	0.003	0.003	0.003	0.003
Generators	100	0.43	0.464	0.464	0.464	0.271	0.077	0.077	0.040	0.002	0.002	0.002	0.002
	200	0.43	0.419	0.419	0.244	0.070	0.070	0.036	0.002	0.002	0.002	0.002	0.002
Graders	200	0.59	0.581	0.581	0.581	0.339	0.097	0.097	0.050	0.003	0.003	0.003	0.003
	500	0.59	0.581	0.581	0.581	0.339	0.097	0.097	0.050	0.003	0.003	0.003	0.003
Landscaping Equipment	150	0.43	0.419	0.419	0.244	0.070	0.070	0.036	0.002	0.002	0.002	0.002	0.002
	400	0.43	0.419	0.419	0.244	0.070	0.070	0.036	0.002	0.002	0.002	0.002	0.002
Loaders	150	0.21	0.240	0.240	0.240	0.140	0.040	0.040	0.021	0.001	0.001	0.001	0.001
	150	0.59	0.581	0.581	0.581	0.339	0.097	0.097	0.050	0.003	0.003	0.003	0.003
	250	0.59	0.581	0.581	0.581	0.339	0.097	0.097	0.050	0.003	0.003	0.003	0.003
Lowboys	500	0.21	0.240	0.240	0.240	0.140	0.040	0.040	0.021	0.001	0.001	0.001	0.001
Misc. Equipment	150	0.59	0.581	0.581	0.581	0.339	0.097	0.097	0.050	0.003	0.003	0.003	0.003

TABLE J.2-69
EMISSION FACTORS: CONSTRUCTION EQUIPMENT – SULFUR DIOXIDE

Equipment	Horse-power	Load Factor	Grams Per Horsepower Hour										
			2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Mixers	20	0.43	0.463	0.463	0.463	0.270	0.077	0.077	0.040	0.002	0.002	0.002	0.002
	50	0.43	0.464	0.464	0.464	0.271	0.077	0.077	0.040	0.002	0.002	0.002	0.002
Motor Buggies	20	0.59	0.463	0.463	0.463	0.270	0.077	0.077	0.040	0.002	0.002	0.002	0.002
	25	0.59	0.463	0.463	0.463	0.270	0.077	0.077	0.040	0.002	0.002	0.002	0.002
Pavers	125	0.59	0.581	0.581	0.581	0.339	0.097	0.097	0.050	0.003	0.003	0.003	0.003
	150	0.59	0.581	0.581	0.581	0.339	0.097	0.097	0.050	0.003	0.003	0.003	0.003
	175	0.59	0.581	0.581	0.581	0.339	0.097	0.097	0.050	0.003	0.003	0.003	0.003
	400	0.59	0.581	0.581	0.581	0.339	0.097	0.097	0.050	0.003	0.003	0.003	0.003
Pumps	25	0.43	0.423	0.423	0.423	0.247	0.071	0.071	0.036	0.002	0.002	0.002	0.002
	120	0.43	0.581	0.581	0.581	0.339	0.097	0.097	0.050	0.003	0.003	0.003	0.003
	500	0.43	0.385	0.385	0.385	0.225	0.064	0.064	0.033	0.002	0.002	0.002	0.002
Rollers / Compactors	110	0.59	0.581	0.581	0.581	0.339	0.097	0.097	0.050	0.003	0.003	0.003	0.003
	350	0.59	0.581	0.581	0.581	0.339	0.097	0.097	0.050	0.003	0.003	0.003	0.003
Saws - Concrete / Pavement	50	0.59	0.644	0.645	0.645	0.376	0.108	0.108	0.055	0.003	0.003	0.003	0.003
Scrapers	300	0.59	0.581	0.581	0.581	0.339	0.097	0.097	0.050	0.003	0.003	0.003	0.003
	500	0.59	0.581	0.581	0.581	0.339	0.097	0.097	0.050	0.003	0.003	0.003	0.003
Sheet Pile Driving Equipment	250	0.43	0.419	0.419	0.244	0.070	0.070	0.036	0.002	0.002	0.002	0.002	0.002
Trucks - Construction	300	0.59	0.581	0.581	0.581	0.339	0.097	0.097	0.050	0.003	0.003	0.003	0.003
	400	0.59	0.581	0.581	0.581	0.339	0.097	0.097	0.050	0.003	0.003	0.003	0.003
	500	0.59	0.581	0.581	0.581	0.339	0.097	0.097	0.050	0.003	0.003	0.003	0.003
Haul Trucks(a)	Off-site		18.252	18.188	18.14	0.544	0.544	0.544	0.54	0.54	0.54	0.54	0.54
Light Duty Vehicles(a)	Off-site		1.365	1.025	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34
	On-Site		1.128	0.849	0.282	0.285	0.285	0.285	0.285	0.285	0.285	0.285	0.285
Buses(a)	On-Site		13.689	13.641	13.005	0.408	0.408	0.408	0.405	0.405	0.405	0.405	0.405
Non-Road Vehicles(a)	On-Site		9.126	9.094	9.07	0.272	0.272	0.272	0.27	0.27	0.27	0.27	0.27

Note: (a) Emission factors in grams per mile
Source: Environmental Science Associates, Inc. [TPC], 2004

TABLE J.2-70
EMISSION FACTORS: CONSTRUCTION EQUIPMENT – PARTICULATE MATTER

Equipment	Horse-power	Load Factor	Grams Per Horsepower Hour										
			2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Augers - Truck Mounted	50	0.43	0.297	0.276	0.255	0.227	0.201	0.192	0.184	0.177	0.173	0.170	0.167
Backhoes	100	0.21	0.297	0.276	0.255	0.227	0.201	0.192	0.184	0.177	0.173	0.170	0.167
	400	0.21	0.201	0.190	0.180	0.167	0.154	0.150	0.144	0.138	0.135	0.131	0.128
Backhoes/Loaders	250	0.21	0.201	0.190	0.180	0.167	0.154	0.150	0.144	0.138	0.135	0.131	0.128
Breakers - Concrete/Road	150	0.43	0.166	0.156	0.148	0.129	0.113	0.112	0.109	0.106	0.106	0.107	0.109
	200	0.43	0.166	0.156	0.148	0.129	0.113	0.112	0.109	0.106	0.106	0.107	0.109
	300	0.43	0.17	0.136	0.128	0.109	0.092	0.088	0.083	0.078	0.076	0.074	0.074
Bulldozers	300	0.59	0.217	0.204	0.197	0.172	0.146	0.141	0.133	0.129	0.131	0.132	0.132
Drilling Equipment	500	0.43	0.320	0.308	0.298	0.274	0.250	0.239	0.227	0.214	0.204	0.194	0.184
Compactors	8	0.43	0.429	0.411	0.390	0.355	0.320	0.301	0.281	0.266	0.260	0.256	0.254
	15	0.43	0.360	0.337	0.311	0.270	0.229	0.205	0.180	0.160	0.151	0.144	0.139
	25	0.43	0.660	0.337	0.311	0.270	0.229	0.205	0.180	0.160	0.151	0.144	0.139
Compressors - Air	100	0.43	0.234	0.203	0.175	0.150	0.128	0.122	0.114	0.108	0.104	0.103	0.103
Compressors - Hydraulic	150	0.43	0.218	0.206	0.194	0.171	0.151	0.143	0.133	0.127	0.124	0.120	0.118
Concrete Finishers	20	0.59	0.483	0.421	0.362	0.312	0.269	0.255	0.239	0.225	0.216	0.213	0.212
	40	0.59	0.439	0.396	0.377	0.340	0.309	0.301	0.291	0.281	0.279	0.277	0.277
Cranes	100	0.43	0.292	0.272	0.252	0.218	0.193	0.187	0.178	0.169	0.165	0.161	0.161
	130	0.43	0.163	0.153	0.145	0.128	0.112	0.111	0.108	0.105	0.106	0.107	0.109
	150	0.43	0.163	0.153	0.145	0.128	0.112	0.111	0.108	0.105	0.106	0.107	0.109
	155	0.43	0.163	0.153	0.145	0.128	0.112	0.111	0.108	0.105	0.106	0.107	0.109
	200	0.43	0.143	0.132	0.126	0.108	0.090	0.087	0.082	0.076	0.074	0.074	0.074
	210	0.43	0.143	0.132	0.126	0.108	0.090	0.087	0.082	0.076	0.074	0.074	0.074
	250	0.43	0.143	0.132	0.126	0.108	0.090	0.087	0.082	0.076	0.074	0.074	0.074
	270	0.43	0.143	0.132	0.126	0.108	0.090	0.087	0.082	0.076	0.074	0.074	0.074
	275	0.43	0.143	0.132	0.126	0.108	0.090	0.087	0.082	0.076	0.074	0.074	0.074
	300	0.43	0.143	0.132	0.126	0.108	0.090	0.087	0.082	0.076	0.074	0.074	0.074
	400	0.43	0.172	0.160	0.151	0.129	0.107	0.100	0.090	0.082	0.079	0.077	0.075
	600	0.43	0.172	0.160	0.151	0.129	0.107	0.100	0.090	0.082	0.079	0.077	0.075
	750	0.43	0.177	0.166	0.157	0.134	0.112	0.105	0.095	0.087	0.084	0.081	0.079
Excavators	250	0.59	0.211	0.198	0.191	0.165	0.140	0.135	0.133	0.131	0.133	0.133	0.132
	300	0.59	0.211	0.198	0.191	0.165	0.140	0.135	0.133	0.131	0.133	0.133	0.132
	500	0.59	0.204	0.185	0.178	0.154	0.131	0.128	0.123	0.120	0.121	0.123	0.126
	100	0.59	0.424	0.396	0.368	0.319	0.285	0.276	0.265	0.265	0.273	0.281	0.288
Forklifts	150	0.59	0.224	0.210	0.197	0.188	0.181	0.195	0.204	0.203	0.205	0.206	0.207
Generators	100	0.43	0.420	0.409	0.397	0.370	0.345	0.335	0.323	0.310	0.300	0.291	0.282
	200	0.43	0.338	0.325	0.312	0.286	0.259	0.246	0.231	0.216	0.204	0.193	0.181
Graders	200	0.59	0.216	0.204	0.197	0.171	0.146	0.141	0.133	0.130	0.131	0.133	0.132

TABLE J.2-70
EMISSION FACTORS: CONSTRUCTION EQUIPMENT – PARTICULATE MATTER

Equipment	Horse-power	Load Factor	Grams Per Horsepower Hour										
			2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
	500	0.59	0.225	0.207	0.194	0.163	0.139	0.135	0.129	0.124	0.123	0.123	0.124
Landscaping Equipment	150	0.43	0.293	0.277	0.262	0.234	0.206	0.194	0.179	0.165	0.156	0.150	0.145
	400	0.43	0.293	0.277	0.262	0.234	0.206	0.194	0.179	0.165	0.156	0.150	0.145
Loaders	150	0.21	0.267	0.251	0.236	0.214	0.192	0.192	0.187	0.184	0.185	0.188	0.192
	150	0.59	0.267	0.251	0.236	0.214	0.192	0.192	0.187	0.184	0.185	0.188	0.192
	250	0.59	0.236	0.218	0.210	0.183	0.158	0.152	0.143	0.135	0.131	0.131	0.132
Lowboys	500	0.21	0.201	0.190	0.180	0.167	0.154	0.150	0.144	0.138	0.135	0.131	0.128
Misc. Equipment	150	0.59	0.298	0.282	0.267	0.238	0.210	0.204	0.197	0.192	0.190	0.190	0.190
Mixers	20	0.43	0.412	0.399	0.385	0.354	0.324	0.310	0.292	0.274	0.260	0.246	0.232
	50	0.43	0.407	0.399	0.391	0.367	0.345	0.339	0.329	0.319	0.312	0.305	0.299
Motor Buggies	20	0.59	0.412	0.399	0.385	0.354	0.324	0.310	0.292	0.274	0.260	0.246	0.232
	25	0.59	0.412	0.399	0.385	0.354	0.324	0.310	0.292	0.274	0.260	0.246	0.232
Pavers	125	0.59	0.257	0.241	0.231	0.209	0.189	0.188	0.184	0.182	0.185	0.190	0.195
	150	0.59	0.257	0.241	0.231	0.209	0.189	0.188	0.184	0.182	0.185	0.190	0.195
	175	0.59	0.257	0.241	0.231	0.209	0.189	0.188	0.184	0.182	0.185	0.190	0.195
	400	0.59	0.262	0.243	0.228	0.194	0.162	0.150	0.141	0.133	0.130	0.128	0.126
Pumps	25	0.43	0.345	0.327	0.307	0.273	0.239	0.220	0.198	0.177	0.160	0.145	0.138
	120	0.43	0.298	0.282	0.267	0.238	0.210	0.204	0.197	0.192	0.190	0.190	0.190
	500	0.43	0.279	0.264	0.251	0.224	0.198	0.185	0.170	0.155	0.144	0.133	0.125
Rollers/Compactors	110	0.59	0.267	0.251	0.236	0.214	0.192	0.192	0.187	0.184	0.185	0.188	0.192
	350	0.59	0.270	0.253	0.238	0.205	0.174	0.162	0.148	0.139	0.135	0.132	0.130
Saws - Concrete/Pavement	50	0.59	0.435	0.393	0.374	0.338	0.308	0.300	0.290	0.281	0.279	0.278	0.278
Scrapers	300	0.59	0.218	0.205	0.198	0.172	0.147	0.141	0.133	0.130	0.130	0.132	0.132
	500	0.59	0.237	0.218	0.204	0.171	0.144	0.140	0.132	0.126	0.124	0.124	0.125
Sheet Pile Driving Equipment	250	0.43	0.259	0.243	0.229	0.201	0.174	0.161	0.146	0.136	0.129	0.123	0.117
Trucks - Construction	300	0.59	0.194	0.176	0.168	0.150	0.135	0.140	0.137	0.133	0.133	0.133	0.133
	400	0.59	0.167	0.158	0.156	0.137	0.120	0.124	0.125	0.125	0.129	0.130	0.131
	500	0.59	0.167	0.158	0.156	0.137	0.120	0.124	0.125	0.125	0.129	0.130	0.131
Haul Trucks(a)	Off-site		16.732	15.62	14.628	12.084	10.576	9.316	8.308	7.436	6.508	5.876	5.076
Light Duty Vehicles(a)	Off-site		1.295	1.275	1.25	1.245	1.245	1.245	1.24	1.24	1.24	1.24	1.24
	On-Site		0.81	0.789	0.756	0.753	0.75	0.75	0.747	0.744	0.744	0.744	0.744
Buses(a)	On-Site		12.549	11.715	10.971	9.063	7.932	6.987	6.231	5.577	4.881	4.407	3.807
Non-Road Vehicles(a)	On-Site		8.366	7.81	7.314	6.042	5.288	4.658	4.154	3.718	3.254	2.938	2.538

Note: (a) Emission factors in grams per mile
Source: Environmental Science Associates, Inc. [TPC], 2004

Emission factors for pickup, flat bed, bucket, and dual tandem trucks were obtained from the MOBILE6.2 motor vehicle emission rate model. Appropriate input for annual vehicle mileage

accumulation, inspection/maintenance programs, anti-tampering and program effectiveness was obtained from the IEPA. Pickup trucks were modeled as light trucks with a gross vehicle weight less than 6,000 pounds (small pickup trucks) and trucks with a gross vehicle weight less than 8,500 pounds (larger pickup trucks). Flat bed, bucket and dual tandem trucks were modeled as heavy diesel powered vehicles. Emission factors for all on-road certified vehicles were obtained from the MOBILE6.2 model at vehicle speeds that were dependent on type of activity. The emission factors used in this analysis for pickup, flat bed, bucket, and dual tandem trucks are also provided in **Tables J.2-66** through **J.2-70**. Estimates of emissions attributable to construction-related employee vehicle trips were also evaluated, as well as onsite busing. For the nonroad equipment sulfur dioxide and particulate matter emission factors, a diesel sulfur content of 3,000 parts per million was assumed. The USEPA mandated reductions in sulfur content in nonroad diesel fuels were also assumed as follows: a) 500 parts per million effective June 2007 for nonroad diesel fuels and b) 15 parts per million (ultra-low sulfur diesel) effective June 2010 for nonroad diesel fuel.

As requested by the IEPA, the potential for air pollutant emissions resulting from demolition of residences and businesses was addressed. The proposed alternatives would involve demolition of some structures. In the northwest area of the Airport, approximately 1.3 million square feet of building demolition would occur through 2007. In the southwest area of the Airport, approximately 2.2 million square feet of building demolition would occur through 2009[30]. Emission estimates of particulate matter less than 10 microns due to demolition were calculated based on the size of each building and a factor of 0.00042 pounds of particulate matter 10 microns or less in size per cubic foot of building.[31]

Fugitive particulate matter emissions are expected from the handling and storage of raw materials during construction. The methodology used to calculate particulate emissions from the handling and storage of raw materials is described in AP-42, Section 13.2.4. The quantity of dust emissions from aggregate handling and storage operations varies with the volume of aggregate passing through the storage cycle. In addition to emissions from the handling of storage piles, USEPA provides a methodology for calculating emissions from wind erosion of storage piles (AP-42 Section 13.2.5). The emission factor for wind-generated particulate emissions is dependent on the frequency of disturbance of the storage pile and is expressed in units of grams per square meter per year. When a vehicle travels over an unpaved road; the force of the wheels on the road surface causes pulverization of surface material. Particles are lifted and dropped from the rolling wheels, and the road surface is exposed to strong air currents in turbulent shear with the surface. The turbulent wake behind the vehicle continues to act on the road surface after the vehicle has passed. The fugitive dust calculations account for watering and other control mechanisms; providing 90 percent control efficiency.

[30] Correspondence with Landrum and Brown dated July 13, 2004.
[31] South Coast Air Quality Management District, CEQA Air Quality Handbook, May 1993. Table A9-9, Estimating PM10 Emissions from Fugitive Dust.

J.2.2.6 Conversion of Total Hydrocarbon to Volatile Organic Compounds and Particulate Matter less than 10 Microns to Particulate Matter less than 2.5 Microns

The EDMS and NONROAD models provide estimates of total hydrocarbons. The MOBILE6.2 model provides estimates of volatile organic compounds. Typically, for General Conformity analyses and other analysis, emissions of this type are reported as volatile organic compounds. Therefore, estimates of total hydrocarbons were converted to volatile organic compounds. **Table J.2-71** provides the factors that were used to convert total hydrocarbons to volatile organic compounds. Further, the EDMS, NONROAD, and MOBILE6.2 models only provide emission estimates for particulate matter less than 10 microns. As such, the emissions and dispersion modeling of particulate matter less than 2.5 microns presented in this EIS, were also derived using conversion factors.

TABLE J.2-71
CONVERSION FACTORS

Pollutant Conversion	Source	Conversion Factor	Reference
Total Hydrocarbons to Volatile Organic Compounds	Aircraft	1.063	USEPA-450/4-81-026d (Revised), page 198
	Ground Support Equipment, Diesel	1.053	USEPA NONROAD model.
	Ground Support Equipment, Gasoline	0.933	USEPA NONROAD model.
	Natural Gas Boiler	0.500	AP-42, Vol.1, Table 1.4-2, ratio of volatile organic compounds to total organic compounds
	Fire Training, Propane	0.600	AP-42, Vol.1, Table 1.5-1, ratio of total non-methane organic compounds to total organic compounds
	Motor Vehicles	varies	USEPA MOBILE6.2
	Construction Equipment	1.00	USEPA NONROAD model.
Particulate Matter 10 Microns or Less in Size to Particulate Matter 2.5 Microns or Less in Size	Aircraft	1.00	FAA Memo May 24, 2005
	Ground Support Equipment, Diesel	0.97	USEPA NONROAD model.
	Ground Support Equipment, Gasoline	0.92	USEPA NONROAD model.
	Boiler, Natural Gas	1.00	AP-42, Vol.1, Table 1.4-2, Note c.
	Boiler, Oil	0.25	AP-42, Vol.1, Table 1.3-6
	Motor Vehicles	0.60	USEPA MOBILE6.2
	Construction Equipment	0.92	USEPA NONROAD model.

Source: Environmental Science Associates, Inc. [TPC] analysis, 2005

J.2.2.7 Emission Inventory Results - Airport-Related Sources

The annual emission inventory for the various project years and alternatives are provided in **Tables J.2-72** through **J.2-76** for the Original Schedule. The annual emission inventory for the various project years and alternatives are provided in **Tables J.2-77** through **J.2-80** for the Delayed Schedule.

TABLE J.2-72
ANNUAL EMISSIONS BY SOURCE CATEGORY - 2002

	Tons Emitted in 2002					
Source Category	**Carbon Monoxide**	**Volatile Organic Compounds**	**Nitrogen Oxides**	**Sulfur Oxides**	**Particulate Matter 10 microns or less**	**Particulate Matter 2.5 microns or less**
Aircraft (a)	4,052	424	3,956	340	53	53
Ground Support Equipment/ Auxiliary Power Units	9,083	414	479	36	10	10
Roadways	15,698	1,149	2,134	66	72	43
Parking Lots	68	11	10	<1	<1	<1
Stationary Sources	42	23	50	<1	4	4
Training Fires	4	2	1	<1	15	15
Total	**28,947**	**2,023**	**6,629**	**443**	**154**	**124**

Note: (a) Includes aircraft refueling emissions
Source: Environmental Science Associates, Inc. [TPC] analysis, 2004/2005.

TABLE J.2-73
ANNUAL EMISSIONS BY SOURCE CATEGORY – 2007 – ORIGINAL SCHEDULE

		Tons Emitted Last Year of Phase (2007) (d)					
Alternative(s)	**Source Category**	**Carbon Monoxide**	**Volatile Organic Compounds**	**Nitrogen Oxides**	**Sulfur Oxides**	**Particulate Matter 10 microns or less**	**Particulate Matter 2.5 microns or less**
A	Aircraft (f)	3,749	352	4,322	355	43	43
	GSE / APU(b)	9,470	410	446	38	10	9
	Roadways	12,144	742	1,580	12	55	33
	Parking Lots	63	10	6	<1	<1	<1
	Stationary Sources	42	24	50	<1	4	4
	Training Fires	4	2	1	<1	15	15
	Total	25,473	1,540	6,405	406	127	104
C, D, and G	Aircraft (f)	4,206	397	4,410	383	98	98
	GSE / APU(b)	9,823	425	458	38	10	10
	Roadways	12,459	760	1,617	13	56	34
	Parking Lots	62	10	6	<1	<1	<1
	Stationary Sources	42	25	50	<1	4	4
	Training Fires	4	2	1	<1	15	15
	Construction(e)	283	38	400	14	40	26
	Total	26,375	1,646	6,941	449	223	160

Notes: (a) Alternative A = No Action, Alternative C, D, and G are "Build Alternatives."
(b) GSE / APU = Ground support equipment / auxiliary power units.
(c) When compared to Alternative A (No Action).
(d) Numbers reflect numerical rounding.
(e) Level of emissions with the 9.4 MCY scenario.
(f) Includes aircraft refueling emissions.

Source: Environmental Science Associates, Inc. [TPC] analysis, 2004 / 2005.

TABLE J.2-74
ANNUAL EMISSIONS BY SOURCE CATEGORY – 2009 – ORIGINAL SCHEDULE

		Tons emitted Last Year of Phase (2009) (d)					
Alternative(s)	**Source Category**	**Carbon Monoxide**	**Volatile Organic Compounds**	**Nitrogen Oxides**	**Sulfur Oxides**	**Particulate Matter 10 microns or less**	**Particulate Matter 2.5 microns or less**
A	Aircraft (f)	3,599	331	4,370	354	38	38
	GSE / APU(b)	9,560	403	422	38	12	11
	Roadways	11,144	624	1,301	13	51	31
	Parking Lots	62	8	5	<1	<1	<1
	Stationary Sources	42	24	50	<1	4	4
	Training Fires	4	2	1	<1	15	15
	Total	24,411	1,393	6,149	405	120	99
C, D, and G	Aircraft (f)	4,633	428	4,694	413	91	91
	GSE / APU(b)	10,195	429	446	40	12	12
	Roadways	11,352	634	1,361	13	52	31
	Parking Lots	66	9	5	<1	<1	<1
	Stationary Sources	50	26	60	<1	5	5
	Training Fires	4	2	1	<1	15	15
	Construction(e)	74	11	126	2	14	9
	Total	26,375	1,537	6,693	468	189	154

Notes:
(a) Alternative A = No Action, Alternative C, D, and G are "Build Alternatives."
(b) GSE / APU = Ground support equipment / auxiliary power units.
(c) When compared to Alternative A (No Action).
(d) Numbers reflect numerical rounding.
(e) Level of emissions with the 9.4 MCY scenario.
(f) Includes aircraft refueling emissions.

Source: Environmental Science Associates, Inc. [TPC] analysis, 2004 / 2005.

TABLE J.2-75
ANNUAL EMISSIONS BY SOURCE CATEGORY – 2013 – ORIGINAL SCHEDULE

		Tons Emitted Last Year of Phase (2013) (e)					
Alternative(s)	**Source Category**	**Carbon Monoxide**	**Volatile Organic Compounds**	**Nitrogen Oxides**	**Sulfur Oxides**	**Particulate Matter 10 microns or less**	**Particulate Matter 2.5 microns or less**
A	Aircraft (g)	3,481	309	4,921	368	33	33
	GSE / APU(b)	9,947	399	394	39	14	14
	Roadways	9,318	419	795	13	46	28
	Parking Lots	57	5	3	<1	<1	<1
	Stationary Sources	42	24	50	<1	4	4
	Training Fires	4	2	1	<1	15	15
	Total	22,849	1,159	6,163	421	113	93
C	Aircraft (g)	4,921	429	5,524	446	39	39
	GSE / APU(b)	11,044	442	428	42	16	15
	Roadways	9,915	447	843	14	49	30
	Parking Lots	62	6	4	<1	<1	<1
	Stationary Sources	72	29	86	1	7	7
	Training Fires	4	2	1	<1	15	15
	Construction(f)	76	5	20	<1	5	3
	Total	**26,095**	1,358	6,905	503	131	105
D(d)	Aircraft (g)	5,197	453	5,588	460	41	41
	Total	26,370	1,392	6,970	517	132	121
G(d)	Aircraft (g)	4,836	422	5,505	442	39	39
	Total	26,010	1,353	6,885	499	131	120

Notes:
(a) Alternative A = No Action, Alternative C, D, and G are "Build Alternatives."
(b) GSE / APU = Ground support equipment / auxiliary power units.
(c) When compared to Alternative A (No Action)
(d) From an air quality / air pollutant perspective, the only difference in estimated emissions between Alternatives C and D or G would be those resulting from the operation of aircraft.
(e) Numbers reflect numerical rounding.
(f) Level of emissions with the 9.4 MCY scenario.
(g) Includes aircraft refueling emissions.

Source: Environmental Science Associates, Inc. [TPC] analysis, 2004 / 2005.

TABLE J.2-76
ANNUAL EMISSIONS BY SOURCE CATEGORY – 2018 – ORIGINAL SCHEDULE

		Tons Emitted Last Year of Phase (2018) (e)					
Alternative(s)	**Source Category**	**Carbon Monoxide**	**Volatile Organic Compounds**	**Nitrogen Oxides**	**Sulfur Oxides**	**Particulate Matter 10 microns or less**	**Particulate Matter 2.5 microns or less**
A	Aircraft (f)	3,549	310	5,359	383	34	34
	GSE / APU(b)	10,190	399	380	41	16	15
	Roadways	8,114	325	455	13	43	26
	Parking Lots	53	4	2	<1	<1	<1
	Stationary Sources	42	23	50	<1	4	4
	Training Fires	4	2	1	<1	15	15
	Total	21,952	1,064	6,246	438	111	93
C	Aircraft (f)	5,233	466	6,242	495	39	39
	GSE / APU(b)	11,799	461	417	44	18	17
	Roadways	8,806	353	491	15	47	28
	Parking Lots	63	5	3	<1	1	<1
	Stationary Sources	72	30	86	<1	7	7
	Training Fires	4	2	1	<1	15	15
	Total	25,977	1,318	7,239	554	125	106
D(d)	Aircraft (f)	5,710	508	6,358	520	41	41
	Total	26,455	1,360	7,355	579	127	107
G(d)	Aircraft (f)	5,210	464	6,236	493	39	39
	Total	25,954	1,316	7,234	553	125	106

Notes:
(a) Alternative A = No Action, Alternative C, D, and G are "Build Alternatives."
(b) GSE / APU = Ground support equipment / auxiliary power units.
(c) When compared to Alternative A (No Action)
(d) From an air quality / air pollutant perspective, the only difference in estimated emissions between Alternatives C and D or G would be those resulting from the operation of aircraft.
(e) Numbers reflect numerical rounding.
(f) Includes aircraft refueling emissions.

Source: Environmental Science Associates, Inc. [TPC] analysis, 2004 / 2005.

TABLE J.2-77
ANNUAL EMISSIONS BY SOURCE CATEGORY – 2008 – DELAYED SCHEDULE

		Tons Emitted Last Year of Phase (2008) (d)					
Alternative(s)	**Source Category**	**Carbon Monoxide**	**Volatile Organic Compounds**	**Nitrogen Oxides**	**Sulfur Oxides**	**Particulate Matter 10 microns or less**	**Particulate Matter 2.5 microns or less**
A	Aircraft (f)	3,703	348	4,357	354	40	40
	GSE / APU(b)	9,490	405	430	38	11	10
	Roadways	11,641	681	1,433	13	53	32
	Parking Lots	63	9	6	<1	<1	<1
	Stationary Sources	42	24	50	<1	4	4
	Training Fires	4	2	1	<1	15	15
	Total	24,942	1,469	6,276	405	123	101
C, D, and G	Aircraft (f)	4,452	407	4,486	396	93	93
	GSE / APU(b)	9,922	423	446	39	11	10
	Roadways	11,874	695	1,446	13	54	32
	Parking Lots	61	9	5	<1	<1	<1
	Stationary Sources	42	13	50	<1	4	4
	Training Fires	4	2	1	<1	15	15
	Construction(e)	284	35	373	4	35	22
	Total	26,639	1,597	6,808	452	211	177

Notes:
(a) Alternative A = No Action, Alternative C, D, and G are "Build Alternatives."
(b) GSE / APU = Ground support equipment / auxiliary power units.
(c) When compared to Alternative A (No Action).
(d) Numbers reflect numerical rounding.
(e) Level of emissions with the 9.4 MCY scenario.
(f) Includes aircraft refueling emissions.

Source: Environmental Science Associates, Inc. [TPC] analysis, 2004 / 2005.

TABLE J.2-78
ANNUAL EMISSIONS BY SOURCE CATEGORY – 2010 – DELAYED SCHEDULE

		Tons Emitted Last Year of Phase (2010) (d)					
Alternative(s)	**Source Category**	**Carbon Monoxide**	**Volatile Organic Compounds**	**Nitrogen Oxides**	**Sulfur Oxides**	**Particulate Matter 10 microns or less**	**Particulate Matter 2.5 microns or less**
A	Aircraft (f)	3,532	320	4,478	354	37	37
	GSE / APU(b)	9,625	401	413	38	13	12
	Roadways	10,639	564	1,161	13	51	30
	Parking Lots	60	7	4	<1	<1	<1
	Stationary Sources	42	24	50	<1	4	4
	Training Fires	4	2	1	<1	15	15
	Total	23,902	1,318	6,106	406	119	98
C, D, and G	Aircraft (f)	4,821	439	4,993	432	92	92
	GSE / APU(b)	10,431	434	444	41	13	13
	Roadways	10,944	580	1,163	13	52	31
	Parking Lots	65	8	5	<1	<1	<1
	Stationary Sources	50	14	60	<1	5	5
	Training Fires	4	2	1	<1	15	15
	Construction(e)	79	10	97	1	13	7
	Total	26,394	1,499	6,793	487	191	164

Notes:
(a) Alternative A = No Action, Alternative C, D, and G are "Build Alternatives."
(b) GSE / APU = Ground support equipment / auxiliary power units.
(c) When compared to Alternative A (No Action).
(d) Numbers reflect numerical rounding.
(e) Level of emissions with the 9.4 MCY scenario.
(f) Includes aircraft refueling emissions.

Source: Environmental Science Associates, Inc. [TPC] analysis, 2004 / 2005.

TABLE J.2-79
ANNUAL EMISSIONS BY SOURCE CATEGORY – 2014 – DELAYED SCHEDULE

		Tons Emitted Last Year of Phase (2014) (e)					
Alternative(s)	**Source Category**	**Carbon Monoxide**	**Volatile Organic Compounds**	**Nitrogen Oxides**	**Sulfur Oxides**	**Particulate Matter 10 microns or less**	**Particulate Matter 2.5 microns or less**
A	Aircraft (g)	3,503	311	5,027	373	33	33
	GSE / APU(b)	10,001	397	388	40	15	14
	Roadways	9,007	389	702	13	46	27
	Parking Lots	56	5	3	<1	<1	<1
	Stationary Sources	42	24	50	<1	4	4
	Training Fires	4	2	1	<1	15	15
	Total	22,612	1,129	6,170	426	112	93
C	Aircraft (g)	5,022	437	5,659	456	39	39
	GSE / APU(b)	11,155	443	423	42	16	16
	Roadways	9,575	413	744	14	49	29
	Parking Lots	60	5	3	<1	<1	<1
	Stationary Sources	72	29	86	<1	7	6
	Training Fires	4	2	1	<1	15	15
	Construction(f)	115	7	31	<1	7	4
	Total	26,004	1,337	6,946	514	133	112
D(d)	Aircraft (g)	5,282	460	5,710	469	41	41
	Total	26,263	1,359	7,006	527	134	113
G(d)	Aircraft (g)	4,893	426	5,629	450	39	39
	Total	25,874	1,328	6,916	507	133	126

Notes:
(a) Alternative A = No Action, Alternative C, D, and G are "Build Alternatives."
(b) GSE / APU = Ground support equipment / auxiliary power units.
(c) When compared to Alternative A (No Action)
(d) From an air quality / air pollutant perspective, the only difference in estimated emissions between Alternatives C and D or G would be those resulting from the operation of aircraft.
(e) Numbers reflect numerical rounding.
(f) Level of emissions with the 9.4 MCY scenario.
(g) Includes aircraft refueling emissions.

Source: Environmental Science Associates, Inc. [TPC] analysis, 2004 / 2005.

TABLE J.2-80
ANNUAL EMISSIONS BY SOURCE CATEGORY – 2019 –DELAYED SCHEDULE

		Tons Emitted Last Year of Phase (2019) (e)					
Alternative(s)	**Source Category**	**Carbon Monoxide**	**Volatile Organic Compounds**	**Nitrogen Oxides**	**Sulfur Oxides**	**Particulate Matter 10 microns or less**	**Particulate Matter 2.5 microns or less**
A	Aircraft (f)	3,549	310	5,359	383	34	34
	GSE / APU (b)	10,190	398	378	41	16	15
	Roadways	8,008	316	420	14	43	26
	Parking Lots	51	4	2	<1	<1	<1
	Stationary Sources	42	24	50	<1	4	4
	Training Fires	4	2	1	<1	15	15
	Total	21,844	1,055	6,210	438	112	94
C	Aircraft (f)	5,349	476	6,327	503	40	40
	GSE / APU (b)	11,935	466	420	45	18	17
	Roadways	8,698	344	455	15	47	28
	Parking Lots	61	5	2	1	1	<1
	Stationary Sources	72	16	86	1	7	6
	Training Fires	4	2	1	<1	15	15
	Total	26,119	1,324	7,290	564	127	107
D(d)	Aircraft (f)	5,835	519	6,445	529	41	41
	Total	26,605	1,367	7,408	589	128	109
G(d)	Aircraft (f)	5,315	473	6,319	501	40	40
	Total	26,085	1,321	7,382	562	127	107

Notes:
(a) Alternative A = No Action, Alternative C, D, and G are "Build Alternatives."
(b) GSE / APU = Ground support equipment / auxiliary power units.
(c) When compared to Alternative A (No Action)
(d) From an air quality / air pollutant perspective, the only difference in estimated emissions between Alternatives C and D or G would be those resulting from the operation of aircraft.
(e) Numbers reflect numerical rounding.
(f) Includes aircraft refueling emissions.

Source: Environmental Science Associates, Inc. [TPC] analysis, 2004 / 2005.

J.2.3 Dispersion Analysis - Airport

Dispersion is the process by which atmospheric pollutants disseminate due to wind and vertical stability. The results of a dispersion analysis are used to assess pollutant concentrations at or near an airport. The base data for the dispersion analysis are the emission inventories. The results of the analysis allow a direct comparison of predicted concentrations of pollutants to the National Ambient Air Quality Standards.

Dispersion modeling uses hourly averaged meteorological data, terrain elevation data (in this case assumed to be flat), and emissions and source release data to compute downwind pollutant concentrations over averaging periods ranging from one hour to one year. This section presents the methodology used for the dispersion modeling analysis.

The macroscale analysis was also performed using the EDMS. Use of this model is required by the FAA when evaluating airport-related emissions at civilian airports and military air bases.[32] EDMS calculates concentrations/levels of carbon monoxide, sulfur dioxide, nitrogen dioxide, and respirable particulate matter with a diameter of 10 microns or smaller. Concentrations of nitrogen dioxide were derived using levels of nitrogen oxides and the USEPA's default factor for converting nitrogen oxides to nitrogen dioxide. Sulfur oxide results were compared directly to the sulfur dioxide National Ambient Air Quality Standard. Where necessary and appropriate, these methods and databases were supplemented with the USEPA's guidance for emissions inventory development.[33]

Input to computer models for dispersion analysis requires identifying emission sources by their location and by a variance in emission rates according to the hour of the day, day of the week, and month of the year (based on operational profiles). The models disperse emissions over each period with respect to weather conditions that are also model input. The dispersion analysis was performed to predict levels of pollutants at expected maximum locations on- and off-airport property and at existing and future receptors (sensitive sites) in the vicinity of the Airport.

The dispersion analysis was performed for the year 2002 and for the future years of 2007, 2009, 2013, and 2018 (with and without the proposed alternatives). Ambient concentrations of pollutants were predicted for carbon monoxide, nitrogen oxides, sulfur oxides, and particulate matter 10 microns in size or less for each of the corresponding National Ambient Air Quality Standard averaging times. Maximum concentrations were estimated at each receptor location for the following pollutants and averaging times:

- Carbon Monoxide: 1-hour and 8-hour,
- Sulfur Dioxide: 3-hour, 24-hour, and annual,
- Nitrogen Dioxide: annual,

[32] Federal Register, Vol. 63, No. 70/April 13, 1998.

[33] Introduction and Use of EIIP Guidance for Emissions Inventory Development, EPA-454/R-97-004a, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. July 1997.

- Particulate Matter 10 microns in size or less: 24-hour, and annual, and
- Particulate Matter 2.5 microns in size or less: 24-hour, and annual.

General input data (at the Airport Reference Point) for the EDMS included the following:

- The latitude of the Airport is 41º 58′ 46.542″ North,
- The longitude is 87º 54′ 16.071″ West,
- The elevation is 668 feet,
- The mixing height was assumed to be 2,510 feet, and
- The average annual temperature is 49.1 degrees Fahrenheit.

The dispersion modeling analysis was supplemented by a post-processing methodology (a Microsoft Access database) that is consistent with industry practice. This methodology was used to identify the concentrations for each pollutant, for each pollutant's respective averaging time(s), at each of the receptors, for a source category and the total Airport. The concentrations at each receptor in the modeling network are needed to present a complete spatial picture of air quality impacts at each modeled location. Actual hourly meteorological data for the maximum (discussed in **Section J.2.3.2**, **Meteorological Data**) was used in the modeling analysis to estimate pollutant concentrations at each sensitive receptor location. Pollutant background concentrations were added to the maximum concentrations estimated by the computer model to provide a total estimated maximum concentration at each sensitive receptor location. The EDMS model and the post-processing methodology were used to estimate concentrations due to emissions from all aircraft, ground support equipment, on- and off-Airport roadways, curbsides, parking facilities, and stationary sources, as well as construction activities.

The following describes how EDMS assigns and models the various sources. Aircraft emissions occur on the taxiways, at the end of the active runways, and on the runways themselves. These emissions were simulated as a set of stationary point sources at each terminal apron area next to aircraft gate locations. Emissions from motor vehicles on the on- and off-Airport roadways were modeled as individual line sources. The motor vehicle emissions from terminal curbsides were modeled as line sources located next to the on-Airport roadways immediately in front of the various terminals. All parking lots, including the Passenger Parking Lots and the Employee Parking Lots in the service areas were modeled as area sources. Each level of parking garages was modeled individually as an elevated area source. The Heating and Refrigeration Plant stacks and training fires were modeled as point sources.

Predicted concentrations resulting from the sources associated with each alternative were added to background concentrations that represent sources in the vicinity of the Airport that were not included in the modeling effort. Notably, the EDMS does not have the capability of predicting concentrations of ozone for comparison with the National Ambient Air Quality Standards. The results of the emission inventories are used to address conformity of the proposed alternatives to the 1-hour ozone State Implementation Plan.

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.

For example, errors in highest estimated concentrations of ±10 to 40 percent are found to be typical, i.e., certainly well within the often quoted "factor-of-two accuracy" for these models.[34] However, estimates of concentrations that occur at a specific time and site are poorly correlated with actually observed concentrations and are much less reliable. Therefore, it is difficult to correlate monitoring results to modeled concentrations in air, and is correspondingly difficult to make predictions about potential human exposures at specific locations.

A limitation with Gaussian plume models is that they use hourly meteorological data which, while the data vary vertically, are assumed to be uniform horizontally. Consequently, the accuracy of modeling results degrades as distance from the source increases (and the source of the meteorological data, which can also be the airport). Therefore, long-range modeling predictions, where "long-range" is taken to mean distances up to 50 km from the source, are progressively less accurate.

J.2.3.1 Background Concentrations

The dispersion modeling performed for the air quality analysis cannot represent all pollutant sources in proximity to the Airport that contribute to total pollutant levels. Therefore, background concentrations were developed to reflect the emissions from nearby sources. When background concentrations are added to the Airport dispersion modeling results, the results represent total pollutant concentrations at the receptor sites.

Background concentrations for this analysis were recommended by the IEPA.[35] For all pollutants except particulate matter 2.5 microns or less in size and for averaging periods less than one year, the background concentrations are the second highest measured level that was measured during a three-year consecutive period (IEPA evaluated the years 1996 through 2001 and selected a three-year period for each pollutant within this time frame). The IEPA's background values were used for both the existing condition and future conditions. Use of these background factors result in conservatively high estimated values for the future given the downward trend in pollutant concentrations within the area. The IEPA's background values for particulate matter 2.5 microns or less in size are based on the 98th percentile value occurring from 2002 through 2004 at the Des Plaines monitoring station. The background concentrations used in the macroscale dispersion analysis are provided in **Table J.2-81**.

[34] U.S. Environmental Protection Agency (USEPA). 2000a. 40 CFR Part 51. Requirements for Preparation, Adoption, and Submittal of State Implementation Plans (Guideline on Air Quality Models); Proposed Rule. Federal Register. 65(78): 21506-21546, April 21, 2000.

[35] Email, Rob Kaleel, IEPA, January 6, 2003.

TABLE J.2-81
BACKGROUND CONCENTRATIONS

Pollutant	Averaging Time	Station Selected	Year	Background Concentration	Percent of Standard
	1-hour	Schiller Park	1999	4.5 ppm (5,143 μg/m³)	13
Carbon Monoxide	8-hour	Schiller Park	1999	2.9 ppm (3,314 μg/m³)	32
Nitrogen Dixode	Annual	Schiller Park	1999	58 μg/m³	58
	3-hour	Lisle	1999	192 μg/m³	15
	24-hour	Lisle	2000	76 μg/m³	21
Sulfur Dioxide	Annual	Lisle	1998	8 μg/m³	10
Particulate Matter 10	24-hour	Bensenville	1998	60 μg/m³	40
Microns of less in size	Annual	Bensenville	1998	30 μg/m³	60
Particulate Matter 2.5	24-hour	Des Plaines	(a)	35.2 μg/m³	54
Microns of less in size	Annual	Des Plaines	(a)	13.3 μg/m³	89

Notes: ppm - parts per million
μg/m³ - micrograms per cubic meter
(a) 98th percentile value for data between the years 2002 and 2004.
Source: Environmental Science Associates, Inc. [TPC] analysis of IEPA Annual Air Quality Report 1999 – 2001, 2004, IEPA correspondance May 17, 2005.

J.2.3.2 Meteorological Data

Lake Michigan influences the climate of northeastern Illinois, especially Chicago. The large thermal mass of the lake tends to moderate temperatures, causing cooler summers and warmer winters. One of the major benefits is cool lake breezes that provide some relief from summer heat. The lake also tends to increase cloudiness in the area and suppress summer precipitation. Winter precipitation is enhanced by lake-effect snows that occur when winds blow from the north or northeast. These winds allow air to pass over the relatively warm lake, boosting storm system energy and water content, and leading to increased snowfall.[36]

Winds in the Chicago region typically flow from either the southwest or northwest (**Exhibit J.2-2**). The 30-year (1971-2000) normal for maximum and minimum temperature are 58.3 degrees Fahrenheit and 39.8 degrees Fahrenheit, respectively. Based on data from 1971 through 2000, the mean annual temperature is 49.1 degrees Fahrenheit. The annual precipitation is approximately 36.3 inches and the average annual wind speed is approximately 10.4 miles per hour. The mixing height is the top of the unstable or neutral air near the ground and it determines the limits of vertical transport and diffusion of pollutants. For this analysis, the site-specific value for the mixing height of 2,410 feet was used.

[36] http://www.sws.uiuc.edu/atmos/statecli/General/Illinois-climate-narrative.pdf

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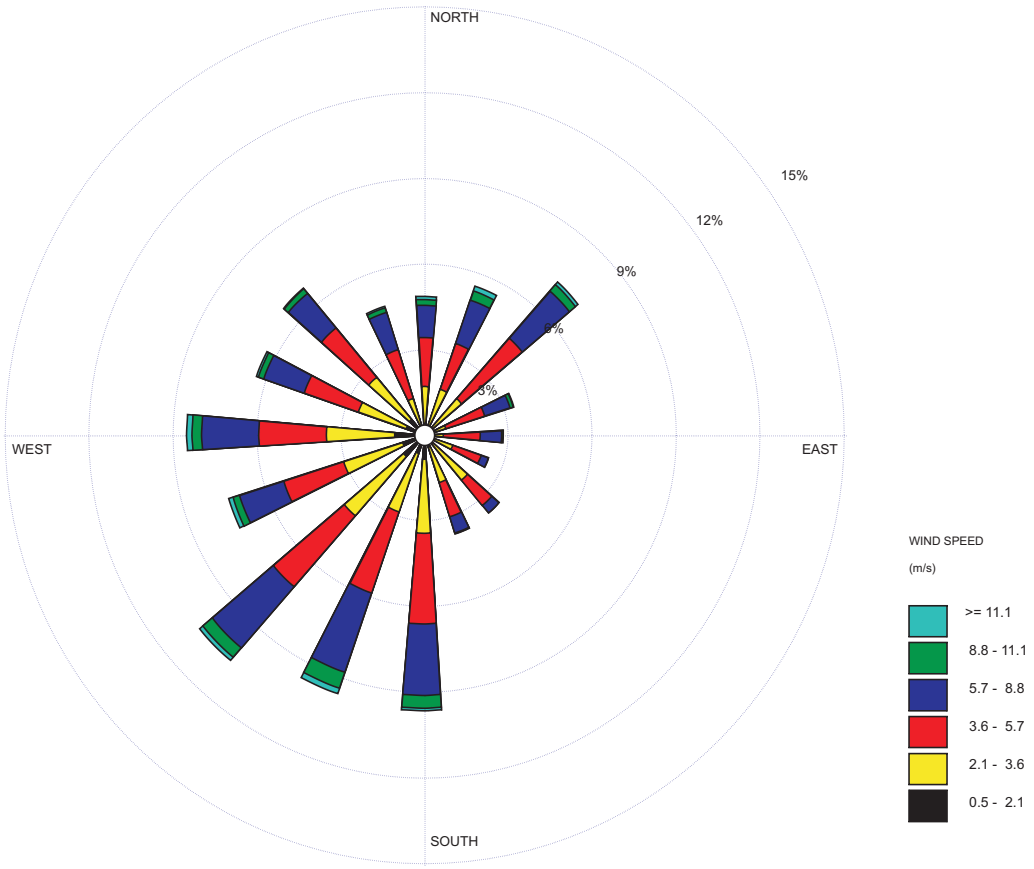

Source: Environmental Science Associates [TPC], 2004

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Meteorological Wind Rose

▶ **Exhibit J.2-2**

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The EDMS program uses both surface and upper air[37] meteorological conditions. The data used in the evaluation of the O'Hare improvements was obtained from the National Climatic Data Center. The dispersion modeling analysis used actual hour-of-day meteorological data collected at the Chicago O'Hare International Airport by the National Weather Service for the five-year period (1986-1990). Based on discussions with IEPA, the year 1990 meteorological data was selected to simulate maximum conditions.[38] Detailed analysis using year 2002 and 2019 (Alternative C) data confirmed the selection of the 1990 meteorological data for use in the analysis as this year of meteorological data produced the highest predicted concentrations. **Table J.2-82** displays the results of the worst case meteorological year analysis. As shown, the analysis focused on predicted concentrations of nitrogen dioxide (not including background) because, based on professional experience with air dispersion modeling for airports, the computer predicted concentrations of this pollutant (including background) would be the closest to the NAAQS. As also shown, the predicted concentrations of nitrogen dioxide for the meteorological year 1990 are much greater than those for any of the other evaluated years (nine and seven percent greater than the next highest predicted concentrations for either evaluated condition). As such, use of the year 1990 meteorological data clearly resulted in the greatest predicted concentrations.

TABLE J.2-82
WORST-CASE METEOROLOGICAL DATA ANALYSIS

Scenario	Year	Annual NO2 Concentration	Percent of 1990
Baseline 2002	1986	24.7	92
	1987	23.9	89
	1988	23.5	88
	1989	22.1	82
	1990	26.8	--
Build Out + 5 Alternative C	1986	23.9	94
	1987	22.5	88
	1988	22.1	87
	1989	21.3	84
	1990	25.5	--

Source: Environmental Science Associates, Inc. [TPC] analysis, 2005.

Also based on discussions with IEPA, if any of the predicted concentrations were close to (within 10 percent) an applicable standard, additional years of meteorological data would be simulated (after reviewing whether adjustments are appropriate to the applicable background concentration(s)). The only occurrence meeting these criteria was for Alternative C, D, and G for the Construction Phase II scenario for the original and delayed schedules for nitrogen dioxides and carbon monoxide, respectively. The following **Table J.2-83** displays the results for these scenarios for all years of analysis. Notably, all data is below the applicable standard and the results for 1990 produce the greatest concentrations.

[37] Peoria, Illinois.
[38] Teleconference with IEPA, November 22, 2002.

TABLE J.2-83
ANALYSIS OF SCENARIOS EXCEEDING 90 PERCENT OF AMBIENT AIR QUALITY STANDARD

Scenario	Year	Annual NO2 Concentration	1-Hour CO Concentration	8-Hour CO Concentration
Construction Phase I	1986	28.3	NA	NA
Alternative C	1987	27.3	NA	NA
Original Schedule	1988	27.4	NA	NA
	1989	25.7	NA	NA
	1990	32.4	NA	NA
Construction Phase I	1986	NA	12,653	3,778
Alternative C	1987	NA	12,538	4,007
Delayed Schedule	1988	NA	9,251	3,078
	1989	NA	10,479	2,452
	1990	NA	31,079	5,074

Note: NA = Not Available
Source: Environmental Science Associates, Inc. [TPC] analysis, 2005.

J.2.3.3 Receptor Data

Pollutant concentrations were predicted at a sufficient number of publicly accessible locations so that the maximum potential concentrations of the pollutants were evaluated. To be conservative, receptors were placed at the Airport property line at approximate intervals of 10 degrees which resulted in predicted concentrations at approximately 36 receptors. On-Airport receptors included the curbsides at the various terminals, in the public and employee parking facilities and at other areas where the public has reasonable access. Additional discrete receptors were analyzed. The placement of discrete receptors was based on the following considerations: locations where the general public have reasonable access, the locations of dominant emission sources, distances between sources and receptors, model limitations, and professional judgment.

Table J.2-84 and **Exhibit J.2-3** provide a brief description of and illustrate the receptor locations that were used in the dispersion modeling analysis. As shown, Receptors R01 through R08 were located at terminal curbside locations on Airport property (lower and upper level). In the future year analyses with the proposed alternatives, receptors were placed at the curbsides of the proposed Terminals 4 and 6, and the West Terminal. Receptors were assumed at a height of 1.8 meters above ground and/or source level (breathing height).

TABLE J.2-84
RECEPTOR LOCATIONS

Receptor ID	Receptor Description	Receptor ID	Receptor Description
R01A	Terminal 1 Curbside (Lower)	12	Property Line (115º - RW27L)
R01B	Terminal 1 Curbside (Upper)	13	Mannheim and Lawrence Intersection (125º)
R02A	Terminal 2 Curbside (Lower)	14	Property Line (135º)
R02B	Terminal 2 Curbside (Upper)	15	Mannheim and Irving Park Intersection (145º)
R03A	Terminal 3 Curbside (Lower)	16	Property Line (155º - FRW10R)
R03B	Terminal 3 Curbside (Upper)	17	Property Line (165º - RW32L)
R04A	Terminal 4 Curbside (Lower)	18	Property Line (175º - RW4R)
R04B	Terminal 4 Curbside (Upper)	19	Property Line (185º)
R05	Shuttle Bus Center Curbside	20	Property Line (195º)
R06A	Terminal 5 Curbside (Lower)	21	Property Line (205º)
R06B	Terminal 5 Curbside (Upper)	22	Property Line (215º)
R07A	Terminal 6 Curbside (Lower)	23	Property Line (225º - FRW28L)
R07B	Terminal 6 Curbside (Upper)	24	York and Irving Park Intersection (235º)
R08A	Terminal 7 Curbside (Lower)	25	Property Line (245º -RW9R)
R08B	Terminal 7 Curbside (Upper)	26	Property Line (260º)
		27	Property Line (275º - RW9L/FRW9R)
1	Property Line (5º)	28	Property Line (285º - FRW9C)
2	Property Line (15º)	29	Property Line (300º - RW14R)
3	Property Line (25º - RW22R)	30	Property Line (310º - FRW9L)
4	Mannheim and Higgins Intersection (35º)	31	Touhy and Elmhurst Intersection (315º)
5	Mannheim and Zemke Intersection (45º)	32	Property Line (325º)
6	Property Line (55º)	33	Touhy and Mt. Prospect Intersection (335º)
7	Property Line (65º)	34	Property Line (345º)
8	Property Line (75º)	35	Property Line (355º)
9	IEPA Monitoring Station (85º - Schiller Park)	36	Touhy and Wolf Intersection (355º)
10	Property Line (95º)	37	Thorndale and Arlington Heights Intersection
11	Property Line (105º - RW22L)	38	Devon and Arlington Heights Intersection

Source: Environmental Science Associates, Inc. [TPC] analysis, 2004/2005.

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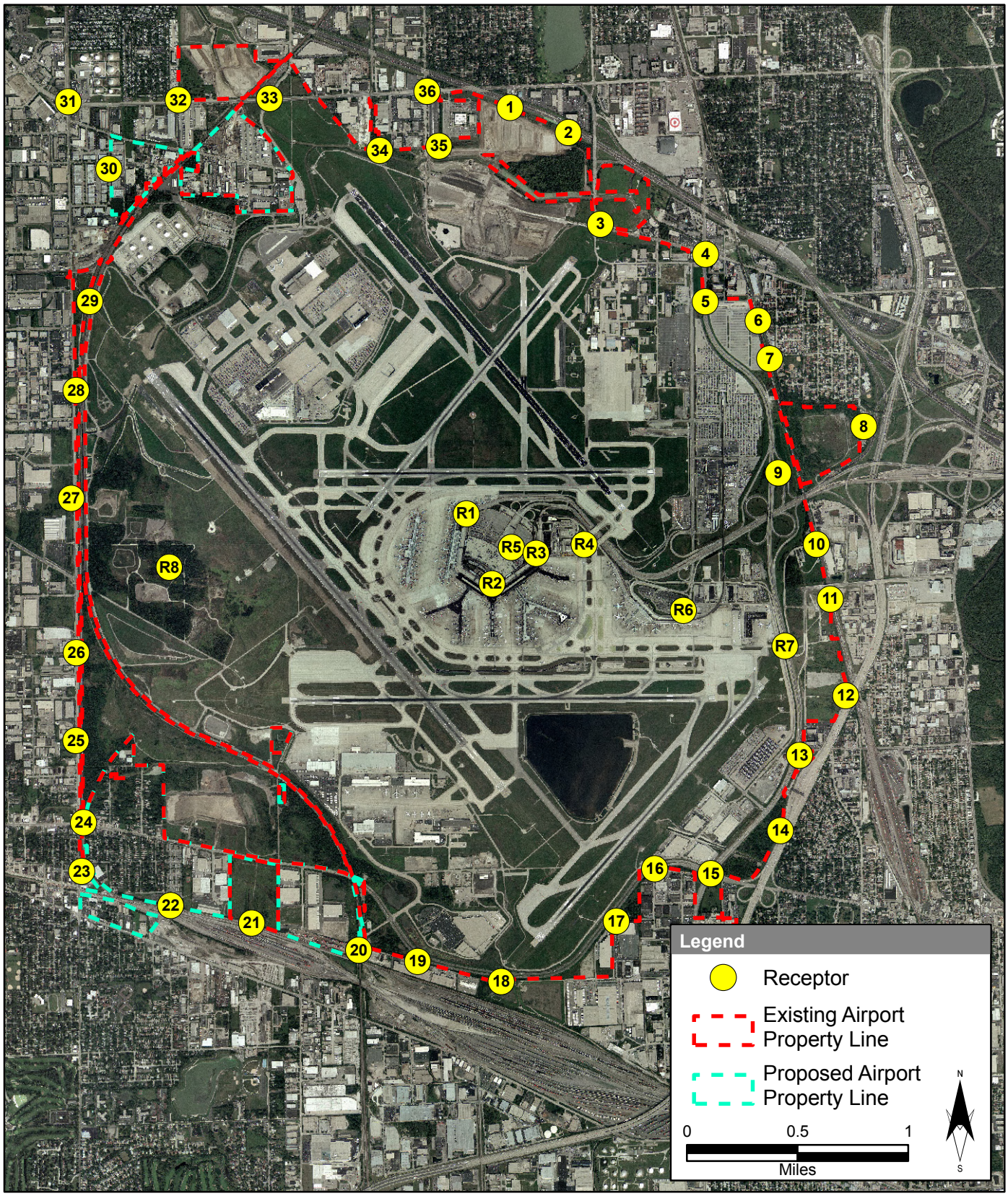

Source: Aerial Express, September 2002. Environmental Science Associates [TPC], 2004.

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Receptor Locations

▶ **Exhibit J.2-3**

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J.2.3.4 Estimating Annual Nitrogen Dioxide Concentrations

Following the Criteria Air Pollutant Protocol (**Section J.1, Air Quality Analysis Protocol – Criteria Air Pollutants**), nitrogen dioxide concentrations were derived from modeled nitrogen oxides estimates using the higher result from the following sources:

- The ratio of measured ambient nitrogen dioxide to nitrogen oxides concentrations at IEPA's Schiller Park monitoring station, or
- The ratio of measured ambient nitrogen dioxide to nitrogen oxides concentrations at IEPA's Cicero monitoring station, or
- The default 0.75 nitrogen dioxide to nitrogen oxides ratio established in United States Environmental Protection Agency's Tier 2 Ambient Ratio Method.[39]

A historical analysis of the nitrogen dioxide to nitrogen oxides monitored concentrations at the Schiller Park and Cicero monitoring stations from 1984 to 2001 indicated that the nitrogen dioxide to nitrogen oxides ratio ranges from 0.35 to 0.62.[40] Therefore, the analysis assumed the highest of the three ratios, the USEPA default of 0.75. Notably, use of this ratio results in conservatively high estimates of nitrogen oxides.

J.2.3.5 Dispersion Modeling Results - Airport-Related Sources

As previously stated, concentrations were estimated for the following pollutants and averaging times: 1- and 8-hour carbon monoxide; 3-hour, 24-hour, and annual sulfur dioxide; annual nitrogen dioxide; 24-hour and annual particulate matter 10 microns or less in size; and 24-hour and annual particulate matter 2.5 microns or less in size. The short-term and annual pollutant concentrations for the various analysis years and alternatives are provided in **Tables J.2-85** through **J.2-89** for the Original Schedule. The short-term and annual pollutant concentrations for the entire receptor network for the project years and alternatives are provided in **Tables J.2-90** through **J.2-102** for the Original Schedule. All of the predicted pollutant concentrations for all averaging periods for every analysis year and alternative were below the applicable air quality standards. The short-term and annual pollutant concentrations for the various analysis years and alternatives are provided in **Tables J.2-103** through **J.2-118** for the Delayed Schedule.

A number of factors effect Airport emissions and the estimated level of air pollutants. Aircraft operations are forecast to increase with Alternatives C, D, and G. However, the operational level remains essentially constant with the No Action Alternative (Alternative A). Further, while motor vehicle volumes would increase with Alternatives A, C, D, and G, the volumes at the individual curbsides are greater with Alternative A than with Alternatives C, D, and G. Alternative A also has a greater number of rental car shuttles than Alternatives C, D, and G

[39] Guideline on Air Quality Models (Revised) with Supplements A and B, EPA-450/2-78-027R, U.S. Environmental Protection Agency, O.A.Q.P.S., Research Triangle Park, NC, July 1, 1997. Codified in 40 CFR Part 51, Appendix W.

[40] AIRSData Monitor Values Report, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC.

(due to the construction of the Rental Car parking lot). Finally, in Construction Phase II, Terminal 7 would become operational with Terminals 4 and 6 becoming operational in the Build Out phase.

Additional factors that affect the estimated pollutant concentrations include the locations of the runways. In Construction Phase I, Runway 9L/27R (the most northern runway) would become operational with Runway 10R/28L (far south runway) becoming operational in the Build Out phase. The cargo-narrow and passenger-narrow aircraft also tend to decrease with time as a percentage of fleet, while cargo-wide and passenger-wide aircraft tend to increase with time as a percentage of fleet.

TABLE J.2-85
DISPERSION MODELING RESULTS - 2002

	Maximum Predicted Pollutant Concentrations (µg/m³)									
	NO2	CO		PM10		PM2.5		SO2		
Item	Annual	1-Hour	8-Hour	24-Hour	Annual	24-Hour	Annual	3-Hour	24-Hour	Annual
NAAQS	100	40,000	10,000	150	50	65	15	1,300	365	80
Within Study Area	26.8	23,967	4,941	5.86	1.68	3.95	1.04	69.2	17.0	3.98
Background	58	5,143	3,314	60	30	35.2	13.3	192	76	8
Total	84.8	29,110	8,255	65.9	31.6	39.2	14.3	261	93.0	12.0
Predicted Meets or Exceeds NAAQS	No	No	No	No	No	No	No	No	No	No
Percentage of Predicted Total to NAAQS	85	73	83	42	63	60	95	20	25	15
Percentage of Background to Predicted Total	68	18	40	95	97	90	93	74	82	67

Notes: NAAQS = National Ambient Air Quality Standards
Source: Environmental Science Associates, Inc. [TPC] analysis, 2004/2005.

TABLE J.2-86
DISPERSION MODELING RESULTS – 2007 – ORIGINAL SCHEDULE

	Maximum Predicted Pollutant Concentrations (µg/m³)									
	NO2	CO		PM10		PM2.5		SO2		
Items	Annual	1-Hour	8-Hour	24-Hour	Annual	24-Hour	Annual	3-Hour	24-Hour	Annual
NAAQS	100	40,000	10,000	150	50	65	15	1,300	365	80
Alternative A										
Within Study Area	31.1	26,266	4,792	4.27	1.34	3.72	0.84	131	23.2	4.66
Background	58	5,143	3,314	60	30	35.2	13.3	192	76	8
Total	89.1	31,409	8,106	64.3	31.3	38.9	14.1	323	99.2	12.6
Predicted Meets or Exceeds NAAQS	No	No	No	No	No			No	No	No
Percentage of Predicted Total to NAAQS	89	79	81	43	63	60	94	25	27	16
Percentage of Background to Predicted Total	65	16	41	93	96	90	94	59	77	63
Alternatives C, D, G										
Within Study Area	32.4	28,608	5,254	4.48	1.43	3.41	0.9	99.3	22.0	5.50
Background	58	5,143	3,314	60	30	35.2	13.3	192	76	8
Total	90.4	33,751	8,568	64.5	31.4	38.5	14.2	1	98.0	13.5
Predicted Meets or Exceeds NAAQS	No	No	No	No	No			No	No	No
Percentage of Predicted Total to NAAQS	91	84	86	43	63	59	95	22	27	17
Percentage of Background to Predicted Total	64	16	39	93	96	91	94	66	78	59

Notes: Alternative A = No Action, Alternative C, D, and G are Build Alternatives.
NAAQS = National Ambient Air Quality Standards
Source: Environmental Science Associates, Inc. [TPC] analysis, 2004/2005.

TABLE J.2-87
DISPERSION MODELING RESULTS – 2009 – ORIGINAL SCHEDULE

	Maximum Predicted Pollutant Concentrations (µg/m³)									
	NO2	CO		PM10		PM2.5		SO2		
Items	Annual	1-Hour	8-Hour	24-Hour	Annual	24-Hour	Annual	3-Hour	24-Hour	Annual
NAAQS	100	40,000	10,000	150	50	65	15	1,300	365	80
Alternative A										
Within Study Area	25.6	24,988	4,724	3.94	1.24	3.19	0.77	87.7	18.2	4.55
Background	58	5,143	3,314	60	30	35.2	13.3	192	76	8
Total	83.6	30,131	8	63.9	31.2	38.4	14.1	280	94.2	12.6
Predicted Meets or Exceeds NAAQS	No	No	No	No	No	No	No	No	No	No
Percentage of Predicted Total to NAAQS	84	75	80	43	62	59	94	22	26	16
Percentage of Background to Predicted Total	69	17	41	94	96	92	95	69	81	63
Alternatives C, D, G										
Within Study Area	25.7	14,816	4,953	3.91	1.23	3.19	0.77	86.9	17.0	4.16
Background	58	5,143	3,314	60	30	35.2	13.3	192	76	8
Total	83.7	19,959	8,267	63.8	31.2	38.4	14.1	279	93.0	12.2
Predicted Meets or Exceeds NAAQS	No	No	No	No	No	No	No	No	No	No
Percentage of Predicted Total to NAAQS	84	50	83	43	62	59	94	21	25	15
Percentage of Background to Predicted Total	69	26	40	94	96	92	95	69	82	66

Notes: Alternative A = No Action, Alternative C, D, and G are Build Alternatives.
NAAQS = National Ambient Air Quality Standards
Source: Environmental Science Associates, Inc. [TPC] analysis, 2004/2005.

TABLE J.2-88
DISPERSION MODELING RESULTS – 2013 – ORIGINAL SCHEDULE

	Maximum Predicted Pollutant Concentrations (µg/m3)									
	NO2	CO		PM10		PM2.5		SO2		
Items	Annual	1-Hour	8-Hour	24-Hour	Annual	24-Hour	Annual	3-Hour	24-Hour	Annual
NAAQS	100	40,000	10,000	150	50	65	15	1,300	365	80
Alternative A										
Within Study Area	25.6	27,183	4,821	3.66	1.12	3.57	0.69	130	24.8	4.66
Background	58	5,143	3,314	60	30	35.2	13.3	192	76	8
Total	83.6	32,326	8,135	63.7	31.1	38.8	14.0	322	101	12.7
Predicted Meets or Exceeds NAAQS	No	No	No	No	No	No	No	No	No	No
Percentage of Predicted Total to NAAQS	84	81	81	42	61	60	93	25	28	16
Percentage of Background to Predicted Total	69	16	41	95	98	91	95	60	75	63
Alternative C										
Within Study Area	24.6	22,903	4,646	3.69	1.16	3.12	0.71	95.2	20.3	4.72
Background	58	5,143	3,314	60	30	35.2	13.3	192	76	8
Total	6	28,046	7,960	63.6	31.1	38.3	14.0	285	96.3	12.7
Predicted Meets or Exceeds NAAQS	No	No	No	No	No	No	No	No	No	No
Percentage of Predicted Total to NAAQS	83	78	80	42	62	59	93	22	26	16
Percentage of Background to Predicted Total	70	16	42	94	96	92	95	67	79	63
Alternative D										
Within Study Area	24.4	21,675	4,616	3.69	1.16	2.99	0.71	81.0	19.7	4.61
Background	58	5,143	3,314	60	30	35.2	13.3	192	76	8
Total	82.4	26,818	7,931	63.6	31.1	38.2	14.0	273	95.7	12.6
Predicted Meets or Exceeds NAAQS	No	No	No	No	No	No	No	No	No	No
Percentage of Predicted Total to NAAQS	82	67	79	42	62	59	93	21	26	16
Percentage of Background to Predicted Total	70	19	42	94	96	92	95	70	79	63

TABLE J.2-88
DISPERSION MODELING RESULTS – 2013 – ORIGINAL SCHEDULE

Items	Maximum Predicted Pollutant Concentrations (µg/m3)									
	NO2	CO		PM10		PM2.5		SO2		
	Annual	1-Hour	8-Hour	24-Hour	Annual	24-Hour	Annual	3-Hour	24-Hour	Annual
Alternative G										
Within Study Area	24.1	21,550	4,630	3.69	1.16	3.00	0.71	80.6	19.6	4.58
Background	58	5,143	3,314	60	30	35.2	13.3	192	76	8
Total	82.1	26,693	4	63.6	31.1	38.2	14.0	273	95.6	12.6
Predicted Meets or Exceeds NAAQS	No	No	No	No	No	No	No	No	No	No
Percentage of Predicted Total to NAAQS	82	67	79	42	62	59	93	21	26	16
Percentage of Background to Predicted Total	70	19	42	94	96	92	95	70	79	63

Notes: Alternative A = No Action, Alternative C, D, and G are Build Alternatives.
NAAQS = National Ambient Air Quality Standards
Source: Environmental Science Associates, Inc. [TPC] analysis, 2004/2005.

TABLE J.2-89
DISPERSION MODELING RESULTS – 2018 – ORIGINAL SCHEDULE

	Maximum Predicted Pollutant Concentrations (µg/m3)									
	NO2	CO		PM10		PM2.5		SO2		
Items	**Annual**	**1-Hour**	**8-Hour**	**24-Hour**	**Annual**	**24-Hour**	**Annual**	**3-Hour**	**24-Hour**	**Annual**
NAAQS	100	40,000	10,000	150	50	65	15	1,300	365	80
Alternative A										
Within Study Area	26.3	29,544	4,923	3.84	1.01	3.74	0.74	111	20.0	4.78
Background	58	5,143	3,314	60	30	35.2	13.3	192	76	8
Total	84.3	34,687	8,237	63.8	31.0	38.9	14.0	303	96.0	12.8
Predicted Meets or Exceeds NAAQS	No	No	No	No	No	No	No	No	No	No
Percentage of Predicted Total to NAAQS	84	87	82	42	62	60	94	23	26	16
Percentage of Background to Predicted Total	69	15	40	95	97	90	95	64	79	63
Alternative C										
Within Study Area	25.3	23,354	4,697	3.61	1.04	3.50	0.64	96.4	22.3	4.98
Background	58	5,143	3,314	60	30	35.2	13.3	192	76	8
Total	83.3	28,497	8,281	63.2	31.0	38.7	13.9	288	98.3	13.0
Predicted Meets or Exceeds NAAQS	No	No	No	No	No	No	No	No	No	No
Percentage of Predicted Total to NAAQS	83	71	83	42	62	60	93	22	27	16
Percentage of Background to Predicted Total	70	18	40	95	97	91	95	66	77	62
Alternative D										
Within Study Area	25.5	24,096	4,894	3.56	1.04	3.46	0.64	97.4	22.5	4.99
Background	58	5,143	3,314	60	30	35.2	13.3	192	76	8
Total	83.5	29,239	8,208	63.2	31.0	38.7	13.9	289	98.5	13.0
Predicted Meets or Exceeds NAAQS	No	No	No	No	No	No	No	No	No	No
Percentage of Predicted Total to NAAQS	84	73	82	42	62	59	93	22	27	16
Percentage of Background to Predicted Total	69	18	40	95	97	91	95	66	77	62

TABLE J.2-89
DISPERSION MODELING RESULTS – 2018 – ORIGINAL SCHEDULE

Items	Maximum Predicted Pollutant Concentrations (µg/m3)									
	NO2	CO		PM10		PM2.5		SO2		
	Annual	1-Hour	8-Hour	24-Hour	Annual	24-Hour	Annual	3-Hour	24-Hour	Annual
Alternative G										
Within Study Area	25.2	23,933	4,931	3.58	1.41	3.48	0.64	96.8	22.4	4.96
Background	58	5,143	3,314	60	30	35.2	13.3	192	76	8
Total	83.2	29,076	8,245	63.2	31.0	38.7	13.9	289	4	13.0
Predicted Meets or Exceeds NAAQS	No	No	No	No	No	No	No	No	No	No
Percentage of Predicted Total to NAAQS	84	73	82	42	62	60	93	22	27	16
Percentage of Background to Predicted Total	69	18	40	95	97	91	95	66	77	62

Notes: Alternative A = No Action, Alternative C, D, and G are Build Alternatives.
NAAQS = National Ambient Air Quality Standards
Source: Environmental Science Associates, Inc. [TPC] analysis, 2004/2005.

TABLE J.2-90
DISPERSION RESULTS (BY RECEPTOR) – 2002

Receptor ID	Maximum Predicted Pollutant Concentrations (µg/m³)									
	NO2	CO		PM10		PM2.5		SO2		
	Annual	1-Hour	8-Hour	24-Hour	Annual	24-Hour	Annual	3-Hour	24-Hour	Annual
1	24.4	7,476	1,739	**5.86**	**1.68**	**3.95**	**1.04**	34.8	7.23	1.48
2	19.10	6,305	1,716	4.94	1.22	3.08	0.76	34.6	6.99	1.29
3	8.49	2,808	622	1.80	0.34	1.57	0.26	29.7	6.42	1.06
4	16.90	5,797	1,398	3.30	0.63	2.09	0.41	23.0	5.12	1.10
5	8.59	2,815	553	1.78	0.34	1.36	0.25	24.0	5.33	0.928
6	7.20	2,797	464	1.51	0.28	1.03	0.20	15.8	4.47	0.757
7	6.95	2,830	536	1.29	0.29	0.87	0.21	14.8	4.08	0.745
8	9.08	2,579	730	1.63	0.39	1.08	0.27	18.7	5.12	0.889
9	19.20	5,576	1,435	3.29	0.88	2.08	0.57	19.2	5.56	1.39
10	8.60	2,368	701	1.30	0.31	0.88	0.23	17.6	5.25	0.880
11	9.12	2,114	626	1.42	0.31	0.97	0.22	18.7	5.54	0.919
12	18.20	5,080	972	2.59	0.65	1.72	0.42	27.8	5.38	1.24
13	16.60	4,869	915	2.56	0.37	2.13	0.28	**69.2**	13.7	1.52
14	17.20	5,306	1,051	3.13	0.72	1.89	0.45	30.1	6.75	1.06
15	11.20	3,743	870	2.44	0.45	1.79	0.29	38.7	7.93	0.819
16	8.91	3,653	734	2.24	0.28	1.90	0.20	59.9	11.7	0.822
17	6.91	3,353	702	1.96	0.23	1.67	0.17	53.8	10.3	0.680
18	4.08	2,923	561	1.29	0.14	1.07	0.11	25.4	5.36	0.415
19	3.17	3,017	511	1.20	0.11	1.03	0.08	28.4	5.71	0.350
20	2.30	3,393	510	1.14	0.08	1.03	0.06	33.8	6.37	0.281
21	2.49	2,128	437	0.86	0.08	0.75	0.07	25.6	4.35	0.290
22	2.38	903	222	1.36	0.08	1.31	0.06	13.2	2.39	0.239
23	3.64	926	234	0.84	0.13	0.83	0.09	7.26	1.69	0.256
24	3.56	663	184	0.91	0.14	0.70	0.09	6.90	1.51	0.256
25	3.54	880	283	1.32	0.15	1.30	0.10	6.48	1.60	0.266
26	5.58	1,154	333	0.94	0.20	0.62	0.13	12.2	2.48	0.370
27	11.50	2,560	636	2.12	0.43	1.92	0.27	18.3	3.61	0.643
28	9.46	2,125	528	1.27	0.35	0.83	0.22	18.8	5.33	0.569
29	4.34	1,480	441	1.10	0.20	0.99	0.14	23.5	7.63	0.376
30	4.74	1,579	497	1.56	0.17	1.55	0.12	14.6	4.75	0.323
31	10.00	3,755	947	2.46	0.60	1.66	0.37	12.4	4.61	0.558
32	6.20	1,936	590	2.09	0.37	1.50	0.23	16.2	5.23	0.443
33	8.39	2,037	614	1.75	0.35	1.37	0.23	22.4	4.53	0.625
34	6.18	3,036	601	1.13	0.22	1.02	0.17	43.0	6.41	0.875
35	6.29	3,001	567	1.14	0.27	1.02	0.21	39.2	5.82	0.877
36	8.71	3,264	792	2.08	0.45	1.34	0.30	34.5	5.23	0.814
37	10.20	1,846	472	1.64	0.38	0.99	0.23	4.89	1.87	0.428
38	0.627	625	92.1	1.06	0.03	1.05	0.02	3.98	0.561	0.0429
R01A	26.30	5,286	1,846	2.86	0.85	2.47	0.73	42.8	14.8	3.91
R01B	**26.80**	16,490	**4,941**	2.93	0.85	2.76	0.75	59.8	**17.0**	**3.98**
R02A	23.60	8,603	1,533	2.99	0.78	2.59	0.67	44.7	14.7	3.47
R02B	23.70	**23,967**	3,669	2.41	0.77	2.21	0.68	55.8	12.7	3.55
R03A	22.60	4,408	1,171	3.42	0.82	2.71	0.65	37.8	12.6	2.85
R03B	21.50	7,698	1,790	3.01	0.78	2.50	0.64	35.9	12.0	2.87
R05	22.30	5,093	1,060	2.88	0.71	2.37	0.58	35.6	12.4	2.72
R06A	20.50	8,073	1,449	2.80	0.72	2.38	0.62	38.5	12.1	2.97
R06B	20.90	20,405	3,330	2.51	0.73	2.44	0.65	44.9	13.8	3.04

Note: Bold numbers are highest predicted values.
Source: Environmental Science Associates, Inc. [TPC] analysis, 2004/2005.

TABLE J.2-91
DISPERSION RESULTS (BY RECEPTOR) - 2007 - ALTERNATIVE A

Receptor ID	Maximum Predicted Pollutant Concentrations (µg/m³)									
	NO2	CO		PM10		PM2.5		SO2		
	Annual	1-Hour	8-Hour	24-Hour	Annual	24-Hour	Annual	3-Hour	24-Hour	Annual
1	**31.10**	6,800	1,481	**4.27**	**1.34**	2.62	**0.84**	39.7	7.03	0.944
2	23.30	4,748	1,383	3.63	0.96	2.27	0.61	40.1	7.26	0.930
3	8.23	3,435	703	1.17	0.28	1.02	0.22	43.0	8.30	1.15
4	11.90	3,460	777	2.11	0.48	1.34	0.32	36.1	6.21	0.815
5	8.46	4,630	720	1.36	0.31	1.13	0.23	52.0	7.70	1.00
6	6.83	3,112	536	1.06	0.24	0.82	0.18	29.1	5.54	0.799
7	7.11	1,984	585	0.95	0.25	0.75	0.18	20.1	5.29	0.806
8	9.95	2,569	842	1.35	0.37	1.05	0.26	24.3	6.53	0.930
9	13.0	3,897	1,022	1.83	0.52	1.18	0.36	22.9	6.47	1.10
10	8.10	1,636	719	1.01	0.25	0.87	0.18	22.0	6.22	0.924
11	8.70	1,487	699	1.10	0.25	1.00	0.19	26.6	7.37	0.970
12	16.90	4,860	936	2.32	0.58	1.45	0.38	34.5	8.06	0.953
13	16.40	6,011	1,072	2.26	0.31	1.95	0.24	94.6	18.1	1.70
14	16.40	5,349	1,014	2.55	0.63	1.58	0.40	31.4	6.48	0.689
15	9.15	4,168	897	1.91	0.33	1.44	0.22	42.8	8.35	0.669
16	8.20	4,931	894	2.38	0.25	2.10	0.18	86.0	15.9	0.815
17	6.38	8,386	1,322	3.96	0.20	**3.72**	0.15	**131**	**23.2**	0.684
18	3.68	2,961	560	1.12	0.12	0.94	0.09	28.5	6.11	0.419
19	3.13	3,212	534	1.09	0.10	0.96	0.08	34.8	7.06	0.411
20	2.39	3,721	547	1.05	0.07	0.96	0.06	42.3	7.89	0.337
21	2.46	2,275	472	0.70	0.08	0.60	0.06	31.5	5.11	0.321
22	2.17	884	224	0.44	0.07	0.34	0.05	15.3	2.73	0.241
23	2.76	666	185	0.54	0.11	0.35	0.07	8.87	1.80	0.193
24	2.93	561	161	0.49	0.12	0.31	0.08	8.20	1.70	0.196
25	3.17	575	193	0.54	0.12	0.36	0.08	7.20	1.63	0.217
26	4.20	1,016	255	0.80	0.17	0.56	0.11	13.4	2.42	0.266
27	8.27	1,960	497	1.26	0.35	0.79	0.23	23.1	4.29	0.375
28	6.96	1,615	407	1.05	0.29	0.88	0.19	22.8	6.45	0.385
29	4.67	1,565	529	1.29	0.18	1.21	0.12	28.5	10.3	0.382
30	3.75	1,392	444	1.22	0.15	0.95	0.10	16.0	5.35	0.257
31	10.90	3,107	766	2.12	0.51	1.45	0.31	14.3	4.76	0.313
32	7.39	1,883	538	1.82	0.31	1.33	0.20	20.5	6.05	0.357
33	7.10	1,393	476	1.38	0.29	0.91	0.19	26.9	5.74	0.500
34	7.13	3,250	671	1.06	0.20	0.97	0.16	52.5	8.00	1.07
35	7.16	3,510	655	1.03	0.25	0.92	0.19	52.9	7.33	0.995
36	9.68	3,153	649	1.58	0.39	1.07	0.26	46.4	6.51	0.775
37	9.26	2,098	553	1.78	0.45	1.08	0.27	2.85	0.635	0.121
38	0.587	372	79.4	0.16	0.02	0.11	0.02	4.73	0.628	0.0336
R01A	25.70	5,194	1,862	2.56	0.74	2.31	0.67	53.3	17.3	4.62
R01B	26.50	10,769	**4,792**	3.07	0.75	2.99	0.68	66.0	18.8	**4.66**
R02A	23.90	9,288	1,679	2.87	0.69	2.52	0.60	64.3	17.9	4.01
R02B	24.20	**26,266**	4,028	2.27	0.68	2.04	0.60	64.5	15.6	4.10
R03A	20.40	4,707	1,235	2.80	0.69	2.28	0.56	48.0	14.0	3.16
R03B	20.50	8,451	1,919	2.44	0.66	2.08	0.55	44.2	13.3	3.23
R05	18.90	5,266	1,068	2.64	0.60	2.29	0.50	62.0	16.7	3.14
R06A	20.70	9,829	1,679	2.37	0.65	2.06	0.58	48.9	14.0	3.44
R06B	21.80	23,487	3,667	2.68	0.68	2.61	0.62	52.7	15.7	3.56

Note: Bold numbers are highest predicted values.
Source: Environmental Science Associates, Inc. [TPC] analysis, 2004/2005.

TABLE J.2-92
DISPERSION RESULTS (BY RECEPTOR) - 2007 – ALTERNATIVES C, D, G

Receptor ID	Maximum Predicted Pollutant Concentrations (µg/m³)									
	NO2	CO		PM10		PM2.5		SO2		
	Annual	1-Hour	8-Hour	24-Hour	Annual	24-Hour	Annual	3-Hour	24-Hour	Annual
1	**32.41**	7,417	1,699	**4.48**	**1.43**	2.76	**0.89**	45.9	7.60	1.05
2	23.72	5,604	1,537	3.73	1.00	2.37	0.64	49.7	9.14	1.08
3	8.97	4,298	780	1.35	0.33	1.20	0.26	56.4	10.11	1.41
4	12.27	3,280	789	2.18	0.51	1.40	0.34	33.4	6.78	0.91
5	8.59	3,431	636	1.43	0.32	0.97	0.24	35.2	7.22	1.10
6	7.02	2,429	528	1.11	0.25	0.86	0.19	18.3	5.58	0.87
7	7.29	1,890	648	1.01	0.26	0.87	0.20	23.0	6.03	0.87
8	9.93	2,554	867	1.38	0.38	1.10	0.27	25.7	6.85	1.00
9	13.29	3,955	1,064	1.93	0.55	1.30	0.38	23.5	6.86	1.18
10	8.58	1,815	761	1.07	0.26	0.93	0.20	23.2	6.69	1.00
11	9.33	1,676	700	1.12	0.26	0.95	0.20	25.5	7.37	1.05
12	17.85	4,965	959	2.36	0.60	1.56	0.40	35.4	7.91	1.05
13	18.80	5,341	1,006	2.33	0.33	2.02	0.26	87.3	17.36	1.91
14	18.75	5,489	1,075	3.17	0.71	1.90	0.45	36.1	7.52	0.75
15	9.78	4,467	956	2.07	0.34	1.59	0.23	47.1	9.36	0.71
16	8.84	5,013	988	2.33	0.24	2.07	0.18	**99.3**	18.38	0.86
17	6.75	4,427	854	2.03	0.20	1.77	0.15	80.5	15.03	0.70
18	3.85	3,183	599	1.22	0.12	1.02	0.09	31.0	6.55	0.43
19	3.28	3,707	595	1.24	0.10	1.09	0.08	42.6	8.31	0.41
20	2.53	4,207	610	1.22	0.08	1.13	0.06	50.5	9.31	0.35
21	2.61	2,324	481	0.74	0.08	0.65	0.07	32.5	5.29	0.34
22	2.30	925	236	0.46	0.08	0.41	0.06	16.0	2.87	0.26
23	2.87	701	191	0.55	0.12	0.42	0.08	9.5	1.95	0.21
24	3.05	592	173	0.51	0.13	0.40	0.09	9.2	1.92	0.21
25	3.45	613	192	0.68	0.14	0.57	0.10	8.3	1.94	0.24
26	4.66	1,113	251	1.00	0.20	0.82	0.14	14.4	2.61	0.29
27	8.55	1,998	507	1.27	0.37	0.80	0.24	24.2	4.19	0.38
28	7.08	1,647	416	1.06	0.30	0.85	0.19	26.0	6.54	0.38
29	4.54	1,784	528	1.29	0.18	1.20	0.12	32.7	10.27	0.37
30	3.70	1,499	467	1.29	0.15	1.03	0.10	19.1	6.07	0.26
31	10.45	2,937	724	2.10	0.48	1.48	0.30	16.8	5.43	0.32
32	7.08	1,912	547	1.85	0.30	1.39	0.20	22.9	6.75	0.37
33	7.02	1,451	486	1.42	0.29	0.95	0.20	27.2	6.30	0.53
34	6.79	3,463	731	1.18	0.21	1.09	0.17	56.5	8.80	1.10
35	7.19	3,828	712	1.18	0.27	1.06	0.21	59.1	8.16	1.08
36	9.81	3,457	704	1.68	0.41	1.20	0.28	52.1	7.25	0.84
37	9.22	2,101	550	1.77	0.44	1.07	0.27	3.0	0.64	0.12
38	0.60	403	81	0.16	0.02	0.12	0.02	5.2	0.68	0.03
R01A	28.10	6,072	2,056	2.90	0.87	2.69	0.80	68.0	20.88	5.49
R01B	29.13	11,662	**5,254**	3.49	0.85	**3.41**	0.79	72.9	21.32	**5.50**
R02A	24.88	10,890	1,837	3.25	0.75	2.94	0.68	83.5	**21.93**	4.52
R02B	26.10	**28,608**	4,374	3.15	0.72	2.84	0.66	81.1	19.37	4.60
R03A	20.49	4,761	1,255	2.84	0.70	2.44	0.59	57.5	16.17	3.39
R03B	21.32	8,235	1,927	3.04	0.67	2.63	0.57	51.7	15.12	3.45
R05	20.50	6,293	1,156	3.44	0.71	3.02	0.59	88.2	21.99	3.58
R06A	21.17	10,198	1,753	2.54	0.75	2.28	0.68	58.1	16.36	3.64
R06B	22.92	26,096	4,065	3.00	0.73	2.91	0.67	55.3	17.23	3.78

Notes: Bold numbers are highest predicted values.
Alternatives C, D, G = Build Alternatives

Source: Environmental Science Associates, Inc. [TPC] analysis, 2004/2005.

TABLE J.2-93
DISPERSION RESULTS (BY RECEPTOR) - 2009 - ALTERNATIVE A

Receptor ID	Maximum Predicted Pollutant Concentrations (µg/m³)									
	NO2	CO		PM10		PM2.5		SO2		
	Annual	1-Hour	8-Hour	24-Hour	Annual	24-Hour	Annual	3-Hour	24-Hour	Annual
1	**26.20**	6,225	1,372	**3.94**	**1.24**	2.42	**0.77**	39.1	6.93	0.934
2	19.9	4,543	1,305	3.36	0.89	2.10	0.56	38.4	7.27	0.917
3	7.77	3,167	695	1.10	0.26	0.96	0.20	40.7	7.90	1.13
4	10.50	2,697	716	1.97	0.45	1.25	0.30	26.8	5.74	0.793
5	7.82	3,027	588	1.30	0.29	0.87	0.21	30.9	6.46	0.970
6	6.33	2,388	481	1.01	0.22	0.69	0.16	14.6	5.06	0.772
7	6.57	1,668	549	0.91	0.23	0.68	0.17	19.6	5.14	0.781
8	9.05	2,272	793	1.31	0.35	0.97	0.24	23.6	6.36	0.905
9	11.6	3,459	968	1.79	0.50	1.16	0.34	22.2	6.33	1.07
10	7.55	1,596	672	0.91	0.23	0.76	0.17	20.7	5.89	0.901
11	8.15	1,522	606	0.99	0.23	0.76	0.17	22.1	6.38	0.945
12	14.90	4,453	857	2.16	0.54	1.35	0.35	32.1	6.56	0.931
13	15.80	5,414	969	2.05	0.29	1.75	0.22	**87.7**	16.8	1.66
14	15.30	4,931	940	2.87	0.64	1.72	0.40	29.8	6.11	0.661
15	8.11	3,884	853	1.81	0.30	1.36	0.20	42.7	8.26	0.618
16	7.42	3,497	709	1.70	0.21	1.44	0.15	67.6	12.9	0.736
17	5.77	3,150	658	1.56	0.17	1.33	0.13	59.0	11.3	0.611
18	3.35	3,026	557	1.08	0.11	0.92	0.08	30.5	6.45	0.384
19	2.79	3,327	540	1.10	0.09	0.97	0.07	37.8	7.52	0.353
20	2.16	3,558	523	0.94	0.06	0.85	0.05	41.4	7.74	0.295
21	2.27	2,160	440	0.62	0.07	0.53	0.05	30.0	4.86	0.295
22	1.99	835	210	0.41	0.06	0.30	0.05	14.8	2.64	0.227
23	2.46	638	170	0.51	0.10	0.33	0.07	7.84	1.64	0.185
24	3.08	826	200	0.56	0.13	0.34	0.09	7.91	1.65	0.194
25	2.82	537	175	0.50	0.11	0.32	0.08	7.15	1.60	0.208
26	3.69	977	229	0.70	0.15	0.48	0.10	13.0	2.36	0.248
27	7.04	1,820	460	1.14	0.32	0.72	0.20	21.9	3.69	0.342
28	5.92	1,494	375	0.94	0.26	0.69	0.17	22.2	5.79	0.342
29	4.00	1,532	444	1.01	0.16	0.93	0.11	28.5	8.86	0.330
30	3.24	1,310	407	1.07	0.14	0.83	0.09	15.7	5.06	0.239
31	9.05	2,813	693	1.92	0.46	1.31	0.28	14.2	4.66	0.300
32	6.31	1,771	504	1.65	0.29	1.20	0.18	20.3	5.99	0.342
33	6.25	1,342	440	1.27	0.27	0.83	0.18	25.0	5.68	0.482
34	6.79	3,163	648	0.94	0.18	0.85	0.14	51.1	7.92	1.04
35	6.75	3,469	636	0.92	0.23	0.82	0.17	52.8	7.33	0.974
36	8.61	3,119	627	1.46	0.36	0.96	0.24	46.5	6.52	0.759
37	7.77	1,935	512	1.66	0.42	1.00	0.25	2.79	0.636	0.123
38	0.506	356	71.7	0.14	0.02	0.10	0.01	4.61	0.614	0.0313
R01A	24.90	5,007	1,796	2.40	0.72	2.14	0.64	50.6	16.8	4.50
R01B	25.60	10,838	**4,724**	3.27	0.74	**3.19**	0.67	63.2	**18.2**	**4.55**
R02A	23.00	8,745	1,630	2.80	0.66	2.39	0.56	60.2	17.4	3.91
R02B	23.40	24,862	3,824	2.16	0.65	1.91	0.57	63.6	15.3	4.00
R03A	19.50	4,858	1,221	2.85	0.65	2.27	0.52	47.0	14.0	3.05
R03B	19.60	8,235	1,874	2.48	0.63	2.08	0.52	43.7	13.4	3.12
R05	18.20	4,971	1,066	2.39	0.56	2.07	0.47	59.9	16.4	3.04
R06A	20.10	9,638	1,711	2.40	0.67	2.06	0.59	47.0	14.0	3.41
R06B	21.20	**24,988**	3,916	2.93	0.72	2.85	0.65	51.1	15.5	3.55

Note: Bold numbers are highest predicted values.
Source: Environmental Science Associates, Inc. [TPC] analysis, 2004/2005.

TABLE J.2-94
DISPERSION RESULTS (BY RECEPTOR) - 2009 – ALTERNATIVES C, D, G

Receptor ID	Maximum Predicted Pollutant Concentrations (µg/m³)									
	NO2	CO		PM10		PM2.5		SO2		
	Annual	1-Hour	8-Hour	24-Hour	Annual	24-Hour	Annual	3-Hour	24-Hour	Annual
1	**25.70**	6,345	1,409	**3.91**	**1.23**	2.39	**0.76**	27.4	4.73	0.731
2	18.30	4,067	1,181	3.22	0.86	2.01	0.54	32.2	5.87	0.726
3	6.31	2,480	543	0.92	0.25	0.75	0.18	32.8	5.96	0.820
4	9.81	2,547	720	1.96	0.44	1.23	0.29	25.2	4.65	0.630
5	6.88	2,921	532	1.31	0.28	0.86	0.20	29.9	5.37	0.739
6	6.03	2,551	460	1.06	0.22	0.73	0.16	17.4	4.79	0.630
7	6.90	1,803	475	0.98	0.23	0.72	0.17	15.5	4.47	0.663
8	9.99	2,393	702	1.38	0.34	0.91	0.24	17.2	4.71	0.796
9	14.20	3,593	981	1.89	0.51	1.22	0.34	20.3	5.47	0.988
10	8.64	1,639	762	0.99	0.23	0.86	0.17	26.5	7.03	0.885
11	9.24	1,549	742	1.02	0.23	0.91	0.17	33.1	8.48	0.962
12	15.90	4,384	852	2.11	0.54	1.27	0.36	38.1	8.16	1.00
13	18.30	2,767	693	1.54	0.30	1.24	0.23	48.2	12.2	1.79
14	16.60	4,906	1,017	2.85	0.66	1.71	0.42	39.1	8.07	0.752
15	8.90	4,964	973	2.07	0.31	1.61	0.21	58.6	10.9	0.699
16	7.68	4,151	803	1.92	0.21	1.66	0.15	**86.9**	15.7	0.716
17	5.75	2,818	597	1.40	0.17	1.17	0.12	54.1	10.2	0.542
18	3.63	2,888	680	1.28	0.11	1.11	0.08	48.9	9.19	0.393
19	3.59	3,104	709	1.32	0.11	1.15	0.08	52.5	9.86	0.429
20	2.61	2,788	457	0.92	0.07	0.82	0.06	38.2	7.38	0.374
21	3.06	3,539	551	0.88	0.09	0.77	0.07	32.9	6.49	0.440
22	2.71	2,117	411	0.77	0.08	0.66	0.06	28.3	5.32	0.372
23	2.97	902	248	0.57	0.11	0.41	0.08	12.6	2.71	0.291
24	3.59	876	224	0.56	0.15	0.37	0.10	12.5	2.75	0.300
25	3.36	817	217	0.58	0.13	0.46	0.09	13.3	2.89	0.325
26	4.48	1,504	467	1.16	0.17	0.93	0.12	25.8	6.69	0.411
27	7.52	1,841	464	1.25	0.34	0.81	0.22	22.5	6.36	0.467
28	6.33	1,533	387	1.04	0.28	0.80	0.18	20.5	6.92	0.446
29	4.18	1,532	470	1.03	0.17	0.94	0.12	29.5	9.46	0.420
30	3.32	1,610	451	1.18	0.14	0.93	0.09	22.4	6.51	0.291
31	9.41	2,847	706	1.89	0.48	1.28	0.30	14.5	4.13	0.332
32	6.41	2,403	589	1.43	0.30	0.98	0.19	33.6	5.03	0.393
33	5.64	1,562	390	1.14	0.24	0.73	0.16	27.0	4.10	0.490
34	4.11	2,042	388	0.67	0.15	0.52	0.11	30.0	4.14	0.556
35	4.74	1,984	408	0.77	0.21	0.57	0.15	28.3	4.43	0.579
36	7.34	1,859	508	1.46	0.35	0.93	0.23	26.2	3.95	0.518
37	7.20	1,849	479	1.55	0.39	0.94	0.23	3.90	0.740	0.120
38	0.539	484	89.4	0.16	0.02	0.13	0.01	7.38	0.958	0.0389
R01A	22.00	4,273	1,776	2.20	0.65	2.13	0.58	54.9	**17.0**	4.10
R01B	22.70	10,932	**4,953**	3.13	0.68	**3.05**	0.61	57.4	16.8	**4.16**
R02A	21.00	5,928	1,282	2.42	0.59	2.12	0.52	57.9	16.1	3.84
R02B	21.40	14,412	2,287	2.19	0.60	2.07	0.54	66.3	15.9	3.91
R03A	19.10	5,773	1,388	2.05	0.60	1.66	0.49	61.5	13.1	3.15
R03B	19.50	8,764	2,117	1.98	0.61	1.72	0.51	54.2	13.6	3.22
R05	17.30	4,020	959	2.33	0.60	1.93	0.48	48.5	13.4	2.93
R06A	19.30	6,237	1,454	1.68	0.51	1.59	0.45	47.8	13.3	2.96
R06B	20.10	**14,816**	3,647	2.41	0.55	2.28	0.50	58.1	15.9	3.06

Notes: Bold numbers are highest predicted values.
Alternatives C, D, G = Build Alternatives

Source: Environmental Science Associates, Inc. [TPC] analysis, 2004/2005.

TABLE J.2-95
DISPERSION RESULTS (BY RECEPTOR) - 2013 - ALTERNATIVE A

Receptor ID	Maximum Predicted Pollutant Concentrations (µg/m³)									
	NO2	CO		PM10		PM2.5		SO2		
	Annual	1-Hour	8-Hour	24-Hour	Annual	24-Hour	Annual	3-Hour	24-Hour	Annual
1	18.00	5,357	1,194	3.55	**1.12**	2.17	**0.69**	38.2	6.82	0.955
2	14.20	4,079	1,155	3.03	0.80	1.88	0.50	37.5	7.16	0.936
3	7.39	3,055	643	0.86	0.23	0.74	0.17	41.5	7.91	1.15
4	8.30	2,567	616	1.80	0.41	1.14	0.27	27.4	5.71	0.811
5	7.16	2,789	526	1.22	0.27	0.81	0.19	29.8	6.37	0.989
6	5.86	2,224	431	0.93	0.21	0.62	0.15	16.6	4.95	0.798
7	6.11	1,763	499	0.84	0.22	0.58	0.15	28.7	5.23	0.818
8	7.99	1,955	711	1.23	0.33	0.82	0.23	25.6	6.39	0.960
9	9.93	2,945	857	1.75	0.50	1.12	0.33	22.2	6.29	1.16
10	7.69	1,894	634	0.84	0.22	0.61	0.16	35.8	6.19	1.06
11	8.58	2,085	585	0.91	0.21	0.63	0.16	26.6	6.90	1.18
12	12.50	3,687	713	1.87	0.48	1.17	0.31	39.5	7.78	1.14
13	17.90	7,280	1,175	1.92	0.26	1.64	0.20	**130**	**24.8**	2.11
14	11.30	4,041	844	2.51	0.57	1.50	0.36	31.3	6.61	0.703
15	6.95	3,607	801	1.61	0.27	1.19	0.18	49.2	9.45	0.657
16	7.07	3,256	644	1.33	0.18	1.10	0.13	66.3	12.7	0.763
17	5.50	2,762	584	1.16	0.15	0.95	0.10	57.4	11.1	0.632
18	3.10	2,637	517	0.83	0.09	0.68	0.07	28.1	6.63	0.393
19	2.69	2,826	499	0.81	0.07	0.69	0.06	39.3	7.79	0.367
20	2.17	3,315	491	0.73	0.05	0.65	0.04	40.5	7.74	0.313
21	2.23	1,987	406	0.50	0.06	0.41	0.04	28.7	4.74	0.311
22	1.86	761	193	0.34	0.06	0.25	0.04	14.6	2.61	0.238
23	1.99	526	150	0.43	0.09	0.28	0.06	7.75	1.63	0.192
24	2.35	662	162	0.48	0.12	0.29	0.08	7.83	1.65	0.200
25	2.25	506	147	0.43	0.10	0.27	0.06	7.19	1.62	0.212
26	2.88	855	209	0.60	0.13	0.41	0.09	12.6	2.30	0.252
27	5.05	1,501	380	0.98	0.28	0.61	0.18	22.5	3.87	0.348
28	4.42	1,235	311	0.81	0.23	0.52	0.14	22.9	5.86	0.346
29	3.30	1,398	407	0.77	0.14	0.69	0.09	28.3	8.83	0.334
30	2.59	1,181	367	0.90	0.12	0.67	0.08	15.9	5.11	0.244
31	6.04	2,367	580	1.66	0.40	1.11	0.25	14.3	4.71	0.306
32	4.65	1,561	444	1.41	0.25	1.00	0.16	20.2	6.04	0.350
33	5.02	1,212	383	1.15	0.24	0.74	0.16	24.3	5.62	0.495
34	6.47	2,868	601	0.73	0.15	0.65	0.11	49.9	7.98	0.995
35	6.37	3,107	583	0.72	0.20	0.62	0.14	51.6	7.34	0.971
36	6.99	2,791	571	1.29	0.32	0.82	0.21	45.3	6.52	0.763
37	4.76	1,611	424	1.45	0.36	0.88	0.22	3.20	0.698	0.124
38	0.389	316	60.5	0.12	0.02	0.09	0.01	4.58	0.605	0.0320
R01A	25.00	4,694	1,793	2.18	0.69	2.10	0.61	50.6	16.9	4.62
R01B	**25.60**	10,690	**4,821**	**3.66**	0.73	**3.57**	0.66	65.6	18.5	**4.66**
R02A	23.30	8,724	1,553	2.45	0.61	2.09	0.51	88.0	17.4	4.09
R02B	23.80	25,085	3,842	1.88	0.62	1.74	0.54	75.9	15.6	4.18
R03A	19.40	4,952	1,171	2.34	0.59	1.86	0.47	88.4	14.1	3.16
R03B	19.60	8,157	1,851	2.16	0.59	1.82	0.48	94.1	14.2	3.23
R05	18.50	4,846	975	2.12	0.50	1.80	0.41	60.5	16.6	3.16
R06A	20.00	10,363	1,794	2.10	0.65	1.93	0.58	46.5	13.7	3.49
R06B	20.90	**27,183**	4,242	3.14	0.73	3.04	0.66	53.9	15.5	3.64

Note: Bold numbers are highest predicted values.
Source: Environmental Science Associates, Inc. [TPC] analysis, 2004/2005.

TABLE J.2-96
DISPERSION RESULTS (BY RECEPTOR) - 2013 - ALTERNATIVE C

Receptor ID	Maximum Predicted Pollutant Concentrations (µg/m³)									
	NO2	CO		PM10		PM2.5		SO2		
	Annual	1-Hour	8-Hour	24-Hour	Annual	24-Hour	Annual	3-Hour	24-Hour	Annual
1	17.8	5.701	1.286	**3.69**	**1.16**	2.26	**0.71**	46.3	6.59	0.935
2	13.8	4.602	1.218	3.00	0.80	1.88	0.50	46.2	8.18	0.953
3	7.36	3,211	687	0.89	0.24	0.75	0.18	46.4	8.03	1.15
4	8.68	3,125	665	1.84	0.42	1.16	0.28	37.5	6.56	0.841
5	8.12	3,451	588	1.27	0.27	0.84	0.19	46.0	8.16	1.06
6	6.72	2,372	504	1.00	0.22	0.67	0.15	25.8	6.67	0.857
7	7.11	1,803	585	0.92	0.23	0.64	0.16	23.7	6.09	0.875
8	8.99	2,110	737	1.30	0.33	0.85	0.22	26.1	6.73	1.00
9	11.2	3,076	900	1.94	0.52	1.25	0.34	22.8	6.59	1.17
10	8.00	1,837	800	0.91	0.22	0.76	0.16	29.1	8.20	0.969
11	8.44	1,654	823	0.96	0.22	0.80	0.15	37.1	10.1	0.997
12	12.5	4,001	774	2.04	0.51	1.23	0.33	37.4	7.95	0.974
13	15.0	4,562	825	1.43	0.26	1.12	0.19	63.8	12.7	1.55
14	12.3	4,432	858	2.72	0.63	1.63	0.39	34.2	6.81	0.800
15	7.46	4.776	882	1.81	0.31	1.34	0.20	57.8	10.7	0.764
16	7.29	4.734	822	1.58	0.22	1.30	0.15	87.3	15.9	0.850
17	5.77	3.616	701	1.32	0.18	1.07	0.12	64.1	11.9	0.680
18	4.05	4.351	888	1.35	0.12	1.17	0.08	79.4	14.4	0.527
19	4.26	3.755	829	1.23	0.12	1.05	0.08	69.1	12.7	0.580
20	3.32	3,088	611	0.92	0.07	0.82	0.06	60.7	11.1	0.509
21	4.75	4,018	633	0.80	0.10	0.67	0.08	37.7	7.85	0.713
22	3.36	3,196	571	0.83	0.09	0.70	0.07	45.2	8.28	0.558
23	2.88	1,052	289	0.54	0.11	0.38	0.08	16.0	3.49	0.373
24	3.45	953	249	0.66	0.16	0.40	0.10	14.4	3.20	0.382
25	3.37	1,119	291	0.69	0.13	0.50	0.09	20.8	3.86	0.435
26	4.16	1,580	482	0.97	0.17	0.76	0.11	26.4	7.39	0.509
27	7.01	2,082	523	1.44	0.40	0.91	0.25	24.6	6.89	0.560
28	5.65	1,598	437	1.11	0.30	0.76	0.19	25.6	8.78	0.514
29	3.63	1,475	439	0.78	0.15	0.70	0.10	30.0	9.38	0.440
30	2.80	1,391	404	0.96	0.13	0.72	0.08	20.5	6.15	0.305
31	6.51	2,461	610	1.71	0.43	1.15	0.27	16.2	5.00	0.361
32	4.83	2.178	513	1.35	0.26	0.94	0.17	31.9	4.95	0.415
33	4.84	1.719	382	1.07	0.22	0.69	0.15	31.0	4.84	0.561
34	4.72	2.429	465	0.65	0.14	0.49	0.11	39.9	5.56	0.804
35	5.31	2,707	509	0.75	0.20	0.53	0.14	44.7	6.10	0.861
36	6.44	2,539	522	1.38	0.33	0.88	0.21	40.9	5.64	0.702
37	4.87	1,592	427	1.48	0.37	0.89	0.22	5.20	0.852	0.136
38	0.450	515	92.6	0.14	0.02	0.11	0.01	8.19	1.06	0.0462
R01A	24.2	4,502	1,678	1.87	0.57	1.78	0.51	61.2	17.7	**4.72**
R01B	**24.6**	10,178	**4.646**	3.22	0.62	**3.12**	0.56	60.1	17.0	**4.72**
R02A	21.9	6,950	1,416	2.18	0.51	1.92	0.44	75.9	20.1	4.20
R02B	22.4	17,969	2,804	1.91	0.53	1.80	0.47	68.1	18.0	4.26
R03A	20.9	6,483	1,431	2.04	0.59	1.68	0.47	80.4	16.5	3.53
R03B	21.7	7,770	2,014	2.00	0.60	1.73	0.49	72.1	15.2	3.59
R04A	21.6	8,060	1,699	2.62	0.70	2.13	0.56	70.7	16.7	3.41
R04B	22.4	**22,903**	4,067	3.44	0.76	2.53	0.61	**92.5**	15.2	3.46
R05	20.0	4,429	1,016	2.42	0.58	2.00	0.45	82.7	**20.3**	3.42
R06A	19.2	3,253	1,372	1.63	0.40	1.41	0.34	52.9	15.2	3.18
R06B	19.2	9,968	3,315	2.33	0.42	2.18	0.37	54.7	15.9	3.17
R07A	17.2	3,260	1,446	1.78	0.39	1.34	0.31	47.1	13.2	2.23
R07B	17.1	7,711	2,693	2.12	0.38	1.95	0.31	54.7	15.2	2.25
R08A	6.37	1,728	496	0.86	0.17	0.75	0.12	32.5	9.73	0.923
R08B	5.96	1,550	463	0.76	0.16	0.68	0.12	28.9	9.40	0.903

Notes: Bold numbers are highest predicted values.
Alternative C = Build Alternative

Source: Environmental Science Associates, Inc. [TPC] analysis, 2004/2005.

TABLE J.2-97
DISPERSION RESULTS (BY RECEPTOR) - 2013 - ALTERNATIVE D

Receptor ID	Maximum Predicted Pollutant Concentrations (µg/m³)									
	NO2	CO		PM10		PM2.5		SO2		
	Annual	1-Hour	8-Hour	24-Hour	Annual	24-Hour	Annual	3-Hour	24-Hour	Annual
1	17.8	5.701	1.281	**3.69**	**1.16**	2.26	**0.71**	42.1	6.08	0.915
2	13.7	4.450	1.190	3.04	0.80	1.92	0.50	43.7	7.78	0.937
3	7.35	3,123	644	0.89	0.24	0.75	0.18	44.8	7.41	1.13
4	8.65	2,997	627	1.83	0.42	1.16	0.28	35.5	6.15	0.826
5	8.10	3,260	550	1.27	0.27	0.84	0.19	42.8	7.66	1.05
6	6.70	2,081	475	1.00	0.22	0.66	0.15	19.4	6.17	0.845
7	7.11	1,578	581	0.92	0.23	0.64	0.16	23.4	6.04	0.870
8	9.02	2,007	736	1.36	0.33	1.11	0.22	25.8	6.72	1.00
9	11.2	2,962	884	1.94	0.52	1.25	0.34	25.1	6.40	1.17
10	8.14	1,663	752	0.91	0.22	0.64	0.16	26.7	7.57	0.967
11	8.73	1,596	754	0.96	0.22	0.66	0.15	33.2	9.11	1.02
12	12.8	4,001	773	2.09	0.51	1.28	0.33	35.6	7.97	0.994
13	17.0	4,581	842	1.42	0.26	1.12	0.19	66.3	13.9	1.85
14	12.1	4,432	860	2.94	0.63	1.85	0.39	33.9	6.90	0.728
15	7.25	4.466	873	1.81	0.31	1.34	0.20	57.5	10.7	0.671
16	6.77	3.863	710	1.58	0.22	1.30	0.15	73.8	13.5	0.678
17	5.14	2.726	586	1.32	0.18	1.07	0.12	49.8	9.38	0.524
18	3.39	3.136	721	1.35	0.12	1.17	0.08	56.9	10.5	0.400
19	3.43	3.599	780	1.23	0.12	1.05	0.08	62.0	11.4	0.444
20	2.57	3,049	490	0.92	0.07	0.82	0.06	42.4	8.11	0.385
21	3.02	3,877	599	0.80	0.10	0.67	0.08	32.9	6.44	0.448
22	2.65	2,352	446	0.83	0.09	0.70	0.07	31.8	5.90	0.382
23	2.64	1,025	270	0.54	0.11	0.38	0.08	13.3	2.81	0.302
24	3.23	953	227	0.64	0.16	0.39	0.10	12.9	2.83	0.318
25	3.08	820	216	0.57	0.13	0.39	0.09	13.1	2.88	0.349
26	4.01	1,506	447	0.89	0.17	0.79	0.11	24.7	6.40	0.452
27	6.92	2,082	523	1.44	0.40	0.91	0.25	23.6	6.35	0.521
28	5.61	1,598	416	1.11	0.30	0.72	0.19	25.6	8.32	0.483
29	3.59	1,365	417	0.67	0.15	0.46	0.10	28.1	8.91	0.414
30	2.76	1,327	392	0.71	0.13	0.50	0.08	19.3	5.85	0.287
31	6.48	2,461	610	1.62	0.43	0.99	0.27	15.8	4.87	0.346
32	4.80	1.982	495	1.16	0.26	0.74	0.17	28.4	4.88	0.396
33	4.81	1.681	374	1.07	0.22	0.69	0.15	30.0	4.75	0.541
34	4.70	2.347	452	0.73	0.14	0.72	0.11	38.3	5.29	0.784
35	5.28	2,501	479	0.75	0.20	0.53	0.14	41.2	5.67	0.841
36	6.41	2,334	493	1.38	0.33	0.88	0.21	37.5	5.22	0.681
37	4.85	1,592	427	1.52	0.37	0.94	0.22	4.00	0.752	0.132
38	0.429	469	84.1	0.35	0.02	0.33	0.01	7.11	0.920	0.0406
R01A	24.0	4,418	1,664	1.87	0.57	1.78	0.51	59.3	17.1	**4.61**
R01B	**24.4**	10,100	**4,616**	3.09	0.62	**2.99**	0.56	58.6	16.4	**4.61**
R02A	21.4	6,858	1,362	2.18	0.51	1.92	0.44	73.2	19.3	4.03
R02B	21.9	17,804	2,769	1.77	0.53	1.59	0.47	66.3	17.2	4.09
R03A	20.2	5,374	1,253	2.04	0.59	1.68	0.47	60.4	15.9	3.33
R03B	20.5	7,713	1,845	2.00	0.60	1.73	0.49	53.1	14.7	3.38
R04A	21.1	6,944	1,608	2.62	0.70	2.13	0.56	58.9	16.3	3.27
R04B	21.9	**21,675**	3,892	3.44	0.76	2.53	0.61	**72.2**	**14.5**	3.32
R05	19.5	4,305	969	2.42	0.58	2.00	0.45	81.0	19.7	3.28
R06A	18.6	3,036	1,305	1.63	0.40	1.40	0.34	52.0	14.7	2.97
R06B	18.6	6,763	3,239	2.14	0.42	1.99	0.37	51.7	15.1	2.96
R07A	17.2	3,022	1,367	1.78	0.39	1.34	0.31	42.7	12.2	2.16
R07B	17.1	7,493	2,606	1.69	0.38	1.56	0.31	50.3	14.1	2.18
R08A	6.22	1,673	482	0.82	0.17	0.67	0.12	31.7	8.99	0.835
R08B	5.82	1,528	420	0.74	0.16	0.61	0.12	28.1	8.71	0.819

Notes: Bold numbers are highest predicted values.
Alternative C = Build Alternative

Source: Environmental Science Associates, Inc. [TPC] analysis, 2004/2005.

TABLE J.2-98
DISPERSION RESULTS (BY RECEPTOR) - 2013 - ALTERNATIVE G

Receptor ID	Maximum Predicted Pollutant Concentrations (µg/m³)									
	NO2	CO		PM10		PM2.5		SO2		
	Annual	1-Hour	8-Hour	24-Hour	Annual	24-Hour	Annual	3-Hour	24-Hour	Annual
1	17.7	5.701	1.280	**3.69**	**1.16**	2.26	**0.71**	41.5	5.97	0.905
2	13.6	4.431	1.190	3.04	0.80	1.92	0.50	43.3	7.72	0.921
3	7.19	3,180	635	0.89	0.24	0.75	0.18	44.9	7.33	1.10
4	8.52	2,981	608	1.83	0.42	1.16	0.28	34.9	6.10	0.800
5	7.87	3,090	529	1.27	0.27	0.84	0.19	39.6	7.50	1.00
6	6.51	2,310	466	1.00	0.22	0.66	0.15	19.0	5.98	0.805
7	6.91	1,587	572	0.92	0.23	0.64	0.16	22.8	5.90	0.822
8	8.78	2,014	712	1.36	0.33	1.11	0.22	24.5	6.37	0.941
9	11.0	2,972	873	1.94	0.52	1.25	0.34	21.4	6.24	1.10
10	7.94	1,666	747	0.91	0.22	0.64	0.16	26.5	7.52	0.916
11	8.52	1,594	744	0.96	0.22	0.66	0.15	32.4	8.93	0.961
12	12.7	4,002	773	2.09	0.51	1.28	0.33	34.3	7.77	0.950
13	16.8	4,365	813	1.42	0.26	1.12	0.19	62.6	13.1	1.78
14	12.1	4,432	856	2.94	0.63	1.85	0.39	33.8	6.77	0.719
15	7.22	4.481	866	1.81	0.31	1.34	0.20	56.8	10.5	0.661
16	6.76	3.880	706	1.58	0.22	1.30	0.15	73.3	13.4	0.669
17	5.16	2.732	582	1.32	0.18	1.08	0.12	49.2	9.24	0.519
18	3.47	3.038	700	1.35	0.12	1.17	0.08	55.8	10.2	0.401
19	3.55	3.567	808	1.23	0.12	1.05	0.08	63.2	11.6	0.448
20	2.71	3,035	503	0.92	0.07	0.82	0.06	43.9	8.29	0.392
21	3.29	3,340	681	0.78	0.10	0.75	0.08	33.5	6.41	0.468
22	2.79	2,386	404	0.83	0.09	0.70	0.07	32.6	6.07	0.393
23	2.77	1,137	287	0.54	0.11	0.38	0.08	15.6	3.04	0.315
24	3.42	953	223	0.64	0.15	0.39	0.10	13.8	3.02	0.339
25	3.34	809	214	0.57	0.13	0.39	0.09	16.0	3.27	0.376
26	4.11	1,482	438	0.89	0.17	0.70	0.11	24.3	6.55	0.468
27	6.93	2,082	523	1.44	0.40	0.91	0.25	23.2	6.32	0.527
28	5.56	1,598	412	1.11	0.30	0.72	0.19	24.8	8.13	0.484
29	3.54	1,360	414	0.67	0.15	0.46	0.10	27.7	8.75	0.413
30	2.74	1,321	389	0.71	0.13	0.50	0.08	19.0	5.75	0.286
31	6.45	2,461	610	1.62	0.43	0.99	0.27	15.5	4.79	0.344
32	4.76	1.976	492	1.16	0.26	0.74	0.17	28.4	4.78	0.393
33	4.75	1.674	372	1.07	0.22	0.69	0.15	29.7	4.66	0.536
34	4.60	2.338	449	0.73	0.14	0.72	0.11	37.9	5.22	0.775
35	5.19	2,494	476	0.75	0.20	0.53	0.14	40.8	5.60	0.830
36	6.33	2,329	490	1.38	0.33	0.88	0.21	37.1	5.15	0.672
37	4.86	1,592	427	1.52	0.37	0.94	0.22	4.13	0.754	0.132
38	0.434	465	83.8	0.35	0.02	0.33	0.01	7.14	0.924	0.0410
R01A	23.6	4,430	1,670	1.87	0.57	1.78	0.51	59.0	17.0	**4.58**
R01B	**24.1**	10,140	**4.630**	3.10	0.62	**3.00**	0.56	58.3	16.4	**4.58**
R02A	21.2	7,046	1,380	2.18	0.51	1.92	0.44	72.8	19.2	4.00
R02B	21.7	17,990	2,790	1.77	0.53	1.58	0.47	66.6	17.1	4.07
R03A	20.0	5,342	1,250	2.04	0.59	1.68	0.47	60.2	15.8	3.29
R03B	20.3	7,668	1,830	2.01	0.60	1.73	0.49	52.9	14.6	3.34
R04A	20.8	6,903	1,610	2.62	0.70	2.13	0.56	58.7	16.2	3.21
R04B	21.6	**21,550**	3,870	3.44	0.76	2.52	0.61	71.8	14.4	3.26
R05	19.3	4,439	979	2.42	0.58	2.00	0.45	**80.6**	**19.6**	3.25
R06A	18.3	3,000	1,300	1.63	0.40	1.41	0.34	49.8	14.1	2.91
R06B	18.4	6,627	3,190	2.14	0.42	1.98	0.37	51.9	15.2	2.91
R07A	16.8	3,030	1,360	1.78	0.39	1.34	0.31	43.0	12.2	2.06
R07B	16.7	7,739	2,540	1.69	0.38	1.56	0.31	50.4	14.1	2.09
R08A	6.40	1,664	467	0.82	0.17	0.67	0.12	30.9	9.00	0.869
R08B	5.99	1,459	402	0.74	0.16	0.61	0.12	27.5	8.72	0.852

Notes: Bold numbers are highest predicted values.
Alternative C = Build Alternative

Source: Environmental Science Associates, Inc. [TPC] analysis, 2004/2005.

TABLE J.2-99
DISPERSION RESULTS (BY RECEPTOR) - 2018 - ALTERNATIVE A

Receptor ID	Maximum Predicted Pollutant Concentrations (µg/m³)									
	NO2	CO		PM10		PM2.5		SO2		
	Annual	1-Hour	8-Hour	24-Hour	Annual	24-Hour	Annual	3-Hour	24-Hour	Annual
1	18.3	4,620	1,063	3.19	**1.01**	1.96	0.63	40.9	7.17	1.00
2	14.5	4,112	1,102	2.71	0.72	1.70	0.46	41.3	7.75	0.988
3	7.84	3,189	696	0.91	0.23	0.80	0.17	42.9	8.50	1.22
4	8.63	2,947	616	1.66	0.39	1.06	0.26	33.1	6.29	0.867
5	7.59	3,709	578	1.22	0.28	0.81	0.20	41.9	7.16	1.06
6	6.21	2,491	473	0.92	0.21	0.63	0.15	24.0	5.72	0.855
7	6.45	1,563	488	0.83	0.22	0.62	0.16	23.7	5.44	0.866
8	8.36	1,946	689	1.23	0.33	0.84	0.23	25.4	6.61	1.01
9	10.3	2,991	823	1.85	0.53	1.18	0.35	23.4	6.61	1.20
10	7.82	1,331	670	0.87	0.22	0.67	0.16	22.2	6.47	1.02
11	8.52	1,532	656	0.91	0.21	0.70	0.16	26.3	7.54	1.07
12	12.5	3,295	634	1.73	0.45	1.13	0.30	33.4	8.39	1.05
13	17.9	4,660	799	1.61	0.26	1.33	0.20	82.6	16.5	1.86
14	11.7	3,570	789	2.31	0.54	1.39	0.34	31.8	6.72	0.753
15	7.35	3,590	731	1.61	0.27	1.20	0.18	45.4	8.93	0.707
16	7.71	4,274	773	1.53	0.17	1.33	0.13	83.0	15.6	0.855
17	6.01	6,514	1,047	1.96	0.14	1.78	0.10	**111**	**20.0**	0.716
18	3.39	3,201	565	0.90	0.09	0.77	0.07	36.9	7.81	0.446
19	3.01	3,514	566	0.90	0.07	0.80	0.06	44.3	8.88	0.433
20	2.37	3,394	496	0.73	0.05	0.66	0.04	42.3	8.02	0.349
21	2.38	2,058	426	0.48	0.06	0.41	0.04	30.9	5.02	0.332
22	1.97	783	199	0.32	0.05	0.24	0.04	15.5	2.76	0.252
23	3.09	638	155	0.45	0.08	0.31	0.06	8.69	1.80	0.206
24	2.46	526	143	0.46	0.10	0.32	0.07	8.26	1.75	0.215
25	2.40	613	140	0.46	0.09	0.33	0.06	7.40	1.69	0.236
26	3.12	1,039	197	0.56	0.13	0.40	0.08	16.3	2.80	0.296
27	5.48	1,397	357	0.97	0.28	0.61	0.18	24.3	4.68	0.443
28	4.98	1,264	339	0.81	0.23	0.63	0.15	24.2	7.10	0.475
29	3.97	2,498	685	1.43	0.15	1.36	0.11	48.3	15.2	0.489
30	2.82	1,252	386	0.94	0.12	0.72	0.08	18.0	5.84	0.291
31	6.22	2,156	527	1.60	0.38	1.09	0.23	15.3	5.03	0.344
32	4.89	1,531	430	1.36	0.24	0.98	0.15	21.0	6.26	0.397
33	5.31	1,270	395	1.14	0.25	0.74	0.16	26.1	5.72	0.549
34	6.96	3,116	640	0.76	0.15	0.69	0.12	54.0	8.51	1.08
35	6.78	3,457	625	0.75	0.19	0.66	0.14	56.5	7.89	1.04
36	7.30	3,112	603	1.19	0.30	0.78	0.20	49.8	7.03	0.813
37	4.78	1,527	391	1.35	0.34	0.81	0.21	3.20	0.702	0.135
38	0.412	382	68.3	0.12	0.02	0.09	0.01	5.76	0.755	0.0364
R01A	25.8	4,661	1,830	2.29	0.73	2.15	0.64	53.4	17.7	4.73
R01B	**26.3**	11,203	**4,923**	**3.84**	0.77	**3.74**	0.69	66.6	18.7	**4.78**
R02A	23.9	8,190	1,544	2.58	0.63	2.21	0.53	64.9	18.3	4.15
R02B	24.3	23,099	3,569	1.96	0.64	1.78	0.56	66.1	16.0	4.24
R03A	20.2	5,170	1,277	2.43	0.62	1.93	0.49	49.4	14.7	3.29
R03B	20.3	8,248	1,910	2.26	0.62	1.90	0.50	45.8	14.0	3.35
R05	19.2	4,607	1,017	2.19	0.51	1.87	0.43	62.9	17.2	3.26
R06A	21.4	11,712	2,019	2.33	0.71	2.15	0.63	50.0	15.6	3.81
R06B	22.2	**29,544**	4,622	3.67	0.80	3.56	**0.74**	59.8	16.7	3.96

Note: Bold numbers are highest predicted values.

Source: Environmental Science Associates, Inc. [TPC] analysis, 2004/2005.

TABLE J.2-100
DISPERSION RESULTS (BY RECEPTOR) - 2018 - ALTERNATIVE C

Receptor ID	Maximum Predicted Pollutant Concentrations (µg/m³)									
	NO2	CO		PM10		PM2.5		SO2		
	Annual	1-Hour	8-Hour	24-Hour	Annual	24-Hour	Annual	3-Hour	24-Hour	Annual
1	11.8	4,857	1,161	3.29	**1.04**	2.03	**0.64**	52.3	7.43	1.02
2	10.0	4,597	1,171	2.74	0.73	1.74	0.46	52.5	9.31	1.08
3	7.76	3,456	689	0.91	0.24	0.77	0.19	52.2	9.22	1.38
4	7.39	3,236	631	1.73	0.41	1.10	0.27	42.0	7.22	0.942
5	8.15	3,581	568	1.33	0.29	0.89	0.21	50.2	8.82	1.18
6	6.73	2,619	509	1.03	0.23	0.70	0.16	29.2	7.20	0.950
7	7.10	2,876	569	0.95	0.24	0.68	0.17	24.2	6.46	0.963
8	8.70	3,065	698	1.35	0.34	0.89	0.24	25.5	6.85	1.10
9	10.5	3,532	856	2.17	0.58	1.40	0.38	23.6	6.77	1.29
10	8.13	1,950	806	0.97	0.23	0.78	0.17	31.4	8.70	1.07
11	8.58	1,726	856	1.00	0.22	0.83	0.16	39.1	10.9	1.11
12	10.6	3,445	668	1.82	0.48	1.17	0.31	39.7	8.66	1.07
13	15.7	4,328	774	1.51	0.28	1.20	0.20	62.3	12.8	1.73
14	9.33	4,252	943	2.42	0.58	1.46	0.37	39.2	7.80	0.871
15	6.78	7,895	1,269	1.97	0.31	1.49	0.21	66.9	12.3	0.840
16	7.05	5,026	860	1.65	0.21	1.38	0.15	**96.4**	17.5	0.934
17	5.60	3,872	731	1.36	0.17	1.13	0.12	72.0	13.4	0.753
18	4.01	4,277	897	1.33	0.11	1.16	0.08	84.6	15.4	0.583
19	4.30	3,723	862	1.22	0.11	1.06	0.08	74.6	13.8	0.642
20	3.54	3,033	680	0.96	0.07	0.86	0.06	67.0	12.4	0.568
21	5.25	4,128	692	0.88	0.10	0.76	0.08	43.1	9.97	0.838
22	3.42	3,179	568	0.80	0.09	0.68	0.07	46.4	8.61	0.612
23	2.63	1,030	290	0.51	0.11	0.38	0.07	17.4	3.77	0.404
24	2.94	846	251	0.58	0.14	0.37	0.09	15.4	3.41	0.412
25	3.06	1,061	293	0.66	0.13	0.49	0.09	21.5	4.06	0.471
26	3.67	1,523	479	0.92	0.16	0.73	0.11	27.2	7.91	0.549
27	5.28	1,852	468	1.31	0.37	0.83	0.24	25.0	7.33	0.600
28	4.48	1,486	448	1.03	0.28	0.75	0.18	26.6	9.30	0.550
29	3.21	1,427	443	0.79	0.14	0.71	0.10	30.5	9.83	0.471
30	2.41	1,319	396	0.93	0.12	0.71	0.08	20.9	6.44	0.329
31	4.48	2,238	553	1.63	0.40	1.10	0.25	16.7	5.31	0.387
32	3.78	2,146	522	1.30	0.25	0.91	0.16	33.5	5.35	0.448
33	4.16	1,691	382	1.01	0.21	0.65	0.14	32.4	5.39	0.608
34	4.75	2,378	484	0.62	0.14	0.52	0.10	41.3	6.32	0.882
35	5.26	2,691	519	0.71	0.19	0.57	0.14	47.3	6.77	0.954
36	5.42	2,525	522	1.26	0.30	0.81	0.20	43.4	6.14	0.772
37	3.15	1,668	426	1.45	0.37	0.88	0.22	5.47	0.909	0.153
38	0.397	500	90.5	0.15	0.02	0.11	0.01	8.43	1.09	0.0504
R01A	24.9	4,472	1,755	2.04	0.64	1.97	0.57	62.1	19.3	**4.98**
R01B	**25.3**	11,606	**4,967**	**3.61**	0.68	**3.50**	0.62	62.2	17.4	**4.98**
R02A	22.8	8,086	1,518	2.43	0.57	2.13	0.49	84.7	**22.1**	4.44
R02B	23.4	22,093	3,413	2.09	0.60	1.97	0.53	80.4	19.9	4.51
R03A	21.8	6,530	1,491	2.23	0.62	1.82	0.49	85.4	18.1	3.79
R03B	22.1	7,930	2,175	2.17	0.64	1.85	0.52	77.2	16.6	3.84
R04A	21.5	8,157	1,594	2.65	0.67	2.12	0.53	73.8	17.8	3.52
R04B	22.4	**23,354**	3,953	3.16	0.74	2.49	0.58	95.4	15.7	3.57
R05	20.9	5,008	1,055	2.58	0.63	2.14	0.49	91.7	22.3	3.65
R06A	20.8	3,482	1,400	1.66	0.41	1.40	0.35	53.0	16.0	3.45
R06B	20.8	7,704	3,459	2.35	0.44	2.19	0.38	56.7	16.6	3.45
R07A	18.8	3,670	1,529	1.95	0.42	1.46	0.34	49.1	14.3	2.52
R07B	18.6	9,126	2,928	2.27	0.42	2.08	0.35	57.1	16.4	2.54
R08A	5.95	1,704	507	0.89	0.17	0.77	0.13	33.5	10.4	0.999
R08B	5.78	1,560	498	0.78	0.16	0.69	0.12	29.8	10.1	0.978

Notes: Bold numbers are highest predicted values.
Alternative C = Build Alternative

Source: Environmental Science Associates, Inc. [TPC] analysis, 2004/2005.

TABLE J.2-101
DISPERSION RESULTS (BY RECEPTOR) - 2018 - ALTERNATIVE D

Receptor ID	Maximum Predicted Pollutant Concentrations (µg/m³)									
	NO2	CO		PM10		PM2.5		SO2		
	Annual	1-Hour	8-Hour	24-Hour	Annual	24-Hour	Annual	3-Hour	24-Hour	Annual
1	11.90	4.857	1.180	3.29	**1.04**	2.03	**0.64**	54.3	7.75	1.03
2	10.20	4.706	1.190	2.74	0.73	1.74	0.46	54.1	9.55	1.11
3	8.02	3,312	715	0.91	0.24	0.78	0.19	49.9	9.26	1.43
4	7.61	3,235	664	1.73	0.41	1.10	0.27	42.1	7.20	0.994
5	8.57	3,870	612	1.33	0.29	0.89	0.21	55.6	9.12	1.29
6	7.06	2,522	530	1.03	0.23	0.70	0.16	29.0	7.63	1.03
7	7.53	2,023	575	0.95	0.24	0.68	0.17	41.9	6.94	1.07
8	9.25	2,137	719	1.35	0.34	0.89	0.24	33.1	8.61	1.24
9	11.10	2,913	849	2.17	0.58	1.40	0.38	41.9	6.91	1.43
10	8.66	1,911	783	0.97	0.23	0.77	0.17	30.6	8.59	1.18
11	9.29	1,765	825	1.00	0.22	0.83	0.16	38.5	10.8	1.25
12	11.20	3,445	668	1.82	0.48	1.17	0.31	40.5	9.09	1.18
13	17.30	5,053	874	1.51	0.28	1.19	0.20	77.7	15.8	1.89
14	9.44	3,786	844	2.42	0.58	1.46	0.37	38.8	8.05	0.879
15	6.91	4.972	940	1.97	0.31	1.48	0.21	69.8	13.1	0.851
16	7.11	4.880	848	1.65	0.21	1.38	0.15	95.0	17.5	0.933
17	5.39	3.661	715	1.36	0.17	1.13	0.12	69.5	13.1	0.729
18	3.59	4.459	911	1.34	0.11	1.16	0.08	85.2	15.6	0.542
19	3.62	3.855	844	1.23	0.11	1.06	0.08	73.1	13.6	0.576
20	2.80	3,124	519	0.96	0.07	0.87	0.06	47.0	9.16	0.473
21	3.14	3,872	605	0.88	0.10	0.76	0.08	35.0	7.01	0.524
22	2.74	2,766	472	0.80	0.09	0.68	0.07	39.9	7.44	0.448
23	2.48	1,058	280	0.51	0.11	0.38	0.07	15.2	3.26	0.358
24	2.83	823	240	0.58	0.14	0.37	0.09	15.2	3.34	0.376
25	2.88	946	208	0.66	0.13	0.49	0.09	18.1	3.71	0.416
26	3.65	1,553	470	0.92	0.16	0.73	0.11	27.9	7.73	0.525
27	5.28	1,852	468	1.31	0.37	0.83	0.24	25.6	7.34	0.586
28	4.51	1,435	452	1.03	0.28	0.75	0.18	27.1	9.46	0.541
29	3.25	1,460	447	0.79	0.14	0.71	0.10	31.1	10.0	0.466
30	2.43	1,344	398	0.93	0.12	0.71	0.08	21.3	6.60	0.326
31	4.50	2,238	553	1.63	0.40	1.10	0.25	17.2	5.45	0.386
32	3.82	2.039	518	1.30	0.25	0.91	0.16	31.4	5.49	0.448
33	4.21	1.708	381	1.01	0.21	0.65	0.14	32.3	5.52	0.611
34	4.85	2.455	495	0.62	0.14	0.52	0.10	42.2	6.56	0.893
35	5.36	2,772	527	0.71	0.19	0.57	0.14	48.4	7.09	0.969
36	5.51	2,601	530	1.26	0.30	0.81	0.20	44.5	6.46	0.783
37	3.14	1,668	426	1.45	0.37	0.88	0.22	4.81	0.891	0.151
38	0.387	501	89.2	0.15	0.02	0.11	0.01	8.25	1.07	0.0479
R01A	25.20	4,609	1,738	2.04	0.64	1.97	0.57	63.4	19.2	**4.99**
R01B	**25.50**	12,075	**4.894**	**3.56**	0.68	**3.46**	0.62	63.5	17.1	**4.99**
R02A	23.00	7,844	1,536	2.42	0.57	2.12	0.49	84.8	22.1	4.45
R02B	23.50	21,444	3,328	2.09	0.60	1.97	0.53	78.0	19.9	4.53
R03A	22.00	6,709	1,504	2.22	0.62	1.82	0.49	86.3	18.4	3.83
R03B	22.30	8,190	2,190	2.15	0.64	1.84	0.52	77.5	16.8	3.88
R04A	21.80	8,397	1,601	2.65	0.68	2.12	0.53	75.1	18.1	3.60
R04B	22.70	**24.096**	4,029	3.16	0.74	2.54	0.58	**97.4**	16.0	3.65
R05	21.20	4,865	1,061	2.58	0.63	2.13	0.49	92.9	**22.5**	3.68
R06A	21.10	3,430	1,366	1.66	0.41	1.40	0.35	65.4	17.2	3.55
R06B	21.10	7,742	3,392	2.33	0.44	2.17	0.38	56.3	16.3	3.53
R07A	19.40	3,639	1,510	1.95	0.42	1.47	0.34	47.9	14.2	2.67
R07B	19.30	9,145	2,885	2.26	0.42	2.07	0.35	55.9	16.3	2.68
R08A	6.09	1,741	511	0.89	0.17	0.77	0.13	34.1	10.5	0.981
R08B	5.91	1,611	447	0.78	0.16	0.69	0.12	30.3	10.1	0.960

Notes: Bold numbers are highest predicted values.
Alternative C = Build Alternative

Source: Environmental Science Associates, Inc. [TPC] analysis, 2004/2005.

TABLE J.2-102
DISPERSION RESULTS (BY RECEPTOR) - 2018 - ALTERNATIVE G

Receptor ID	Maximum Predicted Pollutant Concentrations (µg/m³)									
	NO2	CO		PM10		PM2.5		SO2		
	Annual	1-Hour	8-Hour	24-Hour	Annual	24-Hour	Annual	3-Hour	24-Hour	Annual
1	11.80	4.857	1.172	3.29	**1.04**	2.03	**0.64**	53.3	7.62	1.02
2	10.10	4.679	1.183	2.74	0.73	1.74	0.46	53.5	9.43	1.09
3	7.87	3,367	700	0.91	0.24	0.77	0.19	49.9	9.02	1.41
4	7.48	3,194	658	1.73	0.41	1.10	0.27	40.7	7.07	0.968
5	8.34	3,608	594	1.33	0.29	0.89	0.21	50.6	8.69	1.23
6	6.88	2,539	507	1.03	0.23	0.70	0.16	28.1	7.14	0.993
7	7.33	1,894	566	0.95	0.24	0.68	0.17	33.0	6.67	1.02
8	9.01	2,110	702	1.35	0.34	0.90	0.24	27.5	7.68	1.18
9	10.90	2,923	848	2.17	0.58	1.41	0.38	49.0	6.83	1.38
10	8.47	1,909	782	0.97	0.23	0.77	0.17	31.5	8.52	1.13
11	9.08	1,757	816	1.00	0.22	0.83	0.16	38.0	10.6	1.19
12	11.10	3,445	668	1.82	0.48	1.17	0.31	39.3	9.14	1.15
13	18.10	4,692	832	1.51	0.28	1.19	0.20	71.3	15.2	2.12
14	9.43	3,786	846	2.42	0.58	1.46	0.37	39.5	8.04	0.876
15	6.90	4.985	950	1.97	0.31	1.48	0.21	71.8	13.3	0.847
16	7.10	4.897	842	1.65	0.21	1.38	0.15	94.1	17.3	0.926
17	5.41	3.668	712	1.36	0.17	1.13	0.12	68.9	12.9	0.724
18	3.67	4.392	892	1.33	0.11	1.16	0.08	83.7	15.3	0.544
19	3.76	3.815	870	1.23	0.11	1.06	0.08	73.8	13.7	0.580
20	2.96	3,108	533	0.96	0.07	0.87	0.06	48.3	9.37	0.481
21	3.43	3,352	686	0.86	0.10	0.74	0.08	35.4	7.01	0.545
22	2.90	2,750	436	0.80	0.09	0.68	0.07	39.8	7.47	0.460
23	2.63	1,148	293	0.51	0.11	0.38	0.07	17.0	3.41	0.373
24	3.05	823	232	0.58	0.14	0.37	0.09	16.0	3.54	0.402
25	3.18	955	221	0.66	0.13	0.49	0.09	22.3	4.27	0.450
26	3.77	1,538	461	0.92	0.16	0.73	0.11	27.4	8.02	0.544
27	5.30	1,852	468	1.31	0.37	0.83	0.24	25.3	7.36	0.594
28	4.47	1,457	449	1.03	0.28	0.75	0.18	26.7	9.31	0.543
29	3.20	1,458	445	0.79	0.14	0.71	0.10	30.9	9.90	0.466
30	2.41	1,342	396	0.93	0.12	0.71	0.08	20.8	6.50	0.326
31	4.48	2,238	553	1.63	0.40	1.10	0.25	16.3	5.36	0.385
32	3.77	2.020	510	1.30	0.25	0.91	0.16	31.2	5.38	0.444
33	4.15	1.700	379	1.01	0.21	0.65	0.14	32.0	5.40	0.605
34	4.75	2.443	484	0.62	0.14	0.52	0.10	41.7	6.38	0.883
35	5.26	2,762	523	0.71	0.19	0.57	0.14	47.9	6.87	0.957
36	5.42	2,592	527	1.26	0.30	0.81	0.20	43.9	6.25	0.774
37	3.15	1,668	426	1.45	0.37	0.88	0.22	4.33	0.890	0.151
38	0.392	501	89.6	0.15	0.02	0.11	0.01	8.29	1.09	0.0484
R01A	24.80	4,621	1,750	2.04	0.64	1.96	0.57	63.2	19.1	**4.96**
R01B	**25.20**	12,086	**4.931**	**3.58**	0.68	**3.48**	0.62	63.3	17.0	**4.96**
R02A	22.70	8,039	1,541	2.42	0.57	2.13	0.49	84.4	22.0	4.43
R02B	23.30	21,622	3,351	2.10	0.60	1.97	0.53	78.4	19.8	4.50
R03A	21.70	6,664	1,484	2.23	0.62	1.82	0.49	85.8	18.3	3.79
R03B	22.00	8,135	2,170	2.17	0.64	1.85	0.52	77.1	16.8	3.85
R04A	21.50	8,341	1,593	2.65	0.68	2.12	0.53	74.7	18.0	3.54
R04B	22.40	**23,933**	4,007	3.16	0.74	2.53	0.58	**96.8**	15.9	3.59
R05	20.90	5,006	1,066	2.58	0.63	2.14	0.49	92.4	**22.4**	3.65
R06A	20.90	3,383	1,364	1.66	0.41	1.40	0.35	53.3	16.6	3.50
R06B	20.80	7,733	3,356	2.33	0.44	2.17	0.38	55.4	16.4	3.48
R07A	19.00	3,635	1,497	1.95	0.42	1.47	0.34	48.4	14.1	2.55
R07B	18.80	9,372	2,815	2.25	0.42	2.06	0.35	56.3	16.1	2.56
R08A	6.31	1,740	498	0.88	0.17	0.76	0.13	33.5	10.5	1.02
R08B	6.12	1,600	448	0.77	0.16	0.69	0.12	30.2	10.1	1.00

Notes: Bold numbers are highest predicted values.
Alternative C = Build Alternative

Source: Environmental Science Associates, Inc. [TPC] analysis, 2004/2005.

TABLE J.2-103
DISPERSION MODELING RESULTS – 2008 – DELAYED SCHEDULE

	Maximum Predicted Pollutant Concentrations (µg/m³)									
	NO2	CO		PM10		PM2.5		SO2		
Items	Annual	1-Hour	8-Hour	24-Hour	Annual	24-Hour	Annual	3-Hour	24-Hour	Annual
NAAQS	100	40,000	10,000	150	50	65	15	1,300	365	80
Alternative A										
Within Study Area	28.6	26,925	4,560	4.10	1.29	3.67	0.8	132	23.4	4.56
Background	58	5,143	3,314	60	30	35.2	13.3	192	76	8
Total	87	32,068	7,874	64.1	31.1	38.9	14.1	324	99	13
Predicted Meets or Exceeds NAAQS	No	No	No	No	No	No	No	No	No	No
Percentage of Predicted Total to NAAQS	87%	80%	79%	43%	62%	60	94	25%	27%	16%
Percentage of Background to Predicted Total	67%	16%	42%	94%	97%	91	94	59%	77%	62%
Alternatives C, D, G										
Within Study Area	29.7	31,079	5,074	4.28	1.36	3.37	0.85	99.7	21.8	5.39
Background	58	5,143	3,314	60	30	35.2	13.3	192	76	8
Total	88	36,222	8,388	64.3	31.1	38.6	14.2	292	98	13
Predicted Meets or Exceeds NAAQS	No	No	No	No	No	No	No	No	No	No
Percentage of Predicted Total to NAAQS	88%	91%	84%	43%	62%	59	94	22%	27%	16%
Percentage of Background to Predicted Total	66%	14%	40%	94%	97%	91	94	66%	78%	62%

Notes: Alternative A = No Action, Alternative C, D, and G are Build Alternatives.
NAAQS = National Ambient Air Quality Standards
Source: Environmental Science Associates, Inc. [TPC] analysis, 2004/2005.

TABLE J.2-104
DISPERSION MODELING RESULTS – 2010 – DELAYED SCHEDULE

	Maximum Predicted Pollutant Concentrations (µg/m³)									
	NO2	CO		PM10		PM2.5		SO2		
Items	Annual	1-Hour	8-Hour	24-Hour	Annual	24-Hour	Annual	3-Hour	24-Hour	Annual
NAAQS	100	40,000	10,000	150	50	65	15	1,300	365	80
Alternative A										
Within Study Area	25.5	25,414	4,738	3.86	1.21	3.32	0.75	87.1	18.2	4.55
Background	58	5,143	3,314	60	30	35.2	13.3	192	76	8
Total	84	30,557	8,052	63.9	31	38.5	14.1	279	94	13
Predicted Meets or Exceeds NAAQS	No	No	No	No	No	No	No	No	No	No
Percentage of Predicted Total to NAAQS	84%	76%	81%	43%	62%	59	94	21%	26%	16%
Percentage of Background to Predicted Total	69%	17%	41%	94%	97%	91	95	69%	81%	62%
Alternatives C, D, G										
Within Study Area	22.8	15,190	5,049	3.87	1.18	3.24	0.75	89.1	17.0	4.20
Background	58	5,143	3,314	60	30	35.2	13.3	192	76	8
Total	81	20,333	8,363	63.9	31	38.4	14.1	281	93	12
Predicted Meets or Exceeds NAAQS	No	No	No	No	No	No	No	No	No	No
Percentage of Predicted Total to NAAQS	81%	51%	84%	43%	62%	59	94	22%	25%	15%
Percentage of Background to Predicted Total	72%	25%	40%	94%	97%	92	95	68%	82%	67%

Notes: Alternative A = No Action, Alternative C, D, and G are Build Alternatives.
NAAQS = National Ambient Air Quality Standards
Source: Environmental Science Associates, Inc. [TPC] analysis, 2004/2005.

TABLE J.2-105
DISPERSION MODELING RESULTS – 2014 – DELAYED SCHEDULE

	Maximum Predicted Pollutant Concentrations (µg/m3)									
	NO2	CO		PM10		PM2.5		SO2		
Items	Annual	1-Hour	8-Hour	24-Hour	Annual	24-Hour	Annual	3-Hour	24-Hour	Annual
NAAQS	100	40,000	10,000	150	50	65	15	1,300	365	80
Alternative A										
Within Study Area	25.7	28.269	4,960	3.80	1.10	3.70	0.68	131	24.9	4.72
Background	58	5,143	3,314	60	30	35.2	13.3	192	76	8
Total	84	5,171	8,274	63.8	31.1	38.9	14.0	323	101	13
Predicted Meets or Exceeds NAAQS	No	No	No	No	No	No	No	No	No	No
Percentage of Predicted Total to NAAQS	84%	13%	83%	42%	62%	60	93	25%	28%	16%
Percentage of Background to Predicted Total	69%	99%	40%	95%	97%	90	95	59%	75%	62%
Alternative C										
Within Study Area	24.7	22,952	4,736	3.61	1.13	3.26	0.70	93.4	20.5	4.77
Background	58	5,143	3,314	60	30	35.2	13.3	192	76	8
Total	83	28,095	8,050	64	31	38.5	14.0	285	97	13
Predicted Meets or Exceeds NAAQS	No	No	No	No	No	No	No	No	No	No
Percentage of Predicted Total to NAAQS	83%	70%	81%	43%	62%	59	93	22%	27%	16%
Percentage of Background to Predicted Total	70%	18%	41%	94%	97%	92	95	67%	78%	62%
Alternative D										
Within Study Area	24.5	21,705	4,706	3.61	1.13	3.24	0.70	82.2	20.0	4.66
Background	58	5,143	3,314	60	30	35.2	13.3	192	76	8
Total	83	26,848	8,020	64	31	38	14	274	96	13
Predicted Meets or Exceeds NAAQS	No	No	No	No	No	No	No	No	No	No
Percentage of Predicted Total to NAAQS	83%	67%	80%	43%	62%	58%	93%	21%	26%	16%
Percentage of Background to Predicted Total	70%	19%	41%	94%	97%	93%	95%	70%	79%	62%
Alternative G										
Within Study Area	24.1	21,577	4,724	3.61	1.13	3.25	0.699	81.7	19.8	4.63
Background	58	5,143	3,314	60	30	35.2	13.3	192	76	8
Total	82	26,720	8,038	64	31	38.5	14	274	96	13
Predicted Meets or Exceeds NAAQS	No	No	No	No	No	No	No	No	No	No
Percentage of Predicted Total to NAAQS	82%	67%	80%	43%	62%	59%	93%	21%	26%	16%
Percentage of Background to Predicted Total	71%	19%	41%	94%	97%	91%	95%	70%	79%	62%

Notes: Alternative A = No Action, Alternative C, D, and G are Build Alternatives.
NAAQS = National Ambient Air Quality Standards

Source: Environmental Science Associates, Inc. [TPC] analysis, 2004/2005.

TABLE J.2-106
DISPERSION MODELING RESULTS – 2019 – DELAYED SCHEDULE

	Maximum Predicted Pollutant Concentrations (µg/m3)									
	NO2	CO		PM10		PM2.5		SO2		
Items	Annual	1-Hour	8-Hour	24-Hour	Annual	24-Hour	Annual	3-Hour	24-Hour	Annual
NAAQS	100	40,000	10,000	150	50	65	15	1,300	365	80
Alternative A										
Within Study Area	25.7	29,544	4,923	3.85	1.02	3.75	0.74	111	20.0	4.78
Background	58	5,143	3,314	60	30	35.2	13.3	192	76	8
Total	84	34,687	8,237	64	31	39.0	14.0	303	96	13
Predicted Meets or Exceeds NAAQS	No	No	No	No	No	No	No	No	No	No
Percentage of Predicted Total to NAAQS	84%	87%	82%	42%	62%	60	94	23%	26%	16%
Percentage of Background to Predicted Total	69%	15%	40%	95%	97%	90	95	63%	79%	62%
Alternative C										
Within Study Area	25.5	23,624	5,024	3.66	1.05	3.55	0.65	97.5	22.3	5.04
Background	58	5,143	3,314	60	30	35.2	13.3	192	76	8
Total	84	28,767	8,338	63.7	31.1	38.8	14.0	290	98	13
Predicted Meets or Exceeds NAAQS	No	No	No	No	No	No	No	No	No	No
Percentage of Predicted Total to NAAQS	84%	72%	83%	42%	62%	60	93	22%	27%	16%
Percentage of Background to Predicted Total	69%	18%	40%	95%	97%	91	95	66%	78%	62%
Alternative D										
Within Study Area	25.5	24,374	4,951	3.61	1.05	3.51	0.650	98.5	22.8	5.05
Background	58	5,143	3,314	60	30	35.2	13.3	192	76	8
Total	84	29,517	8,265	64	31	39	14	291	99	13
Predicted Meets or Exceeds NAAQS	No	No	No	No	No	No	No	No	No	No
Percentage of Predicted Total to NAAQS	82%	67%	80%	43%	62%	59%	93%	21%	26%	16%
Percentage of Background to Predicted Total	71%	19%	41%	94%	97%	91%	95%	70%	79%	62%
Alternative G										
Within Study Area	25.4	24,209	4,988	3.63	1.05	3.53	0.65	97.9	22.6	5.02
Background	58	5,143	3,314	60	30	35.2	13.3	192	76	8
Total	83	29,352	8,302	64	31	39	14	290	99	13
Predicted Meets or Exceeds NAAQS	No	No	No	No	No	No	No	No	No	No
Percentage of Predicted Total to NAAQS	82%	67%	80%	43%	62%	59%	93%	21%	26%	16%
Percentage of Background to Predicted Total	71%	19%	41%	94%	97%	91%	95%	70%	79%	62%

Notes: Alternative A = No Action, Alternative C, D, and G are Build Alternatives.
NAAQS = National Ambient Air Quality Standards

Source: Environmental Science Associates, Inc. [TPC] analysis, 2004/2005.

TABLE J.2-107
DISPERSION RESULTS (BY RECEPTOR) - 2008 - ALTERNATIVE A

Receptor ID	Maximum Predicted Pollutant Concentrations (µg/m³)									
	NO2	CO		PM10		PM2.5		SO2		
	Annual	1-Hour	8-Hour	24-Hour	Annual	24-Hour	Annual	3-Hour	24-Hour	Annual
1	**28.56**	6,517	1,423	**4.10**	**1.29**	2.51	**0.80**	39.3	6.98	0.94
2	21.51	4,642	1,342	3.49	0.92	2.18	0.58	39.7	7.21	0.93
3	8.04	3,375	695	1.10	0.27	0.96	0.21	42.6	8.25	1.15
4	11.23	3,456	746	2.02	0.46	1.28	0.31	36.3	6.19	0.81
5	8.20	4,678	725	1.32	0.30	1.12	0.22	53.0	7.83	1.00
6	6.62	3,114	532	1.03	0.23	0.79	0.17	29.5	5.56	0.80
7	6.88	1,938	570	0.92	0.24	0.73	0.18	20.0	5.24	0.81
8	9.51	2,489	822	1.33	0.36	1.00	0.25	24.3	6.52	0.93
9	12.28	3,772	1,001	1.82	0.52	1.17	0.35	22.9	6.48	1.10
10	7.85	1,598	714	0.97	0.24	0.84	0.18	21.9	6.24	0.92
11	8.44	1,484	695	1.06	0.24	0.96	0.18	26.6	7.38	0.97
12	15.84	4,656	897	2.22	0.56	1.40	0.37	34.4	8.07	0.95
13	16.09	5,954	1,053	2.15	0.30	1.85	0.23	94.4	18.09	1.69
14	15.24	5,123	971	2.45	0.61	1.53	0.39	31.4	6.47	0.69
15	8.67	4,132	880	1.86	0.32	1.40	0.22	42.6	8.33	0.67
16	7.92	4,905	884	2.29	0.24	2.02	0.17	85.9	15.88	0.82
17	6.18	8,384	1,317	3.91	0.19	**3.67**	0.14	**132.0**	**23.41**	0.69
18	3.56	2,960	555	1.07	0.12	0.89	0.09	28.6	6.12	0.42
19	3.05	3,193	528	1.04	0.10	0.90	0.08	34.7	7.03	0.41
20	2.34	3,649	536	0.98	0.07	0.89	0.06	41.9	7.81	0.34
21	2.40	2,225	463	0.66	0.07	0.56	0.06	31.2	5.06	0.32
22	2.09	865	220	0.41	0.07	0.32	0.05	15.2	2.71	0.24
23	2.60	644	182	0.51	0.11	0.33	0.07	8.8	1.79	0.19
24	2.75	550	157	0.47	0.11	0.30	0.08	8.1	1.68	0.20
25	2.98	561	186	0.52	0.12	0.35	0.08	7.2	1.62	0.22
26	3.95	992	247	0.77	0.16	0.54	0.11	13.4	2.41	0.27
27	7.68	1,880	477	1.21	0.34	0.76	0.22	22.9	4.28	0.38
28	6.50	1,549	391	1.01	0.28	0.83	0.18	22.7	6.42	0.39
29	4.44	1,544	525	1.23	0.17	1.15	0.12	28.4	10.37	0.38
30	3.53	1,361	434	1.16	0.15	0.90	0.10	15.9	5.33	0.26
31	10.03	2,981	735	2.03	0.49	1.39	0.30	14.3	4.74	0.31
32	6.87	1,838	524	1.73	0.30	1.26	0.19	20.4	6.04	0.36
33	6.69	1,365	459	1.33	0.28	0.87	0.18	26.7	5.76	0.50
34	7.12	3,195	662	0.99	0.19	0.90	0.15	52.1	7.95	1.07
35	7.04	3,467	646	0.97	0.24	0.85	0.18	52.5	7.29	0.99
36	9.18	3,116	639	1.51	0.38	1.00	0.25	46.2	6.47	0.77
37	8.41	2,011	530	1.71	0.43	1.03	0.26	2.8	0.64	0.12
38	0.55	364	76	0.15	0.02	0.11	0.01	4.7	0.63	0.03
R01A	24.93	5,196	1,779	2.43	0.71	2.19	0.64	52.6	17.01	4.52
R01B	25.60	10,243	**4,560**	3.03	0.73	2.96	0.66	63.2	18.08	**4.56**
R02A	23.41	9,422	1,698	2.74	0.67	2.39	0.58	63.2	17.61	3.99
R02B	23.82	**26,925**	4,127	2.16	0.66	1.93	0.58	65.6	15.38	4.07
R03A	20.09	4,789	1,259	2.67	0.67	2.17	0.54	47.5	13.93	3.16
R03B	20.20	8,671	1,964	2.36	0.65	2.01	0.54	43.9	13.24	3.23
R05	18.49	5,299	1,073	2.49	0.57	2.15	0.48	61.2	16.45	3.11
R06A	20.62	10,343	1,766	2.31	0.66	2.01	0.59	48.8	14.11	3.49
R06B	21.74	24,934	3,890	2.89	0.70	2.82	0.64	54.5	15.82	3.62

Note: Bold numbers are highest predicted values.
Source: Environmental Science Associates, Inc. [TPC] analysis, 2004/2005.

TABLE J.2-108
DISPERSION RESULTS (BY RECEPTOR) - 2008 – ALTERNATIVES C, D, G

Receptor ID	Maximum Predicted Pollutant Concentrations (µg/m³)									
	NO2	CO		PM10		PM2.5		SO2		
	Annual	1-Hour	8-Hour	24-Hour	Annual	24-Hour	Annual	3-Hour	24-Hour	Annual
1	**29.70**	7,053	1,620	**4.28**	**1.36**	2.67	**0.85**	45.9	7.59	1.05
2	21.88	5,475	1,489	3.61	0.96	2.30	0.61	49.5	9.12	1.08
3	8.76	4,215	774	1.26	0.31	1.11	0.25	56.1	10.10	1.41
4	11.50	3,258	752	2.09	0.49	1.34	0.33	33.5	6.78	0.91
5	8.32	3,457	634	1.38	0.31	0.93	0.23	35.7	7.24	1.10
6	6.81	2,444	523	1.06	0.25	0.81	0.18	18.6	5.61	0.87
7	7.10	1,893	631	0.96	0.25	0.81	0.19	22.9	6.01	0.88
8	9.60	2,554	845	1.34	0.37	1.05	0.26	25.8	6.86	1.01
9	12.81	3,995	1,044	1.88	0.54	1.24	0.37	23.9	6.93	1.19
10	8.42	1,748	776	1.07	0.25	0.93	0.19	23.5	6.79	1.01
11	9.13	1,625	718	1.08	0.25	0.93	0.19	25.7	7.46	1.06
12	16.76	4,726	913	2.26	0.58	1.48	0.38	35.4	7.98	1.05
13	18.52	5,372	997	2.17	0.31	1.87	0.25	88.0	17.49	1.91
14	17.30	5,223	1,049	3.02	0.68	1.82	0.43	36.0	7.52	0.75
15	9.13	4,402	938	1.98	0.32	1.51	0.22	47.0	9.36	0.71
16	7.64	4,978	985	2.04	0.20	1.85	0.15	**99.7**	18.46	0.86
17	5.79	4,402	853	1.77	0.16	1.57	0.12	81.1	15.13	0.70
18	3.33	3,196	597	1.04	0.10	0.89	0.08	31.0	6.55	0.43
19	3.00	3,675	588	1.11	0.09	0.99	0.07	42.6	8.30	0.41
20	2.45	4,102	595	1.12	0.07	1.03	0.06	50.2	9.25	0.35
21	2.53	2,269	470	0.69	0.08	0.60	0.06	32.4	5.26	0.34
22	2.20	908	231	0.43	0.07	0.34	0.06	16.0	2.85	0.26
23	2.69	675	187	0.52	0.11	0.39	0.08	9.5	1.94	0.21
24	2.85	579	169	0.49	0.12	0.36	0.08	9.2	1.92	0.21
25	3.20	598	184	0.63	0.13	0.52	0.09	8.3	1.92	0.23
26	4.33	1,100	244	0.92	0.19	0.74	0.13	14.5	2.62	0.29
27	7.89	1,904	484	1.25	0.36	0.79	0.23	24.2	4.21	0.38
28	6.57	1,569	396	1.05	0.29	0.83	0.19	26.0	6.56	0.38
29	4.28	1,766	522	1.22	0.17	1.14	0.12	32.7	10.27	0.37
30	3.47	1,465	457	1.23	0.14	0.98	0.10	19.1	6.06	0.26
31	9.54	2,800	690	2.02	0.46	1.42	0.29	16.9	5.44	0.32
32	6.57	1,887	536	1.85	0.29	1.40	0.19	23.1	6.81	0.37
33	6.62	1,423	467	1.35	0.28	0.95	0.19	27.2	6.38	0.53
34	6.80	3,401	720	1.14	0.20	1.03	0.17	56.3	8.76	1.11
35	7.11	3,769	701	1.08	0.26	0.97	0.20	58.9	8.12	1.09
36	9.28	3,407	691	1.60	0.39	1.11	0.27	51.9	7.22	0.84
37	8.32	2,000	524	1.69	0.42	1.02	0.25	3.0	0.65	0.12
38	0.56	398	77	0.17	0.02	0.14	0.02	5.2	0.69	0.03
R01A	27.33	5,880	1,986	2.71	0.82	2.51	0.75	67.5	20.54	5.39
R01B	28.24	11,261	**5,074**	3.45	0.81	**3.37**	0.75	70.5	20.65	**5.39**
R02A	24.33	10,460	1,770	3.06	0.71	2.75	0.64	82.2	21.66	4.47
R02B	25.45	27,259	4,175	2.94	0.68	2.64	0.62	78.9	19.16	4.54
R03A	20.11	4,797	1,262	2.69	0.67	2.29	0.57	57.1	16.08	3.38
R03B	20.89	8,350	1,958	2.91	0.65	2.50	0.55	51.5	15.06	3.44
R05	20.04	6,072	1,132	3.19	0.67	2.78	0.55	87.4	**21.79**	3.55
R06A	21.98	11,978	2,055	2.48	0.80	2.22	0.73	58.8	16.81	3.84
R06B	23.88	**31,079**	4,834	3.42	0.78	3.32	0.72	62.6	17.44	4.00

Notes: Bold numbers are highest predicted values.
Alternatives C, D, G = Build Alternatives
Source: Environmental Science Associates, Inc. [TPC] analysis, 2004/2005.

TABLE J.2-109
DISPERSION RESULTS (BY RECEPTOR) - 2010 - ALTERNATIVE A

Receptor ID	Maximum Predicted Pollutant Concentrations (µg/m³)									
	NO2	CO		PM10		PM2.5		SO2		
	Annual	1-Hour	8-Hour	24-Hour	Annual	24-Hour	Annual	3-Hour	24-Hour	Annual
1	23.86	5,946	1,315	**3.86**	**1.21**	2.36	**0.75**	39.1	6.94	0.94
2	18.21	4,432	1,264	3.29	0.87	2.05	0.55	38.4	7.28	0.92
3	7.62	3,122	683	1.05	0.25	0.92	0.19	40.7	7.90	1.13
4	9.85	2,658	684	1.93	0.44	1.23	0.29	26.8	5.74	0.79
5	7.58	2,998	575	1.29	0.29	0.86	0.21	31.0	6.47	0.97
6	6.15	2,375	471	0.99	0.22	0.67	0.16	14.6	5.07	0.77
7	6.37	1,612	535	0.89	0.23	0.66	0.17	19.6	5.15	0.78
8	8.65	2,183	772	1.29	0.35	0.94	0.24	23.7	6.38	0.91
9	10.96	3,321	942	1.79	0.50	1.15	0.34	22.2	6.34	1.07
10	7.38	1,551	661	0.89	0.23	0.72	0.17	20.4	5.89	0.90
11	7.98	1,499	595	0.97	0.22	0.72	0.17	22.1	6.38	0.94
12	14.01	4,252	734	2.11	0.53	1.32	0.35	32.0	6.54	0.93
13	15.73	5,305	942	1.96	0.28	1.67	0.22	**87.1**	16.73	1.65
14	14.10	4,707	911	2.81	0.62	1.69	0.39	29.8	6.10	0.66
15	7.71	3,823	831	1.77	0.30	1.32	0.20	42.5	8.24	0.62
16	7.23	3,452	695	1.63	0.21	1.38	0.15	67.6	12.84	0.73
17	5.63	3,093	644	1.48	0.17	1.26	0.12	59.1	11.29	0.61
18	3.27	2,981	547	1.03	0.11	0.87	0.08	30.6	6.45	0.38
19	2.74	3,274	530	1.04	0.08	0.91	0.06	37.9	7.53	0.35
20	2.14	3,516	516	0.89	0.06	0.81	0.05	41.4	7.74	0.30
21	2.24	2,138	435	0.60	0.06	0.51	0.05	30.1	4.87	0.30
22	1.94	821	207	0.40	0.06	0.29	0.05	14.8	2.65	0.23
23	2.32	616	263	0.50	0.10	0.33	0.07	7.9	1.64	0.19
24	2.88	785	190	0.55	0.13	0.33	0.09	7.9	1.65	0.19
25	2.66	524	703	0.49	0.11	0.32	0.07	7.2	1.61	0.21
26	3.47	952	221	0.68	0.15	0.46	0.10	13.0	2.37	0.25
27	6.50	1,739	532	1.12	0.32	0.70	0.20	21.9	3.70	0.34
28	5.51	1,428	359	0.92	0.25	0.65	0.16	22.2	5.81	0.34
29	3.80	1,510	438	0.95	0.15	0.87	0.10	28.5	8.88	0.33
30	3.05	1,278	396	1.04	0.13	0.79	0.09	15.7	5.06	0.24
31	8.22	2,689	662	1.87	0.45	1.27	0.28	14.2	4.66	0.30
32	5.84	1,720	843	1.60	0.28	1.16	0.18	20.3	6.00	0.34
33	5.88	1,321	423	1.25	0.26	0.81	0.17	25.0	5.69	0.48
34	6.75	3,124	629	0.90	0.17	0.81	0.14	51.1	7.92	1.04
35	6.64	3,420	625	0.89	0.22	0.78	0.17	52.8	7.33	0.98
36	8.14	3,075	615	1.43	0.35	0.92	0.24	46.4	6.52	0.76
37	6.95	1,848	594	1.63	0.41	0.98	0.25	2.8	0.64	0.12
38	0.47	348	68	0.14	0.02	0.10	0.01	4.6	0.61	0.03
R01A	24.80	4,943	1,792	2.37	0.72	2.12	0.64	50.6	16.84	4.51
R01B	**25.45**	10,886	**4,738**	3.41	0.75	**3.32**	0.68	63.3	**18.19**	**4.55**
R02A	22.88	8,656	1,612	2.76	0.65	2.35	0.55	60.2	17.36	3.91
R02B	23.34	24,656	3,792	2.12	0.64	1.87	0.57	63.8	15.30	4.00
R03A	19.32	4,841	1,216	2.79	0.64	2.21	0.51	47.0	14.01	3.06
R03B	19.47	8,269	1,904	2.45	0.62	2.05	0.51	43.8	13.39	3.12
R05	18.05	4,905	1,052	2.33	0.55	2.01	0.45	59.9	16.45	3.05
R06A	19.90	9,776	1,726	2.35	0.67	2.01	0.59	46.9	13.97	3.41
R06B	20.99	**25,414**	3,981	3.04	0.73	2.96	0.66	51.4	15.49	3.56

Note: Bold numbers are highest predicted values.

Source: Environmental Science Associates, Inc. [TPC] analysis, 2004/2005.

TABLE J.2-110
DISPERSION RESULTS (BY RECEPTOR) - 2010 – ALTERNATIVES C, D, G

Receptor ID	Maximum Predicted Pollutant Concentrations (µg/m³)									
	NO2	CO		PM10		PM2.5		SO2		
	Annual	1-Hour	8-Hour	24-Hour	Annual	24-Hour	Annual	3-Hour	24-Hour	Annual
1	22.41	6,125	1,363	**3.87**	**1.21**	2.37	**0.75**	28.0	4.80	0.74
2	16.81	4,012	1,157	3.21	0.85	2.01	0.53	32.7	5.98	0.74
3	6.17	2,470	541	0.91	0.24	0.73	0.18	33.3	6.04	0.83
4	9.18	2,538	696	1.95	0.44	1.23	0.29	25.7	4.72	0.64
5	6.59	2,921	527	1.32	0.28	0.87	0.20	30.4	5.44	0.75
6	5.66	2,553	457	1.05	0.22	0.70	0.16	17.9	4.87	0.64
7	6.07	1,748	466	0.98	0.23	0.72	0.17	15.9	4.57	0.68
8	8.03	2,314	642	1.38	0.35	0.92	0.24	17.4	4.85	0.81
9	11.49	3,614	951	1.93	0.52	1.25	0.35	21.4	5.55	1.01
10	8.23	1,661	796	0.98	0.23	0.84	0.17	27.1	7.18	0.91
11	9.12	1,574	714	1.01	0.23	0.91	0.17	34.0	8.71	0.99
12	15.29	4,236	823	2.10	0.54	1.26	0.35	39.0	8.40	1.02
13	18.80	2,752	680	1.51	0.29	1.20	0.23	49.9	12.54	1.83
14	15.38	4,738	1,001	2.82	0.65	1.70	0.41	40.3	8.29	0.77
15	8.61	4,947	962	2.05	0.31	1.59	0.21	59.6	11.11	0.71
16	7.69	4,158	804	1.87	0.21	1.61	0.15	**89.1**	16.11	0.73
17	5.75	2,820	595	1.37	0.17	1.14	0.12	55.6	10.42	0.55
18	3.62	2,883	678	1.25	0.11	1.08	0.08	49.9	9.39	0.40
19	3.58	3,093	706	1.28	0.11	1.11	0.08	53.5	10.05	0.44
20	2.64	2,777	454	0.90	0.07	0.80	0.06	38.7	7.49	0.38
21	3.08	3,548	550	0.86	0.09	0.74	0.07	33.4	6.59	0.45
22	2.72	2,143	401	0.75	0.08	0.63	0.06	29.0	5.46	0.38
23	2.88	904	219	0.56	0.11	0.39	0.08	12.8	2.77	0.30
24	3.20	828	438	0.56	0.15	0.40	0.10	12.8	2.80	0.31
25	3.22	816	251	0.63	0.13	0.50	0.09	13.6	2.96	0.33
26	4.31	1,529	533	1.17	0.17	0.94	0.12	26.5	6.87	0.42
27	7.07	1,779	448	1.23	0.34	0.80	0.22	23.0	6.51	0.48
28	5.98	1,482	390	1.02	0.28	0.80	0.18	20.9	7.08	0.46
29	4.03	1,542	483	1.02	0.17	0.93	0.11	30.2	9.65	0.43
30	3.17	1,600	890	1.17	0.14	0.92	0.09	22.9	6.64	0.30
31	8.65	2,753	1,063	1.87	0.48	1.27	0.29	14.8	4.22	0.34
32	6.00	2,406	584	1.42	0.29	0.97	0.19	34.3	5.14	0.40
33	5.38	1,574	378	1.12	0.24	0.72	0.16	27.4	4.16	0.50
34	4.07	2,045	387	0.66	0.14	0.50	0.11	30.5	4.21	0.57
35	4.64	1,983	549	0.76	0.20	0.56	0.14	28.8	4.50	0.59
36	6.92	1,858	492	1.44	0.34	0.92	0.22	26.7	4.02	0.53
37	6.51	1,785	463	1.53	0.38	0.93	0.23	4.0	0.75	0.12
38	0.50	486	139	0.17	0.02	0.14	0.01	7.5	0.98	0.04
R01A	22.11	4,343	1,788	2.22	0.65	2.14	0.58	55.6	**17.11**	4.14
R01B	**22.81**	11,187	**5,049**	3.34	0.68	**3.24**	0.62	58.4	17.00	**4.20**
R02A	21.12	5,714	1,257	2.41	0.59	2.11	0.51	58.8	16.33	3.87
R02B	21.57	13,633	2,172	2.27	0.60	2.15	0.54	65.4	16.21	3.95
R03A	19.36	5,804	1,395	2.03	0.60	1.65	0.49	62.6	13.41	3.20
R03B	19.70	8,834	2,132	1.99	0.61	1.79	0.51	55.3	13.88	3.26
R05	17.43	3,921	949	2.31	0.59	1.90	0.48	49.4	13.56	2.97
R06A	19.83	6,379	1,435	1.68	0.52	1.61	0.46	48.5	13.47	3.05
R06B	20.53	**15,190**	3,629	2.43	0.56	2.30	0.51	58.8	16.09	3.14

Notes: Bold numbers are highest predicted values.
Alternatives C, D, G = Build Alternatives
Source: Environmental Science Associates, Inc. [TPC] analysis, 2004/2005.

TABLE J.2-111
DISPERSION RESULTS (BY RECEPTOR) - 2014 - ALTERNATIVE A

Receptor ID	Maximum Predicted Pollutant Concentrations (µg/m³)									
	NO2	CO		PM10		PM2.5		SO2		
	Annual	1-Hour	8-Hour	24-Hour	Annual	24-Hour	Annual	3-Hour	24-Hour	Annual
1	16.36	5,177	1,160	3.47	**1.10**	2.13	0.68	38.5	6.87	0.96
2	13.04	4,043	1,135	2.97	0.79	1.85	0.49	37.9	7.22	0.94
3	7.33	3,063	642	0.86	0.22	0.74	0.17	41.9	7.99	1.16
4	7.87	2,558	595	1.77	0.40	1.12	0.26	27.7	5.77	0.82
5	7.06	2,790	521	1.22	0.27	0.80	0.19	30.1	6.44	1.00
6	5.78	2,218	429	0.92	0.21	0.61	0.15	16.8	4.99	0.81
7	6.04	1,765	498	0.83	0.22	0.58	0.15	28.9	5.29	0.83
8	7.81	1,945	705	1.22	0.33	0.82	0.23	25.7	6.47	0.97
9	9.71	2,875	846	1.75	0.50	1.12	0.33	22.4	6.35	1.16
10	7.61	1,873	631	0.84	0.22	0.62	0.16	35.8	6.21	1.07
11	8.48	2,087	583	0.91	0.21	0.63	0.16	26.8	6.92	1.19
12	11.91	3,563	689	1.83	0.47	1.15	0.31	39.7	7.81	1.14
13	17.81	7,279	1,166	1.90	0.26	1.63	0.20	**130.8**	**24.88**	2.12
14	10.51	3,910	829	2.45	0.56	1.47	0.35	31.5	6.65	0.71
15	6.70	3,590	790	1.60	0.27	1.19	0.18	49.4	9.49	0.66
16	6.94	3,270	643	1.32	0.18	1.10	0.13	66.8	12.76	0.77
17	5.39	2,767	582	1.16	0.14	0.96	0.10	58.0	11.17	0.64
18	3.04	2,635	515	0.83	0.09	0.68	0.07	28.3	6.68	0.40
19	2.67	2,824	498	0.80	0.07	0.69	0.05	39.6	7.85	0.37
20	2.16	3,324	491	0.73	0.05	0.66	0.04	40.9	7.81	0.32
21	2.21	1,993	407	0.49	0.06	0.41	0.04	29.0	4.78	0.31
22	1.83	763	194	0.34	0.06	0.25	0.04	14.8	2.64	0.24
23	1.90	514	149	0.42	0.09	0.27	0.06	7.8	1.65	0.19
24	2.22	639	156	0.47	0.11	0.29	0.07	7.9	1.66	0.20
25	2.15	696	143	0.42	0.10	0.27	0.06	7.3	1.64	0.21
26	2.74	844	205	0.59	0.13	0.40	0.08	12.7	2.32	0.25
27	4.70	1,451	367	0.97	0.27	0.60	0.17	22.7	3.90	0.35
28	4.15	1,194	300	0.80	0.22	0.52	0.14	23.0	5.91	0.35
29	3.17	1,405	409	0.77	0.14	0.70	0.09	28.6	8.91	0.34
30	2.46	1,171	364	0.89	0.12	0.67	0.08	16.0	5.15	0.25
31	5.49	2,290	561	1.63	0.39	1.10	0.24	14.4	4.75	0.31
32	4.34	1,542	438	1.39	0.25	0.99	0.16	20.4	6.09	0.35
33	4.78	1,210	378	1.13	0.24	0.73	0.16	24.5	5.68	0.50
34	6.49	2,888	604	0.74	0.15	0.66	0.11	50.4	8.05	1.01
35	6.34	3,123	585	0.72	0.20	0.62	0.14	52.0	7.41	0.98
36	6.70	2,805	570	1.26	0.31	0.80	0.21	45.7	6.58	0.77
37	4.22	1,557	410	1.41	0.36	0.85	0.21	3.2	0.70	0.13
38	0.37	314	60	0.12	0.02	0.09	0.01	4.6	0.61	0.03
R01A	25.06	4,653	1,838	2.20	0.70	2.15	0.62	51.1	17.07	4.67
R01B	**25.66**	11,004	**4,960**	**3.80**	0.74	**3.70**	0.67	66.9	18.82	**4.72**
R02A	23.24	8,593	1,534	2.46	0.61	2.11	0.52	88.5	17.58	4.12
R02B	23.79	24,590	3,769	1.89	0.62	1.73	0.55	76.3	15.67	4.21
R03A	19.29	4,932	1,172	2.33	0.59	1.86	0.47	88.8	14.20	3.18
R03B	19.51	8,159	1,853	2.17	0.59	1.83	0.48	94.5	14.32	3.25
R05	18.42	4,780	966	2.11	0.50	1.81	0.41	61.1	16.71	3.18
R06A	20.00	10,754	1,860	2.16	0.66	1.99	0.59	46.9	13.79	3.54
R06B	20.97	**28,269**	4,410	3.27	0.75	3.17	**0.68**	55.6	15.61	3.69

Note: Bold numbers are highest predicted values.
Source: Environmental Science Associates, Inc. [TPC] analysis, 2004/2005.

TABLE J.2-112
DISPERSION RESULTS (BY RECEPTOR) - 2014 - ALTERNATIVE C

Receptor ID	Maximum Predicted Pollutant Concentrations (µg/m³)									
	NO2	CO		PM10		PM2.5		SO2		
	Annual	1-Hour	8-Hour	24-Hour	Annual	24-Hour	Annual	3-Hour	24-Hour	Annual
1	16.16	5.512	1.248	**3.61**	**1.13**	2.22	**0.70**	47.0	6.69	0.95
2	7.95	1.850	802	2.98	0.78	1.88	0.49	29.5	8.32	0.98
3	8.39	1,655	829	0.89	0.24	0.75	0.18	37.6	10.21	1.01
4	11.89	3,873	749	1.81	0.42	1.15	0.27	37.9	8.07	0.99
5	15.09	4,647	826	1.27	0.28	0.84	0.20	65.0	12.94	1.57
6	11.44	4,288	843	0.99	0.22	0.66	0.16	34.7	6.91	0.81
7	7.23	4,771	872	0.92	0.23	0.66	0.16	58.7	10.85	0.78
8	7.17	4,770	826	1.29	0.33	0.85	0.22	88.5	16.07	0.86
9	5.68	3,638	704	1.95	0.52	1.26	0.34	65.1	12.10	0.69
10	4.00	4,376	889	0.92	0.22	0.78	0.16	80.7	14.59	0.54
11	4.22	3,766	828	0.95	0.22	0.82	0.15	70.1	12.84	0.59
12	12.67	4,579	1,202	2.00	0.50	1.20	0.32	46.8	8.30	0.97
13	3.33	3,102	613	1.42	0.26	1.12	0.19	61.5	11.28	0.52
14	4.76	4,009	630	2.66	0.62	1.60	0.39	38.2	7.96	0.72
15	3.34	3,230	574	1.80	0.31	1.34	0.20	45.9	8.41	0.57
16	2.79	1,052	288	1.57	0.22	1.30	0.15	16.3	3.54	0.38
17	3.30	920	248	1.31	0.17	1.07	0.12	14.6	3.24	0.39
18	3.28	1,115	288	1.34	0.12	1.16	0.08	21.1	3.92	0.44
19	4.04	1,592	481	1.22	0.12	1.04	0.08	26.8	7.51	0.52
20	6.52	2,016	507	0.91	0.07	0.81	0.06	25.0	6.99	0.57
21	5.32	1,547	442	0.80	0.10	0.67	0.08	26.0	8.91	0.52
22	3.50	1,495	443	0.82	0.09	0.69	0.07	30.4	9.51	0.45
23	7.30	3,227	689	0.53	0.11	0.38	0.08	47.0	8.15	1.16
24	2.68	1,389	403	0.64	0.15	0.42	0.10	20.8	6.24	0.31
25	5.93	2,385	591	0.70	0.13	0.51	0.09	16.5	5.08	0.37
26	4.52	2,183	510	0.98	0.16	0.77	0.11	32.4	5.03	0.42
27	4.63	1,735	383	1.41	0.39	0.89	0.25	31.5	4.91	0.57
28	4.70	2,449	468	1.09	0.29	0.78	0.19	40.4	5.64	0.82
29	5.25	2,727	511	0.89	0.15	0.79	0.10	45.3	6.18	0.87
30	6.13	2,558	522	1.01	0.13	0.77	0.08	41.5	5.72	0.71
31	4.33	1,541	414	1.73	0.42	1.17	0.26	5.3	0.86	0.14
32	0.43	517	92	1.39	0.26	0.97	0.17	8.3	1.07	0.05
33	8.27	3.128	660	1.04	0.22	0.67	0.15	38.1	6.65	0.85
34	8.05	3.467	585	0.64	0.14	0.55	0.11	46.7	8.28	1.08
35	6.66	2,370	503	0.74	0.20	0.53	0.14	26.3	6.77	0.87
36	7.04	1,802	582	1.35	0.32	0.86	0.21	24.1	6.18	0.89
37	8.81	2,059	728	1.44	0.36	0.87	0.22	26.4	6.83	1.02
38	10.88	2,983	885	0.15	0.02	0.12	0.01	23.1	6.68	1.19
R01A	24.31	4,482	1,705	1.89	0.58	1.82	0.52	61.7	17.90	4.76
R01B	**24.72**	10,384	**4.736**	3.36	0.62	**3.26**	0.57	60.5	17.20	**4.77**
R02A	21.97	6,869	1,409	2.19	0.51	1.93	0.44	77.0	20.34	4.24
R02B	22.45	17,624	2,754	1.93	0.54	1.82	0.47	68.0	18.21	4.29
R03A	20.91	6,523	1,438	2.04	0.59	1.68	0.47	81.5	16.70	3.58
R03B	21.20	7,780	2,023	2.00	0.60	1.74	0.49	73.2	15.36	3.63
R04A	21.57	8,097	1,698	2.62	0.70	2.13	0.56	71.7	16.90	3.45
R04B	22.38	**22.952**	4,072	3.44	0.76	2.55	0.61	**93.4**	15.34	3.50
R05	19.93	4,396	1,014	2.38	0.58	1.98	0.45	83.9	**20.53**	3.46
R06A	19.42	3,275	1,379	1.63	0.40	1.41	0.35	54.0	15.54	3.24
R06B	19.44	6,983	3,321	2.36	0.43	2.20	0.37	55.3	16.07	3.23
R07A	17.36	3,376	1,481	1.76	0.39	1.37	0.31	48.0	13.50	2.27
R07B	17.25	8,211	2,797	2.21	0.38	2.03	0.32	55.9	15.51	2.30
R08A	6.91	1,745	499	0.88	0.17	0.77	0.12	33.0	9.88	0.94
R08B	6.27	1,542	466	0.79	0.16	0.70	0.12	29.4	9.55	0.92

Notes: Bold numbers are highest predicted values.
Alternative C = Build Alternative

Source: Environmental Science Associates, Inc. [TPC] analysis, 2004/2005.

TABLE J.2-113
DISPERSION RESULTS (BY RECEPTOR) - 2014 - ALTERNATIVE D

Receptor ID	Maximum Predicted Pollutant Concentrations (µg/m³)									
	NO2	CO		PM10		PM2.5		SO2		
	Annual	1-Hour	8-Hour	24-Hour	Annual	24-Hour	Annual	3-Hour	24-Hour	Annual
1	16.12	5,512	1,244	**3.61**	**1.13**	2.22	**0.70**	42.8	6.17	0.93
2	12.65	4,427	1,173	2.98	0.78	1.88	0.49	44.4	7.89	0.95
3	7.29	3,138	645	0.89	0.24	0.75	0.18	45.3	7.52	1.15
4	8.24	2,999	622	1.81	0.42	1.15	0.27	36.0	6.24	0.84
5	8.02	3,274	546	1.27	0.28	0.84	0.20	43.5	7.78	1.07
6	6.63	2,277	473	0.99	0.22	0.66	0.16	19.7	6.26	0.86
7	7.04	1,575	577	0.92	0.23	0.66	0.16	23.7	6.13	0.88
8	8.85	1,954	727	1.29	0.33	0.85	0.22	26.1	6.82	1.02
9	10.95	2,868	868	1.95	0.52	1.26	0.34	25.5	6.49	1.18
10	8.09	1,675	753	0.92	0.22	0.78	0.16	27.1	7.68	0.98
11	8.69	1,597	759	0.95	0.22	0.82	0.15	33.7	9.24	1.03
12	12.24	3,873	748	2.00	0.50	1.20	0.32	36.2	8.11	1.01
13	17.19	4,668	843	1.42	0.26	1.12	0.19	67.7	14.14	1.89
14	11.29	4,288	845	2.66	0.62	1.60	0.39	34.4	7.00	0.74
15	7.01	4,458	863	1.80	0.31	1.34	0.20	58.4	10.84	0.68
16	6.65	3,891	712	1.57	0.22	1.29	0.15	74.8	13.69	0.69
17	5.04	2,738	587	1.31	0.17	1.07	0.12	50.6	9.52	0.53
18	3.32	3,147	721	1.34	0.12	1.16	0.08	57.7	10.61	0.41
19	3.37	3,610	779	1.22	0.12	1.04	0.08	62.8	11.56	0.45
20	2.56	3,063	491	0.91	0.07	0.81	0.06	42.9	8.21	0.39
21	2.99	3,866	596	0.80	0.10	0.67	0.08	33.3	6.52	0.45
22	2.62	2,374	448	0.82	0.09	0.69	0.07	32.3	5.99	0.39
23	2.55	1,024	270	0.53	0.11	0.38	0.08	13.6	2.85	0.31
24	3.08	920	227	0.64	0.15	0.42	0.10	13.0	2.87	0.32
25	2.98	813	211	0.70	0.13	0.51	0.09	13.2	2.92	0.35
26	3.89	1,507	445	0.98	0.16	0.77	0.11	25.1	6.49	0.46
27	6.43	2,016	507	1.41	0.39	0.89	0.25	23.9	6.45	0.53
28	5.28	1,547	420	1.09	0.29	0.78	0.19	26.0	8.44	0.49
29	3.47	1,384	420	0.89	0.15	0.79	0.10	28.5	9.04	0.42
30	2.64	1,326	390	1.01	0.13	0.77	0.08	19.6	5.94	0.29
31	5.90	2,385	591	1.73	0.42	1.17	0.26	16.0	4.95	0.35
32	4.49	1,985	492	1.39	0.26	0.97	0.17	28.9	4.96	0.40
33	4.60	1,696	375	1.04	0.22	0.67	0.15	30.4	4.83	0.55
34	4.68	2,367	455	0.64	0.14	0.55	0.11	38.8	5.37	0.80
35	5.23	2,519	481	0.74	0.20	0.53	0.14	41.8	5.75	0.85
36	6.10	2,351	493	1.35	0.32	0.86	0.21	38.1	5.29	0.69
37	4.31	1,541	414	1.44	0.36	0.87	0.22	4.1	0.76	0.13
38	0.41	470	84	0.15	0.02	0.12	0.01	7.2	0.93	0.04
R01A	24.06	4,399	1,691	1.89	0.58	1.82	0.52	59.8	17.32	**4.66**
R01B	**24.47**	10,305	**4,706**	3.35	0.63	**3.24**	0.57	58.9	16.52	**4.66**
R02A	21.46	6,779	1,354	2.19	0.51	1.93	0.44	74.2	19.56	4.07
R02B	21.96	17,470	2,721	1.93	0.54	1.82	0.47	66.2	17.41	4.13
R03A	20.23	5,402	1,258	2.04	0.59	1.68	0.47	61.2	16.16	3.36
R03B	20.53	7,720	1,851	2.00	0.60	1.74	0.49	53.8	14.84	3.42
R04A	21.09	6,967	1,606	2.62	0.70	2.13	0.56	59.7	16.56	3.30
R04B	21.90	**21,705**	3,894	3.44	0.76	2.55	0.61	72.8	14.66	3.35
R05	19.50	4,272	967	2.38	0.58	1.98	0.45	**82.2**	**19.97**	3.31
R06A	18.79	3,056	1,312	1.63	0.40	1.41	0.35	53.1	14.99	3.03
R06B	18.80	6,776	3,245	2.35	0.43	2.19	0.37	52.2	15.30	3.02
R07A	17.36	3,136	1,401	1.76	0.39	1.37	0.31	43.6	12.47	2.20
R07B	17.24	7,992	2,708	2.20	0.38	2.02	0.32	51.5	14.48	2.22
R08A	6.75	1,679	484	0.88	0.17	0.77	0.12	32.2	9.12	0.85
R08B	6.12	1,520	422	0.79	0.16	0.70	0.12	28.6	8.84	0.83

Notes: Bold numbers are highest predicted values.
Alternative C = Build Alternative

Source: Environmental Science Associates, Inc. [TPC] analysis, 2004/2005.

TABLE J.2-114
DISPERSION RESULTS (BY RECEPTOR) - 2014 - ALTERNATIVE G

Receptor ID	Maximum Predicted Pollutant Concentrations (µg/m³)									
	NO2	CO		PM10		PM2.5		SO2		
	Annual	1-Hour	8-Hour	24-Hour	Annual	24-Hour	Annual	3-Hour	24-Hour	Annual
1	16.04	5.512	1.244	**3.61**	**1.13**	2.22	**0.70**	42.1	6.05	0.92
2	12.55	4.407	1.170	2.98	0.78	1.88	0.49	43.9	7.84	0.93
3	7.13	3,194	636	0.89	0.24	0.75	0.18	45.5	7.43	1.12
4	8.10	2,983	602	1.81	0.42	1.15	0.27	35.4	6.19	0.81
5	7.79	3,102	525	1.27	0.28	0.84	0.20	40.2	7.61	1.02
6	6.45	2,306	464	0.99	0.22	0.66	0.16	19.3	6.07	0.82
7	6.84	1,577	569	0.92	0.23	0.66	0.16	23.2	5.98	0.83
8	8.60	1,961	703	1.29	0.33	0.85	0.22	24.8	6.46	0.96
9	10.67	2,878	857	1.95	0.52	1.26	0.34	21.7	6.33	1.11
10	7.90	1,678	749	0.92	0.22	0.78	0.16	26.9	7.63	0.93
11	8.47	1,595	749	0.95	0.22	0.82	0.15	32.9	9.06	0.98
12										
13	16.93	4,450	813	1.42	0.26	1.12	0.19	63.9	13.38	1.82
14	11.26	4,288	841	2.66	0.62	1.60	0.39	34.3	6.88	0.73
15	6.99	4.474	856	1.80	0.31	1.34	0.20	57.7	10.62	0.67
16	6.65	3.907	709	1.57	0.22	1.30	0.15	74.3	13.55	0.68
17	5.06	2.744	583	1.31	0.17	1.07	0.12	50.0	9.38	0.53
18	3.41	3.048	700	1.34	0.12	1.16	0.08	56.6	10.39	0.41
19	3.50	3.577	807	1.22	0.12	1.05	0.08	64.1	11.70	0.45
20	2.70	3,048	503	0.92	0.07	0.82	0.06	44.4	8.39	0.40
21	3.27	3,333	679	0.77	0.10	0.65	0.08	33.9	6.49	0.47
22	2.77	2,410	407	0.82	0.09	0.69	0.07	33.1	6.17	0.40
23	2.68	1,137	287	0.53	0.11	0.38	0.08	15.9	3.08	0.32
24	3.27	920	223	0.64	0.15	0.41	0.10	14.0	3.06	0.34
25	3.24	803	209	0.70	0.13	0.51	0.09	16.3	3.32	0.38
26	3.99	1,484	436	0.98	0.16	0.76	0.11	24.6	6.65	0.47
27	6.44	2,016	507	1.41	0.39	0.89	0.25	23.6	6.41	0.53
28	5.23	1,547	416	1.09	0.29	0.78	0.19	25.1	8.25	0.49
29	3.42	1,379	418	0.89	0.15	0.79	0.10	28.0	8.87	0.42
30	2.62	1,319	388	1.01	0.13	0.77	0.08	19.3	5.84	0.29
31	5.88	2,385	591	1.73	0.42	1.17	0.26	15.7	4.86	0.35
32	4.45	1.979	489	1.39	0.26	0.97	0.17	28.9	4.86	0.40
33	4.54	1.690	373	1.04	0.22	0.67	0.15	30.1	4.74	0.54
34	4.58	2.357	451	0.64	0.14	0.55	0.11	38.4	5.30	0.79
35	5.13	2,512	478	0.74	0.20	0.53	0.14	41.4	5.68	0.84
36	6.02	2,345	489	1.35	0.32	0.86	0.21	37.7	5.22	0.68
37	4.31	1,541	414	1.44	0.36	0.87	0.22	4.2	0.76	0.13
38	0.41	466	83	0.15	0.02	0.12	0.01	7.2	0.94	0.04
R01A	23.72	4,409	1,697	1.89	0.58	1.82	0.52	59.5	17.17	4.63
R01B	**24.14**	10,346	**4,724**	3.36	0.62	**3.25**	0.57	58.7	16.59	**4.63**
R02A	21.24	6,965	1,368	2.19	0.51	1.93	0.44	73.8	19.44	4.04
R02B	21.74	17,649	2,745	1.94	0.54	1.82	0.47	66.5	17.30	4.10
R03A	20.00	5,371	1,250	2.04	0.59	1.68	0.47	61.0	15.96	3.33
R03B	20.30	7,675	1,839	2.01	0.60	1.74	0.49	53.6	14.73	3.38
R04A	20.77	6,927	1,606	2.62	0.70	2.13	0.56	59.5	16.39	3.24
R04B	21.58	**21,577**	3,871	3.44	0.76	2.54	0.61	72.4	14.57	3.30
R05	19.24	4,405	977	2.38	0.58	1.98	0.45	**81.7**	**19.83**	3.28
R06A	18.55	3,020	1,308	1.63	0.40	1.41	0.35	50.8	14.37	2.97
R06B	18.57	6,800	3,200	2.34	0.43	2.19	0.37	52.4	15.34	2.97
R07A	17.00	3,144	1,399	1.76	0.39	1.37	0.31	43.8	12.47	2.11
R07B	16.89	8,233	2,645	2.19	0.38	2.02	0.32	51.6	14.46	2.13
R08A	6.93	1,670	470	0.88	0.17	0.76	0.12	31.4	9.14	0.88
R08B	6.29	1,477	407	0.78	0.16	0.70	0.12	28.0	8.86	0.87

Notes: Bold numbers are highest predicted values.
Alternative C = Build Alternative

Source: Environmental Science Associates, Inc. [TPC] analysis, 2004/2005.

TABLE J.2-115
DISPERSION RESULTS (BY RECEPTOR) - 2019 - ALTERNATIVE A

Receptor ID	Maximum Predicted Pollutant Concentrations (µg/m³)									
	NO2	CO		PM10		PM2.5		SO2		
	Annual	1-Hour	8-Hour	24-Hour	Annual	24-Hour	Annual	3-Hour	24-Hour	Annual
1	11.34	4,564	1,056	3.21	**1.02**	1.97	0.63	40.9	7.18	1.00
2	7.18	1,320	668	2.73	0.72	1.71	0.46	41.3	7.76	0.99
3	7.85	1,531	654	0.92	0.23	0.80	0.18	42.9	8.50	1.22
4	9.92	3,256	627	1.68	0.39	1.07	0.26	33.1	6.29	0.87
5	17.18	4,652	795	1.23	0.28	0.81	0.20	41.9	7.16	1.06
6	8.31	3,530	783	0.92	0.21	0.63	0.15	24.0	5.72	0.86
7	6.15	3,574	725	0.84	0.22	0.63	0.16	23.7	5.44	0.87
8	6.92	4,274	772	1.24	0.34	0.84	0.23	25.4	6.61	1.01
9	5.38	6,511	1,046	1.86	0.54	1.19	0.36	23.4	6.61	1.20
10	3.03	3,196	564	0.87	0.22	0.67	0.16	22.2	6.47	1.02
11	2.77	3,510	565	0.91	0.21	0.70	0.16	26.3	7.54	1.07
12	9.54	4,096	1,095	1.74	0.46	1.14	0.30	33.4	8.40	1.05
13	2.22	3,392	495	1.61	0.26	1.33	0.20	82.6	16.49	1.86
14	2.21	2,057	425	2.33	0.54	1.40	0.34	31.8	6.73	0.75
15	1.77	782	199	1.61	0.27	1.20	0.18	45.4	8.93	0.71
16	1.66	634	154	1.54	0.17	1.33	0.13	83.0	15.60	0.86
17	1.84	520	142	1.97	0.14	1.79	0.10	**110.5**	**20.02**	0.72
18	1.91	1,104	139	0.90	0.09	0.77	0.07	36.9	7.81	0.45
19	2.45	1,035	196	0.90	0.08	0.80	0.06	44.3	8.88	0.43
20	4.07	1,380	352	0.73	0.05	0.66	0.04	42.3	8.02	0.35
21	3.87	1,263	338	0.48	0.06	0.41	0.04	30.9	5.02	0.33
22	3.33	2,497	685	0.32	0.05	0.24	0.04	15.5	2.76	0.25
23	7.23	3,186	695	0.45	0.08	0.31	0.06	8.7	1.80	0.21
24	2.26	1,247	385	0.47	0.10	0.32	0.07	8.3	1.75	0.22
25	4.01	2,131	521	0.47	0.09	0.33	0.06	7.4	1.69	0.24
26	3.56	1,522	427	0.56	0.13	0.40	0.08	16.3	2.80	0.30
27	4.23	1,265	394	0.98	0.28	0.62	0.18	24.3	4.68	0.44
28	6.58	3,115	639	0.81	0.23	0.63	0.15	24.2	7.10	0.47
29	6.25	3,455	624	1.43	0.15	1.36	0.11	48.3	15.23	0.49
30	5.87	3,111	602	0.94	0.12	0.73	0.08	18.0	5.84	0.29
31	2.70	1,508	386	1.61	0.38	1.09	0.23	15.3	5.03	0.34
32	0.32	381	68	1.37	0.24	0.98	0.16	21.0	6.26	0.40
33	6.62	2,942	612	1.14	0.25	0.74	0.16	26.1	5.72	0.55
34	6.82	3,703	576	0.76	0.15	0.69	0.12	54.0	8.51	1.08
35	5.57	2,481	471	0.75	0.20	0.66	0.15	56.5	7.89	1.03
36	5.78	1,554	486	1.20	0.30	0.78	0.20	49.8	7.03	0.81
37	7.18	1,931	685	1.36	0.35	0.82	0.21	3.2	0.70	0.14
38	8.77	2,954	816	0.12	0.02	0.09	0.01	5.8	0.76	0.04
R01A	25.18	4,658	1,830	2.30	0.73	2.15	0.65	53.4	17.69	4.73
R01B	**25.74**	11,202	**4,923**	**3.85**	0.77	**3.75**	0.70	66.6	18.75	**4.78**
R02A	23.20	8,189	1,543	2.58	0.63	2.21	0.53	64.9	18.35	4.15
R02B	23.78	23,098	3,569	1.97	0.64	1.78	0.56	66.1	16.04	4.24
R03A	19.38	5,170	1,276	2.43	0.62	1.93	0.49	49.4	14.66	3.29
R03B	19.65	8,247	1,909	2.26	0.62	1.91	0.50	45.8	13.98	3.36
R05	18.61	4,601	1,015	2.19	0.52	1.87	0.43	63.0	17.24	3.26
R06A	20.87	11,711	2,019	2.34	0.71	2.15	0.63	50.0	15.57	3.81
R06B	21.80	**29,544**	4,622	3.67	0.81	3.56	**0.74**	59.8	16.66	3.96

Note: Bold numbers are highest predicted values.

Source: Environmental Science Associates, Inc. [TPC] analysis, 2004/2005.

TABLE J.2-116
DISPERSION RESULTS (BY RECEPTOR) - 2019 - ALTERNATIVE C

Receptor ID	Maximum Predicted Pollutant Concentrations (µg/m³)									
	NO2	CO		PM10		PM2.5		SO2		
	Annual	1-Hour	8-Hour	24-Hour	Annual	24-Hour	Annual	3-Hour	24-Hour	Annual
1	11.21	4,806	1,159	3.34	**1.05**	2.06	**0.65**	52.9	7.51	1.03
2	8.15	1,964	811	2.77	0.74	1.76	0.47	31.8	8.80	1.08
3	8.60	1,742	863	0.91	0.25	0.78	0.19	39.6	11.05	1.12
4	10.38	3,410	661	1.75	0.41	1.11	0.27	40.2	8.76	1.09
5	15.81	4,365	775	1.34	0.30	0.90	0.21	63.1	12.98	1.74
6	9.05	4,284	941	1.04	0.23	0.70	0.16	39.6	7.89	0.88
7	6.72	7,958	1,273	0.97	0.24	0.69	0.17	67.7	12.48	0.85
8	7.03	5,084	867	1.39	0.35	0.92	0.24	97.5	17.75	0.95
9	5.58	3,909	736	2.19	0.58	1.42	0.38	72.8	13.55	0.76
10	4.01	4,316	905	2.10	0.23	1.29	0.17	85.5	15.60	0.59
11	4.31	3,757	869	1.01	0.22	0.84	0.16	75.4	13.93	0.65
12	9.67	4,620	1,172	1.83	0.48	1.19	0.31	53.1	9.42	1.09
13	3.56	3,063	686	1.53	0.28	1.21	0.21	67.7	12.51	0.57
14	5.27	4,171	698	2.45	0.59	1.47	0.37	43.5	10.09	0.85
15	3.43	3,211	574	1.99	0.32	1.50	0.21	46.9	8.71	0.62
16	2.60	1,035	292	1.66	0.21	1.39	0.15	17.6	3.81	0.41
17	2.90	852	253	1.37	0.17	1.13	0.12	15.5	3.45	0.42
18	3.03	1,066	294	1.34	0.11	1.17	0.08	21.8	4.11	0.48
19	3.63	1,531	481	1.23	0.11	1.06	0.08	27.6	8.00	0.56
20	5.10	1,831	463	0.96	0.07	0.87	0.06	25.3	7.41	0.61
21	4.36	1,502	453	0.88	0.10	0.76	0.08	26.9	9.40	0.56
22	3.18	1,441	448	1.32	0.09	0.90	0.07	30.9	9.95	0.48
23	7.77	3,492	695	0.82	0.11	0.50	0.08	52.8	9.32	1.39
24	2.37	1,326	397	0.67	0.15	0.54	0.10	21.2	6.52	0.33
25	4.27	2,215	547	0.81	0.13	0.53	0.09	16.9	5.37	0.39
26	3.67	2,162	524	1.42	0.16	1.01	0.11	33.9	5.41	0.45
27	4.09	1,710	385	1.32	0.38	0.84	0.24	32.7	5.46	0.61
28	4.76	2,404	489	1.04	0.28	0.76	0.18	41.8	6.40	0.89
29	5.26	2,720	523	1.63	0.15	1.08	0.10	47.9	6.85	0.96
30	5.32	2,552	525	0.94	0.12	0.72	0.08	43.9	6.21	0.78
31	2.92	1,650	421	1.65	0.40	1.11	0.25	5.5	0.92	0.15
32	0.39	503	91	1.31	0.25	0.92	0.16	8.5	1.10	0.05
33	7.26	3,264	632	1.01	0.21	0.66	0.14	42.5	7.31	0.95
34	8.16	3,615	573	1.05	0.14	0.63	0.11	50.8	8.92	1.19
35	6.73	2,631	511	1.05	0.19	0.66	0.14	29.5	7.28	0.96
36	7.10	2,886	571	1.27	0.31	0.82	0.20	24.4	6.53	0.97
37	8.67	3,064	698	1.72	0.37	1.09	0.22	25.8	6.93	1.11
38	10.48	3,508	853	0.80	0.02	0.55	0.01	23.8	6.85	1.30
R01A	25.14	4,520	1,775	2.07	0.64	1.99	0.57	62.8	19.47	**5.04**
R01B	**25.49**	11,739	**5,024**	**3.66**	0.69	**3.55**	0.63	62.9	17.59	5.03
R02A	22.98	8,178	1,533	2.46	0.58	2.15	0.50	85.7	22.34	4.49
R02B	23.56	22,346	3,453	2.12	0.61	2.00	0.54	81.4	20.17	4.56
R03A	21.90	6,604	1,507	2.24	0.63	1.84	0.50	86.4	18.26	3.83
R03B	22.22	8,020	2,199	2.19	0.64	1.86	0.52	78.1	16.77	3.89
R04A	21.59	8,250	1,610	2.67	0.68	2.14	0.53	74.7	17.99	3.56
R04B	22.49	**23,624**	3,997	3.16	0.74	2.52	0.59	**96.5**	15.92	3.62
R05	20.94	5,057	1,065	2.59	0.63	2.14	0.49	92.7	**22.54**	3.70
R06A	20.97	3,521	1,415	1.67	0.42	1.41	0.35	53.6	16.15	3.49
R06B	20.95	7,793	3,498	2.38	0.44	2.22	0.38	57.3	16.80	3.48
R07A	18.88	3,708	1,543	1.93	0.42	1.46	0.34	49.7	14.43	2.54
R07B	18.79	9,227	2,959	2.30	0.42	2.11	0.35	57.8	16.54	2.57
R08A	5.97	1,719	512	1.55	0.17	1.03	0.13	33.9	10.52	1.01
R08B	5.81	1,577	503	0.81	0.16	0.70	0.12	30.2	10.17	0.99

Notes: Bold numbers are highest predicted values.
Alternative C = Build Alternative

Source: Environmental Science Associates, Inc. [TPC] analysis, 2004/2005.

TABLE J.2-117
DISPERSION RESULTS (BY RECEPTOR) - 2019 - ALTERNATIVE D

Receptor ID	Maximum Predicted Pollutant Concentrations (µg/m³)									
	NO2	CO		PM10		PM2.5		SO2		
	Annual	1-Hour	8-Hour	24-Hour	Annual	24-Hour	Annual	3-Hour	24-Hour	Annual
1	11.21	4,806	1,178	3.34	**1.05**	2.06	**0.65**	54.9	7.83	1.04
2	9.67	4,730	1,191	2.77	0.74	1.76	0.47	54.7	9.66	1.12
3	7.77	3,346	721	0.92	0.25	0.78	0.19	50.4	9.36	1.45
4	7.26	3,262	665	1.75	0.41	1.11	0.27	42.6	7.28	1.01
5	8.16	3,908	617	1.35	0.30	0.90	0.21	56.2	9.23	1.30
6	6.73	2,544	532	1.04	0.23	0.70	0.16	29.3	7.71	1.04
7	7.10	2.042	577	0.97	0.24	0.69	0.17	42.4	7.02	1.08
8	8.67	2.125	720	1.39	0.35	0.92	0.24	33.5	8.71	1.25
9	10.48	2.879	846	2.19	0.58	1.42	0.38	42.3	6.99	1.45
10	8.15	1.925	787	0.98	0.23	0.78	0.17	30.9	8.68	1.20
11	8.60	1.772	832	1.01	0.23	0.84	0.16	38.9	10.95	1.27
12	10.38	3,410	661	1.83	0.48	1.19	0.31	41.0	9.20	1.19
13	15.81	5,099	876	1.52	0.28	1.20	0.21	78.6	15.96	1.91
14	9.05	3,747	842	2.45	0.59	1.47	0.37	39.2	8.14	0.89
15	6.72	5,002	940	1.98	0.32	1.49	0.21	70.6	13.30	0.86
16	7.03	4,936	855	1.66	0.21	1.39	0.15	96.1	17.69	0.94
17	5.58	3,696	719	1.37	0.17	1.14	0.12	70.3	13.23	0.74
18	4.01	4,501	919	1.34	0.11	1.17	0.08	86.2	15.75	0.55
19	4.31	3,891	851	1.23	0.11	1.06	0.08	74.0	13.80	0.58
20	3.56	3,155	524	0.96	0.07	0.87	0.06	47.5	9.27	0.48
21	5.27	3,912	610	0.89	0.10	0.76	0.08	35.4	7.09	0.53
22	3.43	2,794	476	0.81	0.09	0.68	0.07	40.3	7.53	0.45
23	2.60	1,064	282	0.52	0.11	0.39	0.08	15.4	3.30	0.36
24	2.90	816	240	0.61	0.15	0.38	0.10	15.4	3.38	0.38
25	3.03	950	207	0.67	0.13	0.49	0.09	18.3	3.75	0.42
26	3.63	1.562	472	0.93	0.16	0.74	0.11	28.2	7.82	0.53
27	5.10	1.831	463	1.32	0.38	0.84	0.24	25.9	7.43	0.59
28	4.36	1.450	456	1.04	0.28	0.76	0.18	27.4	9.57	0.55
29	3.18	1,475	451	0.80	0.15	0.71	0.10	31.5	10.15	0.47
30	2.37	1,350	400	0.94	0.12	0.72	0.08	21.6	6.67	0.33
31	4.27	2,215	547	1.65	0.40	1.11	0.25	17.4	5.51	0.39
32	3.67	2,053	520	1.31	0.25	0.92	0.16	31.8	5.55	0.45
33	4.09	1,727	385	1.01	0.21	0.66	0.14	32.7	5.58	0.62
34	4.76	2,482	500	0.63	0.14	0.52	0.11	42.7	6.63	0.90
35	5.26	2,802	531	0.72	0.19	0.57	0.14	49.0	7.17	0.98
36	5.32	2,629	534	1.27	0.31	0.82	0.20	45.0	6.54	0.79
37	2.92	1,650	421	1.47	0.37	0.89	0.22	4.9	0.90	0.15
38	0.39	505	90	0.15	0.02	0.11	0.01	8.3	1.08	0.05
R01A	25.14	4,658	1,758	2.07	0.64	1.99	0.57	64.1	19.44	**5.05**
R01B	**25.49**	12,214	**4,951**	**3.61**	0.69	**3.51**	0.63	64.2	17.31	**5.05**
R02A	22.98	7.933	1.552	2.45	0.58	2.15	0.50	85.9	22.36	4.51
R02B	23.56	21.690	3.366	2.13	0.61	2.00	0.54	78.9	20.16	4.58
R03A	21.90	6,786	1,521	2.24	0.63	1.83	0.50	87.2	18.63	3.87
R03B	22.22	8,284	2,214	2.17	0.64	1.86	0.53	78.3	16.99	3.93
R04A	21.59	8,493	1,618	2.67	0.68	2.14	0.53	76.0	18.31	3.64
R04B	22.49	**24,374**	4,074	3.16	0.74	2.57	0.59	**98.5**	16.18	3.69
R05	20.94	4,912	1,071	2.59	0.63	2.14	0.49	93.9	**22.76**	3.72
R06A	20.97	3,468	1,381	1.67	0.42	1.41	0.35	66.1	17.41	3.59
R06B	20.95	7,829	3,430	2.36	0.44	2.20	0.38	56.9	16.52	3.57
R07A	18.88	3,677	1,524	1.94	0.42	1.46	0.34	48.5	14.41	2.70
R07B	18.79	9,247	2,915	2.28	0.42	2.09	0.35	56.5	16.49	2.71
R08A	5.97	1,757	516	0.90	0.17	0.78	0.13	34.5	10.57	0.99
R08B	5.81	1,629	452	0.79	0.16	0.70	0.12	30.7	10.25	0.97

Notes: Bold numbers are highest predicted values.
Alternative C = Build Alternative

Source: Environmental Science Associates, Inc. [TPC] analysis, 2004/2005.

TABLE J.2-118
DISPERSION RESULTS (BY RECEPTOR) - 2019 - ALTERNATIVE G

Receptor ID	Maximum Predicted Pollutant Concentrations (µg/m³)									
	NO2	CO		PM10		PM2.5		SO2		
	Annual	1-Hour	8-Hour	24-Hour	Annual	24-Hour	Annual	3-Hour	24-Hour	Annual
1	11.23	4,806	1,170	3.34	**1.05**	2.06	**0.65**	53.9	7.71	1.03
2	9.74	4,703	1,184	2.77	0.74	1.76	0.47	54.1	9.54	1.11
3	7.88	3,402	705	0.91	0.25	0.78	0.19	50.6	9.12	1.42
4	7.36	3,220	659	1.75	0.41	1.11	0.27	41.5	7.15	0.98
5	8.35	3,643	595	1.35	0.30	0.90	0.21	51.3	8.79	1.25
6	6.89	2,562	509	1.04	0.23	0.70	0.16	28.7	7.23	1.00
7	7.34	1.893	567	0.97	0.24	0.69	0.17	33.6	6.74	1.04
8	8.99	2.098	703	1.39	0.35	0.92	0.24	27.8	7.77	1.19
9	10.87	2.888	846	2.19	0.58	1.42	0.38	49.6	6.91	1.39
10	8.49	1.922	786	0.98	0.23	0.78	0.17	30.7	8.62	1.15
11	9.10	1.765	823	1.01	0.23	0.84	0.16	38.7	10.77	1.21
12	10.91	3,410	661	1.83	0.48	1.18	0.31	39.8	9.24	1.17
13	18.19	4,733	833	1.52	0.28	1.20	0.21	72.1	15.42	2.14
14	9.15	3,747	844	2.45	0.59	1.47	0.37	40.0	8.14	0.89
15	6.85	5,015	951	1.98	0.32	1.49	0.21	72.6	13.49	0.86
16	7.09	4,953	849	1.66	0.21	1.39	0.15	95.2	17.45	0.94
17	5.39	3,703	716	1.37	0.17	1.14	0.12	69.7	13.07	0.73
18	3.67	4,433	899	1.34	0.11	1.17	0.08	84.7	15.45	0.55
19	3.75	3,850	877	1.24	0.11	1.07	0.08	74.6	13.86	0.59
20	2.97	3,139	537	0.97	0.07	0.87	0.06	48.9	9.48	0.49
21	3.44	3,386	693	0.86	0.10	0.74	0.08	36.0	7.09	0.55
22	2.90	2,778	439	0.81	0.09	0.68	0.07	40.3	7.55	0.47
23	2.61	1,155	294	0.52	0.11	0.38	0.08	17.4	3.45	0.38
24	3.01	818	234	0.61	0.15	0.38	0.10	16.2	3.58	0.41
25	3.16	960	221	0.67	0.13	0.49	0.09	22.8	4.32	0.45
26	3.73	1.546	464	0.93	0.16	0.73	0.11	28.1	8.11	0.55
27	5.12	1.831	463	1.32	0.38	0.84	0.24	25.7	7.44	0.60
28	4.35	1.472	453	1.04	0.28	0.76	0.18	26.8	9.41	0.55
29	3.17	1,473	449	0.80	0.15	0.71	0.10	31.2	10.01	0.47
30	2.37	1,348	397	0.94	0.12	0.72	0.08	21.4	6.58	0.33
31	4.27	2,215	547	1.65	0.40	1.11	0.25	17.2	5.41	0.39
32	3.66	2,035	512	1.31	0.25	0.92	0.16	31.6	5.44	0.45
33	4.08	1,719	382	1.01	0.21	0.66	0.14	32.3	5.46	0.61
34	4.76	2,470	489	0.63	0.14	0.53	0.11	42.2	6.45	0.89
35	5.26	2,792	528	0.72	0.19	0.57	0.14	48.5	6.95	0.97
36	5.33	2,620	531	1.27	0.31	0.82	0.20	44.4	6.32	0.78
37	2.92	1,650	421	1.47	0.37	0.89	0.22	5.0	0.90	0.15
38	0.38	504	90	0.15	0.02	0.11	0.01	8.5	1.10	0.05
R01A	25.03	4,670	1,769	2.06	0.64	1.99	0.57	63.9	19.33	**5.02**
R01B	**25.38**	12,224	**4,988**	**3.63**	0.69	**3.53**	0.63	64.0	17.20	**5.02**
R02A	22.90	8.130	1.557	2.45	0.58	2.15	0.50	85.4	22.27	4.48
R02B	23.48	21.870	3.390	2.13	0.61	2.00	0.54	79.3	20.06	4.55
R03A	21.85	6,740	1,499	2.24	0.63	1.83	0.50	86.8	18.54	3.84
R03B	22.17	8,228	2,195	2.19	0.64	1.86	0.52	78.0	16.96	3.89
R04A	21.62	8,436	1,610	2.67	0.68	2.14	0.53	75.5	18.18	3.58
R04B	22.53	**24,209**	4,051	3.16	0.74	2.56	0.59	**97.9**	16.05	3.64
R05	20.87	5,055	1,075	2.59	0.63	2.14	0.49	93.4	**22.63**	3.69
R06A	21.04	3,421	1,378	1.67	0.42	1.41	0.35	54.2	16.77	3.54
R06B	21.00	7,820	3,394	2.36	0.44	2.20	0.38	56.1	16.58	3.52
R07A	19.06	3,673	1,511	1.94	0.42	1.46	0.34	49.1	14.21	2.58
R07B	18.95	9,477	2,845	2.28	0.42	2.09	0.35	57.1	16.25	2.59
R08A	6.33	1,756	502	0.89	0.17	0.77	0.13	33.9	10.58	1.04
R08B	6.15	1,618	453	0.78	0.16	0.69	0.12	30.7	10.19	1.01

Notes: Bold numbers are highest predicted values.
Alternative C = Build Alternative

Source: Environmental Science Associates, Inc. [TPC] analysis, 2004/2005.

J.2.4 Dispersion Analysis - Intersections

Microscale hot spot dispersion modeling was also performed. The results of the hot spot analysis determined if the proposed alternatives would cause emissions of carbon monoxide to exceed the National Ambient Air Quality Standards. The microscale analysis was performed following USEPA's *Guideline for Modeling Carbon Monoxide from Roadway Intersections.*[41] For each year and each alternative, the roadway intersection analysis evaluated 10 intersections in the vicinity of the airport. The intersections included existing intersections, as well as proposed intersections/intersection improvements.

The selection of intersections was based on the analysis methodology described in the USEPA's *Guideline for Modeling Carbon Monoxide from Roadway Intersections*. The methodology requires rank ordering of the candidate intersections based on the average delay per vehicle (in seconds) and the total volume of motor vehicle traffic at the intersection. The average delay per vehicle is multiplied by the total traffic volume to arrive at the total amount of estimated vehicle idling (measured in vehicle-seconds). Intersections were then ranked from highest to lowest based on the total amount of idling, and the top 10 intersections are subjected to the microscale dispersion analysis.

Approach volumes, turning movements, and signal cycle times for the peak-hour conditions for each analysis scenario were developed by Kimley-Horn and Associates, Inc. [CCT]. These data were reviewed to determine which of the intersections represent the ten maximum facilities with respect to air quality. Typically, the intersections were facilities with a combination of the highest approach volume and greatest predicted delay per vehicle.

The USEPA's CAL3QHC model was used to estimate the carbon monoxide concentrations at all of the facilities evaluated. The MOBILE6.2 program was used to determine carbon monoxide emission factors for free flowing motor vehicles. Idle emission factors were calculated using USEPA's recommended procedure for idle factors contained in the MOBILE5 Information Sheet #2, dated 30 July 1993. At each roadway intersection analyzed, receptors were placed along both sides of each approach to the intersection, at distances of 3, 25, and 50 meters from the cross street (in accordance with USEPA guidance).

To calculate 8-hour CO concentrations, a persistence factor was derived following the USEPA's *Guideline for Modeling Carbon Monoxide from Roadway Intersections* (1992). Based on the guidance, monitoring data was evaluated from the closest carbon monoxide monitor to the Airport (Site Number 17-031-3103 located at 4743 North Mannheim Road). Using the first highest maximum 1-hour concentration and the first highest maximum 8-hour concentration for each of the past three years, results in an average high persistence factor of 0.635. This approach is considered conservative because it is based on the first highest maximum concentrations over a three-year period. Additionally, the Criteria Air Pollutant Protocol states that background CO concentrations of 4.5 parts per million and 2.9 parts per million be used for the 1-hour and 8-hour estimations, respectively. This implies a local persistence factor of 0.644, which is very close to the factor based on monitoring data.

[41] Guideline for Modeling Carbon Monoxide from Roadway Intersections. EPA-4454/R-92-05, U.S. EPA OAQPS, Research Triangle Park, NC, November 1992.

The analysis assumed maximum meteorological conditions including a stable atmosphere, an average winter temperature (motor vehicle emissions of carbon monoxide are higher at lower temperatures) range of 13 to 29 degrees Fahrenheit,[42] low wind speed (1 meter per second), forecast peak hour traffic volumes and constant wind direction (from 0 to 360 degrees). These maximum assumptions were used in the CAL3QHC emission dispersion model to estimate peak 1-hour concentrations of carbon monoxide for direct comparison with the National Ambient Air Quality Standards for this pollutant.

The CAL3QHC model requires several different input parameters including forecast traffic volumes, turning movements, and signal timing. The following provides a list of the various parameters.

- Cycle Length (seconds): The cycle length was assumed to be the "actuated cycle length" from the Highway Capacity Manual Signalized Intersection Analysis Reports prepared by Kimley-Horn and Associates, Inc. [CCT], after review and acceptance by the TPC.
- Average Red Time (seconds): The average red time for each queue link was calculated by subtracting the Effective Green Time (seconds) from the Actuated Cycle Length (seconds) for a particular movement.
- Clearance Lost Time (seconds): The Clearance Lost Time was calculated by subtracting the difference between the Effective Green Time and the Actuated Green Time from the Clearance Time for a particular movement.
- Approach and Departure traffic volumes were calculated using the traffic volumes provided by Kimley-Horn and Associates, Inc. [CCT] after review and acceptance by the TPC.
- A Saturation Flow Rate of 1900 vehicles per hour was used for all intersections, obtained from the "Ideal Flow" category of the Highway Capacity Manual Signalized Intersection Analysis Reports prepared by Kimley-Horn and Associates, Inc. [CCT] after review and acceptance by the TPC.
- All intersections were assumed to have "Actuated" signals.
- The Arrival Rate for each queue link was determined according to a particular movement's level-of-service. An intersection approach with a level-of-service "A" was assigned an arrival rate of "Best Progression". Level-of-service "B" was assigned an arrival rate of "Above Average Progression". Level-of-service "C" corresponds to an arrival rate of "Average Progression". A Level-of-service "D" warranted an Arrival Rate of "Below Average Progression". Levels-of-service "E" and "F" were assigned an Arrival Rate of "Worst Progression".
- Lane widths for all movements were modeled according to the schematic diagrams prepared for each intersection by Kimley-Horn and Associates, Inc. [CCT], after review and acceptance by the TPC. Approach and departure links assumed a mixing zone of 9.85 feet (3 meters) on each side of the roadway.

[42] Telephone conversation with Walt Zyzniuski, IDOT, February 14, 2003.

- All intersections were assumed to be at-grade.
- All intersections were assumed to have a surface roughness length of 100 centimeters, which corresponds to a suburban land use. Suburban land use is defined as regular coverage with large obstacles, open spaces roughly equal to obstacle heights, suburban houses, villages, and mature forests.

Table J.2-119 provides a list of the roadway intersections evaluated. **Exhibit J.2-4** is a schematic diagram of the intersection roadway network and the receptor locations modeled in the analysis. The traffic data used in the air quality analysis for all roadway intersections are in agreement with the approach and methodology in **Appendix G**, **Surface Transportation**. **Tables J.2-120** through **J.2-128** present the maximum 1- and 8-hour carbon monoxide concentrations for each roadway intersection for each analysis year for each alternative for the Original Schedule. **Tables J.2-129** through **J.2-136** present the maximum 1- and 8-hour carbon monoxide concentrations for each roadway intersection for each analysis year for each alternative for the Delayed Schedule.

TABLE J.2-119
MICROSCALE DISPERSION ANALYSIS - ROADWAY FACILITIES EVALUATED

		Roadway Facilities Evaluated								
			2007		2009		2013		2018	
ID	Intersection	2002	Alt A	Alt C, D, G	Alt A	Alt C, D, G	Alt A	Alt C, D, G	Alt A	Alt C, D, G
1	Touhy Ave and Elmhurst Rd	X	X	X	X	X	X	-	X	X
2	Touhy Ave and Mt. Prospect Rd	X	-	X	X	X	X	-	X	-
3	Touhy Ave and Wolf Rd	X	X	X	X	X	X	X	X	X
4	Touhy Ave and Lee Street (West)	-	X	-	X	-	X	-	X	-
6	Bessie Coleman Dr and Higgins Rd	-	-	X	-	-	-	X	-	X
7	Mannheim Rd and Higgins Rd	X	X	X	X	X	X	X	X	X
10	Mannheim Rd and Zemke Rd	X	X	X	X	X	X	X	X	X
16	Balmoral Ave and Des Plaines River Rd	-	-	-	-	-	-	X	-	-
17	Mannheim Rd and Lawrence Ave	X	X	X	X	X	X	X	X	X
20	Mannheim Rd and Irving Park Rd	X	X	X	X	X	X	X	X	X
22	York Rd and Irving Park Rd	X	X	X	-	-	-	-	-	-
29	Thorndale Ave and Arlington Heights Rd	X	X	X	X	X	X	X	X	X
33	Devon Ave and Arlington Heights Rd	X	X	-	X	X	X	-	X	-
37	York Rd and Irving Park Rd Ramp	-	-	-	-	-	-	X	-	X
38	Irving Park Rd and York Rd Ramp	-	-	-	-	X	-	X	-	X

Notes: X = Microscale dispersion analysis performed
- = No microscale dispersion analysis performed
Alternative A = No Action, Alternative C, D, and G are Build Alternatives.
The ten intersections identified in each column are the ten selected "maximum" intersections per scenario.

Source: Environmental Science Associates, Inc. [TPC] analysis, 2004/2005.

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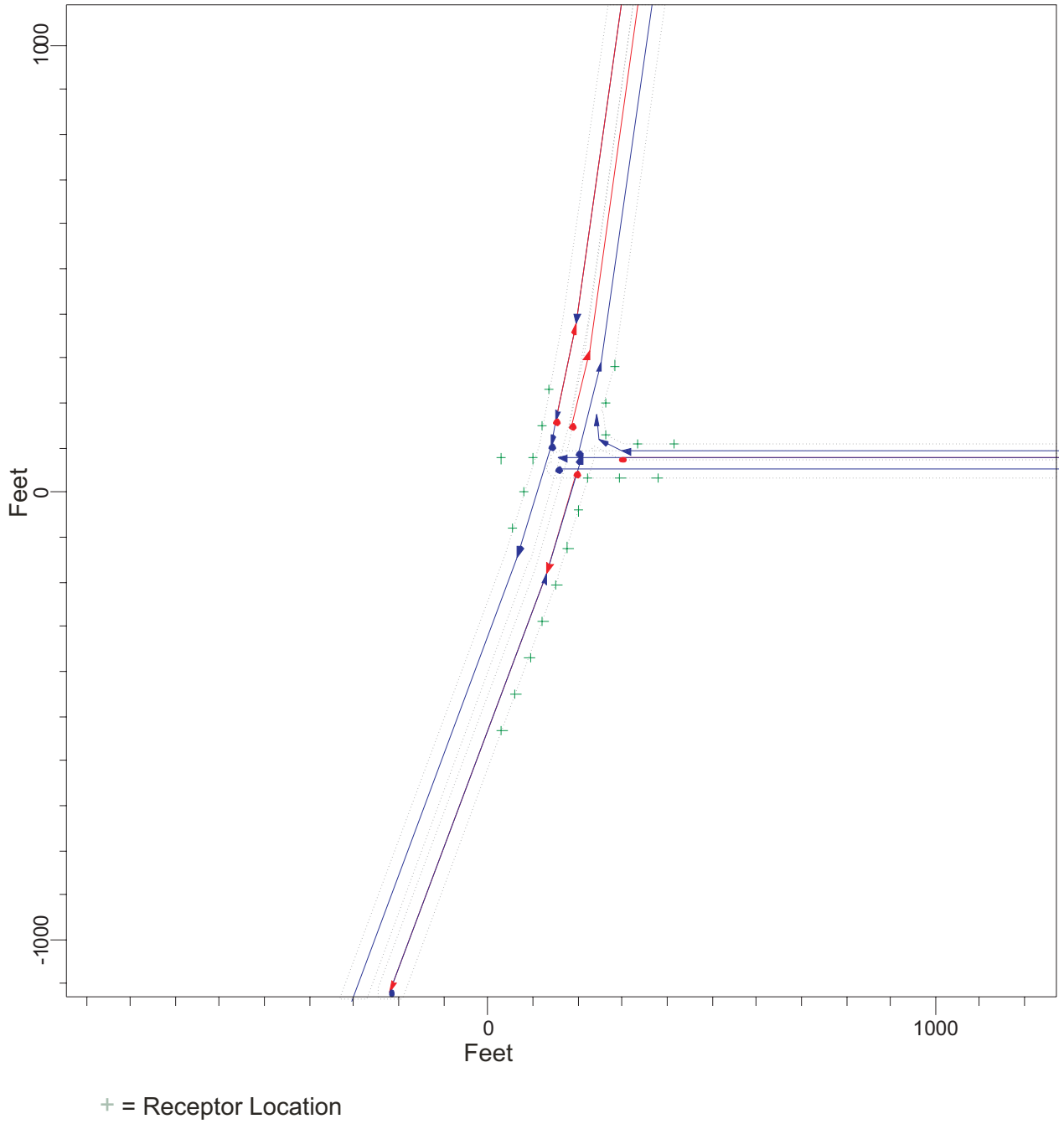

Source: Environmental Science Associates [TPC], 2004

Chicago O'hare International Airport

O'Hare Modernization Environmental Impact Statement

CAL3QHC Diagram: Mannheim Rd/ Lawrence Ave

Exhibit J.2-4

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TABLE J.2-120
MAXIMUM CARBON MONOXIDE CONCENTRATIONS – 2002

ID	Intersection	Maximum Concentration (ppm)(a)	
		1-hour(b)	8-hour(c, d)
1	Touhy Ave and Elmhurst Rd	11.4	7.3
2	Touhy Ave and Mt. Prospect Rd	11.3	7.2
3	Touhy Ave and Wolf Rd	10.8	6.9
7	Mannheim Rd and Higgins Rd	10.8	6.9
10	Mannheim Rd and Zemke Rd	10.0	6.4
17	Mannheim Rd and Lawrence Ave	11.3	7.2
20	Mannheim Rd and Irving Park Rd	12.7	8.1
22	York Rd and Irving Park Rd	12.2	7.8
29	Thorndale Ave and Arlington Heights Rd	10.0	6.4
33	Devon Ave and Arlington Heights Rd	11.4	7.3

Notes: (a) ppm – parts per million
(b) Includes background concentration of 4.5 ppm.
(c) Calculated using a meteorological/traffic persistence factor of 0.635.
(d) Includes a background concentration of 2.9 ppm.
Source: Environmental Science Associates, Inc. [TPC] analysis, 2004

TABLE J.2-121
MAXIMUM CARBON MONOXIDE CONCENTRATIONS - 2007 - ALTERNATIVE A (NO ACTION ALTERNATIVE) – ORIGINAL SCHEDULE

		Maximum Concentration (ppm)(a)	
ID	Intersection	1-hour(b)	8-hour(c, d)
1	Touhy Ave and Elmhurst Rd	9.9	6.3
3	Touhy Ave and Wolf Rd	10.0	6.4
4	Touhy Ave and Lee Street (West)	10.4	6.6
7	Mannheim Rd and Higgins Rd	10.6	6.8
10	Mannheim Rd and Zemke Rd	11.6	7.4
17	Mannheim Rd and Lawrence Ave	14.3	9.1
20	Mannheim Rd and Irving Park Rd	11.7	7.5
22	York Rd and Irving Park Rd	10.6	6.8
29	Thorndale Ave and Arlington Heights Rd	6.2	4.0
33	Devon Ave and Arlington Heights Rd	9.6	6.1

Notes: (a) ppm – parts per million
(b) Includes background concentration of 4.5 ppm.
(c) Calculated using a meteorological/traffic persistence factor of 0.635.
(d) Includes a background concentration of 2.9 ppm.
Source: Environmental Science Associates, Inc. [TPC] analysis, 2004

TABLE J.2-122
MAXIMUM CARBON MONOXIDE CONCENTRATIONS - 2007 - ALTERNATIVES C, D, AND G – ORIGINAL SCHEDULE

		Maximum Concentration (ppm)(a)	
ID	Intersection	1-hour(b)	8-hour(c, d)
1	Touhy Ave and Elmhurst Rd	9.7	6.2
2	Touhy Ave and Mt. Prospect Rd	9.6	6.1
3	Touhy Ave and Wolf Rd	9.8	6.3
6	Bessie Coleman Dr and Higgins Rd	10.1	6.5
7	Mannheim Rd and Higgins Rd	10.1	6.5
10	Mannheim Rd and Zemke Rd	9.7	6.2
17	Mannheim Rd and Lawrence Ave	11.2	7.2
20	Mannheim Rd and Irving Park Rd	10.4	6.6
22	York Rd and Irving Park Rd	10.5	6.7
29	Thorndale Ave and Arlington Heights Rd	8.6	5.5

Notes: (a) ppm – parts per million
(b) Includes background concentration of 4.5 ppm.
(c) Calculated using a meteorological/traffic persistence factor of 0.635.
(d) Includes a background concentration of 2.9 ppm.
Source: Environmental Science Associates, Inc. [TPC] analysis, 2004

TABLE J.2-123
MAXIMUM CARBON MONOXIDE CONCENTRATIONS - 2009 - ALTERNATIVE A (NO ACTION ALTERNATIVE) – ORIGINAL SCHEDULE

ID	Intersection	Maximum Concentration (ppm)(a) 1-hour(b)	8-hour(c, d)
1	Touhy Ave and Elmhurst Rd	9.7	6.2
2	Touhy Ave and Mt. Prospect Rd	9.7	6.2
3	Touhy Ave and Wolf Rd	9.5	6.1
4	Touhy Ave and Lee Street (West)	10.1	6.5
7	Mannheim Rd and Higgins Rd	10.2	6.5
10	Mannheim Rd and Zemke Rd	11.9	7.6
17	Mannheim Rd and Lawrence Ave	13.6	8.7
20	Mannheim Rd and Irving Park Rd	11.7	7.5
29	Thorndale Ave and Arlington Heights Rd	8.3	5.3
33	Devon Ave and Arlington Heights Rd	9.4	6.0

Notes: (a) ppm – parts per million
(b) Includes background concentration of 4.5 ppm.
(c) Calculated using a meteorological/traffic persistence factor of 0.635.
(d) Includes a background concentration of 2.9 ppm.
Source: Environmental Science Associates, Inc. [TPC] analysis, 2004

TABLE J.2-124
MAXIMUM CARBON MONOXIDE CONCENTRATIONS - 2009 - ALTERNATIVES C, D AND G – ORIGINAL SCHEDULE

ID	Intersection	Maximum Concentration (ppm)(a) 1-hour(b)	8-hour(c, d)
1	Touhy Ave and Elmhurst Rd	9.4	6.0
2	Touhy Ave and Mt. Prospect Rd	9.7	6.2
3	Touhy Ave and Wolf Rd	9.6	6.1
7	Mannheim Rd and Higgins Rd	9.6	6.1
10	Mannheim Rd and Zemke Rd	9.2	5.9
17	Mannheim Rd and Lawrence Ave	10.9	7.0
20	Mannheim Rd and Irving Park Rd	10.2	6.5
29	Thorndale Ave and Arlington Heights Rd	8.2	5.2
33	Devon Ave and Arlington Heights Rd	9.0	5.8
38	Irving Park Rd and York Rd Ramp	8.1	5.2

Notes: (a) ppm – parts per million
(b) Includes background concentration of 4.5 ppm.
(c) Calculated using a meteorological/traffic persistence factor of 0.635.
(d) Includes a background concentration of 2.9 ppm.
Source: Environmental Science Associates, Inc. [TPC] analysis, 2004

TABLE J.2-125
MAXIMUM CARBON MONOXIDE CONCENTRATIONS - 2013 - ALTERNATIVE A (NO ACTION ALTERNATIVE) – ORIGINAL SCHEDULE

ID	Intersection	Maximum Concentration (ppm)(a) 1-hour(b)	8-hour(c, d)
1	Touhy Ave and Elmhurst Rd	8.8	5.6
2	Touhy Ave and Mt. Prospect Rd	9.4	6.0
3	Touhy Ave and Wolf Rd	8.8	5.6
4	Touhy Ave and Lee Street (West)	8.9	5.7
7	Mannheim Rd and Higgins Rd	9.4	6.0
10	Mannheim Rd and Zemke Rd	12.4	7.9
17	Mannheim Rd and Lawrence Ave	12.7	8.1
20	Mannheim Rd and Irving Park Rd	10.5	6.7
29	Thorndale Ave and Arlington Heights Rd	7.9	5.1
33	Devon Ave and Arlington Heights Rd	8.9	5.7

Notes: (a) ppm – parts per million
(b) Includes background concentration of 4.5 ppm.
(c) Calculated using a meteorological/traffic persistence factor of 0.635.
(d) Includes a background concentration of 2.9 ppm.
Source: Environmental Science Associates, Inc. [TPC] analysis, 2004

TABLE J.2-126
MAXIMUM CARBON MONOXIDE CONCENTRATIONS - 2013 - ALTERNATIVES C, D AND G –ORIGINAL SCHEDULE

ID	Intersection	Maximum Concentration (ppm)(a) 1-hour(b)	8-hour(c, d)
3	Touhy Ave and Wolf Rd	9.0	5.8
6	Bessie Coleman Dr and Higgins Rd	10.2	6.5
7	Mannheim Rd and Higgins Rd	9.5	6.1
10	Mannheim Rd and Zemke Rd	9.6	6.1
16	Balmoral Ave and Des Plaines River Rd	8.4	5.4
17	Mannheim Rd and Lawrence Ave	11.2	7.2
20	Mannheim Rd and Irving Park Rd	12.0	7.7
29	Thorndale Ave and Arlington Heights Rd	7.9	5.1
37	York Rd and Irving Park Rd Ramp	7.8	5.0
38	Irving Park Rd and York Rd Ramp	9.1	5.8

Notes: (a) ppm – parts per million
(b) Includes background concentration of 4.5 ppm.
(c) Calculated using a meteorological/traffic persistence factor of 0.635.
(d) Includes a background concentration of 2.9 ppm.
Source: Environmental Science Associates, Inc. [TPC] analysis, 2004

TABLE J.2-127
MAXIMUM CARBON MONOXIDE CONCENTRATIONS - 2018 - ALTERNATIVE A (NO ACTION ALTERNATIVE) – ORIGINAL SCHEDULE

ID	Intersection	Maximum Concentration (ppm)(a) 1-hour(b)	8-hour(c, d)
1	Touhy Ave and Elmhurst Rd	8.7	5.6
2	Touhy Ave and Mt. Prospect Rd	9.2	5.9
3	Touhy Ave and Wolf Rd	8.6	5.5
4	Touhy Ave and Lee Street (West)	8.5	5.4
7	Mannheim Rd and Higgins Rd	9.2	5.9
10	Mannheim Rd and Zemke Rd	11.9	7.6
17	Mannheim Rd and Lawrence Ave	11.7	7.5
20	Mannheim Rd and Irving Park Rd	10.0	6.4
29	Thorndale Ave and Arlington Heights Rd	7.7	4.9
33	Devon Ave and Arlington Heights Rd	8.6	5.5

Notes: (a) ppm – parts per million
(b) Includes background concentration of 4.5 ppm.
(c) Calculated using a meteorological/traffic persistence factor of 0.635.
(d) Includes a background concentration of 2.9 ppm.
Source: Environmental Science Associates, Inc. [TPC] analysis, 2004

TABLE J.2-128
MAXIMUM CARBON MONOXIDE CONCENTRATIONS - 2018 - ALTERNATIVES C, D, AND G – ORIGINAL SCHEDULE

ID	Intersection	Maximum Concentration (ppm)(a) 1-hour(b)	8-hour(c, d)
1	Touhy Ave and Elmhurst Rd	8.9	5.7
3	Touhy Ave and Wolf Rd	8.6	5.5
6	Bessie Coleman Dr and Higgins Rd	9.6	6.1
7	Mannheim Rd and Higgins Rd	8.9	5.7
10	Mannheim Rd and Zemke Rd	9.0	5.8
17	Mannheim Rd and Lawrence Ave	10.2	6.5
20	Mannheim Rd and Irving Park Rd	10.9	7.0
29	Thorndale Ave and Arlington Heights Rd	7.9	5.1
37	York Rd and Irving Park Rd Ramp	7.6	4.9
38	Irving Park Rd and York Rd Ramp	8.1	5.2

Notes: (a) ppm – parts per million
(b) Includes background concentration of 4.5 ppm.
(c) Calculated using a meteorological/traffic persistence factor of 0.635.
(d) Includes a background concentration of 2.9 ppm.
Source: Environmental Science Associates, Inc. [TPC] analysis, 2004

TABLE J.2-129
MAXIMUM CARBON MONOXIDE CONCENTRATIONS - 2008 - ALTERNATIVE A (NO ACTION ALTERNATIVE) - DELAYED SCHEDULE

		Maximum Concentration (ppm)(a)	
ID	Intersection	1-hour(b)	8-hour(c, d)
1	Touhy Ave and Elmhurst Rd	9.7	6.2
3	Touhy Ave and Wolf Rd	9.8	6.3
4	Touhy Ave and Lee Street (West)	10.2	6.5
7	Mannheim Rd and Higgins Rd	10.4	6.6
10	Mannheim Rd and Zemke Rd	11.4	7.3
17	Mannheim Rd and Lawrence Ave	13.9	8.9
20	Mannheim Rd and Irving Park Rd	11.9	7.6
22	York Rd and Irving Park Rd	10.3	6.6
29	Thorndale Ave and Arlington Heights Rd	8.4	5.4
33	Devon Ave and Arlington Heights Rd	9.4	6.0

Notes: (a) ppm – parts per million
(b) Includes background concentration of 4.5 ppm.
(c) Calculated using a meteorological/traffic persistence factor of 0.635.
(d) Includes a background concentration of 2.9 ppm.
Source: Environmental Science Associates, Inc. [TPC] analysis, 2004

TABLE J.2-130
MAXIMUM CARBON MONOXIDE CONCENTRATIONS - 2008 - ALTERNATIVES C, D, AND G - DELAYED SCHEDULE

		Maximum Concentration (ppm)(a)	
ID	Intersection	1-hour(b)	8-hour(c, d)
1	Touhy Ave and Elmhurst Rd	9.6	6.1
2	Touhy Ave and Mt. Prospect Rd	9.7	6.2
3	Touhy Ave and Wolf Rd	9.6	6.1
7	Mannheim Rd and Higgins Rd	9.9	6.3
10	Mannheim Rd and Zemke Rd	9.5	6.1
17	Mannheim Rd and Lawrence Ave	11.3	7.2
20	Mannheim Rd and Irving Park Rd	10.4	6.6
22	York Rd and Irving Park Rd	10.4	6.6
29	Thorndale Ave and Arlington Heights Rd	8.4	5.4
33	Devon Ave and Arlington Heights Rd	9.4	6.0

Notes: (a) ppm – parts per million
(b) Includes background concentration of 4.5 ppm.
(c) Calculated using a meteorological/traffic persistence factor of 0.635.
(d) Includes a background concentration of 2.9 ppm.
Source: Environmental Science Associates, Inc. [TPC] analysis, 2004

TABLE J.2-131
MAXIMUM CARBON MONOXIDE CONCENTRATIONS - 2010 - ALTERNATIVE A (NO ACTION ALTERNATIVE) - DELAYED SCHEDULE

ID	Intersection	Maximum Concentration (ppm)(a) 1-hour(b)	8-hour(c, d)
1	Touhy Ave and Elmhurst Rd	9.5	6.1
2	Touhy Ave and Mt. Prospect Rd	9.4	6.0
3	Touhy Ave and Wolf Rd	9.3	5.9
4	Touhy Ave and Lee Street (West)	9.9	6.3
7	Mannheim Rd and Higgins Rd	9.9	6.3
10	Mannheim Rd and Zemke Rd	11.7	7.5
17	Mannheim Rd and Lawrence Ave	13.4	8.6
20	Mannheim Rd and Irving Park Rd	11.5	7.3
29	Thorndale Ave and Arlington Heights Rd	8.1	5.2
33	Devon Ave and Arlington Heights Rd	9.1	5.8

Notes: (a) ppm – parts per million
(b) Includes background concentration of 4.5 ppm.
(c) Calculated using a meteorological/traffic persistence factor of 0.635.
(d) Includes a background concentration of 2.9 ppm.
Source: Environmental Science Associates, Inc. [TPC] analysis, 2004

TABLE J.2-132
MAXIMUM CARBON MONOXIDE CONCENTRATIONS - 2010 - ALTERNATIVES C, D AND G - DELAYED SCHEDULE

ID	Intersection	Maximum Concentration (ppm)(a) 1-hour(b)	8-hour(c, d)
1	Touhy Ave and Elmhurst Rd	9.4	6.0
2	Touhy Ave and Mt. Prospect Rd	9.5	6.1
3	Touhy Ave and Wolf Rd	9.5	6.1
7	Mannheim Rd and Higgins Rd	9.4	6.0
10	Mannheim Rd and Zemke Rd	9.1	5.8
17	Mannheim Rd and Lawrence Ave	11.2	7.2
20	Mannheim Rd and Irving Park Rd	10.2	6.5
29	Thorndale Ave and Arlington Heights Rd	8.1	5.2
37	York Rd and Irving Park Rd Ramp	7.9	5.1
38	Irving Park Rd and York Rd Ramp	8.1	5.2

Notes: (a) ppm – parts per million
(b) Includes background concentration of 4.5 ppm.
(c) Calculated using a meteorological/traffic persistence factor of 0.635.
(d) Includes a background concentration of 2.9 ppm.
Source: Environmental Science Associates, Inc. [TPC] analysis, 2004

TABLE J.2-133
MAXIMUM CARBON MONOXIDE CONCENTRATIONS - 2014 - ALTERNATIVE A (NO ACTION ALTERNATIVE) - DELAYED SCHEDULE

ID	Intersection	Maximum Concentration (ppm)(a) 1-hour(b)	8-hour(c, d)
1	Touhy Ave and Elmhurst Rd	8.8	5.6
2	Touhy Ave and Mt. Prospect Rd	9.4	6.0
3	Touhy Ave and Wolf Rd	8.9	5.7
4	Touhy Ave and Lee Street (West)	8.9	5.7
7	Mannheim Rd and Higgins Rd	9.4	6.0
10	Mannheim Rd and Zemke Rd	12.3	7.9
17	Mannheim Rd and Lawrence Ave	12.4	7.9
20	Mannheim Rd and Irving Park Rd	10.4	6.6
29	Thorndale Ave and Arlington Heights Rd	7.7	4.9
33	Devon Ave and Arlington Heights Rd	8.8	5.6

Notes: (a) ppm – parts per million
(b) Includes background concentration of 4.5 ppm.
(c) Calculated using a meteorological/traffic persistence factor of 0.635.
(d) Includes a background concentration of 2.9 ppm.
Source: Environmental Science Associates, Inc. [TPC] analysis, 2004

TABLE J.2-134
MAXIMUM CARBON MONOXIDE CONCENTRATIONS - 2014 - ALTERNATIVES C, D AND G - DELAYED SCHEDULE

ID	Intersection	Maximum Concentration (ppm)(a) 1-hour(b)	8-hour(c, d)
3	Touhy Ave and Wolf Rd	8.7	5.6
6	Bessie Coleman Dr and Higgins Rd	10.3	6.6
7	Mannheim Rd and Higgins Rd	9.3	5.9
10	Mannheim Rd and Zemke Rd	9.4	6.0
16	Balmoral Ave and Des Plaines River Rd	8.3	5.3
17	Mannheim Rd and Lawrence Ave	10.9	7.0
20	Mannheim Rd and Irving Park Rd	11.8	7.5
29	Thorndale Ave and Arlington Heights Rd	7.9	5.1
37	York Rd and Irving Park Rd Ramp	7.8	5.0
38	Irving Park Rd and York Rd Ramp	9.0	5.8

Notes: (a) ppm – parts per million
(b) Includes background concentration of 4.5 ppm.
(c) Calculated using a meteorological/traffic persistence factor of 0.635.
(d) Includes a background concentration of 2.9 ppm.
Source: Environmental Science Associates, Inc. [TPC] analysis, 2004

TABLE J.2-135
MAXIMUM CARBON MONOXIDE CONCENTRATIONS - 2019 - ALTERNATIVE A (NO ACTION ALTERNATIVE) - DELAYED SCHEDULE

ID	Intersection	Maximum Concentration (ppm)(a) 1-hour(b)	8-hour(c, d)
1	Touhy Ave and Elmhurst Rd	8.7	5.6
2	Touhy Ave and Mt. Prospect Rd	9.2	5.9
3	Touhy Ave and Wolf Rd	8.6	5.5
4	Touhy Ave and Lee Street (West)	8.5	5.4
7	Mannheim Rd and Higgins Rd	9.1	5.8
10	Mannheim Rd and Zemke Rd	11.7	7.5
17	Mannheim Rd and Lawrence Ave	11.5	7.3
20	Mannheim Rd and Irving Park Rd	9.8	6.3
29	Thorndale Ave and Arlington Heights Rd	7.7	4.9
33	Devon Ave and Arlington Heights Rd	8.4	5.4

Notes: (a) ppm – parts per million
(b) Includes background concentration of 4.5 ppm.
(c) Calculated using a meteorological/traffic persistence factor of 0.635.
(d) Includes a background concentration of 2.9 ppm.
Source: Environmental Science Associates, Inc. [TPC] analysis, 2004

TABLE J.2-136
MAXIMUM CARBON MONOXIDE CONCENTRATIONS - 2019 - ALTERNATIVES C, D, AND G - DELAYED SCHEDULE

ID	Intersection	Maximum Concentration (ppm)(a) 1-hour(b)	8-hour(c, d)
1	Touhy Ave and Elmhurst Rd	8.8	5.6
3	Touhy Ave and Wolf Rd	8.5	5.4
6	Bessie Coleman Dr and Higgins Rd	9.4	6.0
7	Mannheim Rd and Higgins Rd	8.7	5.6
10	Mannheim Rd and Zemke Rd	8.9	5.7
17	Mannheim Rd and Lawrence Ave	10.6	6.8
20	Mannheim Rd and Irving Park Rd	10.9	7.0
29	Thorndale Ave and Arlington Heights Rd	7.9	5.1
37	York Rd and Irving Park Rd Ramp	7.5	4.8
38	Irving Park Rd and York Rd Ramp	8.0	5.1

Notes: (a) ppm – parts per million
(b) Includes background concentration of 4.5 ppm.
(c) Calculated using a meteorological/traffic persistence factor of 0.635.
(d) Includes a background concentration of 2.9 ppm.
Source: Environmental Science Associates, Inc. [TPC] analysis, 2004

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ATTACHMENT J-1

DRAFT AIR QUALITY ANALYSIS PROTOCOL – CRITERIA POLLUTANTS

(08/05/03)

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Chicago O'Hare International Airport

NOTE: This document is a suggested guideline for conducting the O'Hare Modernization Program (OMP) air quality analyses. It is provided for deliberative purposes only and is based on previously approved air quality methodologies and assumptions used in the preparation of the air quality analysis for O'Hare's World Gateway Program Environmental Assessment. This Air Quality Analysis Protocol is being developed through close coordination with the Federal Aviation Administration (FAA) and associated contractors, the City of Chicago Department of Aviation, the US Environmental Protection Agency (USEPA) Region V, and the Illinois EPA (IEPA). This Protocol is based on information that the City of Chicago has provided to the FAA to date. If major components of the OMP are changed and/or phasing is altered, this Protocol will be adjusted by FAA as necessary, in consultation with USEPA and IEPA.

Draft

Air Quality Analysis Protocol – Criteria Pollutants

O'Hare Modernization Program
Environmental Impact Statement

August 5, 2003

CHICAGO O'HARE INTERNATIONAL AIRPORT O'HARE MODERNIZATION PROGRAM EIS

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Chapter 1 Project Background

The City of Chicago Department of Aviation (City) is proposing a program to modernize O'Hare International Airport (Airport). Known as the O'Hare Modernization Program (OMP), the program includes the addition of one new runway and the relocation of three existing runways into an east-west configuration. The future airport, as currently envisioned by the City, would consist of eight runways (six east-west parallel runways and two northeast-southwest parallel runways). The OMP could also involve relocation of some or all of the existing navigation aids, placement of new navigation aids, provision for a new western access to the Airport, construction of additional terminal facilities, and relocation of various roadway and rail line. Based on the potential impacts associated with the proposed developments, the Federal Aviation Administration (FAA) has determined that the environmental review process will be in the form of an Environmental Impact Statement (EIS).

As part of the air quality analysis for the EIS, emission inventories will be prepared and dispersion modeling will be conducted. The results of these efforts will be evaluated to ensure the OMP complies with all applicable state and Federal laws, including the National Environmental Policy Act (NEPA), the Clean Air Act (CAA), and FAA Orders 1050.1D and 5050.4A.

Additional details regarding the OMP and graphics illustrating the airfield development concept and airfield evolution can be viewed at http://modernization.ohare.com/program_pages/configuration.htm.

This Protocol identifies the technical assumptions, methodologies, databases, and models that will be used to conduct the air quality analysis for the OMP EIS. The purpose of the Protocol is to document, in advance of any data collection or data analysis, the approach to the criteria pollutant analysis. The document will be circulated to the US Environmental Protection Agency (USEPA) and the Illinois Environmental Protection Agency (IEPA) to ensure that the approach meets regulatory needs and requirements.

During scoping, issues related to hazardous air pollutants were identified by the USEPA and the IEPA. A separate Protocol will be prepared to document the approach to this air quality concern.

1.1 Regional Air Quality Status

The State of Illinois and the federal government have Ambient Air Quality Standards (AAQS) for six air pollutants—ozone (O3), carbon monoxide (CO), nitrogen dioxide (NO2), sulfur dioxide (SO2), particulate matter less than 10 microns in size (PM_{10}) and lead (Pb). The standards were established to protect the health and welfare of the public. **Table 1** presents a summary of the current and future National and Illinois AAQS.

The Airport is located within Cook and DuPage counties. Based on historical air monitoring data, these two counties, along with six other counties (two located in Indiana) and the Townships of Aux Sable and Goose Lake in Grundy County and Oswego in Kendall County, are currently designated by the USEPA to be a severe-17 nonattainment area for the one-hour AAQS for O3. The nonattainment area is located within Air Quality Control Region (AQCR) 67 (the Metropolitan Chicago Interstate AQCR).

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Table 1. National and Illinois Ambient Air Quality Standards[1]

Pollutant	Averaging Time	Primary Standards[2]		Secondary Standards[2]	
		µg/m³	ppm	µg/m³	ppm
Carbon Monoxide (CO)	1-hour	40,000	35	same as primary	same as primary
	8-hour	10,000	9	same as primary	same as primary
Ozone (O_3)	1-hour	235	0.12	same as primary	same as primary
	8-hour[3]		0.08	same as primary	same as primary
Nitrogen Dioxide (NO_2)	Annual	100	0.053	same as primary	same as primary
Sulfur Dioxide (SO_2)	3-hour	none	none	1,300	0.5
	24-hour	365	0.14	none	none
	Annual	80	0.03	none	none
Particulate Matter (PM_{10})	24-hour	150	- -	same as primary	- -
	Annual	50	- -	same as primary	- -
Particulate Matter ($PM_{2.5}$)	24-hour[3]	65	- -	same as primary	- -
	Annual[3]	15	- -	same as primary	- -
Lead (Pb)	Quarterly Mean	1.5	- -	same as primary	- -

[1] Federal and Illinois standards, except for annual means, are not to be exceeded more than once per year.

[2] The tabulated thresholds are for primary standards which are for protection of public health. Secondary standards are for protection of public welfare.

[3] The State of Illinois has not adopted the $PM_{2.5}$ or 8-hour ozone standards at this time. An area will meet the 8-hour ozone standard when the average fourth-highest daily maximum 8-hour average is less than or equal to the threshold.

40 CFR Part 50.12, *National Primary and Secondary Ambient Air Quality Standards for Lead* 35 IAC Part 243, Air Quality Standards.

1.1.1 Status of the State Implementation Plan (SIP)

On November 13, 2001, the USEPA approved a State Implementation Plan (SIP) revision submitted by the IEPA (effective December 13, 2001). The revision met certain requirements of the CAA regarding attainment of the 1-hour O3 standard in the Chicago-Gary-Lake County O3 nonattainment area (which includes Cook and DuPage counties where the Airport is located).[1] The approved SIP revision included:

- A plan that demonstrates attainment of the 1-hour O3 standard by November 15, 2007,
- A post-1999 ozone rate-of-progress (ROP) plan with mobile source conformity emission budgets,
- Contingency plans for the attainment demonstration and the ROP plan,
- A commitment to conduct a Mid-Course Review (MCR) of the attainment demonstration,
- Year 2002, 2005, and 2007 motor vehicle emission budgets for volatile organic compounds (VOC) and year 2007 oxides of nitrogen (NOx) (to be revised within two years of release of the MOBILE6 program), and
- A demonstration that the State has fully implemented Reasonably Available Control Measures (RACM).

The SIP identifies emissions from all sources in the nonattainment area for the years 1990, 1996, and 1999. Regional emissions are described below. Emissions attributable to aircraft are also described.

[1] Federal Register: November 13, 2201 (Volume 66, Number 219, Pages 56903-56931)

Volatile Organic Compounds (VOC)

As shown in **Table 2**, the amount of VOC emitted within the nonattainment area in the years 1990, 1996, and 1999 totaled approximately 1,363, 941, and 953 tons per day during the summer months.

The largest sources of VOC emissions within the nonattainment area were mobile sources. Mobile sources include on- and off-highway motor vehicles, such as locomotives, commercial vessels, pleasure boats, aircraft, airport service equipment (ASE), and construction equipment. During 1990, 1996, and 1999, the VOC emissions from all aircraft and ASE activity at all airports within the nonattainment area totaled approximately 10, 9, and 9 tons per day—less than 1 percent of regional emissions.[2] VOC emissions from construction activities within the area during these same years were approximately 13, 14, and 15 tons per day—less than 2 percent of regional emissions.

Oxides of Nitrogen (NOx)

As shown in **Table 3**, the amount of NOx emitted within the nonattainment area in the years 1990, 1996, and 1999 totaled approximately 1,022, 1,030, and 1,001 tons per day during the summer months.

The largest sources of NOx emissions within the nonattainment area were mobile sources. During 1990, 1996, and 1999, the NOx emissions from all aircraft and ASE activity at all airports within the nonattainment area totaled approximately 28, 32, and 33 tons per day—approximately 3 percent of regional emissions.[2] NOx emissions from construction activities within the area during these same years were approximately 81, 93, and 92 tons per day—less than 10 percent of regional emissions.

Carbon Monoxide (CO)

As shown in **Table 4**, the amount of CO emitted within the nonattainment area in the years 1990, 1996, and 1999 totaled approximately 4,750, 3,103, and 2,908 tons per day during the summer months. Of this total, mobile sources contributed 84 percent in 1990 and 96 percent in 1999.

The largest sources of CO emissions within the nonattainment area were mobile sources. During 1990, 1996, and 1999, the CO emissions from aircraft activity within the nonattainment area were approximately 40, 35, and 35 tons per day--approximately 1 percent of regional emissions.[3]

2007 Aircraft Emissions

Based on information incorporated in to the Chicago Attainment Demonstration SIP, the IEPA has projected that during the year 2007, all aircraft and ASE activity within the nonattainment area will contribute approximately 13 tons per day to regional totals of VOC, with construction activity contributing approximately 15 tons per day to the total. During this same year, all aircraft and ASE activity will contribute approximately 39 tons to the regional totals of NOx, with construction activity contributing approximately 86 tons per day to the total. [2]

[2] Correspondence – Mike Rogers, IEPA, January 14, 2003.
[3] The 1990 Ozone Precursors Emissions Inventory for the Chicago Area, Illinois State Implementation Plan. IEPA. Nov 1993, the Illinois 1996 Periodic Inventory and Milestone Demonstration, IEPA. Sept 1999, and the 1999 Illinois Periodic Emissions Inventory, IEPA. Dec 2001.

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Table 2. Summer Weekday Emissions of VOC (Tons Per Day)[a]

Source Categories	1990				1996				1999			
	Point	Area	Mobile	Total	Point	Area	Mobile	Total	Point	Area	Mobile	Total
Storage, Transportation & Marketing of VOC	21.46	56.10	0.00	77.56	17.09	14.84	0.00	31.93	10.58	14.96	0.00	25.54
Industrial Processes	143.31	0.00	0.00	143.31	42.05	0.00	0.00	42.05	37.08	0.00	0.00	37.08
Industrial Surface Coating	104.33	0.00	0.00	104.33	38.12	0.00	0.00	38.12	27.87	0.00	0.00	27.87
Non-Industrial Surface Coating	0.00	79.37	0.00	79.37	0.00	66.12	0.00	66.12	0.00	53.26	0.00	53.26
Other Solvent Use	46.28	116.22	0.00	162.50	18.64	121.41	0.00	140.05	15.35	88.32	0.00	103.67
Waste Disposal	23.33	3.39	0.00	26.72	10.64	2.99	0.00	13.63	11.95	3.75	0.00	15.70
Other Miscellaneous[b]	11.37	12.93	0.00	24.30	9.91	14.98	0.00	24.89	9.26	13.59	0.00	22.85
Mobile – On Road	0.00	0.00	491.22	491.22	0.00	0.00	268.48	268.48	0.00	0.00	241.77	241.77
Mobile – Off Road[c]	0.00	0.00	144.28	144.28	0.00	0.00	145.19	145.19	0.00	0.00	133.44	133.44
Total Anthropogenic	350.08	268.01	635.50	1253.59	136.45	220.34	413.67	770.46	112.09	173.88	375.21	661.18
Biogenic	--	109.81	--	109.81	--	170.70	--	170.70	--	292.43	--	292.43
TOTAL	350.08	377.82	635.50	1363.40	136.45	391.04	413.37	941.16	112.09	466.31	375.21	953.61
Aircraft[d]	--	--	7.92	--	--	--	6.28	--	--	--	6.33	--
Airport Service Equipment[e]	--	--	2.27	--	--	--	2.38	--	--	--	2.44	--
Construction Equipment[e]	--	--	12.70	--	--	--	14.41	--	--	--	14.87	--

[a] Chicago ozone nonattainment area and major sources within 25 miles.
[b] Excludes biogenic sources.
[c] Includes aircraft, airport service equipment, and construction equipment.
[d] Nonattainment area estimates for all military, commercial, and general aviation aircraft and refueling activities.
[e] Nonattainment area estimates for all 2-stoke and 4-stroke gasoline and diesel construction activities.
Source: IEPA

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Table 3. Summer Weekday Emissions of NOx (Tons Per Day)[a]

Source Categories	1990				1996				1999			
	Point	Area	Mobile	Total	Point	Area	Mobile	Total	Point	Area	Mobile	Total
External Fuel Combustion	202.76	21.64	0.00	224.40	222.40	25.78	0.00	248.18	214.29	28.88	0.00	243.17
Stationary Internal Combustion	28.46	0.00	0.00	28.46	20.09	0.00	0.00	20.09	31.80	0.00	0.00	31.80
Other Combustion	3.56	2.19	0.00	5.75	0.58	4.23	0.00	4.81	2.77	3.95	0.00	6.72
Industrial Processes	55.90	0.00	0.00	55.90	32.59	0.00	0.00	32.59	27.20	0.00	0.00	27.20
Mobile – On Road	0.00	0.00	540.26	540.26	0.00	0.00	520.00	520.00	0.00	0.00	495.94	495.94
Mobile – Off-Road[b]	0.00	0.00	167.51	167.51	0.00	0.00	185.20	185.20	0.00	0.00	186.89	186.89
TOTAL	290.68	23.83	707.77	1022.28	275.66	48.69	705.20	1029.55	276.06	42.59	682.83	1001.48
Aircraft[c]	--	--	14.37	--	--	--	17.30	--	--	--	19.61	--
Airport Service Equipment[d]	--	--	13.88	--	--	--	14.48	--	--	--	13.77	--
Construction Equipment[d]	--	--	80.67	--	--	--	92.58	--	--	--	92.33	--

[a] Chicago ozone nonattainment area and major sources within 25 miles.
[b] Includes aircraft, airport service equipment, and construction equipment.
[c] Nonattainment area estimates for all military, commercial, and general aviation aircraft and refueling activities.
[d] Nonattainment area estimates for all 2-stoke and 4-stroke gasoline and diesel construction activities.
Source: IEPA

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Table 4. Summer Weekday Emissions of CO (Tons Per Day)[a]

Source Categories	1990				1996				1999			
	Point	Area	Mobile	Total	Point	Area	Mobile	Total	Point	Area	Mobile	Total
External Fuel Combustion	18.33	4.06	0.00	22.39	62.47	4.68	0.00	67.15	40.24	3.17	0.00	43.41
Stationary Internal Combustion	6.06	0.00	0.00	6.06	14.71	0.00	0.00	14.71	13.64	0.00	0.00	13.64
Other Combustion	4.15	18.40	0.00	22.55	2.03	17.11	0.00	19.14	2.56	17.48	0.00	20.04
Industrial Processes	688.26	0.00	0.00	688.26	52.67	0.00	0.00	52.67	36.86	0.00	0.00	36.86
Mobile – On Road	0.00	0.00	2924.41	2924.41	0.00	0.00	1780.08	1780.08	0.00	0.00	1576.90	1576.90
Mobile – Off Road[b]	0.00	0.00	1086.60	1086.60	0.00	0.00	1170.09	1170.09	0.00	0.00	1217.93	1217.93
TOTAL	716.80	22.46	4011.01	4750.27	131.88	21.79	2950.17	3103.84	93.30	20.66	2794.83	2908.79

[a] Chicago ozone nonattainment area and major sources within 25 miles.
b Includes aircraft, airport service equipment, and construction equipment.
Source: IEPA

1.2 Air Pollutant Monitoring Network

The IEPA and other air quality agencies own, maintain, and operate a network of over 200 air quality monitoring stations throughout the State of Illinois. **Figure 1** illustrates the locations of the monitoring stations within Cook and DuPage counties with respect to the Airport. As shown, there are currently 33 monitoring stations located within Cook County and two stations within DuPage County. **Table 5** details information for each monitor including the cities/areas in which each monitor is located, the owners/operators of the equipment, and the specific pollutants/parameters measured.

1.3 Future Air Quality Considerations

1.3.1 New O3 Standard

In July 1997, the USEPA adopted a new National 8-hour average O3 AAQS at a level of 0.08 ppm. This revised O3 standard was challenged by several industry groups in federal court. In 1999, the D.C. Circuit Court of Appeals ruled that USEPA could revise the standard, but could not enforce the standard. This ruling was appealed and the U.S. Supreme Court unanimously determined that the new standard for O3 was constitutional and USEPA was correct in not considering costs when setting the new limits. However, the Supreme Court determined that the USEPA implementation policy for the new standard was unlawful and left it up to USEPA after the D.C. Circuit's final disposition of the case to develop a reasonable interpretation of the nonattainment implementation provisions. In 2002, the D.C. Circuit addressed certain unresolved issues raised by the industry groups, and found for USEPA. On January 6, 2003, USEPA reaffirmed its 0.08 ppm/8-hour standard in the Federal Register. Although USEPA has held public meetings on O3 implementation, USEPA has not yet issued a proposed revised implementation rule.

Following promulgation of a new or revised air quality standard such as this, the CAA requires the Governor of each State to recommend initial designations of the attainment status for all areas of the State (42 U.S.C. 7401(d)). Ordinarily this is required within 1 year of the promulgation of a new standard. But, according to Public Law No. 105-178, passed in June of 1998, the Governor of each State was required to submit the designations referred to in Section 107(d)(1) of the Clean Air Act within 2 years following the promulgation of the July 1997 O3 National AAQS.

To make the recommendation, the IEPA evaluated O3 data collected from 1997 to 1999, as well as factors such as planned emission reduction strategies, spatial patterns of precursor emissions near and upwind of the monitors not meeting the standard, and projected economic and population growth patterns as they relate to an expected growth in precursor emissions. Based on the evaluation, the IEPA recommended to the USEPA that the boundaries of the 8-hour AAQS nonattainment area remain the same as for the 1-hour standard. The designation for the area will likely be official in the year 2004.

The dispersion model that will be used in the OMP analysis does not have the capability of predicting concentrations of O3 for comparison with the AAQS. The formation of O3 in the atmosphere is complex to model on a local scale and the effects of elevated O3 concentrations are generally realized on a regional scale rather than a local level. However, where possible, the air quality analyses for the OMP will include information relevant to the new standard.

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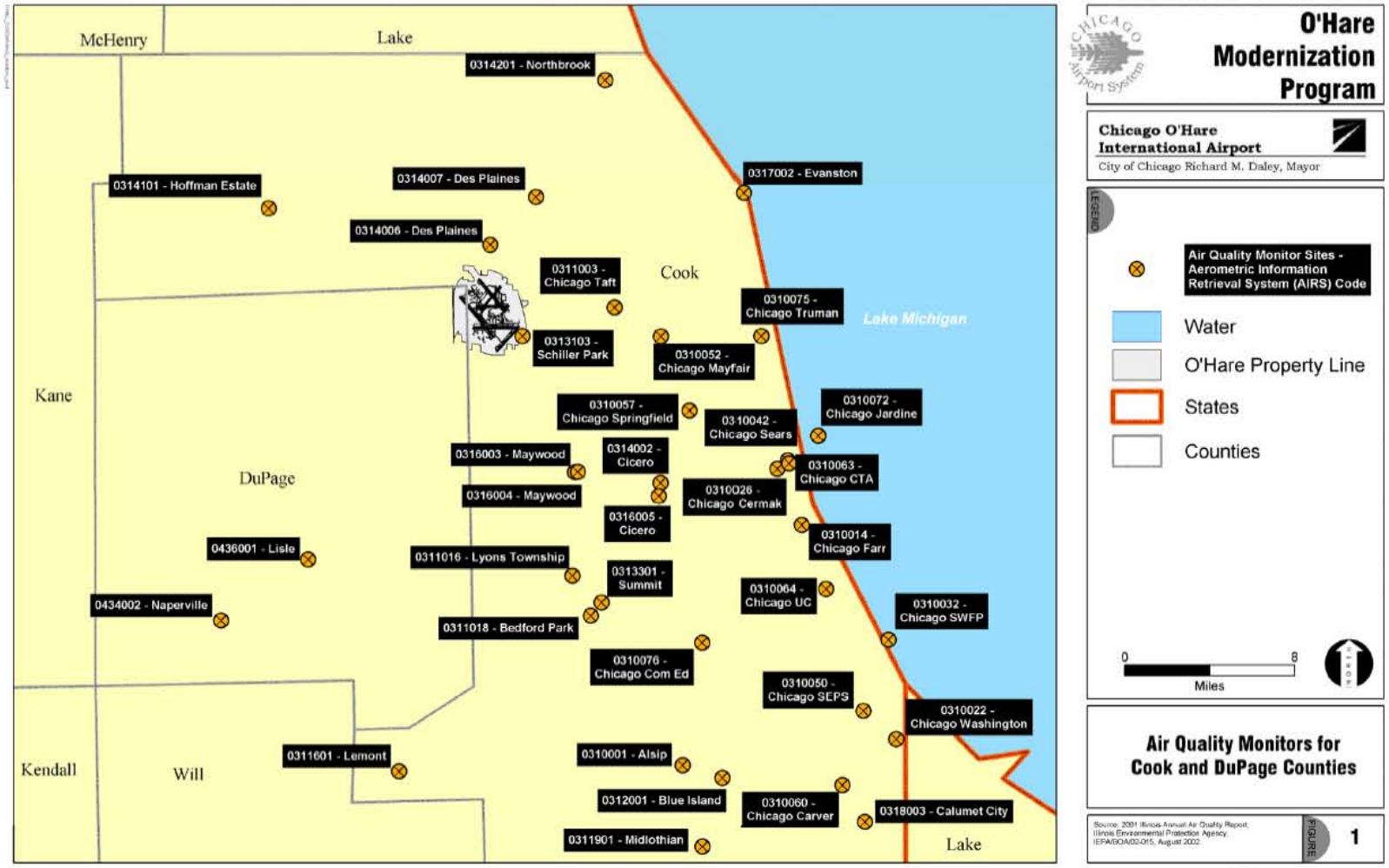

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Table 5. Air Pollutant Monitoring Stations (Cook and DuPage Counties)

Distance to ORD* (miles)	City Name	AIRS Code	Owner/Operator	WS	WD	O_3	SO_2	NO/ NO_2	CO	Pb	TSP	PM_{10}	$PM_{2.5}$	VOC	SOL	UV	MET	Rain
1.8	Schiller Park	0313103	IEPA	(d)	(d)			(a)	(a)	(a)	(d)							
3.2	Des Plaines-FES	0314006	Cook County DEC			(a)												
5.8	Chicago-Taft	0311003	Cook County DEC			(a)												
5.8	Des Plaines-ROB	0314007	IEPA										(a)					
8.1	Chicago-Mayfair	0310052	Cook County DEC							(b)	(d)		(a)					
8.5	Maywood-MCC1	0316004	Cook County DEC						(b)									
8.6	Maywood-MCCM	0316003	Cook County DEC							(b)								
10.4	Chicago-SPS	0310057	Cook County DEC										(a)					
11.3	Cicero-Liberty	0316005	Cook County DEC										(a)					
11.6	Hoffman Estates	0314101	Cook County DEC									(a)						
11.7	Cicero-51st	0314002	Cook County DEC			(a)	(b)	(b)	(a)									
12.2	Northbrook	0314201	IEPA	(c)	(c)	(c)		(c)					(a)	(c)	(c)		(c)	
12.7	Chicago-Truman	0310075	Cook County DEC			(a)		(a)										
13.0	Lyons Township	0311016	Cook County DEC									(a)	(a)					
13.1	Evanston	0317002	IEPA	(d)	(d)	(b)												
14.5	Lisle	0436001	IEPA	(d)	(d)	(a)												
14.6	Summit	0313301	Cook County DEC							(a)	(d)	(a)	(a)					
15.1	Bedford Park	0311018	Cook County DEC	(d)	(d)		(a)											
15.3	Chicago-Cermak	0310026	Cook County DEC							(a)	(d)							
15.6	Chicago-Sears	0310042	IEPA			(d)												
15.7	Chicago-CTA	0310063	IEPA				(b)	(b)	(b)									
16.4	Chicago-Jardine	0310072	IEPA	(c)	(c)	(c)		(c)						(c)	(c)	(c)	(c)	(c)
17.7	Chicago-Farr	0310014	Cook County DEC										(a)					
18.5	Chicago-ComEd	0310076	Cook County DEC	(d)	(d)								(a)					
19.3	Naperville	0434002	IEPA										(a)					
20.4	Chicago-UC	0310064	Cook County DEC			(a)									(d)			
22.1	Lemont	0311601	Cook County DEC			(a)	(a)											
23.2	Alsip	0310001	Cook County DEC	(d)	(d)	(a)				(a)	(d)	(a)						
24.2	Chicago-SWFP	0310032	Cook County DEC			(a)												

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Table 5. Air Pollutant Monitoring Stations (Cook and DuPage Counties) - Continued

Distance to ORD* (miles)	City Name	AIRS Code	Owner/Operator	WS	WD	O_3	SO_2	NO/ NO_2	CO	Pb	TSP	PM_{10}	$PM_{2.5}$	VOC	SOL	UV	MET	Rain
24.5	Blue Island	0312001	Cook County DEC				(a)					(b)	(a)					
25.7	Chicago-SEPS	0310050	Cook County DEC			(a)	(b)						(a)					
27.1	Midlothian	0311901	Cook County DEC									(a)						
27.7	Chicago-Wash.	0310022	Cook County DEC							(a)	(d)		(a)					
27.7	Chicago-Carver	0310060	Cook County DEC									(b)						
29.8	Calumet City	0318003	Cook County DEC			(a)	(a)	(a)	(a)									
TOTALS				8	8	15	7	7	5	7	6	7	13	2	3	1	2	1

(a) Pollutant monitored as part of the State/Local Air Monitoring Station (SLAMS) Network

(b) Pollutant monitored as part of the National Air Monitoring Station (NAMS) Network

(c) Pollutant monitored as part of the Photochemical Assessment Monitoring Station (PAMS) Network

(d) Pollutant monitored as part of the Special Purpose Monitoring Station (SPMS) Network

* Distance is to the Airport Reference Point (ARP), which is close to the geographic center of Chicago O'Hare International Airport.

Source: Illinois Annual Air Quality Report – 2001. Illinois Environmental Protection Agency, Bureau of Air. IEPA/BOA/02-015. August 2002.

WS = Wind Speed
WD = Wind Direction
O_3 = Ozone
SO_2 = Sulfur Dioxide
NO = Nitric Oxide
NO_2 = Nitrogen Dioxide
CO = Carbon Monoxide
Pb = Lead
TSP = Total Suspended Particulates
PM_{10} = Particulate Matter (10 micrometers or smaller)
$PM_{2.5}$ = Particulate Matter (2.5 micrometers or smaller)
VOC = Volatile Organic Compounds
SOL = Total Solar Radiation
UV = Ultra-Violet Radiation
MET = Temperature, Relative Humidity, Barometric Pressure
Rain = Rainfall

1.3.2 Revised PM Standard

In July 1997, the USEPA revised the PM_{10} National AAQS for PM up to 10 microns in diameter by creating a $PM_{2.5}$ standard for PM up to 2.5 microns in diameter as follows:

- Creating a new size-specific indicator for particulate matter, collecting particles with a nominal diameter of 2.5 microns or less
- Creating a new annual $PM_{2.5}$ standard of 15 ug/m3
- Creating a new 24-hour $PM_{2.5}$ standard of 65 ug/m3
- Retaining the current 24-hour PM_{10} standard of 150 ug/m3

This revised PM standard was challenged by several industry groups in federal court, along with the revised O3 standard (see Section 1.3.1, above), but was ultimately upheld.

In anticipation of the revised standard and pursuant to CAA Section 110(a)(2)(B), the IEPA began collecting $PM_{2.5}$ ambient data to determine $PM_{2.5}$ nonattainment boundaries. In 2000, IEPA completed it's $PM_{2.5}$ network and currently monitors this pollutant at 35 locations statewide, with twelve of the stations located in Cook County and one in DuPage County. The USEPA does not expect to designate areas to be in attainment or nonattainment with the new particulate standards until 2003 or 2004. IEPA will then submit a plan for meeting the new standards to USEPA, and will implement that plan upon its approval by USEPA.

Data (emission factors) for $PM_{2.5}$ from the sources that will be included in the OMP analysis are limited. However, where possible, the air quality analyses for the OMP will include information relevant to the new standard.

1.4 Applicable Regulations

As previously stated, the results of the air quality analysis will be evaluated to ensure the OMP complies with all applicable state and Federal laws, including the NEPA, the CAA, and FAA Orders 1050.1D and 5050.4A. The following subsections provide brief summaries of the requirements of these documents.

1.4.1 NEPA

The National Environmental Policy Act of 1969 (NEPA) establishes national environmental policies that apply to the federal government as a whole and prescribes certain procedural requirements for federal agency actions. Except as otherwise provided by Congress, the Act applies to all federal agency actions, including those that intersect with non-federal activities (e.g. through a federal permit or funding), although its requirements may vary depending on the nature of the action involved.

NEPA establishes a national environmental policy that makes it the continuing responsibility of the federal government to use all practicable means, consistent with other essential considerations of national policy, to improve and coordinate federal plans, functions, programs, and resources to the end that the nation may: (1) assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings; and (2) attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences. In addition to these general duties, NEPA requires all federal agencies to do certain specific things, such as the preparation of an EIS for any major federal action significantly affecting the quality of the human environment.

As a federal agency, FAA is required under NEPA to prepare an environmental document for major federal actions that have the potential to affect the quality (including air quality) of the human environment. An air quality assessment prepared for inclusion in a NEPA environmental document includes an analysis and conclusion regarding the proposed action's impacts on air quality.

1.4.2 CAA

The CAA (42 U.S.C. 7401 et seq) seeks to protect human health and the environment from emissions that pollute ambient, or outdoor, air. Among other things, it requires the USEPA to establish minimum national standards for air quality (the AAQS), and assigns primary responsibility to the states to assure compliance with the standards. States then do so by submitting State Implementation Plans (SIPs) for USEPA approval. Areas not meeting the standards, referred to as nonattainment areas, are required to implement specified air pollution control measures.

One of the essential components of the CAA strategies to achieve and maintain the AAQS is known as "conformity". Conformity requirements are addressed in Section 176(c)(1) of the CAA. These requirements are intended to ensure that the federal government does not take, approve, or support actions that are inconsistent with a state's plan to attain and maintain the AAQS. A demonstration of conformity is a demonstration that an action is consistent with a State Implementation Plan (SIP).

1.4.2.1 General Conformity Requirements

The USEPA established the General Conformity Rule on November 30, 1993. The General Conformity Rule implements the CAA conformity provision. The General Conformity Rule divides the conformity process into two areas: applicability analysis and conformity determination. Federal agencies must initially assess if an action is subject to the Conformity Rule (applicability analysis) and then if the action conforms to implementation plans (conformity determination). The applicability analysis requires federal agencies to identify, analyze, and quantify emission impacts of an action. It should be noted that while the conformity process is separate from the NEPA process, the conformity analysis can be completed concurrently with the NEPA analysis.

Applicability Analysis

General conformity applies to all actions in nonattainment or maintenance areas not specifically covered by transportation conformity. To determine whether general conformity requirements apply to an action, a federal agency must (1) consider the nonattainment and maintenance status of an area; (2) the exemptions from and presumptions to conformity; (3) the project's emissions and (4) the regional significance of the project's emissions.

First, for general conformity to be applicable, the action must be located in an area that is nonattainment or maintenance for any of the National AAQS found in 40 CFR 93.153(b)(1) and (2). Second, the action must not be exempt or presumed to conform, pursuant to 40 CFR 93.153(c)-(h). Third, the proposed action's net annual emissions (proposed federal action emission levels--which is the sum of the direct and indirect emissions, including construction emissions, minus the no action

emission levels) must equal or exceed the National AAQS *de minimis* levels identified in 40 CFR 93.153(b)(1) and (2).[4] Fourth, even if the action is presumed to conform or does not exceed the *de minimis* levels, the action is still subject to a general conformity determination if the action is "regionally significant" pursuant to 40 CFR 93.153(i). An action is defined as being "regionally significant" when the emissions from the action represent 10 percent or more of a nonattainment or maintenance area's total emissions of the applicable pollutant. (40 CFR 93.152)

Conformity Determination

Once the conformity regulations are deemed to be applicable to the particular federal action pursuant to 40 CFR 93.153, the next question is whether the general federal action conforms with the applicable SIP pursuant to the criteria of 40 CFR 93.158. This regulation specifies that an action within an O3 nonattainment area conforms with the applicable SIP where the action: (1) complies with 40 CFR 93.158(c)[5] and (2) meets <u>any</u> of the following requirements:

- The total of direct and indirect emissions from the action are specifically identified and accounted for in the applicable SIP's attainment or maintenance demonstration;
- The total of direct and indirect emissions from the action are fully offset within the same nonattainment or maintenance area through a revision to the applicable SIP or a similarly enforceable measure that effects emission reductions so that there is no net increase in emissions of that pollutant;
- Each portion of the action or the action as a whole meets any of the following requirements:
    - Where EPA has approved a revision to an area's attainment or maintenance demonstration after 1990 and the State makes a determination that (1) the total direct and indirect emissions from the action (or portion thereof) result in a level of emissions which, together with all other emissions in the nonattainment (or maintenance) area, would not exceed the emissions budgets specified in the applicable SIP, or (2) the total direct and indirect emissions from the action (or portion thereof) would exceed a SIP budget and the State Governor or the Governor's designee for SIP actions makes a written commitment to USEPA to revise the SIP to achieve the needed emissions reduction;
    - The action (or portion thereof), as determined by the Metropolitan Planning Organization, is specifically included in a current transportation plan and transportation improvement program which have been found to conform to the applicable SIP;
    - The action (or portion thereof) fully offsets its emissions within the same nonattainment or maintenance area through a revision to the applicable SIP or an equally enforceable measure that effects emission reductions equal to or greater than the total of direct and indirect emissions from the action so that there is no net increase in emissions of that pollutant;

[4] It should be noted that the de minimis thresholds for federal actions in severe O3 nonattainment areas are 25 tons per year (tons/year) of VOCs and 25 tons/year of NOx. In 1996, USEPA granted the States of Illinois, Indiana, Michigan, and Wisconsin and exemption from the NOx requirements for O3 nonattainment areas (the Lake Michigan Ozone Study) following section 182(f)(3) of the CAA (61 Federal Register 2,248(1996)). Therefore, the applicable de minimis threshold for the Chicagoland nonattainment area is 25 tons/year of VOC.

[5] 40 CFR 93.158(c) provides that: "Notwithstanding any other requirements of this section, an action subject to this subpart may not be determined to conform to the applicable SIP unless the total of direct and indirect emissions from the action is in compliance or consistent with all relevant requirements and milestones contained in the applicable SIP, such as elements identified as part of the reasonable further progress schedules, assumptions specified in the attainment or maintenance demonstration, prohibitions, numerical emission limits, and work practice requirements."

Notably, all of the analysis required under the General Conformity Rule must be completed, and any mitigation requirements necessary for a finding of conformity must be identified, before a determination of conformity is made.

1.4.2.2 Transportation Conformity Requirements

The Transportation Conformity Rule was established on November 24, 1993. A transportation conformity determination is required for any highway or transit project which is proposed to receive funding assistance and approval through the Federal-Aid Highway program or the Federal mass transit program, or requires Federal Highway Administration (FHWA) or Federal Transit Administration (FTA) approval for some aspect of the project. A transportation conformity determination is not required for individual projects which are not FHWA/FTA projects unless the highway or transit project is of regional significance (40 CFR 51.392). A transportation conformity determination is also required where a MPO is involved in the development, funding, or approval of a transportation plan, program, or project. Although FAA is not directly responsible for transportation conformity determinations, there are coordination requirements concerning off-site impacts of motor vehicles and conformity determinations for local and regional planning.

It is expected that the OMP roadway projects will require transportation conformity analysis, regardless of funding source, unless an individual project is already included in the regional Transportation Improvement Plan (TIP) and it has been demonstrated that the TIP conforms to the one hour O3 SIP.[6]

1.4.3 FAA Orders

FAA Order 1050.1D (Policies and Procedures for Considering Environmental Impacts) assigns responsibility for assuring agency compliance with the environmental provisions of the NEPA. Order 1050.1D provides that when a NEPA analysis is needed, the proposed action's impact on air quality is assessed by evaluating the impact of the proposed action on the AAQS. The proposed action's *build* and *nobuild* emissions are inventoried (including both direct and indirect, reasonably foreseeable emissions) for each reasonable alternative.

At this point, if the emissions do not exceed general conformity thresholds, further analysis is normally not required (further consultation with State and local air quality agencies may be required). If additional analysis is required, the emissions for the proposed build case are translated into pollutant concentrations using a dispersion model. Once this modeling is performed, pollutant concentrations are combined with background concentrations and compared to the AAQS. If concentrations do not exceed the AAQS, the analysis is complete. If concentrations do exceed the AAQS, emissions must be offset, or the action redesigned to reduce emissions.

FAA Order 5050.4A (October 8, 1985) provides guidance for the environmental review of proposed airport development proposals that require federal approval. Compliance with this order signifies compliance with FAA Order 1050.1D. As stated in Order 5050.4A, it is the FAA's objective to enhance environmental quality and avoid or minimize adverse environmental impacts that might result from a proposed federal action in a manner that is consistent with the FAA's principal mission to provide for the safety of aircraft operations. The techniques and methodologies used to perform the air quality analysis of airport actions are described in the FAA's Air Quality Handbook[7].

[6] Per 40 CFR 93.130 and 40 CFR 51.452

[7] Federal Aviation Administration, Air Quality Procedures for Civilian Airports and Air Force Bases. (April, 1997).

Chapter 2 ELEMENTS OF THE ANALYSIS

The air quality analysis will be performed using two techniques—emission inventories and dispersion analysis. This section of the Criteria Pollutant Protocol provides a general discussion of the techniques. A detailed discussion, including a discussion of the assumptions and models that will be used to conduct the OMP air quality analysis is provided in Chapters 3 and 4, respectively.

Table 6 presents a matrix summarizing the years of planned air quality analysis, the types(s) of analysis to be performed for each year, and the OMP project components to be assessed. Notably, both existing (baseline) conditions at the Airport and future conditions with and without the OMP are reflected in the matrix. A discussion of this information is provided in the following sections of this Protocol.

2.1 Emission Inventories

Estimates of emissions of air pollutants by source are known as emission inventories. Emission inventories provide an indication of the relative magnitude of future increases of pollutants (when compared to existing levels) and potential increases/decreases in air pollutants with proposed project alternatives (when compared to a no-action alternative).

To compare emissions directly attributable to the OMP to the de minimis thresholds, inventories of VOC will be prepared to represent annual emissions. The scenarios for which an emission inventory is calculated vary according to the type of analysis being performed (e.g., conformity, and comparison with the AAQS or SIP). For conformity, the "build" and "no-build" emissions are calculated for the same year and the difference in the two inventories are the emissions directly attributable to the project. These "net" emissions are compared to the de minimis threshold to determine if conformity is applicable to the federal action. If the direct and indirect emissions from the action are less than the de minimis levels and the emissions are not regionally significant, the action can be presumed to conform to a SIP, and a conformity determination is not required. If the direct and indirect emissions from the action are greater than the de minimis levels or the emissions are regionally significant, a conformity determination will be performed.

The sources for each scenario also vary depending on the type of analysis being performed. For conformity, the sources are limited to sources not subject to New Source Review (NSR) or Prevention of Significant Deterioration (PSD) permits that the federal agency proposing the action can "practicably control and maintain control over due to a continuing program responsibility". An example of a source that the FAA would be able to practicably control and maintain control over for the OMP are the motor vehicles accessing the Airport.

As shown in **Table 6**, total airport-related emission inventories will be prepared for the existing condition (2001) and for the following future conditions: 2003 through 2013 and 2018. Depending on the year, the inventories will be conducted for operational conditions (including construction emissions if applicable) or construction emissions. The annual inventories will be prepared for the pollutant and pollutant precursors of CO, VOC, NOx, sulfur oxides (SOx), and PM_{10}.

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Table 6. OMP Air Quality Elements by Calendar Year

Air Quality Element		Existing (2001)		Future																							
				2003		2004		2005		2006		2007[a]		2008		2009		2010		2011		2012		2013		2018	
		E	D	E	D	E	D	E	D	E	D	E	D	E	D	E	D	E	D	E	D	E	D	E	D	E	D
Existing Conditions and Future No-Action Alternative[b]		*	*									*	*			*	*							*	*	*	*
OMP (Action) Alternative[b]	New Rwy 9L-27R											*	*			*	*							*	*	*	*
	Rwy 18-36 Relocated															*	*							*	*	*	*
	Rwy 10L-28R Extended															*	*										
	Rwy 9R-27L Extended																							*	*	*	*
	Rwy 14L-32R Relocated																							*	*	*	*
	Rwy 14R-32L Relocated																							*	*	*	*
	Western Access																							*	*	*	*
	On-Airport public roadways																							*	*	*	*
	On-Airport service roads											*	*			*	*							*	*	*	*
	Irving Park Road relocated															*	*							*	*	*	*
Construction Emissions				*		*		*		*		*	*	*		*	*	*		*		*		*	*		
General Conformity Determination												*															
Intersection Dispersion Analyses		*										*				*								*		*	

E = emission inventory D = dispersion analysis

[a] Demonstration of conformity required for one-hour O3 SIP.

b Includes emissions from aircraft, ground service vehicles, point sources, motor vehicles (on and off airport), parking facilities, auxiliary power units, and training fires.

2.2 Dispersion Analysis

Dispersion is the process by which atmospheric pollutants disseminate due to wind and vertical stability. The results of a dispersion analysis are used to assess pollutant concentrations at or near an airport. The base data for the dispersion analysis are the emission inventories described in Section 2.1 above. The results of the analysis allow a direct comparison of predicted concentrations of pollutants to the AAQS.

Predicted concentrations resulting from the OMP sources will be added to background concentrations that represent sources in the vicinity of the Airport that will not be included in the modeling effort for the OMP project. As stated in Section 1.3.1 of this Protocol, the airport dispersion model that will be used in the OMP analysis does not have the capability of predicting concentrations of O3 for comparison with the AAQS. As such, the results of the emission inventories will be used to address conformity of the OMP to the one-hour O3 SIP.

Input to computer models for dispersion analysis requires identifying emission sources by their location and by a variance in emission rates according to the hour of the day, day of the week, and month of the year. The models disperse emissions over each period with respect to weather conditions that are also model input. For the OMP analysis, dispersion analysis will be performed to predict levels of pollutants at expected worst-case locations on- and off-Airport property and at existing receptors (sensitive sites) in the vicinity of the Airport. The analysis will be performed including all evaluated sources of air pollutant emissions, including any NSR and PSD permitted sources.

Microscale hot spot dispersion modeling will also be performed. This analysis will be performed for intersections potentially affected by the project. The results of the hot spot analysis will determine if increases in congestion, that may result from the OMP, cause emissions of CO to exceed the AAQS. The microscale analysis will be performed following USEPA's *Guideline for Modeling Carbon Monoxide From Roadway Intersections.*[8]

The airport dispersion analysis will be performed for CO, NOx, SOx, and PM-10. Estimates of nitrogen dioxide (NO2) concentrations will be derived using the NOx results and historical monitoring data in the vicinity of the Airport (see Section 4.5 for additional information regarding the conversion of NOx to NO2). Because airport-related sources are not typically a large source of SOx or SO2 emissions, SOx results will be used as a direct comparison to the SO2 AAQS.

As shown in **Table 6**, to assess the OMP, the dispersion analysis will be performed for the existing condition (2001) and for the following future conditions: 2007, 2009, 2013, and 2018. Concentrations will be predicted for CO, NO2, SO2, and PM_{10} for each of the corresponding averaging times to compare to the AAQS.

[8] Guideline for Modeling Carbon Monoxide from Roadway Intersections. EPA-4454/R-92-05, U.S. EPA OAQPS, Research Triangle Park, NC. November 1992.

Chapter 3 EMISSION INVENTORY ANALYSIS

As stated in Section 2.1, total airport-related emission inventories will be prepared for the existing condition (2001) and for the following future conditions: 2003 through 2013 and 2018. Depending on the year, the inventories will be conducted for operational conditions (including construction emissions if applicable) or construction emissions.

Annual emissions of pollutants and pollutant precursors will be estimated for sources operating at the Airport and from motor vehicles on the major roadways in the vicinity of the Airport. For the purpose of review/use by the IEPA, emissions will also be reported in tons per typical summer week day (for the O3 season—April through October). The pollutants and pollutant precursors that will be inventoried are CO, VOC, NOx, SOx, and PM_{10}. Notably, PM_{10} and $PM_{2.5}$ emission will be evaluated from airport sources, as applicable, using the most recent databases and available tools.

The sources that will be included in the emission inventories are aircraft, auxiliary power units (APUs), ground support equipment (GSE), motor vehicles on airport roadways, parking facilities, and at terminal curbsides; fuel storage and handling; on-site stationary combustion sources including the existing heating and refrigeration plant and space heating facilities, surface coating operations, maintenance activities, and training fires. Motor vehicle emissions on access and egress roads in the vicinity of the airport will also be accounted for.

The FAA's Emissions and Dispersion Modeling System (EDMS) will be used to prepare the inventories. Where necessary and appropriate, the EDMS and EDMS's databases will be supplemented with the USEPA's Guidance for Emissions Inventory Development[9], the MOBILE6.1[10] program , and EPA's AP-42[11] document.

The EDMS is a combined emissions and dispersion model. Use of the model is required by the FAA when evaluating airport-related emissions at civilian airports and military air bases.[12] The model was developed by the FAA in cooperation with the United States Air Force (USAF). EDMS generates an inventory of emissions from sources on and around an airport or air base and calculates pollutant concentrations. It is one of the few air quality assessment tools specifically engineered for the aviation community. Version 4.11 of the EDMS will be used for the evaluation of the OMP.

3.1 Aircraft

The combinations of aircraft and their engines for the various analysis years will be developed. This data will encompass all of the aircraft and engine combinations currently using O'Hare Airport, and will include other new aircraft and candidate engines forecast to be in service in the future. The fleets used

[9] *Introduction and Use of EIIP Guidance for Emissions Inventory Development*. EPA-454/R-97-004a, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. July 1997.
[10] *User's Guide to MOBILE6 (Mobile Source Emission Factor Model)*. U.S. Environmental Protection Agency, Office of Air and Radiation, Office of Mobile Sources, Emission Planning and Strategies Division. Report number EPA-AA-AQAB-94-01. Ann Arbor, MI. May 1994. Revised as MOBILE5b April 1997.
[11] *Compilation of Air Pollutant Emission Factors*. AP-42, U.S. Environmental Protection Agency, Fifth Edition (with Supplements), Office of air Quality Planning and Standards, Research Triangle Park, NC, January 1995.
[12] Federal Register, Vol. 63, No. 70/April 13, 1998.

in the analysis will be consistent with those used to assess noise impacts with the proposed airport improvements

3.1.1 Aircraft Times in Mode

Default operating times for each mode in an aircraft landing-and-takeoff (LTO) cycle are available in EDMS. These aircraft specific data will be used in the analyses, with the exception of taxi-in, taxi-out, apron idling, and queuing time at the end of the runway. O'Hare specific taxi-in, taxi-out, apron idling, and runway queue delay data will be obtained from the Chicago Department of Aviation's airport simulation modeling and planning group.

3.1.2 Aircraft Operational Levels

Peak month average week day (PMAWD) aircraft operations will be extrapolated to annual aircraft operations using aircraft temporal factors for the existing year (2001) and future years of analysis for commercial, commuter, cargo, general aviation, and military aircraft. The PMAWD is generally considered to be approximately seven percent greater than the average annual condition at O'Hare. This should result in a conservative estimate of aircraft emissions. The O'Hare-specific PMAWD operations will be obtained from the Chicago Department of Aviation's airport simulation modeling and planning group.

3.1.3 Aircraft Temporal Factors (Operational Profiles)

To simulate actual aircraft operations and aircraft queuing characteristics at the Airport throughout an entire calendar year, hour-of-day, day-of-week, and month-of-year, temporal factors will be developed that scale the peak-hour aircraft landing-takeoff cycles (LTOs) to off-peak activity periods. The O'Hare-specific aircraft operational profiles will be developed using data from the Chicago Department of Aviation's airport simulation modeling and planning group.

3.2 Ground Support Equipment (GSE)

Data on the number and type of GSE vehicles servicing the various types of commercial aircraft; the amount of time each piece of equipment spends with individual aircraft; and emission factors for each piece of equipment are available in EDMS. The default emission factors will be used in the OMP analyses. However, O'Hare-specific data for vehicle types and operating times will be used in the analyses, based on the O'Hare GSE Survey conducted for the World Gateway Program Environmental Assessment.

3.3 Motor Vehicles

3.3.1 On-Airport Traffic

Average 24-hour traffic volumes and speeds for the average weekday condition for the on-Airport roadway network will be used in the EDMS. O'Hare-specific on-Airport traffic data will be developed using data from the Chicago Department of Aviation's surface transportation modeling and planning group.

3.3.2 Curbside Traffic

Curbside volumes and vehicle dwell times will be developed for each Airport terminal based on field observations of existing conditions. Demand volumes, average curbside running times, and average travel speeds for each terminal curbside location will be developed for the average 24-hour condition in

each year of analysis. These data will be used in the analyses. O'Hare-specific curbside traffic data will be developed using data from the Chicago Department of Aviation's surface transportation modeling and planning group.

3.3.3 Parking Facilities

Average 24-hour demand volumes, speeds, and average travel distances (or engine-on time) for each major parking facility (including the taxicab and limousine holding areas) will be used. This data will be obtained from City of Chicago records that provide usage rates for current public parking facilities.

3.3.4 Regional Traffic

The emission inventories will include contributions from vehicles on major arterials in the vicinity of the Airport. Therefore, average weekday 24-hour volumes and average travel speeds will be developed for such arterials as I-190, I-90, Bessie Coleman Drive, and Mannheim Road. In addition, the issue of western airport access will introduce a series of new roadway configurations and regional arterials to be assessed in the proposed EIS. Once the plans for the western access are finalized with the FHWA, Illinois DOT, and the Chicago Area Transit System (CATS), the resulting roadway network will be assessed as part of the future build scenarios of the air quality analysis. O'Hare-specific regional traffic data will be developed using data from the Chicago Department of Aviation's surface transportation modeling and planning group.

3.3.5 MOBILE Assumptions

USEPA's MOBILE6.2 program will be used to determine VOC, NOx, and CO emission factors for free-flowing motor vehicles for this project. Idle emission factors will be calculated using USEPA's MOBILE6.2 program and recommended procedure for idle factors contained in the MOBILE5 Information Sheet #2 (dated July 30 1993).[13]

Network specific motor vehicle fleet mixes will be developed for use in MOBILE6.2. The off-Airport network will use a regional mix from IEPA or the national default mix in the MOBILE program. Any data received from CATS for use in the analysis will be coordinated with the IEPA to determine the appropriate/corresponding MOBILE fleet mix. The on-Airport network will use an O'Hare-specific mix; and the parking lots will use their own specific fleet mix that excludes heavy-duty vehicles and motorcycles.

Operating modes, including hot/cold start percentages, will use the MOBILE6.2 national defaults, except that parking lots and links exiting the lots will use a 100% cold start percentage.

The following Chicago nonattainment area-specific MOBILE6.2 files were obtained from the IEPA and will be used in the analysis or used to develop O'Hare-specific data[14]:

- FVMTCH07.def – A file containing vehicle-miles-traveled data by facility type (freeway, arterial, local roads, and ramps) for each hour of the day. Data in this file will be used to create O'Hare-specific data.

[13] *User's Guide to CAL3QHC Version 2.0: A Modeling Methodology for Predicting Pollutant Concentrations Near Roadway Intersections.* U.S. Environmental Protection Agency. Research Triangle Park, NC. Report number EPA-454/R-92-006. November 1992. Revised June 1993.
[14] Sam Long, IEPA, November 22, 2002.

- CHIRD01.d – A file containing the registration distribution of vehicles by year within the Chicago nonattainment area. Differences in this file and default MOBILE6.2 files only exist for light-duty vehicles and light-duty trucks.

- HVMTCH7.sl – A file containing vehicle-miles-traveled by hour of the day. As with the FVMTCH07.def file, the information will be used to create O'Hare-specific data.

- ILLOBDIM.d – A file containing specific data related to the Inspection and Maintenance (I&M) program in the Chicago nonattainment area. It will be assumed that 91.5 percent of the gasoline-powered on-highway traffic in the airport area is subject to the I&M program (to be consistent with IEPA's regional analysis).[15]

- SVMTCH07.def – A file containing vehicle-miles-traveled data by speed by hour of the day. Information in this file will be used to develop O'Hare-specific data.

3.3.6 PART5 Assumptions

USEPA's PART5 program, currently part of the MOBILE program, will be used to determine PM_{10} and SO_2 emission factors for free-flowing motor vehicles. The following assumptions will be used for the PART5 input:

VMT mix:	use O'Hare-specific mixes (as described above)
Mileage accrual rates:	default to PART5 database
Registration distribution:	default to PART5 database
Reformulated gasoline:	all vehicles
Speed cycle:	transient (cyclical)
Average no. of wheels by class:	default to PART5 database
Number of precipitation days:	127 days per year
Trap emission control for buses:	none
Particle size cutoff:	2.5 microns

3.4 Fuel Storage and Handling

The sources of VOC emissions for the storage and handling of fuel include breathing and working losses for storage tanks, and losses from the filling of tanker trucks. VOC emissions from fuel storage and handling will be calculated using the EPA's TANKS[16] model and methodologies.

3.5 Stationary Sources

Stationary sources located on the Airport property that will be accounted for in the air quality analysis include the existing Heating and Refrigeration Plant and boilers used for space heating. Emissions from these sources will be calculated using the FAA's EDMS model and methodologies. Annual fuel use data will be obtained from City of Chicago utility records.

3.6 Construction Activities

Pollutant emissions resulting from activities associated with the construction of the new runways, extended runways, new and extended taxiways, new terminals, Federal Inspection System (FIS) facilities, parking facilities, and roadways will be estimated. Data regarding the number of pieces and

[15] Meeting with IEPA on December 20, 2002.
[16] *User's Guide to TANKS, Storage Tank Emissions Calculation Software Version 4.0.* U.S. Environmental Protection Agency, Office of air Quality Planning and Standards, Research Triangle Park, NC, April 7, 1999.

types of construction equipment to be used on the project, the deployment schedule of equipment (monthly and annually), and the approximate daily operating time (including power level or duty cycle) will be estimated for each individual construction project based on a schedule of construction activity for the OMP. These estimates will be prepared by project phase, by subcomponent, and by month.

The emission inventories for the equipment will be calculated using emission factors obtained from the USEPA's Nonroad Engine and Vehicle Emission Study[17], the NONROAD model (Version 2.2.0)[18] databases and support information, and/or the Compilation of Air Pollutant Emission Factors (AP-42). A later version of NONROAD model will be used if the newer model is available before the analysis begins (the USEPA anticipates releasing a new nonroad engine emission model (NONROAD2000) early in 2003). Use of either model and emission rates for the equipment will be coordinated with the IEPA.

Any potential adverse and temporary air quality effects that may arise during construction, such as fugitive dust emissions and elevated CO levels, will be assessed qualitatively. The assessment will identify mitigation measures to alleviate fugitive dust emissions and potential elevated CO levels due to traffic disruption and subsequent congestion.

3.7 Other Miscellaneous Sources

Other miscellaneous sources that will be addressed in the modeling analysis will include training fires, surface coating (aircraft maintenance) activities, aircraft deicing activities, and other permitted sources. Emissions from these sources will be calculated using the FAA's EDMS model and methodologies, as well as EPA's AP-42 methods and databases.

3.8 Demolition-Related Emissions

As requested by the IEPA in their September 13, 2002 scoping comments, the potential for air pollutant emissions resulting from demolition of residences and businesses will be addressed, including the amount and type of particulate matter and the potential for asbestos emissions.

The proposed project could involve demolition of some structures. IEPA's Notification of Demolition and Renovation (Form IL 532 1296) will be completed for each structure before demolition. Emission estimates of PM_{10} due to demolition will be calculated size of each building and a factor of 0.00042 pounds per PM_{10} per cubic foot of building.[19]

Buildings constructed before 1980 often contain regulated asbestos containing materials (ACM). Following 40 CFR Parts 61 and 763, each building (including those built after 1980) will be inspected for ACM before demolition. The demolition and removal of ACM will comply with all Federal and/or local applicable regulations regarding asbestos and be performed by a licensed contractor.

[17] *Nonroad Engine and Vehicle Emission Study - Report*. U.S. Environmental Protection Agency. Office of Transportation and Air Quality. Research Triangle Park, NC. Report number EPA-460/3-91-02. November 1991.
[18] NONROAD, Version 2.2.0, June, 1998. U.S. Environmental Protection Agency.
[19] South Coast Air Quality Management District, CEQA Air Quality Handbook, May 1993. Table A9-9, Estimating PM10 Emissions from Fugitive Dust.

Chapter 4 DISPERSION ANALYSIS

As stated in Section 2.2, the dispersion analysis will be performed for the existing condition (2001) and for the following future year conditions with and without the Preferred Build Alternative: 2007, 2009, 2013, and 2018[20]. Ambient concentrations of pollutants will be predicted for CO, NO_2, SO_2, and PM_{10} for each of the corresponding averaging times. The concentrations (including appropriate background levels) will then be compared to the AAQS. To assess predicted concentrations with the OMP, the FAA's EDMS computer model will be used. To assess concentrations near intersections, EPA's CAL3QHC model will be used. Using these models, maximum concentrations will be estimated at each receptor location for the following pollutants and averaging times:

- CO: 1-hour and 8-hour,
- SO2: 3-hour, 24-hour, and annual,
- NO2: annual; and
- PM_{10}: 24-hour, and annual.

4.1 Background Concentrations

Dispersion modeling performed for the proposed OMP cannot represent all pollutant sources in proximity to the Airport that contribute to total pollutant levels. Therefore, background concentrations are developed to reflect the emissions from nearby sources. When background concentrations are added to the Airport dispersion modeling results, the results represent total pollutant concentrations at the receptor sites.

The background concentrations that will be used in the evaluation of the proposed OMP were recommended by the IEPA.[21] For averaging periods less than one year, the concentrations are the second highest measured level during a given three-year consecutive period (IEPA evaluated the years 1996 through 2001 and selected a three-year period for each pollutant within this time frame). The values will be used for both the existing condition and future conditions.

Use of these factors will result in conservatively high values for the future given the downward trend in pollutant concentrations within the area. As such, depending on the outcome of the modeling, the future background concentrations may need to be adjusted to reflect less conservative levels. Should this be the case, adjustments to the factors will be made in consultation with the IEPA. Notably, one of the monitoring stations selected by the IEPA to represent background concentrations is located in close proximity to O'Hare (Schiller Park). Use of data from this station may result in conservatively high estimates of CO and NO2.

The background concentrations are provided in **Table 7**.

[20] The dispersion analysis will be performed for NEPA purposes even if a Conformity Determination is accomplished without dispersion analysis.
[21] Email, Rob Kaleel, IEPA, January 6, 2003.

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Table 7. Background Concentrations

Pollutant	Averaging Time	Station Selected	Year	Background Concentration	Percent of Standard
CO	1-hour	Schiller Park	1999	4.5 ppm	13
	8-hour	Schiller Park	1999	2.9 ppm	32
NO_2	Annual	Schiller Park	1999	58 ug/m3	58
SO_2	3-hour	Lisle	1999	192 ug/m3	15
	24-hour	Lisle	2000	76 ug/m3	21
	Annual	Lisle	1998	8 ug/m3	10
PM_{10}	24-hour	Bensenville	1998	60 ug/m3	40
	Annual	Bensenville	1998	30 ug/m3	60

Source: IEPA

4.2 Meteorological Parameters

4.2.1. Airport Dispersion Analysis

The dispersion analysis of total airport sources will be based on actual hour-by-hour meteorological data for the Chicago O'Hare Airport as collected by the National Weather Service. Based on discussions with IEPA, year 1990 meteorological data will be used to represent worst-case conditions[22]. Should any of the predicted concentrations be close to (within 10 percent) an applicable standard, additional years of meteorological data will be simulated (after reviewing whether adjustments are appropriate to the applicable background concentration(s)).

4.2.2 Intersection Analysis

Per discussions with IEPA, worst-case meteorological factors will be used to assess concentrations of CO adjacent to intersections. These worst-case factors are:

Temperature – minimum 13 degrees, maximum 29 degrees[23]

Wind Speed – 1 meter/second

Wind Direction – 350 degrees at 10 degree increments

Stability Class – "D" (neutral/slightly stable)

4.3 Receptor Locations

Pollutant concentrations will be predicted at a sufficient number of publicly accessible locations so that the maximum potential concentration of the pollutants is evaluated. Receptors will be placed at the Airport property line at intervals of 5 degrees (approximately 72 receptors or a receptor every 1000 feet). The proposed network will also include approximately 10 discrete receptors to represent locations on Airport property, 15 discrete receptors to represent areas of maximum expected concentrations off Airport (where the public has reasonable access), and 5 discrete receptors in specific communities/locations.

[22] Teleconference with IEPA, November 22, 2002.
[23] Telephone conversation with Walt Zyzniuski, IDOT, February 14, 2003.

The placement of discrete receptors will be based on the following considerations: locations where the general public have reasonable access, the locations of dominant emission sources, distances between sources and receptors, model limitations, and professional judgment.

At each traffic intersection to be analyzed (see Section 4.4 below), receptors will be placed along both sides of each approach to the intersection, at distances of 3 meters, 25 meters, and 50 meters from the cross street in accordance with EPA guidance;[24] and, if applicable, at sensitive locations such as schools, hospitals, etc. in the vicinity of each intersection.

4.4 Traffic Intersection Selection Methodology

The traffic intersection analysis will evaluate up to 15 intersections, including existing intersections and proposed new intersections. The selection of which intersections will be analyzed will be based on the analysis methodology described in the USEPA's "Guideline for Modeling Carbon Monoxide from Roadway Intersections" and coordination with IDOT, CATS, and IEPA. This methodology focuses the evaluation on intersections with an existing or forecast level-of-service (LOS) of D or worse. The LOS D, E, and F intersections are then rank ordered within each LOS category based on total traffic volume and delay. The intersections with the worst combination of volume and LOS are selected for detailed analysis.

Impacts from the selected intersections will be assessed for the existing baseline condition as well as the future No-Build and Preferred Build conditions. Approach volumes, turning movements, and cycle times for the peak hour are being developed for the modeling analysis.

4.4.1 MOBILE6 Assumptions for the Intersection Analysis

USEPA's MOBILE6 program will be used to determine CO emission factors for free-flowing motor vehicles for this project. Idle emission factors will be calculated using USEPA's MOBILE 6.2 and the recommended procedure for idle factors contained in the MOBILE5 Information Sheet #2 (dated July, 30, 1993).

The MOBILE6 parameters will be the same as those for the VOC analysis except for the following changes:

Minimum daily temperature:	13°F
Maximum daily temperature:	29°F
Ambient temperature:	24°F

4.5 Estimating Annual NO_2 Concentrations

Through discussions with IEPA, it was determined that NO2 concentrations would be derived from modeled NOx estimates using the higher result from the following sources:

- The ratio of measured ambient NO2 to NOx concentrations at IEPA's Schiller Park Monitoring station,
- The ratio of measured ambient NO2 to NOx concentrations at IEPA's Cicero monitoring station, or

[24] *Guidelines for Modeling Carbon Monoxide from Roadway Intersections*. U.S. Environmental Protection Agency. Office of Air Quality Planning and Standards. Research Triangle Park, NC. Report number EPA-454/R-92-005. November 1992.

- The default 0.75 NO2 to NOx ratio established in USEPA's Tier 2 Ambient Ratio Method (ARM).[25]

A historical analysis of the NO2 to NOx monitored concentrations at the Schiller Park and Cicero monitoring stations from 1984 to 2001 indicates that the NO2 to NOx ratio ranged from 0.35 to 0.62. Therefore, the analysis will assume the highest of the three ratios, the USEPA default of 0.75. Notably, use of this ratio should result in conservatively high results.

[25] 40 CFR 51, Appendix W.

Chapter 5 MITIGATION

The assessment of air quality mitigation measures will depend on the outcome of the modeling analysis. If required by the NEPA analysis and/or conformity determination, candidate mitigation measures (including design measures, offsets, and emission reduction credits) will be identified and evaluated in the EIS. The effect of all viable measures will be quantitatively and/or qualitatively assessed as appropriate.

DRAFT – DO NOT CITE OR QUOTE

Chapter 6 REFERENCES

A number of references will be used to develop the emission estimates and perform the OMP assessment. The references will include, but not be limited to:

- *Air Quality Procedures for Civilian Airports and Air Force Bases*, Federal Aviation Administration, Office of Environment and Energy, April 1997.
- *Determining Conformity of General Federal Actions to State or Federal Implementation Plans, Final Rule*, US Environmental Protection Agency, 40 CFR Part 51, November 30, 1993.
- *Air Pollution Mitigation Measures for Airports and Associated Activity*, California Air Resources Board, May 1994.
- *Technical Data to Support FAA's Advisory Circular on Reducing Emissions From Commercial Aviation*, US Environmental Protection Agency/Federal Aviation Administration, September 29, 1995.
- *General Conformity Guidance for Airports Questions and Answers*, Federal Aviation Administration, Community and Environmental Needs Division and US Environmental Protection Agency, September 25, 2002.
- *Guide for Assessing and Mitigating Air Quality Impacts*, San Joaquin Valley Unified Air Pollution Control District, January 10, 2002.
- *Nonroad Engine and Vehicle Emission Study – Report*, US Environmental Protection Agency, Office of Air and Radiation, November 1991.
- *User's Guide to CAL3QHC Version 2.0: A Modeling Methodology for Predicting Pollutant Concentrations Near Roadway Intersections*, US Environmental Protection Agency, September 1995.
- *User's Guide to MOBILE6.1 and MOBILE6.2: Mobile Source Emission Factor Model*, US Environmental Protection Agency, October 2002.
- *User's Guide to TANKS*, US Environmental Protection Agency, February 20, 1996.
- *Emissions and Dispersion Modeling System (EDMS) Reference Manual*, US Department of Transportation/Federal Aviation Administration, May 2001.
- Aircraft Engine Exhaust Emissions Databank, International Civil Aviation Organization, http://www.qinetiq.com/aircraft.html
- *Nonroad Diesel Emission Standards*, US Environmental Protection Agency, October 2001.
- *Guideline on Air Quality Models*, US Environmental Protection Agency, 40 CFR Part 51, Appendix W. July 7, 2002.

- *Impact of Aircraft Emissions on Air Quality in the Vicinity of Airports*, Federal Aviation Administration, Office of Environment and Energy, July 1980.
- *Airport Environmental Handbook, Order 5050.4A*, Federal Aviation Administration, October 1985.
- *Policies and Procedures for Considering Environmental Impacts, Order 1050.1*, Federal Aviation Administration, December 1986.
- *Aviation and the Environment, Results from a Survey of the Nation's 50 Busiest Commercial Service Airports*, Government Accounting Office, August 2000.
- *Validation of the Federal Aviation Administration's Emission and Dispersion Modeling System: Measurement and Comparison of Local Concentrations*, Federal Aviation Administration/Volpe National Transportation Systems Center, June 2001.
- *1990 Ozone Precursors Emissions Inventory for the Chicago Area*, Illinois State Implementation Plan. Illinois Environmental Protection Agency, November 1993
- *Illinois 1996 Periodic Inventory and Milestone Demonstration*, Illinois Environmental Protection Agency, September 1999,
- *1999 Illinois Periodic Emissions Inventory*, Illinois Environmental Protection Agency, December 2001.
- *Guideline for Modeling Carbon Monoxide from Roadway Intersections,* US Environmental Protection Agency, November 1992.
- *Illinois COSIM-Carbon Monoxide Screen for Intersection Modeling*, Illinois Department of Transportation, August 1999.
- *Draft User's Guide to PART5: A Program for Calculating Particle Emissions from Motor Vehicles*. US Environmental Protection Agency, February 1995.
- *Compilation of Air Pollutant Emission Factors*. AP-42, US Environmental Protection Agency, Fifth Edition (with Supplements), Office of air Quality Planning and Standards, January 1995.

ATTACHMENT J-2

FINAL GENERAL CONFORMITY DETERMINATION

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FINAL

GENERAL CONFORMITY DETERMINATION

O'Hare Modernization

O'HARE INTERNATIONAL AIRPORT

Department of Transportation

Federal Aviation Administration

July 2005

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EXECUTIVE SUMMARY

The Federal Aviation Administration (FAA) has assessed the City of Chicago's (the Sponsor's) proposed improvements to O'Hare International Airport. Because O'Hare is located within an area currently designated by the US Environmental Protection Agency (USEPA) to be non-attainment for the 8-hour ozone National Ambient Air Quality Standards (NAAQSs), and for the annual NAAQS for particulate matter 2.5 microns or less in size, under Section 176(c) of the Clean Air Act, the FAA must determine that their actions with respect to the proposed improvements at O'Hare conform to the State of Illinois plans to attain these NAAQS.

Because the NAAQS for particulate matter 2.5 microns or less in size are recent, the General Conformity Rules are not yet applicable to this pollutant. Further, the Illinois Environmental Protection Agency (IEPA) has not yet prepared, nor has the USEPA approved, State Implementation Plans (SIPs) that address either 8-hour ozone or particulate matter 2.5 microns or less in size. As such, the USEPA requested that the 1-hour ozone attainment demonstration SIP for the Chicago area be considered the "applicable" SIP for the purpose of determining the conformance of the proposed improvements. The Chicago area 1-hour attainment demonstration ozone SIP was developed and submitted by the IEPA and approved by the USEPA on November 13, 2001.

The USEPA promulgated two sets of conformity rules to implement Section 176(c) of the Clean Air Act. The first set is known as the Transportation Conformity Rules.[1] These rules are applicable to highways and mass transit projects within non-attainment areas. The Transportation Conformity Rules establish the criteria and procedures for determining that transportation plans, programs, and projects funded under Title 23 of the United States Code (USC) or the Federal Transit Act conform to State Implementation Plans (SIPs). Notably, the FAA is not required to demonstrate that projects associated with proposed roadway improvements conform to the SIP. As such, only evidential records demonstrating that the project-related roadway improvements conform to a SIP are provided (Section 4: Transportation Conformity - Evidential Records).

The second set of rules is known as the General Conformity Rules.[2] These rules are applicable to all Federal actions within non-attainment areas not encompassed by the Transportation Conformity Rule. The General Conformity Rules are not applicable to certain Federal actions, such as those which would result in no emissions increase or an increase that is either de minimis or clearly de minimis, actions where the emissions are not reasonably foreseeable, and actions that implement a decision to conduct or carry out a conforming program. Also, general conformity determinations are not required for portions of actions that include major new or modified stationary sources that require a permit under the new source review (NSR) program.

[1] 58 FR 62188 (November 24, 1993).
[2] 58 FR 63214 (November 30, 1993).

The following lists the Federal actions that relate to the proposed improvements at O'Hare:

- Approval of an Airport Layout Plan (ALP) depicting the proposed project,
- Approval of Federal funding under the Airport Improvement Program (AIP) and approval to impose and expend passenger facility charges (PFCs),
- Establishment of air traffic control and airspace management procedures designed to affect the safe and efficient movement of air traffic to and from the proposed runways, as well as in the airspace surrounding the airport,
- Establishment of flight procedure modifications,
- Certifications as to the safety of instrumentation, procedures, and airfield operations, and,
- Installation and/or relocation of navigational aids associated with the proposed new and relocated runways.

The purpose of this Final General Conformity Determination (FGCD) is to demonstrate that the emissions associated with the proposed FAA actions conform to the purpose of the IEPA's SIP for 1-hour ozone.

The following summarizes the methodologies used to evaluate the applicability of the General Conformity Rules to FAA's proposed actions, to evaluate total direct and indirect project-related emissions of volatile organic compounds and nitrogen oxides from the sources subject to the General Conformity Rules, and the results of the FAA's conformity evaluation.

- **Applicability** – To determine if the General Conformity Rules were applicable, net (project-related) emission levels of volatile organic compounds and nitrogen oxides were compared to de minimis levels published in the General Conformity Rules. At the request of the USEPA, the de minimis level for the 8-hour ozone NAAQS was used (100 tons of either volatile organic compounds or nitrogen oxides). Notably, the de minimis level for the 1-hour ozone NAAQS was also considered (25 tons of either volatile organic compounds or nitrogen oxides). Based on the results of the comparison, it was determined that the General Conformity Rules are applicable to emissions from the proposed improvements.
- **Aircraft, Ground Support Equipment/Auxiliary Power Units** - The IEPA provided 1-hour SIP-based emission projections for the aircraft, ground support equipment and auxiliary power units that would be operating at O'Hare. To evaluate if project-related emissions could be reasonably accounted for in the IEPA's SIP-based projections, emission levels with the proposed improvements at O'Hare were compared to the IEPA projected levels for the attainment year (2007). Because the project-related emission estimates when added to the emissions estimates that would occur without the project were lower than the SIP-based projections, the FAA, in consultation with the IEPA,

determined that project-related emissions can reasonably be accounted for in the 1-hour ozone attainment demonstration SIP.[3]

- **Construction Activity** – The 1-hour SIP does not identify specific or individual projects with respect to emissions resulting from any regional construction activity. As such, the O'Hare-related emission estimates were compared to SIP-based projected emissions for the region for this type of activity to determine if it could be said that the emissions could reasonably be accounted for in the regional totals. Based on the results of the comparison, the greatest level of construction-related volatile organic compound and nitrogen oxide emissions would represent approximately 2 and 5 percent of the IEPA's regional emissions, respectively. Because the O'Hare-related construction emissions would represent a relatively small percentage of the IEPA's regional projections, the FAA, in consultation with the IEPA, determined that it is reasonable to assume that the O'Hare-related construction emissions can be accounted for in the inventories for the 1-hour ozone attainment demonstration SIP regardless of year, construction schedule, construction scenario, or alternative.[4]
- **Motor Vehicles** – The improvements to O'Hare would increase motor vehicle activity as a result of the forecast increase in aircraft operations with the improvements. In turn, motor vehicle emissions would increase. These O'Hare-related emissions were compared to the SIP-based regional totals for motor vehicles to determine if it could be said that the emissions could reasonably be accounted for in the regional totals. When the greatest project-related motor vehicle emissions of volatile organic compounds and nitrogen oxides were compared to Chicago Area Transportation Study (CATS) projected emissions, project-related emissions would account for approximately 0.06 percent of the volatile organic compound or nitrogen oxide emissions. Because the emissions represent such a small portion of the regional emissions, the FAA, in consultation with the IEPA, determined that the motor vehicle emissions can reasonably be accounted for in established emission totals.[5]

The following table provides the greatest level of individual O'Hare-related source emissions regardless of year, construction schedule, construction scenario, or alternative. The results of a comparison to the IEPA's 1-hour ozone attainment demonstration SIP emission inventories are also provided.

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[3] 40 CFR 93.158(a)(1).

[4] 40 CFR 93.158(a)(5) and Questions 17, 21, and 22 of the General Conformity Guidance for Airports – Questions and Answers, September 25, 2002; Federal Aviation Administration and United States Environmental Protection Agency.

[5] 40 CFR 93.158(a)(5) and Questions 17, 21, and 22 of the General Conformity Guidance for Airports – Questions and Answers, September 25, 2002; Federal Aviation Administration and United States Environmental Protection Agency.

TABLE ES-1
COMPARISON OF GREATEST O'HARE-RELATED EMISSIONS TO SIP-BASED INVENTORIES

		Tons/Summer Weekday				
		IEPA SIP-Based Inventory		O'Hare-Related Emissions		
Ozone Precursor	**Source**	**Year 2007**	**Representative of**	**Level**	**Year(s)**	**Percentage of IEPA-SIP Based Inventory**
Volatile Organic Compounds	Aircraft, Ground Support Equipment, Auxiliary Power Units (a)	9.16	O'Hare	2.82	2019	31%
	Construction	15.75	Non-Attainment Area	0.32	2006	2%
	Motor Vehicles	127.42	Non-Attainment Area	0.08	2019	0.06%
Nitrogen Oxides	Aircraft, Ground Support Equipment, Auxiliary Power Units	24.10	O'Hare	21.14	2019/ 2005	88%
	Construction	86.05	Non-Attainment Area	4.09	2006	5%
	Motor Vehicles	280.40	Non-Attainment Area	0.17	2010	0.06%

Notes: (a) Includes aircraft refueling emissions.

Sources: SIP emission levels: Illinois Environmental Protection Agency;
O'Hare-Related Emissions: Environmental Science Associates, 2005.

1 INTRODUCTION

Within areas designated non-attainment or maintenance for any of the National Ambient Air Quality Standards (NAAQS), the Clean Air Act requires that federal agencies ensure that their actions conform to State Implementation Plans (SIPs). The requirements for determining conformity to SIPs are detailed in Title 40, Chapter I, Subchapter C, Part 51 of the Code of Federal Regulations (40 CFR 51). For airport improvement projects, the Federal action can be the Federal Aviation Administration's (FAA's) approval of an Airport Layout Plan (ALP), approval of funding, and/or approval of flight procedures or modifications to flight procedures.

The following lists the Federal actions that relate to the proposed improvements at O'Hare:

- Approval of an ALP depicting the proposed project,
- Approval of Federal funding under the Airport Improvement Program (AIP) and approval to impose and expend passenger facility charges (PFCs),
- Establishment of air traffic control and airspace management procedures designed to affect the safe and efficient movement of air traffic to and from the proposed runways, as well as in the airspace surrounding the airport,
- Establishment of flight procedure modifications,
- Certifications as to the safety of instrumentation, procedures, and airfield operations, and,
- Installation and/or relocation of navigational aids associated with the proposed new and relocated runways.

In accordance with Section 176 of the Clean Air Act, the FAA has assessed whether pollutant and pollutant precursor emissions that would result from the above actions are in conformance with the Illinois SIP.

This document provides the supporting material, analytical methods, and conclusions relied upon by the FAA in performing the applicability analysis described in 40 CFR 51 and making a Final General Conformity Determination. This document also provides evidential records that demonstrate that the O'Hare Modernization-related roadway improvements are consistent with the requirements for transportation (motor vehicle) -related criteria air pollutants.

1.1 Air Quality Status

O'Hare is located within Cook and DuPage counties. The counties are included in an area that is currently designated as:

- Moderate non-attainment for the 8-hour ozone NAAQS, and
- Non-attainment for the annual NAAQS for particulate matter 2.5 microns or less in size (fine particulate matter).

Cook and DuPage counties were designated to be within a severe non-attainment area for the 1-hour ozone NAAQS on November 6, 1991.[6] In April of 2004, the United States Environmental Protection Agency (USEPA) published the final rules that are guiding the implementation of a new 8-hour ozone NAAQS.[7] These rules specify that the 1-hour standard was to be revoked on June 15, 2005.[8] The mandated date by which the area was to attain the 1-hour standard was November 15, 2007. The mandated date by which the area is to attain the 8-hour standard is June 15, 2010. Areas will not be obligated to continue to demonstrate conformity for the 1-hour ozone NAAQS as of the effective date of the revocation of the 1-hour NAAQS (June 15, 2005). At that time, conformity to the 8-hour ozone NAAQS will be required. Until such time that States are required to submit SIPs that will address the 8-hour ozone NAAQS (2007), the SIP that addresses the 1-hour ozone NAAQS is considered the "applicable" SIP.

On December 17, 2004, the USEPA designated areas of the United States with respect to the NAAQS for particulate matter 2.5 microns or less in size.[9] Areas designated non-attainment this pollutant are mandated to attain the NAAQS no later than the year 2010.

Finally, there are two small areas within Cook County that are designated as moderate non-attainment for particulate matter 10 microns or less in size (coarse particulate matter). One area is located in Lyons Township and the other area is in southeast Chicago.[10] Notably, neither area encompasses (partially or wholly) the O'Hare International Airport.

Cook and DuPage counties are designated attainment for all other criteria air pollutants (carbon monoxide, nitrogen dioxide, sulfur dioxide, and lead). **Table 1-1** summarizes the air quality status of Cook and DuPage counties with respect to the criteria air pollutants.

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[6] 56 FR 56694 (November 6, 1991).
[7] 69 FR 23951 (April 30, 2004) (8-hour implementation rule).
[8] 69 FR 23954 (April 30, 2004) and 69 FR 23858 (April 30, 2004) (designation and classification rule).8-hour
[9] 70 FR 944 (January 5, 2005).
[10] The area bounded on the north by 79th Street, on the west by Interstate 57 between Sibley Boulevard and Interstate 94 and by Interstate 94 between Interstate 57 and 79th Street, on the south by Sibley Boulevard, and on the east by the Illinois/Indiana State line.

TABLE 1-1
CHICAGO AREA AIR QUALITY STATUS

Pollutant	National Ambient Air Quality Standard Averaging Time	Designation	Mandated Attainment Date
Ozone	1-hour	Non-attainment (severe)	November 15, 2007 (was revoked on June 15, 2005)
	8-hour	Non-attainment (moderate)	June 15, 2010
Nitrogen dioxide	Annual	Attainment	NA
Carbon monoxide	1-hour	Attainment	NA
	8-hour	Attainment	NA
PM_{10} (b,d)	24-hour	Non-attainment (moderate)	NA
	Annual	Attainment	NA
$PM_{2.5}$ (c)	24-hour	Attainment	NA
	Annual	Non-attainment	No later than 2010
Sulfur dioxide (a)	3-hour	Attainment	NA
	24-hour	Attainment	NA
	Annual	Attainment	NA
Lead	Quarterly Mean	Attainment	NA

Notes: NA = not applicable
PM_{10} = Particulate matter 10 microns or less in size
$PM_{2.5}$ = Particulate matter 2.5 microns or less in size
(a) The NAAQS for sulfur oxides is measured in the ambient air as sulfur dioxide.
(b) Also referred to as coarse particulate matter.
(c) Also referred to as fine particulate matter.
(d) There are two areas within Cook County that are designated non-attainment for PM10. The O'Hare International Airport is not encompassed (wholly or partially) within either area.

Sources: 40 CFR Part 81, Air Quality Designations and Classifications for the 8-hour ozone NAAQS.
USEPA, Areas Designated Non-attainment for the Fine Particle National Air Quality Standard, Fact Sheet: http://www.epa.gov/pmdesignations/documents/final/factsheet.htm

1.2 Illinois State Implementation Plans (SIPs)

Because measured levels of ambient air in the Greater Chicago Metropolitan Area have exceeded the 1-hour and 8-hour NAAQS for ozone, and the annual NAAQS for particulate matter 10 microns and 2.5 microns or less in size, the State of Illinois is required to develop SIPs that outline the actions that will be taken to achieve the respective pollutant standards. The area is designated as attainment for all other pollutants.

The mandated attainment date for the 1-hour ozone NAAQS was November 15, 2007. In compliance with the mandates of the Clean Air Act, the Illinois Environmental Protection Agency (IEPA) developed a SIP that defines the process by which the 1-hour ozone NAAQS would be attained. On November 13, 2001 the USEPA approved the SIP, which included a

demonstration of attainment by the end of 2007.[11] The SIP also contained a post-1999 ozone Rate-of-Progress (ROP) plan with associated ROP motor vehicle emission budgets for use in conducting transportation conformity; a contingency measure plan for both the 1-hour ozone attainment demonstration and the post-1999 ROP plan; a commitment by the State of Illinois to conduct a Mid-Course Review of the ozone non-attainment demonstration; motor vehicle emission inventories and budgets for volatile organic compounds and oxides of nitrogen for the years 2002, 2005 and 2007 (the inventories and budgets were updated in September of 2003);[12] and, a demonstration that the State of Illinois had fully implemented Reasonably Available Control Measures.

ROP plans are a requirement of the Clean Air Act. The ROP plans contain strategies to achieve periodic reductions in pollutant emissions and/or pollutant precursors in areas not attaining the NAAQS. The 1-hour ozone SIP for the Illinois portion of the non-attainment area (referred to in this document as the Chicago non-attainment area) contains control strategies that the State is relying on to reduce emissions to reach attainment of the 1-hour ozone standard. The emission control strategies within the 1-hour ozone SIP include, but are not limited to, operation of an enhanced motor vehicle inspection/maintenance program, new source review (NSR) requirements, the use of reformulated gasoline and measures to recover gasoline vapors at retail service stations.

The IEPA is preparing a SIP defining the process by which the 8-hour ozone NAAQS will be attained. At the time the Draft Environmental Impact Statement (DEIS) was prepared, the USEPA had not yet designated this or any other area with respect to the status of attainment for the NAAQS for particulate matter 2.5 microns or less in size. Subsequent to the air quality analysis for the DEIS, the USEPA designated Cook and DuPage counties, along with four surrounding counties and three townships within two additional counties, as non-attainment for the annual NAAQS for this pollutant. Based on the USEPA's scheduled timeline to have all areas of the US attain the standards for particulate matter 2.5 microns or less in size, states will submit their plans to attain this standard on or before April of 2008.

1.2.1 SIP-Based Emission Inventories

As required by the USEPA, the IEPA generates ROP milestone emission inventories every three years. Within these inventories, four general types of emission sources are identified: mobile (on-road and off-road); point (facilities holding operating permits); area (small stationary and other sources); and biogenic (or natural) sources. Aircraft and ground support equipment (GSE) are mobile off-road sources. Construction activities are also included in the mobile off-road category. Year 1990 emission totals are used as a base by which emission control measures are evaluated for attainment of the 1-hour ozone NAAQS and meeting ROP requirements.

As shown in **Table 1-2**, the IEPA estimates of volatile organic compounds for the year 1999 indicate that regional emission levels decreased approximately 592 tons/day, a 47 percent reduction when compared to 1990 levels. The majority of this reduction was due to compliance

[11] Federal Register, Vol 66, No. 219, November 13, 2001.
[12] Federal Register, Vol 68, No. 178, September 13, 2003.

with emission controls established by the State and USEPA. While by the year 1999, total volatile organic compound emissions were less (661 tons/day), the percentage portion from area sources increased to represent approximately 26 percent (174 tons/day) of the total, the on-road mobile source emissions portion decreased to represent approximately 37 percent (242 tons/day) of the total emissions, the off-road mobile source portion increased to represent approximately 20 percent (133 tons/day), and the point source portion decreased to represent approximately 17 percent (112 tons/day). Notably, in 1999, the aircraft and ground support equipment operating within the Chicago non-attainment area contributed less than two percent (approximately nine tons/day) to the regional total of volatile organic compound emissions.[13]

TABLE 1-2
1990/1999 SUMMER WEEKDAY EMISSION INVENTORY WITHIN THE CHICAGO OZONE NON-ATTAINMENT AREA – VOLATILE ORGANIC COMPOUNDS

	1990 (Tons/Day)					1999 (Tons/Day)				
Source	**Point**	**Area**	**On Road**	**Off Road**	**Total**	**Point**	**Area**	**On Road**	**Off Road**	**Total**
Storage, Transportation and Marketing(a)	21.46	56.10	-	-	77.56	10.58	14.96	-	-	25.54
Industrial Process	143.31	-	-	-	143.31	37.08	-	-	-	37.08
Industrial Surface Coating	104.33	-	-	-	104.33	27.87	-	-	-	27.87
Non-Industrial Surface Coating	-	79.37	-	-	79.37	-	53.26	-	-	53.26
Other Solvent Use	46.28	116.22	-	-	162.50	15.35	88.32	-	-	103.67
Waste Disposal	23.33	3.39	-	-	26.72	11.95	3.75	-	-	15.70
Miscellaneous Sources	11.37	12.93	-	-	24.30	9.26	13.59	-	-	22.85
Mobile - On Road	-	-	491.22	-	491.22	-	-	241.77	-	241.77
Mobile - Off Road	-	-		133.26	133.26	-	-		124.04	124.04
Mobile - Off Road – Aircraft and Ground Support Equipment	-	-	-	11.02	11.02	-	-	-	9.40	9.40
Total (b)	**350.08**	**268.01**	**491.22**	**144.28**	**1253.59**	**112.09**	**173.88**	**241.77**	**133.44**	**661.18**
Percent of Regional Total	**28**	**21**	**39**	**12**	**100**	**17**	**26**	**37**	**20**	**100**

Notes: "-" = Not Applicable
(a) Includes aircraft refueling
(b) Excludes biogenic sources
Source: Environmental Science Associates, Inc. [TPC] analysis of information provided by the Illinois Environmental Protection Agency.

As shown in **Table 1-3**, regional emission levels of nitrogen oxides decreased approximately 50 tons/day by 1999 – a 5 percent reduction when compared to 1990 levels. Of the total nitrogen oxide emissions occurring in 1999 (992 tons/day), on-road mobile sources contributed approximately 50 percent (496 tons/day); point sources contributed approximately 28 percent (276 tons/day); off-road mobile sources contributed approximately 19 percent (187 tons/day); and area sources contributed approximately three percent (33 tons/day). As also shown, the

[13] Aircraft and ground support equipment emissions from O'Hare International Airport and other airports within the non-attainment area including the Chicago Midway, Lansing Municipal, and Palwaukee Municipal airports in Cook County, the Schaumburg Regional and DuPage airports in DuPage County, and the Clow International, Joliet Regional, and Sanger airports in Will County.

aircraft and ground support equipment operating within the Chicago non-attainment area contributed approximately 33 tons to the regional total emissions (three percent).

TABLE 1-3
1990/1999 SUMMER WEEKDAY EMISSION INVENTORY WITHIN THE CHICAGO OZONE NON-ATTAINMENT AREA – NITROGEN OXIDES

	1990 (Tons/Day)					1999 (Tons/Day)				
Source	**Point**	**Area**	**On Road**	**Off Road**	**Total**	**Point**	**Area**	**On Road**	**Off Road**	**Total**
External Fuel Combustion	202.78	21.64	-	-	224.42	214.29	28.88	-	-	243.17
Stationary Internal Combustion	48.46		-	-	48.46	31.80	-	-	-	31.80
Other Combustion	3.56	2.19	-	-	5.75	2.77	3.95	-	-	6.72
Industrial Processes	55.90	-	-	-	55.90	27.20	-	-	-	27.20
Mobile - On Road	-	-	540.26	-	540.26	-	-	495.94	-	495.94
Mobile - Off Road	-	-	-	139.26	139.26	-	-	-	153.51	153.51
Mobile - Off Road - Aircraft and Ground Support Equipment	-	-	-	28.25	28.25	-	-	-	33.38	33.38
Total (a)	**310.70**	**23.83**	**540.26**	**167.51**	**1042.30**	**276.06**	**32.83**	**495.94**	**186.89**	**991.72**
Percent of Regional Total	**30**	**2**	**52**	**16**	**100**	**28**	**3**	**50**	**19**	**100**

Notes: "-" = Not Applicable
(a) Excludes biogenic sources.
Source: Environmental Science Associates, Inc. [TPC] analysis of information provided by the Illinois Environmental Protection Agency.

In compliance with Clean Air Act requirements, the IEPA has prepared projected emission inventories for the Chicago non-attainment area for the years 2005 and 2007. The following describes the methodologies used by the IEPA to prepare the 2007 inventory and presents the IEPA's year 2007 data for O'Hare-related emissions. Although regional estimates of emissions are also available for the year 2005, the inventories are not discussed in detail because the only project-related emissions that would occur in the year 2005 would result from construction activities (project-related operational emissions are not anticipated until the end of Construction Phase I. The end of Construction Phase I would occur in the year 2007 or 2008 depending on construction schedule. The potential construction schedules are described in **Section 2.4, Construction Schedules/Scenarios,** of this Final General Conformity Determination.

1.2.2 Year 2005 and 2007 Inventories

Following requirements of the Clean Air Act, the IEPA prepared a 1990 base year emissions inventory for the Chicago non-attainment area. This inventory serves as the base year by which attainment plans were prepared for the 1-hour ozone NAAQS. The base year 1990 emissions inventory was also used by the IEPA, along with growth and control factors, to project year 2005 and 2007 emission estimates. The year 2007 is the Clean Air Act mandated attainment year for the 1-hour ozone NAAQS. The year 2005 is a required ROP year.

The IEPA's 1990 emission inventories were prepared for carbon monoxide, volatile organic compounds and nitrogen oxides. The general categories of sources included in the IEPA's

inventory were point, area, biogenic, and mobile. The O'Hare-related emissions subject to the General Conformity Rules are included in the following mobile source subcategories:

- Mobile – On Road: Regionally, this category includes emissions from all on-road (highway) vehicles within the non-attainment area. This category also includes the emissions from passenger, Airport employee-related, and construction employee-related motor vehicle trips to and from O'Hare.
- Mobile – Off Road: Regionally, this category includes emissions from aircraft, railway vehicles, commercial vessels, and recreational, agricultural, ground support, lawn/garden, industrial, light commercial, and construction equipment. The off-road mobile category also includes the emissions from the aircraft, ground support equipment, auxiliary power units, and construction equipment associated with O'Hare.

On Road Mobile Sources

The IEPA projected their on road mobile source emissions using USEPA emission factors from the MOBILE5b computer model and estimates of daily vehicle miles traveled (VMT) for the non-attainment area. The IEPA obtained the 1990 VMT estimates from the Chicago Area Transportation Study (CATS) for those roadways included in the CATS network and from Illinois Department of Transportation (IDOT) for roadways not included in the CATS network.

Aircraft

The IEPA used a detailed method of estimating emissions attributable to aircraft operating at O'Hare (and at other airports within the non-attainment area) during the year 1990. Year 1990 aircraft operational levels were reported to be obtained from the FAA's publication "*Aircraft Departures Scheduled and Aircraft Departures Performed by Community, by Air Carrier, and by Aircraft Type: 12 Months Ended December 31, 1990*". The IEPA obtained aircraft engine emission rates from the FAA's Aircraft Engine Emissions Database (FAEED, November 1991) and assumed an atmospheric mixing height of 3,000 feet. Times in aircraft operational modes are reported to be "default" values. These times include a default total taxi/idle time for jet commercial carriers (air carriers) and turboprop aircraft of 26 minutes.

The IEPA projected year 2007 aircraft-related emission estimates for O'Hare using the 1990 base year estimate and category specific activity factors from the USEPA's Economic Growth Analysis System (EGAS). The EGAS was developed by the USEPA for the purpose of projecting the growth in future year emissions using category-specific economic activity projections. Using EGAS, the IEPA assumed that emissions from aircraft would increase 9.67 percent from 1990 to 2007.

Ground Support Equipment/Auxiliary Power Units

The IEPA obtained their 1990 estimates of emissions from the use of ground support equipment from estimates prepared by the USEPA.[14] The USEPA prepared the estimates for the purpose of

[14] Nonroad Engine and Vehicle Emission Study – Report, USEPA, November 1991

quantifying the contribution of nonroad sources to ozone and carbon monoxide air pollution. The USEPA's study of nonroad engine/vehicle emissions was a result of a Clean Air Act mandate that required USEPA to further regulate emissions from nonroad engines and vehicles if the USEPA determined that nonroad emission sources were significant contributors to ozone or carbon monoxide concentrations in areas that had failed to attain the NAAQS. The Chicago non-attainment area was one of 24 non-attainment areas for which the USEPA prepared such emission estimates.

Several factors were considered in the USEPA inventories including estimates of equipment populations within each non-attainment area, the annual hours of use of each type of equipment (adjusted for geographic region and for the season of interest for each pollutant study), the average rated horsepower of the different types of equipment, typical engine load factors, and emission factors for each of the equipment categories. Because the USEPA did not have emission factors that were specific to ground support equipment itself, the USEPA assumed the same emission factors that they developed for the purpose of evaluating industrial equipment.

The IEPA projected year 2007 ground support equipment emissions for O'Hare using the USEPA's 1990 base year estimate and growth factors obtained from EGAS. Control factors were also applied if the implementation of any related emissions control regulation would reduce future emissions. Combining these factors, the IEPA projected that emissions from ground support equipment/auxiliary power units would, like aircraft emissions, increase 9.67 percent.

Construction Equipment

The IEPA obtained their 1990 emission estimates for construction-related activities from the estimates prepared by the USEPA. The USEPA's documentation[15] indicates that because limited amount of data was available to characterize emissions from construction-related activities at the time, two sets of estimates were prepared. The equipment populations for these two data sets are described by USEPA as follows:

- Inventory A –Relied heavily on a commercially available marketing research database and publicly available indices of commercial activity to estimate equipment populations.
- Inventory B - Incorporated manufacturer-provided data in almost all high usage categories.

The USEPA apportioned the construction-related emission estimates based on information provided by the Engine Manufacturers Institute on the national equipment fleet mix and on fleet mixes that were specific to the Consolidated Metropolitan Statistical Areas (CMSA). The data for of the various types of equipment (i.e., scrapers, cranes, pavers), and economic indicators/census data that were available at that time of the study for the 24 non-attainment areas, were used for the apportionment. Due to the differences in the inventories, the USEPA

[15] Nonroad Engine and Vehicle Emission Study – Report, USEPA, November 1991 (http://www.epa.gov/nonroad/nrstudy.pdf)

recommended that states use the average of the two inventories or specific equipment emissions from Inventory A plus the equipment emissions from Inventory B, divided by 2.

Notably, based on the USEPA's documentation describing their methods of calculating emissions for non-road engines/vehicles, it can be said that individual projects were not considered in the development of the inventory. Rather, the emission estimates can be considered broad projections that reflect the best available data at the time of the USEPA's study

The IEPA's projected emissions for the year 2007 also assumed growth factors obtained from EGAS. Using the EGAS factors, the IEPA assumed that emissions from construction-related activities would increase 45.8 percent from 1990 to 2007. The IEPA also assumed, based on USEPA guidance, that phased-in national engine emission reduction measures would, to a certain extent, reduce the assumed growth in emissions. The USEPA estimated that emissions of volatile organic compounds from 2- and 4-stroke engines would be reduced by approximately 75 and 65 percent, respectively, while emissions of nitrogen oxides would be reduced by approximately 1 and 27 percent, respectively.

IEPA's 2007 Inventory

Tables 1-4 and **1-5** present the IEPA projected 2007 volatile organic compound and nitrogen oxide emissions by source category. The year 2007 is the farthest out year for which the IEPA has prepared projections of regional emissions. As shown in **Table 1-4**, by 2007, the IEPA projects that emissions of volatile organic compounds will decrease to approximately 534 tons/day, a 57 percent reduction when compared to 1990 levels and a 19 percent reduction when compared to 1999 levels. By 2007, area sources are predicted to be the largest source of regional emissions contributing approximately 185 tons/day (35 percent) to the total. Most notably, the aircraft and ground support equipment operating within the Chicago non-attainment area are predicted to contribute approximately 11 tons/day (two percent) of the regional total. As such, the proportion of aircraft and ground support equipment emissions is not projected to increase substantially through the year 2007.

Exhibit 1-1 illustrates the source distribution of regional emissions of volatile organic compounds in the base year of 1990 and the year 2007. As previously stated, aircraft and ground support equipment emissions contributed two percent to the regional total of these emissions in 1999 and the proportional share of emissions from these sources is not projected to increase through the year 2007.

TABLE 1-4
IEPA PROJECTED (2007) SUMMER WEEKDAY EMISSIONS WITHIN THE CHICAGO OZONE NON-ATTAINMENT AREA – VOLATILE ORGANIC COMPOUNDS

	2007 (Tons/Day)				
Source	**Point**	**Area**	**On-Road**	**Off-Road**	**Total**
Storage, Transportation and Marketing (a)	9.52	14.98	-	-	24.50
Industrial Process	34.48	-	-	-	34.48
Industrial Surface Coating	40.19	-	-	-	40.19
Non-Industrial Surface Coating	-	56.44	-	-	56.44
Other Solvent Use	20.51	97.16	-	-	117.67
Waste Disposal	13.67	2.14	-	-	15.81
Miscellaneous Sources (b)	13.23	14.19	-	-	27.42
Mobile - On Road (c)	-	-	127.42	-	127.42
Mobile - Off Road	-	-	-	78.27	78.27
Mobile - Off Road - Aircraft and Ground Support Equipment	-	-	-	11.48	11.48
Total (d)	**131.60**	**184.91**	**127.42**	**89.75**	**533.68**
Percent of Regional Total	**25**	**35**	**24**	**17**	**100**
1990 (Percent Increase/Decrease by 2007)	**350.08 (-62)**	**268.01 (-31)**	**491.22 (-74)**	**144.28 (-38)**	**1,253.59 (-57)**
1999 (Percent Increase/Decrease by 2007)	**112.09 (+17)**	**173.88 (+6)**	**241.77 (-47)**	**133.44 (-33)**	**661.18 (-19)**

Notes: "-" = Not Applicable
(a) Includes aircraft refueling
(b) Excludes biogenic sources
(c) IEPA mobile on road source emission estimate using the MOBILE6 emission model.
(d) Excludes biogenic sources.

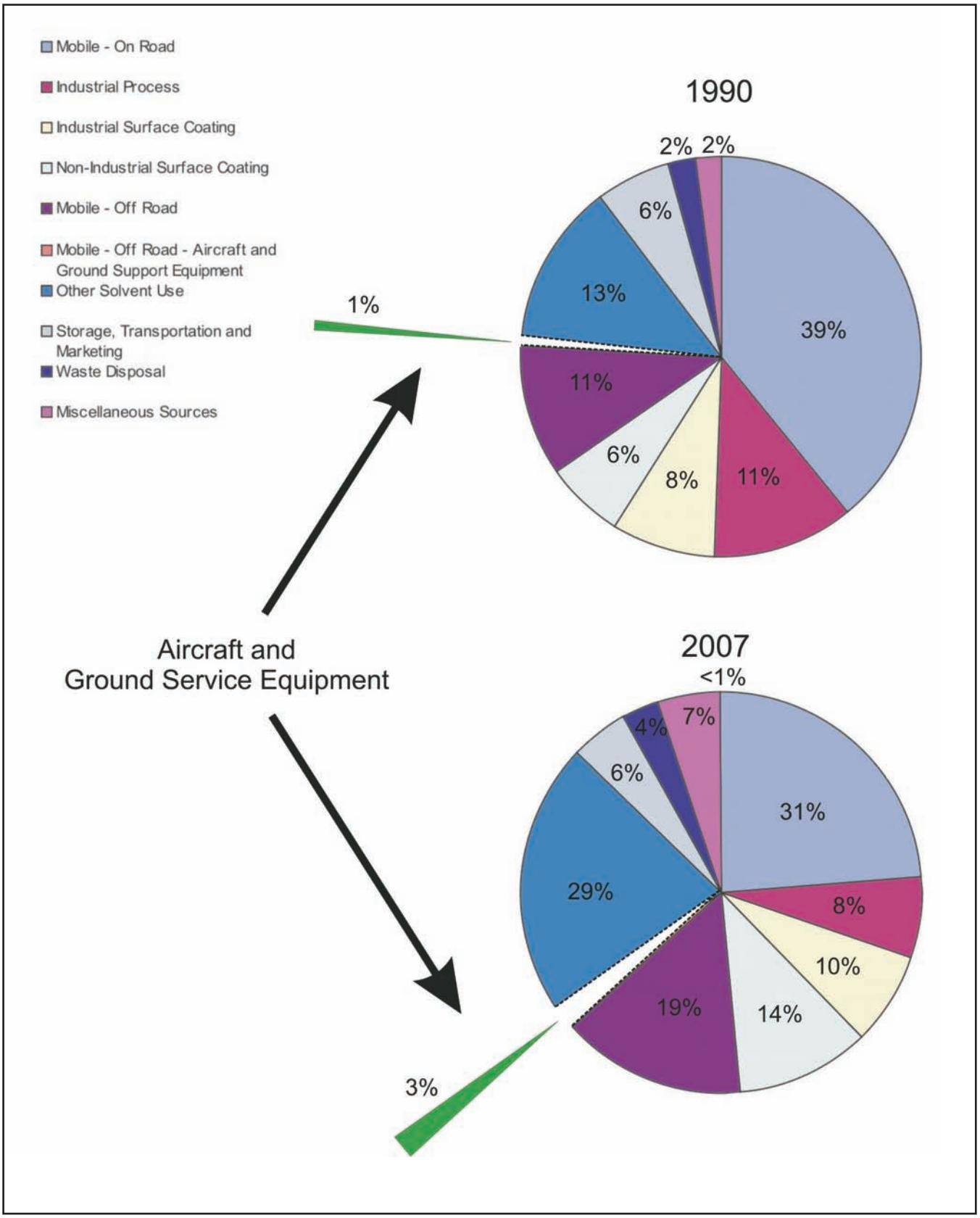
Source: Environmental Science Associates, Inc. [TPC] analysis of information provided by the Illinois Environmental Protection Agency.

TABLE 1-5
IEPA PROJECTED (2007) SUMMER WEEKDAY EMISSIONS WITHIN THE CHICAGO OZONE NON-ATTAINMENT AREA – NITROGEN OXIDES

	2007 (Tons/Day)				
Source	**Point**	**Area**	**On Road**	**Off Road**	**Total**
External Fuel Combustion	123.77	30.84	-	-	154.61
Stationary Internal Combustion	53.93	-	-	-	53.93
Other Combustion	3.26	4.22	-	-	7.48
Industrial Processes	33.65	-	-	-	33.65
Mobile - On Road (a)	-	-	280.40	-	280.40
Mobile - Off Road	-	-	-	127.85	127.85
Mobile - Off Road - Aircraft and Ground Support Equipment	-	-	-	26.93	26.93
Total (b)	**214.61**	**35.06**	**280.40**	**154.78**	**684.85**
Percent of Regional Total	**31**	**5**	**41**	**23**	**100**
1990 (c)	**310.70**	**23.83**	**540.26**	**167.51**	**1,042.30**
(Percent Increase/Decrease by 2007)	**(-31)**	**(+47)**	**(-48)**	**(-8)**	**(-34)**
1999	**276.06**	**32.83**	**495.94**	**186.89**	**991.72**
(Percent Increase/Decrease by 2007)	**(-22)**	**(+7)**	**(-43)**	**(-17)**	**(-31)**

Note: "-" = Not applicable
(a) EPA mobile on road source emission estimate using the MOBILE6 emission model.
(b) Excludes biogenic sources.
(c) The 1990 inventory does not include a line item for biogenic sources.

Source: Environmental Science Associates, Inc. [TPC] analysis of information provided by the Illinois Environmental Protection Agency.



Source: Environmental Science Associates [TPC], 2004.

Chicago O'Hare International Airport

O'Hare Modernization Environmental Impact Statement

Source Distribution of Regional Emissions Volatile Organic Compounds

Exhibit 1-1

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As shown in **Table 1-5**, all sources are projected to emit approximately 685 tons of nitrogen oxides each summer day during the year 2007 (a decrease of 357 tons/day or 34 percent less than in the year 1990 and a decrease of 309 tons/day or 31 percent less than in the year 1999). By 2007, on-road mobile sources are predicted to be the largest contributor (approximately 280 tons/day or 41 percent of the total) while aircraft and ground support equipment are projected to contribute approximately 27tons (approximately four percent of total emissions).

Exhibit 1-2 illustrates the source distribution of regional emissions of nitrogen oxides in the base year of 1990 and in the year 2007. As previously stated, aircraft and ground support equipment contributed approximately three percent to the regional total of these emissions in 1999 and the proportional share of emissions from these sources is projected to increase to approximately four percent by the year 2007.

O'Hare-Related Emission Estimates

Table 1-6 identifies the portion of the 2007 emission inventories that the IEPA attributes to O'Hare-related aircraft and ground support equipment. O'Hare-related construction emissions are not provided in **Table 1-6** because, as with all other individual construction projects, the IEPA did not specifically consider construction activity at the Airport in their regional estimates. As shown, based on the IEPA's projections, O'Hare-related aircraft and ground support equipment would contribute approximately 9 and 24 tons of the total regional emissions of volatile organic compounds and nitrogen oxides in the year 2007 (approximately 1 and 3 percent of the total regional emissions of these ozone precursors, respectively).

TABLE 1-6
IEPA PROJECTED (2007) O'HARE-RELATED SUMMER WEEKDAY EMISSIONS – AIRCRAFT AND GROUND SUPPORT EQUIPMENT

	Tons/Day			
Source	**Volatile Organic Compounds**	**Percent of Regional Total**	**Nitrogen Oxides**	**Percent of Regional Total**
Aircraft(a)	6.60	0.8	14.83	2.1
Ground Support Equipment(b)	2.06	0.2	9.27	1.3
Total	**8.66**	**1.0**	**24.1**	**3.4**

Notes: (a) Military, commercial, and general aviation aircraft
(b) Two- and four-stroke gasoline and diesel equipment
Source: Illinois Environmental Protection Agency

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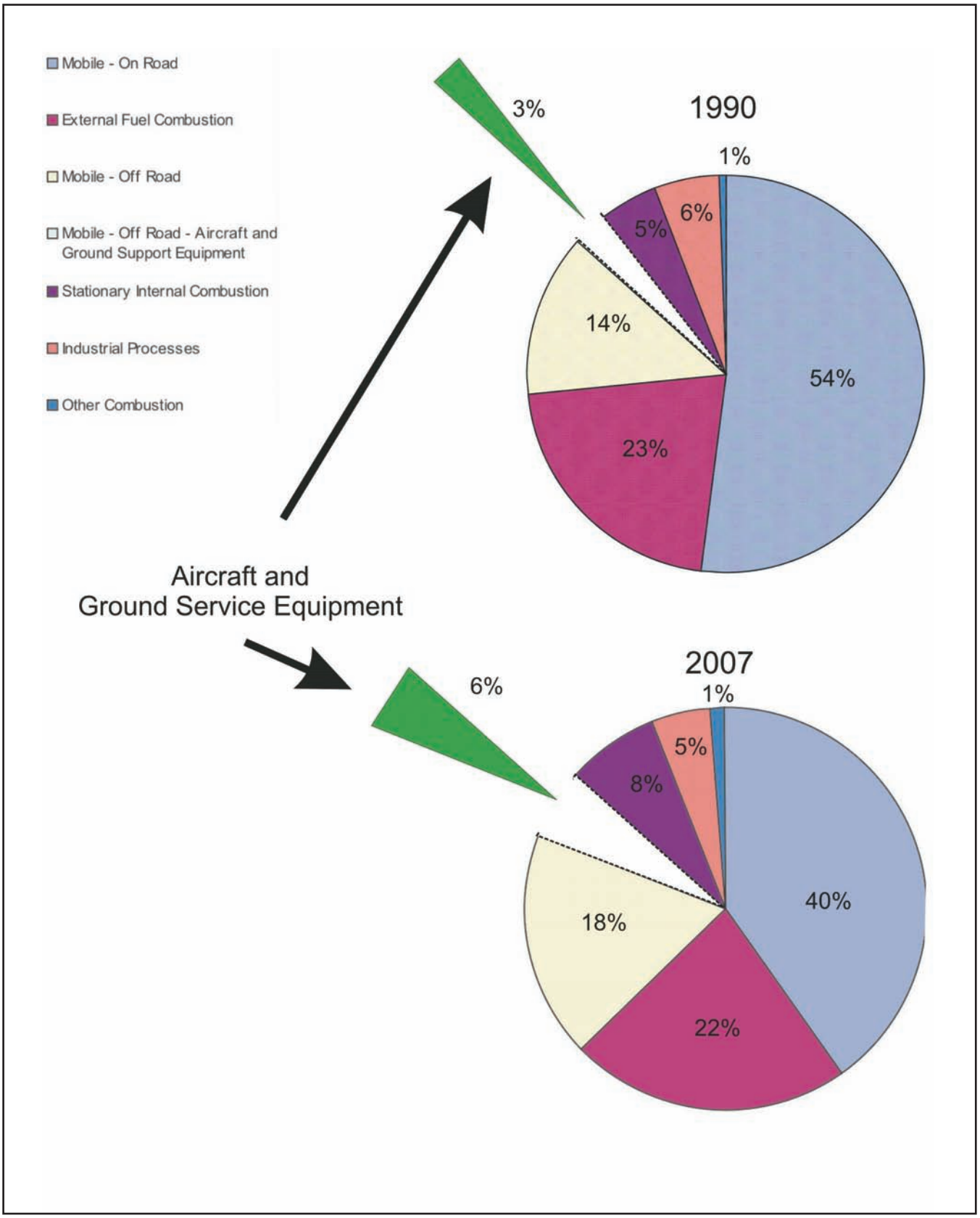

Source: Environmental Science Associates [TPC], 2004.

Chicago O'Hare International Airport

O'Hare Modernization Environmental Impact Statement

Source Distribution of Regional Emissions Nitrogen Oxide

▶ Exhibit 1-2

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2 PROPOSED FEDERAL ACTION

The City of Chicago (the project Sponsor) has identified and recommended a number of Airport improvements, referred to as the O'Hare Modernization Program (OMP). The proposed projects are illustrated in **Exhibit 2-1** and **Exhibit 2-2**.

A detailed discussion of the proposed projects is provided in the following section. A discussion of the Transportation Conformity Rule with respect to transportation-related (highway projects) is provided in Section 4 of this document. A discussion of the General Conformity Rule with respect to the other projects is provided in Section 5 of this document.

2.1 Description of the Sponsor's Proposed Projects

The following provides a description of the Sponsor's proposed projects (improvements) to O'Hare International Airport.

2.1.1 Airfield Projects

The Sponsor-proposed airfield projects include the realignment of three runways, and the construction of one new runway. For FAA purposes, realignment involves decommissioning of existing runways and construction of replacement runways. The four replacement runways are Runway 9L/27R, 9C/27C, 10C/28C, and 10R/28L. The three existing runways that would be decommissioned are Runways 18/36, 14L/32R, and 14R/32L. In addition, two existing runways (Runway 9L/27R and 9R/27L), whose future designations would be 9R/27L and 10L/28R, respectively, would be extended. Further, existing Runways 4L/22R and 4R/22L would remain for additional operational flexibility. This airfield layout results in a total of eight runways, including six parallel runways in an east-west orientation and two crosswind runways. **Exhibit 2-3** is a schematic layout of the existing runways and the Sponsor's proposed future runways.

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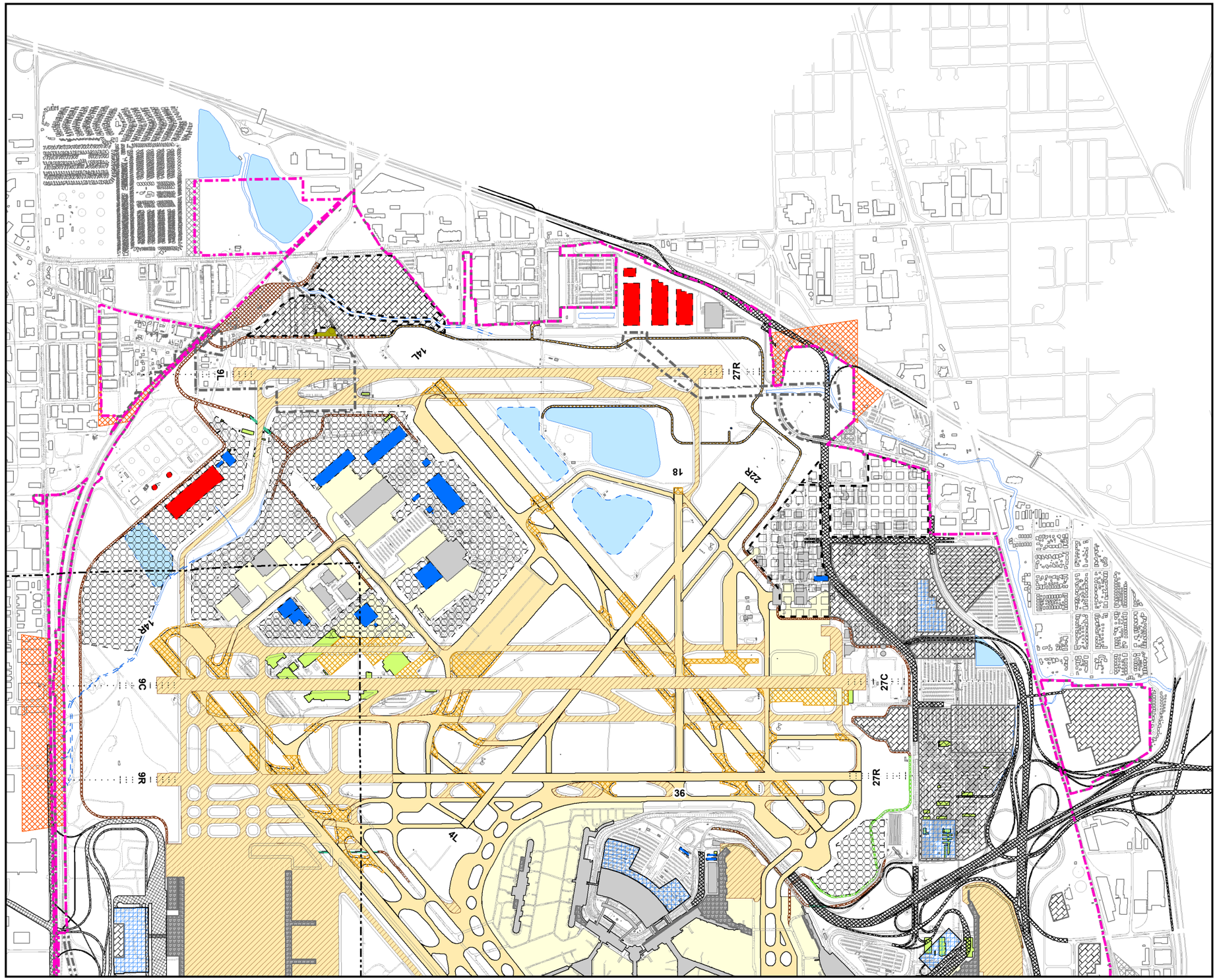

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- Future Airport Property Line
- Existing Airport Property Line
- County Line
- Creeks
- Future Creeks
- Existing Airfield Pavement
- Future Airfield Pavement
- Airfield Pavement Demolition
- Existing Apron Pavement
- Existing Airport Building
- Future Terminal Building
- Existing Airport Building in AOA to be Relocated
- Relocated Airport Buildings Previously in AOA
- Future Airport Buildings
- Future Aviation Development Areas
- Future Collateral Development
- Future Roadways
- Future Structured Parking
- Future Surface Parking
- Future Detention Basins
- Existing Detention Basins
- Existing Avigation Easment
- Future Avigation Easement
- Future Tunnel
- Future Service Roadways
- Service Road Upgrade
- Future NAVAID/ARFF Access Roads

0 1,750 3,500
Feet

N
S

Sponsor's Proposed Project North Airfield

▶ **Exhibit 2-1**

Source: ALP Drawing Set, Ricond and Associates, Inc. [CCT], 2004.

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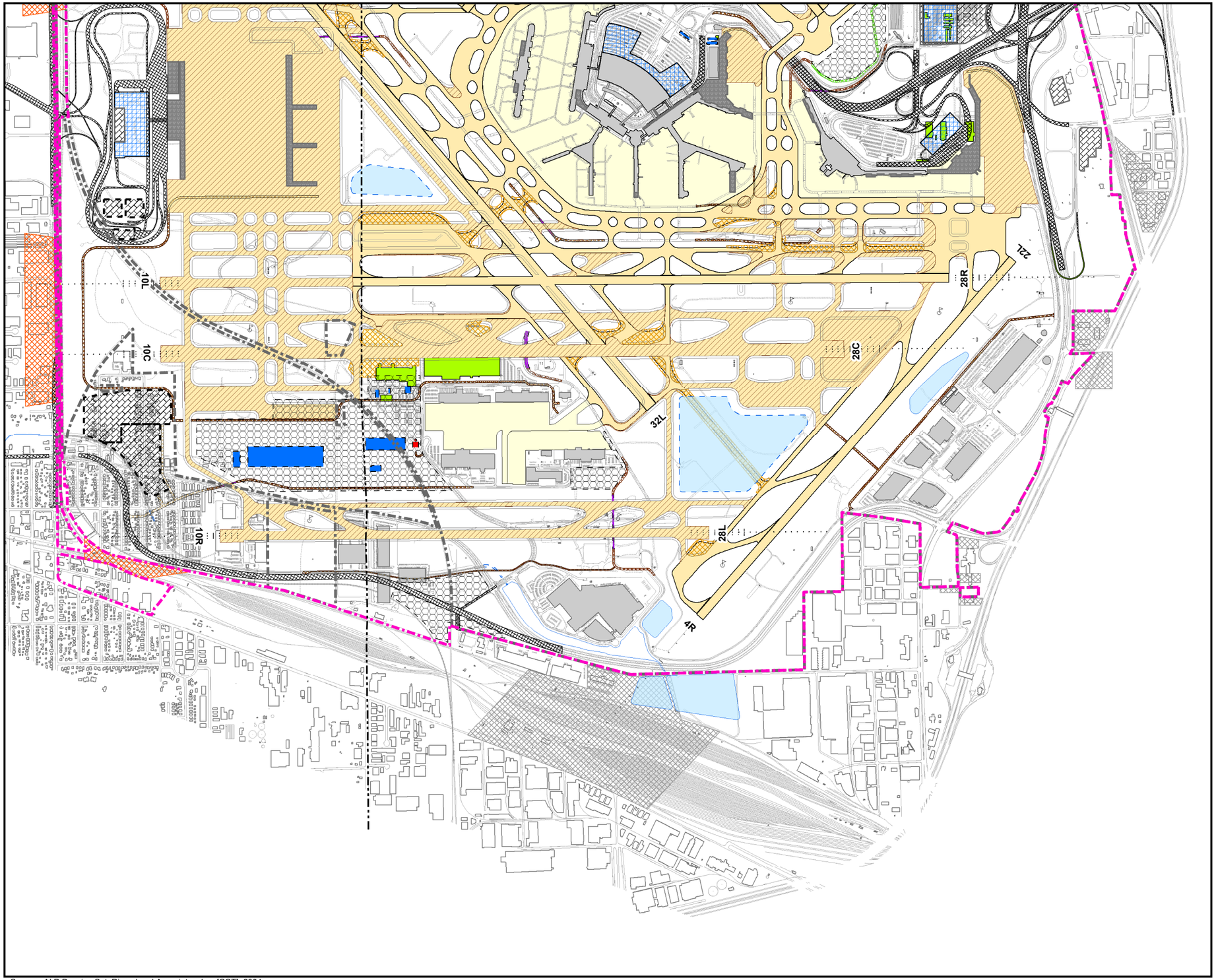

Chicago O'Hare International Airport

O'Hare Modernization Environmental Impact Statement

- Future Airport Property Line
- Existing Airport Property Line
- County Line
- Creeks
- Future Creeks
- Existing Airfield Pavement
- Future Airfield Pavement
- Airfield Pavement Demolition
- Existing Apron Pavement
- Existing Airport Building
- Future Terminal Building
- Existing Airport Building in AOA to be Relocated
- Relocated Airport Buildings Previously in AOA
- Future Airport Buildings
- Future Aviation Development Areas
- Future Collateral Development
- Future Roadways
- Future Structured Parking
- Future Surface Parking
- Future Detention Basins
- Existing Detention Basins
- Existing Avigation Easment
- Future Avigation Easement
- Future Tunnel
- Future Service Roadways
- Service Road Upgrade
- Future NAVAID/ARFF Access Roads

0 1,700 3,400
Feet

N
S

Sponsor's Proposed Project South Airfield

▶ Exhibit 2-2

Source: ALP Drawing Set, Ricond and Associates, Inc. [CCT], 2004.

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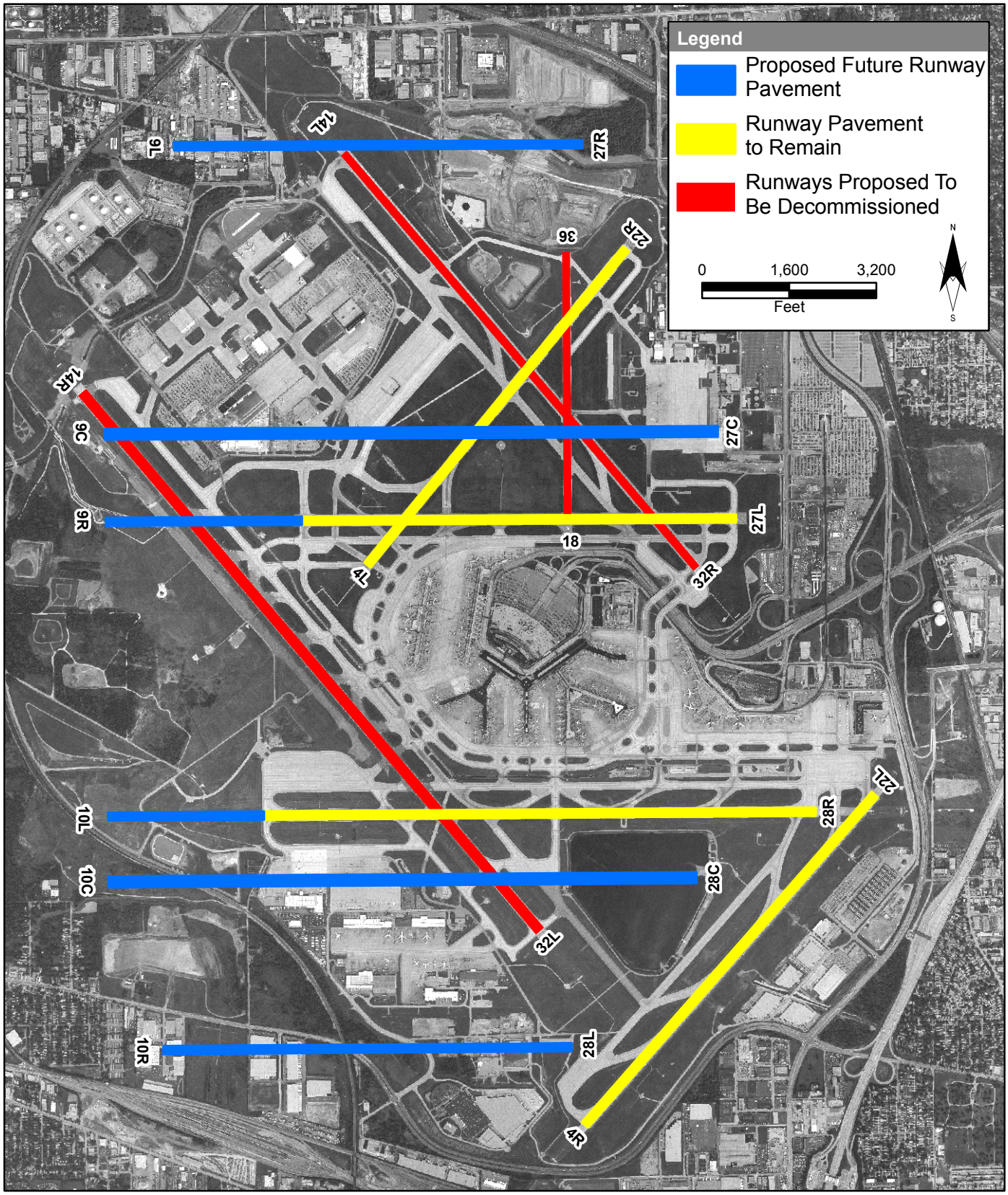

Source: ALP Drawing Set, Ricondo and Associates Inc. (CCT), 2004.

Chicago O'Hare International Airport

O'Hare Modernization Environmental Impact Statement

Existing and Proposed Future Runways (Sponsor's Proposal)

▶ **Exhibit 2-3**

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2.1.2 Terminal Area Improvements

The proposed projects include improvements to the existing Terminal Core Area and development of new eastern and western terminal facilities. In developing the proposed projects, it was assumed that planned terminal development in the approved World Gateway Project (WGP) Environmental Assessment (EA) on the east side of the Airport would be implemented with modifications, with the exception of Terminal 2.[16] On the west side of the Airport, the proposed projects would include a new satellite concourse and terminal facility (Terminal 7) with associated gates and a new ground access point of entry from York Road. The new western access could operate in conjunction with the possible extension of the Elgin-O'Hare Expressway and/or construction of a Western By-Pass extending from I-94/I-294 south of the airport, and terminating near Thorndale Avenue west of the airport. However, western access to the Airport is neither dependent on the Elgin-O'Hare Expressway or the Western By-Pass. The new west side terminal would be developed on existing Airport property west of the existing Runway 14R/32L, which would ultimately be decommissioned. The improvements would provide a total of 232 gates and approximately 38,460 linear feet of total apron frontage.

2.1.3 Support Facilities

The facilities needed to support the operation of the Airport generally include the following:

- Cargo terminals and warehouses,
- Maintenance of aircraft and ground support equipment facilities,
- Flight kitchens,
- Department of Aviation maintenance, and
- General Aviation and fixed based operators (FBO).

A number of existing support facilities would be affected by the airfield development proposed. Hence, the proposed land use plan for support facilities provides for:

- "In-kind" replacement of existing facilities that would be displaced by the proposed airfield development,
- Area for those facilities previously identified for future development; and
- Area to accommodate projected growth.

Relocation of existing support facilities and future development would be accommodated through expansion of the Northwest Maintenance Area and South Cargo Area. The Northwest Maintenance Area would be expanded in the east and west directions through proposed decommissioning of Runways 14L/32R and 14R/32L. The Southwest Cargo Area would be reconfigured to the west with the proposed relocation of the Union Pacific Railroad, and to the

[16] With the WGP EA, Terminal 2 was to be reconfigured to include Federal Inspection Service (FIS) facilities. However, with the proposed terminal improvements in the west airfield, the facilities are no longer needed in Terminal 2.

east with proposed decommissioning of Runway 14R/32L. The plan provides that affected facilities in each of the support facility areas (Northwest Maintenance Area and South Cargo Area) would be redeveloped within the area in which the facilities currently exist. In this manner, operational characteristics, such as airfield access and ground access, associated with the facilities would remain consistent with current activities. Furthermore, each of these areas would have additional land available for projected growth needs of other aviation development. More detailed descriptions of the proposed support facilities are provided in **Appendix E**, **Alternatives, Table E-19** of the O'Hare Modernization (OM) Final Environmental Impact Statement (FEIS).

2.1.4 Ground Access and Parking

As noted previously, some elements of the proposed surface transportation projects were previously approved as part of the WGP EA, other previously approved elements were modified or refined to accommodate the current proposal, and others are newly planned projects.

Table 2-1 identifies the on-Airport and off-airport roads being considered in the EIS and denotes the projects that were previously approved by the WGP EA or are being considered in the I-190 Environmental Assessment (I-190 EA) being undertaken by Illinois Department of Transportation (IDOT). The WGP and I-190 projects are identified because they were assumed to be in place with and without the proposed improvements at O'Hare (simulated as being completed in the analysis).

Areas dedicated to both short- and long-term parking are provided on the east side of the Airport supporting the Terminal Core Area and the East Terminal Area, and on the west side supporting the new West Terminal Area.

Parking for flight crews and for employees working in the terminal area would be provided in three facilities: the existing surface lot in the Southeast Service Area, immediately west of the AMC Building; a new Northwest employee lot; and a new surface lot located in the Northeast Quadrant, in the southern portion of what is currently Lot E, immediately south of the Runway 9C/27C extended object free area (OFA).

Parking for Terminal 7 employees and flight crews would be provided in a surface lot to the north of the proposed long-term public parking lot supporting the terminal in the southwest corner of the Airport. A new access road to this lot would be provided from the new service road entrance to the Southwest Cargo Area off realigned Irving Park Road, following the eastern boundary of the long-term public parking lot. Parking for employees working in areas of the Airport other than the terminals and the Northwest Maintenance Area would be provided onsite at each facility.

2.1.5 Airport Transit System Improvements

The proposed projects include the following improvements to the non-secure landside ATS previously approved in the WGP EA:

- The addition of ATS stations at Terminal 6, the Metra Transfer Station, and the proposed consolidated rental car facility
- Relocation of the Operations and Maintenance (O&M) test track facility to an area in the Northeast Quadrant to accommodate the development of Terminal 6 and the track extension necessary to serve this facility

A minor modification to the alignment of the ATS extension guideway (as approved in the WGP EA) may be necessary to avoid conflict with the Federal Aviation Regulations (FAR) Part 77 surfaces of future Runway 9C/27C. This modification would involve shifting the alignment to the west so that the guideway would pass over the planned flyover between Bessie Coleman Drive and Mannheim Road at a lower elevation, thereby lowering the height of the guideway within the runway protection zone for Runway 9C/27C. The location of the Lot E ATS station (as approved in the WGP EA) would penetrate the FAR Part 77 surfaces of the future Runway 9C/27C and, thus when that project is undertaken, the station would be closed.

TABLE 2-1
GROUND ACCESS PROJECTS

No.	Project Description	On Airport	Off – Airport - East	Off – Airport - West	Previously Approved by WGP EA	Considered within I-190 EA
1	Terminal 6 curbfront roadways and new Terminal 5/6 access and egress roadways,	X			X	
2	New ramps and intersections at Bessie Coleman Drive and I-190	X			X	
3	Upgrade of I-190 west of Bessie Coleman Drive (Airport portion of I-190)	X			X	
4	Westerly relocation and widening of the northern portion of Bessie Coleman Drive to Higgins Road	X			X	
5	Westerly extension of Zemke Road to relocated Bessie Coleman Drive	X			X	
6	Fly-over ramps from Bessie Coleman Drive to southbound Mannheim Road	X			X	
7	Closing of the East Cargo Road and the northern part of Spine Road	X			X	
8	Reallocation of Terminal Core roadways/curbfront between Terminals 3 and 4 to provide curbfront at new Terminal 4	X			X	
9	Roadway changes in the Southwest Cargo Area as a result of the realignment of Irving Park Road and the Construction of Runway 10R/28L	X				
10	Roadway changes in the Northwest Maintenance Area as a result of the construction of Runway 9L/27R	X				
11	Access and egress roadway connections between the Thorndale Avenue/York Road Intersection area and the arrival and departure level curbs	X				
12	Roadway connections to the West Terminal landside support facilities, including the parking garage, taxi staging area, bus/limo staging area, rental car area, terminal services area, and recirculation roadway	X				
13	I-90 upgrade from Bessie Coleman Drive to Cumberland Avenue		X			X
14	Extension of Balmoral Avenue to Bessie Coleman Drive		X		X	
15	Widen Mannheim Road between Higgins Road and Irving Park Road		X			X
16	New ramp and intersections at Mannheim Road and I-190		X			X
17	New ramp and intersections at I-190 and I-294		X			X
18	New ramps between Mannheim Road and I-294		X			X
19	Expansion of the I-90/Lee Street interchange		X		X	
20	Southerly realignment of Irving Park Road between York Road and the U.S. Postal Service building			X		
21	Preservation of a corridor for a future West O'Hare Bypass (by others)			X		

Note: More detailed descriptions of the on-Airport surface transportation projects are provided in **Appendix E**, **Alternatives, Table E-19** of the O'Hare Modernization FEIS.
Source: Federal Aviation Administration, November 5, 2004.

2.1.6 Secure Automated People Mover

As noted previously, a new secure automated people mover (APM) system is proposed between the West Terminal and the Terminal Core Area, connecting at the bases of Terminals 1 and 2, in the secure area of the Terminals. This system includes proposed station locations at the main West Terminal facility, the satellite West Terminal concourse, and a single station serving Terminals 1 and 2 with pedestrian walkways. The O&M facility for the new secure APM system would be located in the infield area of the West Terminal roadway system, north of the short-term public parking structure.

2.1.7 Rental Car Facilities

The east side locations for the rental car facilities proposed are similar to those depicted in the approved WGP EA. The two (2) proposed elements include a core facility where all major rental car companies would be located for passengers to pick up and drop off rental cars and a rental car storage and maintenance area. The core rental car facility would be located in the southern portion of the Northeast Quadrant and would be served by a new ATS station. However, in the proposed projects, the footprint of the site has been expanded into the existing rental car area to better accommodate forecast demand. The core facility would consist of a four-level structure that would occupy approximately 9 acres, and surface parking on about 30 acres. The second element would be the rental car storage and maintenance lot, which would be located on a 30-acre parcel at the northeast corner of I-190 and the Canadian National Railway. The two sites would be linked by a dedicated nonpublic road and bridge over Mannheim Road.

The West Terminal area is proposed to have a separate rental car operation on the ground floor of the parking garage. This rental car ready and return area would be supported by a quick-turn around maintenance facility located at the surface level immediately west of the parking structure.

2.1.8 Commercial Vehicle Holding Area

Holding areas for commercial vehicles would be provided on both the east and west sides of the Airport. On the east side of the Airport, the Commercial Vehicle Holding Area (CVHA) would be maintained in its current location. The previously approved return-to-terminal roadway would also be provided for commercial vehicles destined for the CVHA after the vehicles drop off passengers at the Upper Level Roadway in the Terminal Core. Staging for other commercial vehicles on the east side of the Airport would be provided along the west side of Bessie Coleman Drive, just north of Runway 27C. These vehicles would access the terminals via the on-Airport roadway system.

On the west side of the Airport, staging for commercial vehicles would be provided within the proposed terminal loop roadway. Access to and from the main terminal circulation roadways would be provided in a manner that facilitates quick response times to the terminal curbs.

2.1.9 Railroad Realignment

To accommodate the extension of Runway 10L/28R, and the construction of Runways 10C/28C and 10R/28L, relocation of the Union Pacific Railroad would be necessary from its current westerly alignment to an alignment similar to that of the Canadian Pacific Railroad. The realigned Union Pacific rail corridor would be grade-separated over Irving Park Road near the interchange with York Road. This rail corridor would continue to cross the existing rail yard on the south side of the airfield via a bridge section.

2.1.10 Other Facilities

Additional facilities included in the proposed projects have undergone separate analysis to determine the proposed requirements. These facilities and their associated studies include:

- **Service Roads** – The O'Hare Modernization Program Airfield Service Road Traffic Study Draft Report.[17]
- **Utilities and Drainage Infrastructure** – The O'Hare Modernization Program [Drainage and Utility Infrastructure Study] Final Draft.[18]

2.1.11 Proposed Land Acquisition

Both fee-simple and avigation easement acquisitions are proposed by the City of Chicago. Their proposed land acquisition consists of:

- **Proposed Northwest Acquisition Area:** The northwest acquisition area is approximately 135.8 acres and would accommodate the construction of proposed Runway 9L/27R, the relocation of Mount Prospect Road, and the runway protection zone for Runway 9L/27R. The northwest acquisition area currently consists of commercial, industrial, and six residential properties.
- **Proposed Southwest Acquisition Area:** The southwest acquisition area is approximately 297.8 acres in size and would be necessary to accommodate the development of proposed Runways 10R/28L and 10C/28C as well as the runway protection zones for these runways. The southwest acquisition area would also be used to relocate the Union Pacific Railroad and Irving Park Road. The southwest acquisition area currently consists primarily of residential areas (533 housing units), some commercial properties, and vacant land.
- **Proposed Cemetery Acquisition Area:** There are two cemeteries within the proposed acquisition area: St. Johannes Cemetery and Rest Haven Cemetery, which have approximately 1,400 and 200 graves respectively, and are approximately 6.2 acres in

[17] The O'Hare Modernization Program Airfield Service Road Traffic Study Draft Report, Ricondo & Associates, Inc. [CCT] November 2003.

[18] The O'Hare Modernization Program [Drainage and Utility Infrastructure Study] Final Draft, Consoer Townsend Envirodine Engineers, [CCT] December 15, 2002.

size. These cemeteries would need to be relocated to accommodate the construction of Runway 10C/28C and ancillary airfield operating areas.

- **Proposed Avigation Easements:** A total of approximately 108 acres of avigation easements are proposed for the protection of the airspace above the runway protection zones. This acreage was calculated from the areas as depicted on the O'Hare Airport Layout Plan.

The proposed land acquisition and avigation easements are illustrated on **Exhibit 2-4**. See **Appendix H**, **Social Impacts** of the OM FEIS for more detail on the proposed land acquisition.

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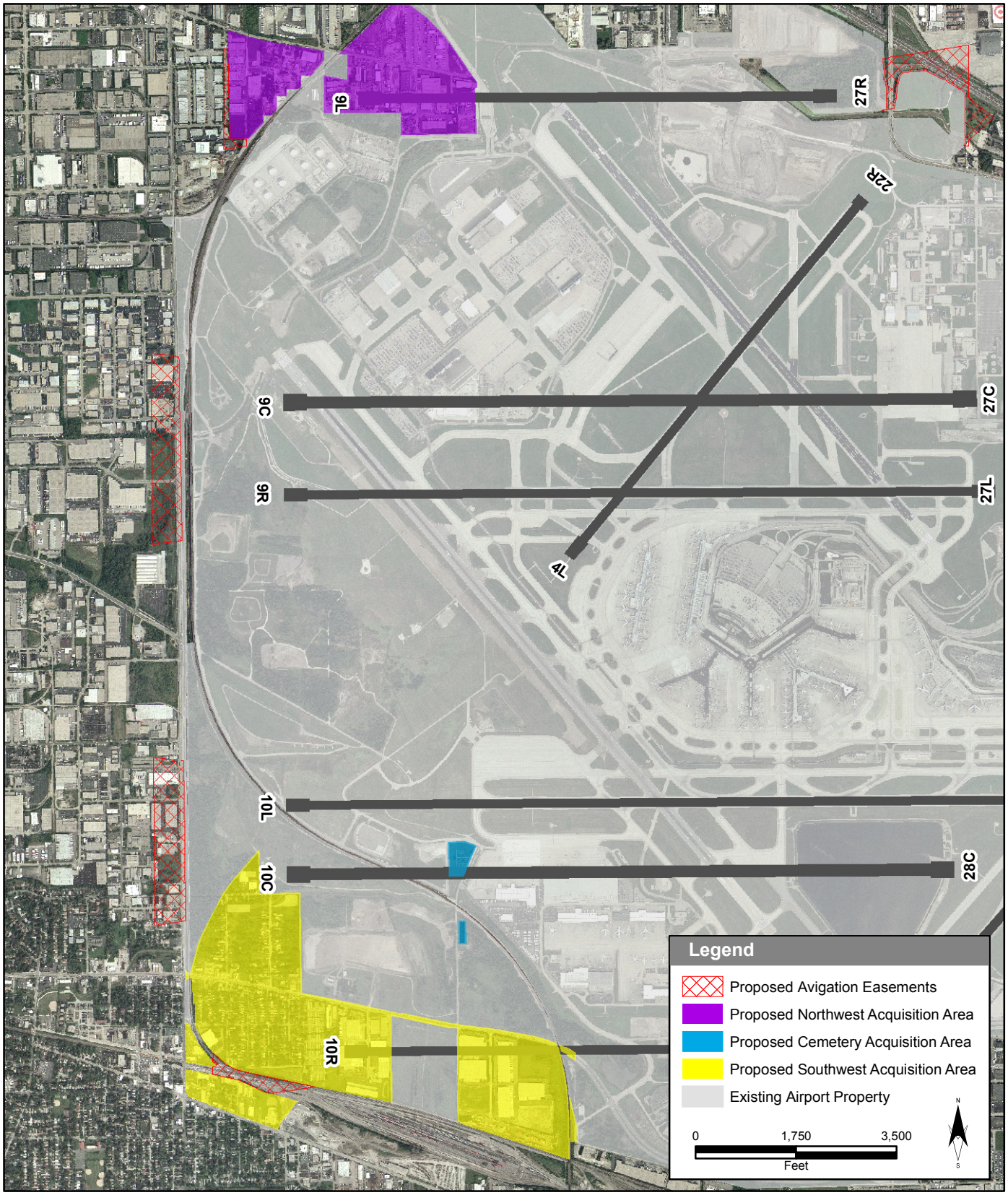

Source: Aerial; Aerial Express, September, 2000; OMP Land Acquisition Coverage; Ricondo ALP Drawing set, 2004.

Chicago O'Hare International Airport

O'Hare Modernization Environmental Impact Statement

Proposed Land Acquisition and Easements

▶ **Exhibit 2-4**

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2.2 Description of Alternatives Retained for Detailed Consideration

This section summarizes the physical characteristics of the alternatives retained for detailed evaluation to ensure consistent evaluation of the benefits and environmental consequences among the alternatives.

2.2.1 Alternative A – No Action

In accordance with CEQ Regulations, Section 1502.14, the No Action Alternative is retained for detailed consideration. Under the No Action Alternative (Alternative A), it is assumed some limited development at O'Hare would continue without the proposed action. For purposes of defining the No Action Alternative, improvements which would be reasonably foreseeable without the O'Hare Modernization, and which would not require additional FAA reviews or approvals pursuant to NEPA, are included in the No Action Alternative. NEPA approvals include any FAA action pursuant to the agency's NEPA guidance documents, such as (1) preparation of an EIS, supplemental EIS, or written re-evaluation, (2) approval of an environmental assessment (EA) or written re-evaluation of an EA, and (3) determination that "extraordinary circumstances" would not require formal environmental assessment for projects that are otherwise categorically excluded.

Major improvement projects included as part of Alternative A are described in **Appendix E, Alternatives,** of the OM FEIS**, Section E.6.1, Alternative A - No Action.** The rationale used to include or exclude individual projects follows:

- Projects that have been initiated are reflected in the No Action Alternative.
- Projects that are likely to be developed in the near term with or without development of the Sponsor's Proposed Action are reflected in the No Action Alternative.
- Projects that would require FAA NEPA approval as defined above will not be included unless the NEPA process has been initiated.

Most No Action Alternative (Alternative A) improvements are intended to replace and/or rehabilitate Airport infrastructure to maintain operations throughout the planning period. However, a few of the projects associated with Alternative A would enhance the operational capabilities of the existing airfield. These include the following:

- Implementation of Category II/III Instrument Landing Systems (ILS) to serve Runways 27L and 27R. Note that the environmental considerations associated with the installation of these ILSs were evaluated in the *Final Environmental Assessment for the Upgrade of Runways 27L and 27R to a Category II/III Instrument Landing System,*[19] dated October 1, 2004. The FAA issued a Finding of No Significant Impact (FONSI) and Record of Decision (ROD) on the same date.

[19] Final Environmental Assessment for the Upgrade of Runways 27L and 27R to a Category II/III Instrument Landing System. FAA, October 1, 2004.

- Chicago Terminal Airspace Project (CTAP) evaluated modifications to aircraft routes and air traffic control procedures in the Chicago area to reduce the overall en route time for aircraft using O'Hare and other airports in the Chicago area. The FAA issued its Record of Decision on November 2, 2001. Further information on CTAP is included in **Chapter 1, Introduction and Background** of the OM FEIS.
- Land-and-Hold-Short Operations (LAHSO) at O'Hare are also included in the No Action Alternative. Under LAHSO, aircraft are permitted to land on certain runways under various configurations, and then hold short of certain intersecting runways. Using LAHSO, intersecting/crossing runways can be used to provide independent operations subject to certain operating criteria. While LAHSO provides sufficient capacity to serve the current activity levels during good weather, it cannot be used under adverse weather conditions (IFR) (ceiling below 1,000-foot and/or visibility less than three-miles), or in wet runway conditions. An FAA Order[20] to this effect was issued regarding LAHSO procedures at O'Hare in February 2001.

A graphic depiction of Alternative A is presented on **Exhibit 2-5**. As shown**,** the airfield layout of Alternative A consists of three pairs of parallel runways (e.g., six total runways) oriented in the 9/27, 14/32, and 4/22 directions. The lengths and widths of these runways are provided in **Table 2-2**, and are identical to the existing runway lengths and widths.

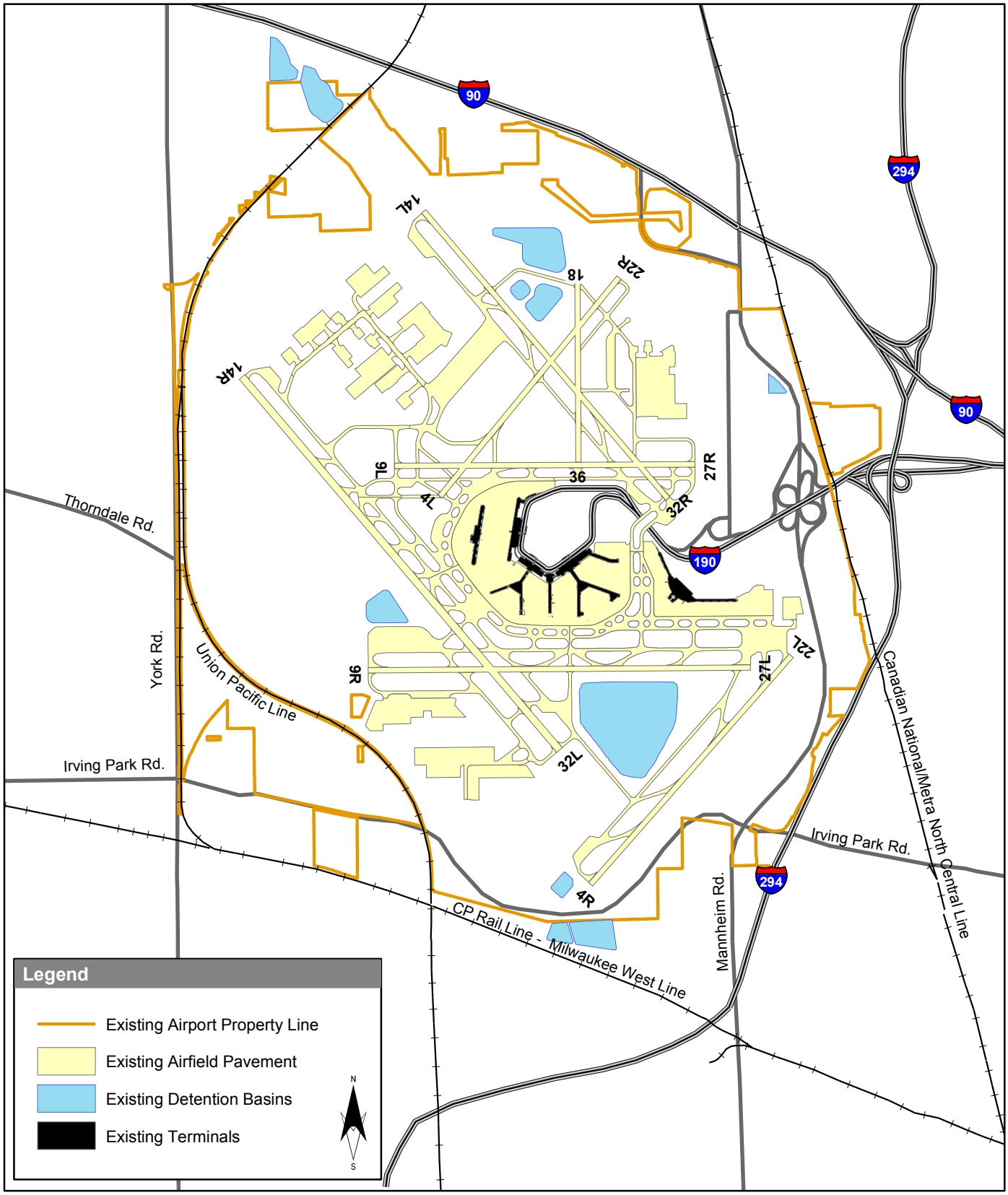
TABLE 2-2
RUNWAY CHARACTERISTICS: ALTERNATIVE A (NO ACTION ALTERNATIVE)

Runway	Length	Width
9L / 27R	7,967	150
9R / 27L	10,144	150
4L / 22R	7,500	150
4R / 22L	8,075	150
14L / 32R	10,005	150
14R / 32L	13,000	200

Source: National Oceanic & Atmospheric Administration Survey, September 2002.

In Alternative A, the airport's terminal facilities would remain in the existing locations. The terminal complex would consist of the Airport's existing gates, which are distributed among four terminals. Customs and immigration services facilities to process passengers arriving from abroad would remain located in Terminal 5, requiring all international arrivals disembark their passengers at Terminal 5.

[20] FAA Order ORD 7110.118, Land and Hold Short Operations (LAHSO), February 9, 2001.



Source: Crawford, Murphy and Tilly, Inc. [TPC] 2004

Chicago O'Hare International Airport

O'Hare Modernization Environmental Impact Statement

Alternative A - No Action

▶ Exhibit 2-5

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Ground access to the terminal complex would remain and would be provided via the existing I-190 corridor. Ground access to other major airport development areas—including the cargo complex on the south side of the airfield, the general aviation and air cargo facilities located on the former Air Force site on the northeast corner of the airfield, and airline maintenance complex located on the northwest corner of the airfield—would remain the same as it is today.

Aside from committed airfield and support facility improvements on and around the former Air Force facility, aviation support, air cargo, and general aviation facilities would remain in their current locations without substantial modification or expansion.

Based on Total Airspace and Airport Modeller (TAAM) simulation results, Alternative A would neither reduce existing delays nor accommodate anticipated growth in aviation activity at the Airport at acceptable levels of delay. A detailed description of the operational and delay characteristics of Alternative A is provided in **Appendix E, Alternatives** of the OM FEIS, **Section E.6.1, Alternative A – No Action.**

2.2.2 Alternative C

A graphic depiction of Alternative C is presented on **Exhibit 2-6**. Major improvement projects that would be undertaken in Alternative C are described in **Appendix E** of the OM FEIS, **Section E.6.2, Alternative C.**

As presented on **Exhibit 2-6**, the current airfield at the Airport would be reconfigured in accordance with the O'Hare Modernization Program (OMP) proposed by the City of Chicago. Ultimately, this airfield reconfiguration would result in two sets of parallel runways. The first set would consist of six parallel runways in the 9/27 orientation, whereas the second set would consist of two parallel runways in the 4/22 orientation. Runways 14L/32R and 14R/32L would be decommissioned. The lengths and widths of all runways in Alternative C are provided in **Table 2-3**.

TABLE 2-3
RUNWAY CHARACTERISTICS: ALTERNATIVE C

Proposed Future Runway Designation	Existing Runway Designation	Ultimate Length (feet) (a)	Ultimate Width (feet)
9L / 27R	N / A	7,500	150
9C / 27C	N / A	11,245	200
9R / 27L	9L / 27R	11,260 (7,967)	150
10L / 28R	9R / 27L	13,000 (10,144)	150
10C / 28C	N / A	10,800	200
10R / 28L	N / A	7,500	150
4L / 22R	4L / 22R	7,500 (7,500)	150
4R / 22L	4R / 22L	8,075 (8,075)	150

Notes: N / A = Not Applicable
(a) The value shown in parenthesis is the existing runway length.
Source: Draft Airport Layout Plan, October 2003; National Oceanic & Atmospheric Administration Survey, September 2002.

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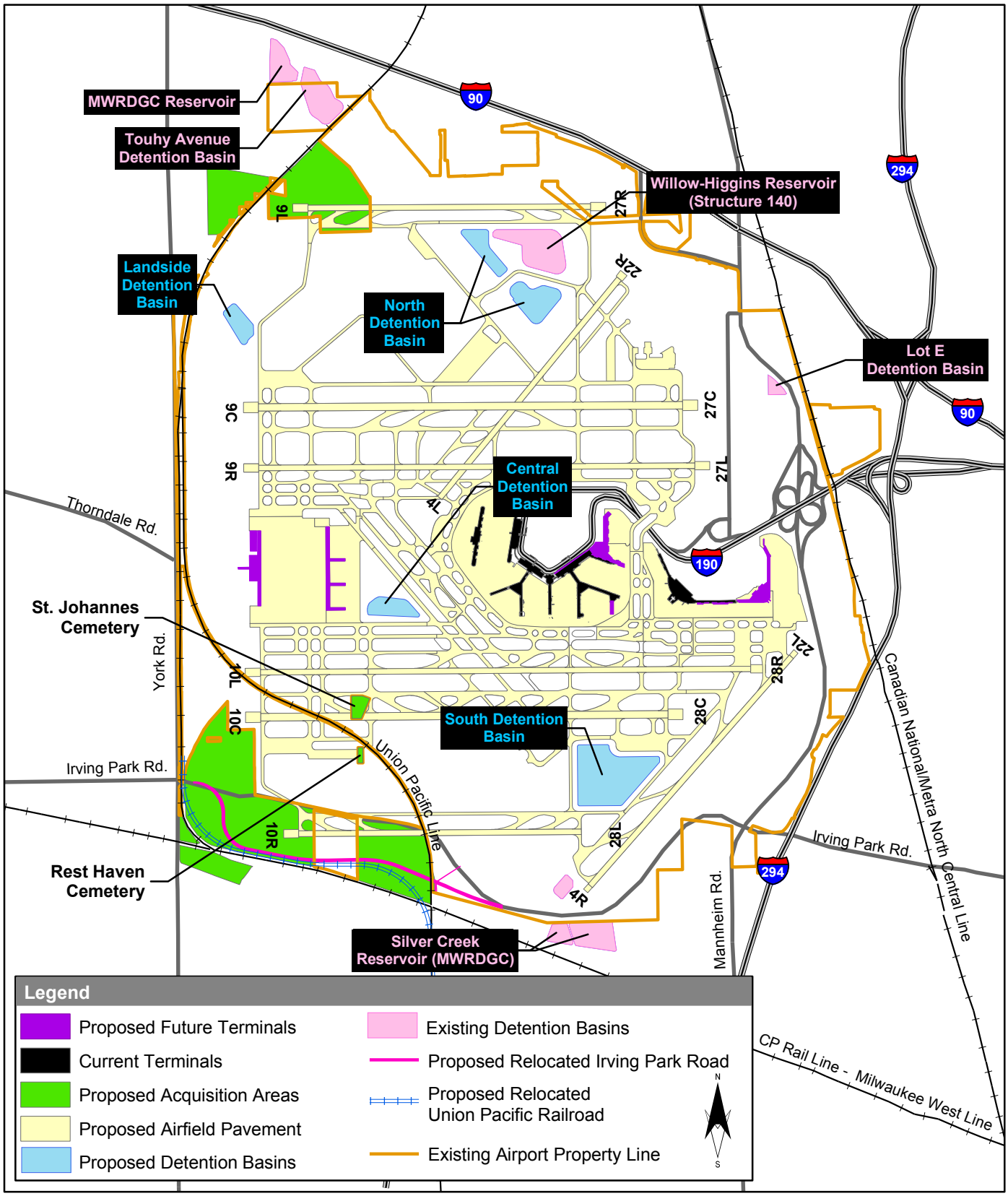

Source: Crawford, Murphy and Tilly, Inc. [TPC] 2004

Chicago O'Hare International Airport

Alternative C

O'Hare Modernization Environmental Impact Statement

Exhibit 2-6

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As indicated in **Table 2-3,** existing Runway 9L/27R would be renamed Runway 9R/27L and existing Runway 9R/27L would be renamed Runway 10L/28R. Both of these existing runways would be extended in Alternative C. Existing Runway 9L/27R/future Runway 9R/27L would be extended from 7,967 feet to 11,260 feet and existing Runway 9R/27L/future Runway 10L/28R would be extended from 10,144 feet to 13,000 feet.

In Alternative C, the existing airport terminal complex would be expanded with the construction of Terminals 4 and 6, and the expansion of Concourse K. In addition, a new 60-gate terminal complex—including both landside and airside facilities—would be constructed on the west side of the airfield. This new west terminal would be supported by its own access roadway system, parking facilities, and passenger processing facilities. The west terminal would be connected to the existing terminal complex via an underground people mover system that would permit ticketed, screened passengers to travel between the new west terminal and Terminal 1. The new west terminal would incorporate its own U.S. Customs and Immigration Services facilities to process international travelers.

Land areas would be reserved in Alternative C for the expansion of airline support, airport support, and air cargo facilities. In addition, facilities for new storm water detention, wastewater treatment, and utilities would be provided. To accommodate new runways and supporting development in Alternative C, the City of Chicago would acquire approximately 135.8 acres of land northwest of the existing Airport boundary and approximately 304.2 acres of land to the southwest of the Airport.

Based on TAAM simulation results, Alternative C would accommodate the unconstrained 2009, 2013, and 2018 flight schedules at reasonable delay levels. A detailed description of the operational and delay characteristics of Alternative C is provided in **Appendix E, Alternatives** of the OM FEIS**, Section E.6.2, Alternative C.**

2.2.3 Alternative D

A graphic depiction of Alternative D is presented on **Exhibit 2-7**. Major improvement projects that would be undertaken in Alternative D are described in **Appendix E, Section E.6.3, Alternative D** of the OM FEIS**.**

As presented on **Exhibit 2-7** in Alternative D,[21] the current six-runway airfield at the Airport would be reconfigured in accordance with the OMP proposed by the City of Chicago, with the exception that 7,500-foot long Runway 10R/28L would not be constructed. Ultimately, this airfield reconfiguration effort would result in two sets of parallel runways. The first set would consist of five parallel runways in the 9/27 orientation, whereas the second set would consist of two parallel runways in the 4/22 orientation. The existing 14/32 parallel runway system, consisting of Runways 14L/32R and 14R/32L would be decommissioned. The lengths and widths of all runways in Alternative D are provided in **Table 2-4.**

[21] In materials prepared by the City of Chicago, Alternative D is referred to as Alternative X.

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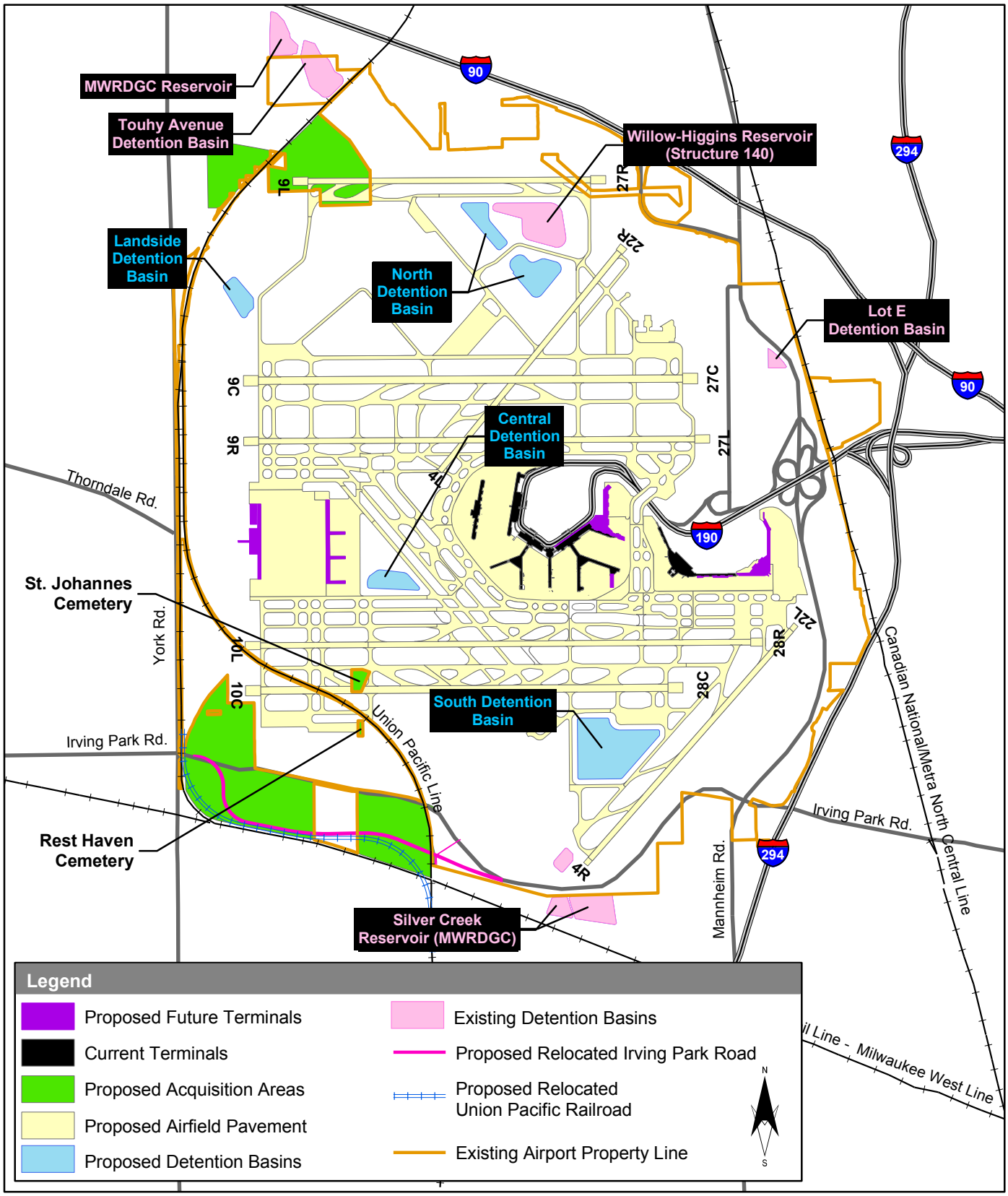

Source: Crawford, Murphy and Tilly, Inc. [TPC] 2004

Chicago O'Hare International Airport

Alternative D

O'Hare Modernization Environmental Impact Statement

Exhibit 2-7

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TABLE 2-4
RUNWAY CHARACTERISTICS: ALTERNATIVE D

Proposed Future Runway Designation	Existing Runway Designation	Ultimate Length (feet) (a)	Ultimate Width (feet) (a)
9L / 27R	N / A	7,500	150
9C / 27C	N / A	11,245	200
9R / 27L	9L / 27R	11,260 (7,967)	150
10L / 28R	9R / 28L	13,000 (10,144)	150
10C / 28C	N / A	10,800	200
4L / 22R	4L / 22R	7,500 (7,500)	150
4R / 22L	4R / 22L	8,075 (8,075)	150

Notes: N / A = Not Applicable
(a) The value shown in parenthesis is the existing runway length.
Source: October 2003 Draft Airport Layout Plan, National Oceanic & Atmospheric Administration Survey, September 2002.

As indicated in **Table 2-4,** existing Runway 9L/27R would be renamed Runway 9R/27L and existing Runway 9R/27L would be renamed Runway 10L/28R. Both of these existing runways would be extended in Alternative D. Existing Runway 9L/27R/future Runway 9R/27L would be extended from 7,967 feet to 11,260 feet and existing Runway 9R/27L/future Runway 10L/28R would be extended from 10,144 feet to 13,000 feet.

In Alternative D, the existing airport terminal complex would be expanded with the construction of Terminals 4 and 6, and the expansion of Concourse K. In addition, a new 60-gate terminal complex—including both landside and airside facilities—would be constructed on the west side of the airfield. This new west terminal would be supported by its own access roadway system, parking facilities, and passenger processing facilities. The west terminal would be connected to the existing terminal complex via an underground people mover system that would permit ticketed, screened passengers to travel between the new west terminal and Terminal 1. The new west terminal would incorporate its own U.S. Customs and Immigration Services facilities to process international travelers.

Land areas would be reserved in Alternative D for the expansion of airline support, airport support, and air cargo facilities. In addition, new storm water detention, wastewater treatment, and utilities facilities would be provided. To accommodate new runways and supporting development in Alternative D, the City of Chicago would acquire approximately 135.8 acres of land northwest of the existing Airport boundary and approximately 277.7 acres of land to the southwest of the Airport.

Based on TAAM simulation results, Alternative D would accommodate the unconstrained 2009, 2013, and 2018 flight schedules at reasonable delay levels. A detailed description of the operational and delay characteristics of Alternative D is provided in **Appendix E, Alternatives** of the OM FEIS**, Section E.6.3, Alternative D**.

2.2.4 Alternative G

A graphic of Alternative G is presented on **Exhibit 2-8**. Major improvement projects that would be undertaken in Alternative G are described in **Appendix E, Alternatives** of the OM FEIS**, Section E.6.4, Alternative G.**

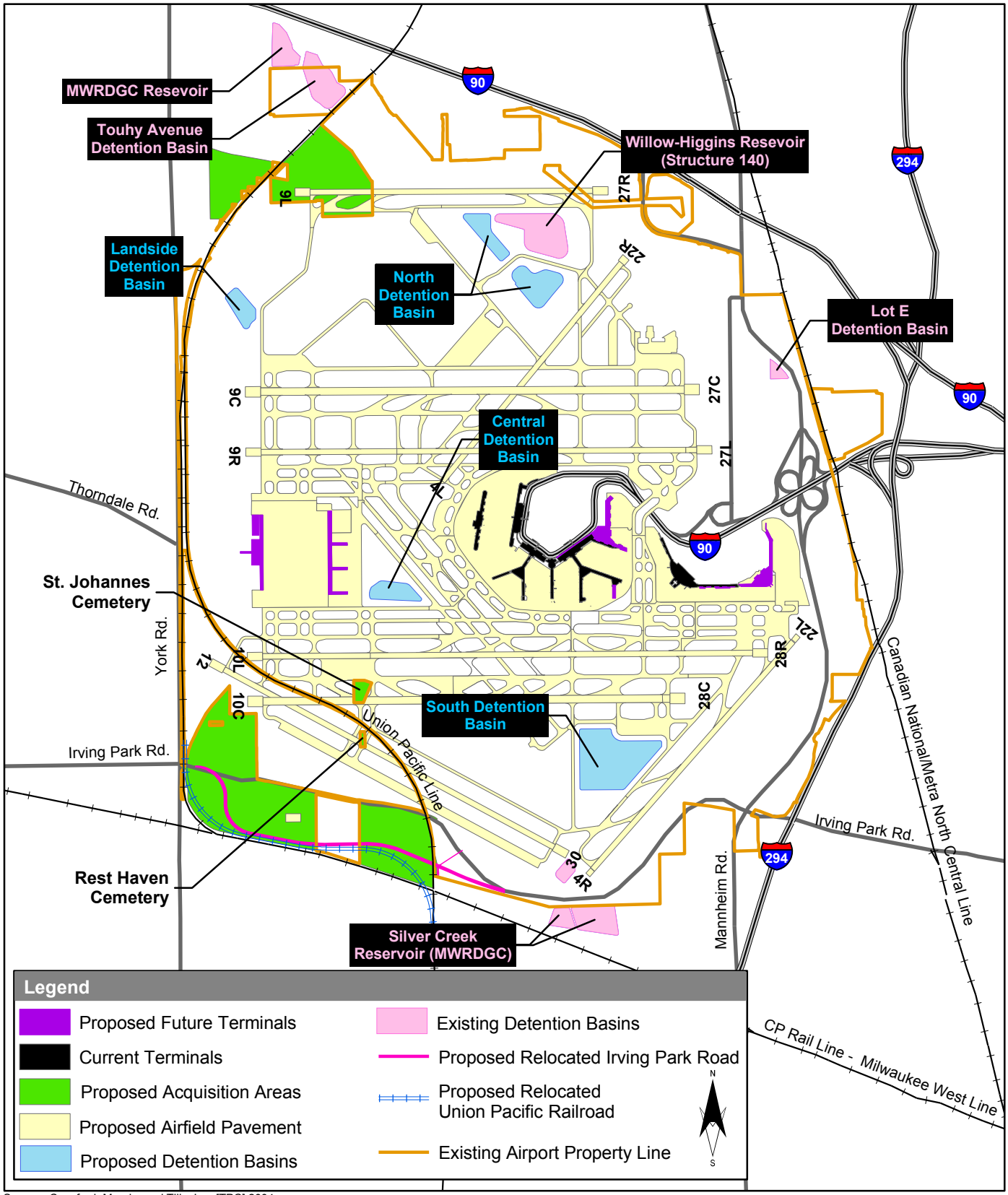
As presented on **Exhibit 2-8,** the current six-runway airfield at the Airport would be reconfigured in accordance with the OMP proposed by the City of Chicago, with the exception that 7,500-foot long Runway 10R/28L would not be constructed. In place of this south parallel runway, a 9,946-foot long runway would be constructed on the southwest quadrant of the airfield with a 12/30 orientation. Ultimately, this airfield reconfiguration effort would result in two sets of parallel runways plus new Runway 12/30. The first set would consist of five parallel runways in the 9/27 orientation, whereas the second set would consist of two parallel runways in the 4/22 orientation. The existing 14/32 parallel runway system, consisting of Runways 14L/32R and 14R/32L would be decommissioned. The lengths and widths of all runways in Alternative G are provided in **Table 2-5.**

TABLE 2-5
RUNWAY CHARACTERISTICS: ALTERNATIVE G

Proposed Future Runway Designation	Existing Runway Designation	Ultimate Length (feet) (a)	Ultimate Width (feet) (a)
9L / 27R	N / A	7,500	150
9C / 27C	N / A	11,245	200
9R / 27L	9L / 27R	11,260 (7,967)	150
10L / 28R	9R / 28L	13,000 (10,144)	150
10C / 28C	N / A	10,800	200
12 / 30	N / A	9,946	150
4L / 22R	4L / 22R	7,500 (7,500)	150
4R / 22L	4R / 22L	8,075 (8,075)	150

Notes: N / A = Not Applicable
(a) The value shown in parenthesis is the existing runway length.
Source: 2003 Draft Airport Layout Plan, National Oceanic & Atmospheric Administration Survey, September 2002.

As indicated in **Table 2-5,** existing Runway 9L/27R would be renamed Runway 9R/27L and existing Runway 9R/27L would be renamed Runway 10L/28R. Both of these existing runways would be extended in Alternative C. Existing Runway 9L/27R/future Runway 9R/27L would be extended from 7,967 feet to 11,260 feet and existing Runway 9R/27L future Runway 10L/28R would be extended from 10,144 feet to 13,000 feet.



Source: Crawford, Murphy and Tilly, Inc. [TPC] 2004

Chicago O'Hare International Airport

Alternative G

O'Hare Modernization Environmental Impact Statement

▶ Exhibit 2-8

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In Alternative G, the existing airport terminal complex would be expanded with the construction of Terminals 4 and 6, and the expansion of Concourse K. In addition, a new 60-gate terminal complex—including both landside and airside facilities—would be constructed on the west side of the airfield. This new west terminal would be supported by its own access roadway system, parking facilities, and passenger processing facilities. The west terminal would be connected to the existing terminal complex via an underground people mover system that would permit ticketed, screened passengers to travel between the new west terminal and Terminal 1. The new west terminal would incorporate its own U.S. Customs and Immigration Services facilities to process international travelers.

Land areas would be reserved in Alternative G for the expansion of airline support, airport support, and air cargo facilities. In addition, new storm water detention, wastewater treatment, and utilities facilities would be provided. To accommodate new runways and supporting development in Alternative G, the City of Chicago would acquire approximately 135.8 acres of land northwest of the existing Airport boundary and approximately 277.7 acres of land to the southwest of the Airport.

Based on TAAM simulation results, Alternative G would accommodate the unconstrained 2009, 2013, and 2018 flight schedules at reasonable delay levels. A detailed description of the operational and delay characteristics of Alternative G is provided in **Appendix E, Alternatives** of the OM FEIS**, Section E.6.4, Alternative G.**

2.3 Environmental Impact Statement (EIS) Schedule

The FAA issued a Draft Environmental Impact Statement (DEIS) on January 21, 2005 for the proposed improvements at O'Hare. The City of Chicago developed and submitted a construction schedule to be used in the EIS evaluation. The schedule was based on the City's anticipation of a Final EIS/Record of Decision (ROD) completion date in 2004. Subsequently, the FAA informed the City that the EIS/ROD process would be completed in 2005.

As owner and operator of the Airport, the City controls the schedule of construction for any of the build alternatives that may be approved by the FAA. In the case of the EIS, the City's construction schedule was established over two years ago. Neither the original EIS schedule nor the City's construction schedule, both of which were established in 2002, will be achieved.

2.4 Construction Schedules/Scenarios

The preparation of an EIS requires that certain assumptions (e.g. forecast, construction schedule, development plan) must be made early in the process to provide a framework for the environmental analysis. In the case of the O'Hare EIS, the assumptions were established in the late summer/early fall of the year 2002. These assumptions helped to form the basis for identifying and selecting the various alternatives to be considered. The assumptions further enabled computer simulation models to be formatted and run to analyze the potential impacts of the alternatives on numerous environmental categories required for consideration under the NEPA. As stated in the OM DEIS and the OM FEIS, the analyses of environmental impacts are presented for the following conditions:

- Baseline – Represents conditions in 2002
- Construction Phase I – First major construction phase complete (2007)
- Construction Phase II – Second major construction phase complete (2009)
- Build Out – Construction completed and operational (2013)
- Build Out + 5 – Five years beyond Build Out (2018)

Throughout the year 2002 and most of 2003, the expectation of the FAA was that the entire NEPA process could be completed, and a ROD could be issued, sometime in the middle of 2004 (consistent with the City's original EIS schedule). As a result, initially the EIS analyses were prepared using specific "years of analysis," (i.e. 2007, 2009, 2013 and 2018). This assignment of years of analysis was necessary to allow technical experts to begin the work (e.g. running models) of disclosing potential impacts in compliance with NEPA.

In early 2004, it became clear to the Agency that the City's proposed EIS/ROD schedule was incompatible with the time required to achieve the quality of work the Agency has always devoted to such projects. Accordingly, the years of analysis were revised to reflect major phases (i.e., Construction Phase I, Construction Phase II, Build Out, and Build Out +5), rather than specific years. In addition, and in an effort to assist the FAA with adequate disclosure of the best estimate of the revised construction timetable, the City of Chicago submitted a letter in December 2004[22] confirming revised construction timetables.

The changes in presentation (i.e., major phases, construction schedules) described below were made to allow flexibility given the uncertainties that abound regarding construction implementation, and to acknowledge that commencing construction in 2004 was not feasible. There are other uncertainties that can also affect construction, including, for example, weather conditions, length of construction season, etc.

Therefore, in an effort to provide this flexibility and bound the potential timeframe under which construction could commence or be completed, the following potential construction schedule scenarios were considered:

- Original Schedule – The original construction schedule submitted to the FAA by the City called for construction to begin in mid-2004. For reasons already identified, it is now evident that this schedule was unduly optimistic. Details of the original schedule are presented in **Section 5.20, Construction Impacts** of the OM FEIS**.**
- Compressed Schedule – This construction schedule would compress the construction that was to occur in the original schedule between July 2004 (Year 1) and September 2007 (Year 4) into the time period of September 2005 (Year 1) to September 2007 (Year 3). Unlike the original schedule, the City's proposed Runway 9R/27L would be fully operational in October 2007 (Year 3) instead of January 2007 (Year 4). All other future years of analysis would remain the same as those assessed in the original schedule.

[22] Letter from Rosemarie Andolino, City of Chicago, to Barry Cooper, FAA, December 20, 2004.

- Delayed Schedule – This construction schedule is the same as the original construction schedule, but delayed by 14 months. Instead of construction beginning in July 2004 (Year 1), it would begin in September 2005 (Year 1). For all other future years of analysis, there would be a one-year delay (i.e. 2008, 2010, 2014, and 2019 are analyzed instead of 2007, 2009, 2013, and 2018). However, reference will continue to be made to the construction start year for each potential construction schedule (i.e. Year 1, Year 2, etc.)

These construction schedules are further discussed in **Section 5.20** and **Appendix Q, Construction,** of the OM FEIS**.** In addition to the evaluation of the Original, Compressed, and Delayed construction schedules, three construction scenarios are being evaluated through the EIS process. For the purpose of this Final General Conformity Determination, the most conservative construction scenario, the 9.4 million cubic yard (MCY) scenario, was used. This scenario assumes that 9.4 MCY of soil would be removed from airport property and would result in the greatest level of air pollutant and pollutant precursor emissions.

3 CLEAN AIR ACT CONFORMANCE RULES

In November of 1993, the USEPA promulgated two sets of rules to implement Section 176(c) of the Clean Air Act.

The first set is known as the Transportation Conformity Rules.[23] These rules are applicable to highways and mass transit projects within non-attainment areas and establish the criteria and procedures for determining that transportation plans, programs, and projects which are funded under Title 23 of the United States Code (USC) or the Federal Transit Act conform to SIPs. Projects adopted, accepted, approved, or funded by the Federal Highway Administration (FHWA) or the Federal Transit Authority (FTA) must be included in a conforming long range Regional Transportation Plan and shorter-term transportation improvement program (TIP). To satisfy the Transportation Conformity requirements, the design concept and scope of the project that was in place at the time of the conformity finding must be maintained through implementation, and the project design concept and scope is to be sufficiently defined to determine emissions at the time of the TIP conformity determination. It is the FHWA's or FTA's responsibility to ensure that all transportation projects proposed within non-attainment/maintenance areas conform to a States plans to attain/maintain the NAAQS.

The second set of rules is known as the General Conformity Rules.[24] These rules are applicable to all Federal actions within non-attainment areas that are not covered by the Transportation Conformity Rule. Notably, some actions are exempt from the General Conformity Rules. In addition to exempt actions, some other action-related emissions are also not subject to conformity. These include emissions from sources subject to new source review; those covered by the Comprehensive Environmental Response, Compensation, and Liability Act or by other

[23] 58 FR 62188, November 24, 1993.
[24] 58 FR 63214, November 30, 1993.

environmental laws, actions that are not reasonable foreseeable, and those which federal agencies would have no continuing program responsibility.

To be excluded from the requirements to provide a determination of conformity, those projects (actions) which would result in a level of emissions so minimal that the emissions would not have an affect on whether or not an area attains/maintains any of the NAAQS, the USEPA established de minimis (of minimum importance) levels. If, for any action, the total direct and indirect action-related emissions are below the de minimis level, and the action-related emissions are determined not to be regionally significant, it is assumed that the emission level conforms to a State's plan to attain/maintain the NAAQS. Action (project)-related emissions are determined to be regionally significant if the emission level represents 10 percent or more of the regional total of emissions for which the area is non-attainment. The de minimis levels for ozone are provided in **Table 3-1**. The USEPA has not yet established de minimis levels for particulate matter 2.5 microns or less in size.

TABLE 3-1
DE MINIMIS LEVELS – OZONE

Area Designation	Tons/Year	
	Volatile Organic Compounds	Nitrogen Oxides
Extreme	10	10
Severe	25	25
Serious	50	50
Marginal/Moderate/Maintenance	100 (a)	100

Note: (a) 50 tons per year inside an ozone transport region.
Source: General Conformity Rules.

The criteria for determining the conformity of general Federal actions to a SIP vary by pollutant. For the purpose of the O'Hare Final General Conformity Determination, the following discussion of the conformance criteria is limited to the air pollutant ozone because the USEPA has not yet established the criteria by which general Federal actions will be shown to conform to SIPs for particulate matter 2.5 microns or less in size. The discussion is also limited only to those criteria that are applicable to the Chicago non-attainment area.

For Federal actions within the Chicago ozone non-attainment area, the criteria for determining if the action conforms to the applicable SIP (in this case the 1-hour ozone attainment demonstration SIP) are:

- Total project-related direct and indirect emissions of volatile organic compounds and nitrogen oxides emissions are specifically identified and accounted for in 1-hour ozone attainment demonstration SIP, *or*
- The total project-related emissions from the action(s) are fully offset within the same non-attainment or maintenance area through a revision to 1-hour ozone attainment demonstration SIP, or similarly enforceable measure, that effects emission reductions so that there is no net increase in emissions of that pollutant, *or*

- The IEPA makes a determination that the level of emissions, which together with all other emissions in the non-attainment (or maintenance) area, would not exceed the emission targets specified in the 1-hour ozone attainment demonstration SIP, *or*
- The IEPA commits to revise the 1-hour ozone attainment demonstration SIP to accommodate the increased emissions by achieving reductions from other sources.

The USEPA recognizes that emissions associated with airport-related development programs are not typically specifically identified and/or accounted for in SIPs. As such, guidance issued jointly by the USEPA and FAA[25] states that if airport source emissions are not readily identifiable in a SIP inventory, the airport operator should coordinate with the State to determine what, if any, portion of a category could or would be allocated to an airport. The determination of whether an action/project is specifically identified in a SIP is made on a case-by-case basis and done in consultation with the State/local air quality agency and the USEPA regional office. The USEPA/FAA guidance also states that if total emissions with the project/action are below the levels identified/accounted for in the SIP, then it has been demonstrated that the project/action conforms to the applicable SIP.

4 TRANSPORTATION CONFORMITY – EVIDENTIAL RECORDS

To ensure that the proposed roadway improvements conform to the 1-hour ozone attainment demonstration SIP with respect to the Transportation Conformity Rule, the surface transportation projects included in the OM EIS surface transportation modeling efforts were reviewed to insure that the projects are included in the modeling of the Chicago Area Transportation Study (CATS) transportation network, and that each of these projects are included in the most recent conforming TIP (FY 04-09). To aide in the review of CATS conformity determination efforts, a matrix was developed which lists the CATS TIP identification number, CATS TIP project descriptions, and corresponding OM-EIS project descriptions. The conformity status of each project was then documented (see **Table 4-1**).

As shown in **Table 4-1**, it was demonstrated that most of these projects are part of a conforming TIP (CATS verified that the projects either "conformed", are "exempt" (e.g. the project would have de minimis impacts), or are "not regionally significant". CATS did note that conformity was not demonstrated for a few projects. However, the projects that are not in a conformity plan are sponsored by the Illinois State Toll Highway Authority (ISTHA) and are not part of the OM. These projects were determined to be "reasonably foreseeable" by ISTHA, and as a result were included in the OM-EIS surface transportation model. These projects were not part of the most recent conforming FY 04-09 TIP because their funding was no longer available, and hence the projects were not included in the conformity analysis by CATS. It should be noted however, that these projects were previously included in a conforming plan as part of a prior TIP (FY 02-06).

[25] Questions 17, 21, and 22 of the General Conformity Guidance for Airports – Questions and Answers, September 25, 2002; Federal Aviation Administration and United States Environmental Protection Agency.

Although a transportation conformity demonstration is not required for the projects being proposed "by others" (because they are not part of the OM EIS), it is anticipated that a conformity analysis would be completed in the future by the appropriate sponsoring agency, when these projects are proposed for inclusion with a new or amended TIP.

TABLE 4-1
TRANSPORTATION CONFORMITY MATRIX:
ROADWAY PROJECTS IN THE CATS TRANSPORTATION IMPROVEMENT PROGRAM AND IN THE CHICAGO O'HARE MODERNIZATION PROGRAM TRANSPORTATION MODEL

TIP I.D. No.	CATS TIP Project Description	Work Type (from TIP)	O'Hare Modernization FEIS Description	OMP Project #	OMP Year of Operation	Conformity
PREVIOUSLY APPROVED PROJECTS						
01-02-0023	Zemke Rd from Bessie Coleman (W of existing) (Cook / Chicago) to US 12 45 Mannheim Rd (Cook / Chicago) N. end of Bessie Coleman Dr at O'Hare – Conformed UN, Highway / Road – Reconst with change in use or width of lane extension of airport access – new road.	Road Reconstruction	Mannheim Road: Continuous SB through and right turn lane from Higgins to Zemke	I-40	2007	Exempt
			Mannheim Road: Extension of NB left turn lane at Zemke	I-41	2007	Exempt
			Zemke Road: Addition of 2nd left turn lane on EB Zemke onto NB Mannheim	I-42	2007	Exempt
			Zemke Road: Addition of WB through lane on Zemke at Mannheim Road	I-43	2007	Exempt
			Zemke Road: Right turn-only from EB Zemke to SB Mannheim	I-44	2007	Exempt
			Zemke Road: Right turn-only from EB Zemke to SB Bessie Coleman	I-45	2007	Exempt
01-02-0023	Zemke Rd from Bessie Coleman (W of existing) (Cook / Chicago) to US 12 45 Mannheim Rd (Cook / Chicago)	Road Reconstruction	Bessie Coleman Drive: Addition of right turn lane onto EB Zemke Road	I-46	2007	Exempt
03-96-0004	Interchange element was coded with ISTHA Northwest Tollway add-lanes element. Neither element was funded at time of conformity determination, so neither element was conformed.	Highway Additional Lanes, Interchange Reconfigure	Lee Street / Northwest Tollway Interchange (addition of Lee St. on-ramp to WB I-90 and EB I-90 off-ramp to Lee St.)	I-73	2007	Not Conformed(a)
01-00-0077	Bessie Coleman Drive from IL 72 Lee St (Cook / Chicago) to I-190 (North of) (Cook / Chicago), Realign and Extend Bessie Coleman Dr north to Lee St.	Road Extension, Road Alignment	Westerly relocation and widening of the northern portion of Bessie Coleman Drive to Higgins Road	I-74	2007	Conformed
01-02-0023	Zemke Rd from Bessie Coleman (W of existing) (Cook / Chicago) to US 12 45 Mannheim Rd (Cook / Chicago) N. end of Bessie Coleman Dr at O'Hare.	Road Reconstruction	Zemke Road Extension (includes intersection improvements to Zemke and Mannheim Roads)	I-75	2007	Not Regionally Significant
04-00-0022	Balmoral from Bessie Coleman (Cook / Chicago) to US 12 45 East of Mannheim Road (Cook / Rosemont),– Provide full access from Mannheim to Balmoral	New Bridge, New Interchange, Road Extension	Balmoral Avenue Ramps at SB Mannheim	I-77	2007	Conformed
04-00-0022	Balmoral from Bessie Coleman (Cook / Chicago) to US 12 45 East of Mannheim Road (Cook / Rosemont),– Provide full access from Mannheim to Balmoral	New Bridge, New Interchange, Road Extension	Balmoral Extension over Mannheim Road	I-78	2007	Conformed
01-98-0114	I-190 O'Hare access roads from US 12 45 Mannheim Rd (Cook / Chicago) to I-294 Cumberland Ave (Cook / Rosemont)	Corridor Improvement	Mannheim Fly-over ramp from Bessie Coleman Drive to SB Mannheim Road	I-76	2007	Conformed
N / A	Local access only. Not required in TIP / Plan conformity.	N / A	Southeast Service Road and Spine Road Conversion	I-79	2009	Exempt
			Johnson Road: Extension to the east with a right turn only to SB Mannheim Road	I-47	2007	Exempt
			Commercial Vehicle Tunnel	I-80	2007	Exempt
ADDITIONAL ROADWAY IMPROVEMENTS BY OTHERS						
01-98-0114	I-190 O'Hare access roads from US 12 45 Mannheim Rd (Cook / Chicago) to I-294 Cumberland Ave (Cook / Rosemont)	Corridor Improvement	Mannheim Road: Widening of Mannheim Road to 3 lanes each direction between Higgins and Irving Park - Illinois Department of Transportation (IDOT Project)	III-1	2007	Conformed
			I-190 Improvements (IDOT Project)	III-5	2007	Conformed
04-95-0003	I-294 Tri-State Tollway at Devon Avenue (Cook / Rosemont).	Interchange Expansion, Bridge Reconfiguration	Addition of Partial Interchange on I-294 at Devon Avenue (add SB off-ramp to Devon) - Illinois State Toll Highway Authority (ISTHA Project)	III-2	2009	Not Conformed(b)
03-96-0004	Interchange element was coded with ISTHA Northwest Tollway add-lanes element. Neither element was funded at time of conformity determination, so neither element was conformed.	Highway Additional Lanes, Interchange Reconfigure	Expansion of I-90 Interchange at Elmhurst Road (add Elmhurst Road on-ramps to WB I-90 and EB I-90 off-ramps to Elmhurst Road) (ISTHA Project)	III-3	2009	Not Conformed(a)
N / A	Project maintains current access, so it is exempt from conformity analysis.	N / A	Irving Park Road and York Road Intersection Improvements (IDOT Project)	III-4	2009	Exempt
03-96-0004	I-90 Northwest Tollway from Plaza #9 – Elgin (Kane / Elgin) to I-294 Tri-State Tollway (Cook / Rosemont) MP 0.0 – 24.8.	Add Lanes	I-90 add lanes from I-294 to Illinois Route 53	III-6	2009	Not Conformed(a)
08-02-9039	O'Hare Western Access from O'Hare Bypass at Elgin-O'Hare Expy (DuPage / Bensenville) to O'Hare West Terminal (Cook / Chicago)	New Road	York / Thorndale grade separation and interchange improvements including 'off-airport' improvements all of which will be within the existing York / Thorndale right-of-way	III-7	2013	Conformed
PROJECTS BY OTHERS						
04-00-0022	Balmoral from Bessie Coleman (Cook / Chicago) to US 12 45 East of Mannheim Road (Cook / Rosemont),– Provide full access from Mannheim to Balmoral	New Bridge, New Interchange,Road Extension	Balmoral Avenue SB Tunnel	IV-1	2007	Conformed
O'HARE MODERNIZATION PROGRAM PROJECTS						
N / A	Local access only. Not required in TIP / Plan conformity.	N / A	Construct Public Access Road to USPS Complex	VII-106	2013	Exempt
			Construct Public Access Road and Tunnel in Southwest Cargo Area	VII-107	2013	Exempt
			Construct South Access Road Extension West of Main Cargo Road	VII-52	2009	Exempt
01-05-0006	IL 19 Irving Park Road from York Road (DuPage / Bensenville) to Cargo Rd / Taft Road (Cook). Relocation of a section of Irving Park Road between just east of York Rd to 0.3 miles east of Cargo Road / Taft Road.	Road Alignment, Reconstruct in Kind	Irving Park Road Relocation	VII-109	2009	Exempt
08-02-9039	O'Hare Western Access from O'Hare Bypass at Elgin-O'Hare Expy (DuPage / Bensenville) to O'Hare West Terminal (Cook / Chicago)	New Road	West Terminal Ground Access Roadways (on Airport only) in conjunction with York / Thorndale interchange roadways	VII-119	2013	Conformed
			Commercial Vehicle Staging Area Return Roadway	VII-118		

TABLE 4-1
TRANSPORTATION CONFORMITY MATRIX:
ROADWAY PROJECTS IN THE CATS TRANSPORTATION IMPROVEMENT PROGRAM AND IN THE CHICAGO O'HARE MODERNIZATION PROGRAM TRANSPORTATION MODEL

TIP I.D. No.	CATS TIP Project Description	Work Type (from TIP)	O'Hare Modernization FEIS Description	OMP Project #	OMP Year of Operation	Conformity
N / A	Local access only. Not required in TIP / Plan conformity.	N / A	Relocate Mount Prospect Road	VII-12	2007	Exempt
N / A	Freight rail infrastructure is not included in travel demands. No impact on passenger service. Not required to be in TIP / Plan conformity.	N / A	Union Pacific Railroad Relocation	VII-20	2009	Exempt
N / A	Local access only. Not required in TIP / Plan conformity.	N / A	Secure Service Road &Tunnel Connecting North Airfield from Relocated Mt. Prospect Rd	VII-62	2013	Exempt
N / A	Local access only. Not required in TIP / Plan conformity.	N / A	Secure Service Roads and Tunnel Construction in South Airfield	VII-108	2013	Exempt

Notes: (a) Project originally included in conforming TIP FY 02-06, but no longer funded and not included in the conformity analysis. Project included in EIS surface transportation model per ISTHA. A sensitivity analysis performed on the project confirmed that the removal of this project would have only minor effects on modeling.

(b) Project originally included in conforming TIP FY 02-06, but no longer funded. Project was included in EIS surface transportation model per ISTHA. The project is outside the EIS study area but was included in the background trip modeling. The removal of this project would cause some redistribution of trips, but would not have a major effect on the modeling.

As a result of the collaboration between FAA and CATS on all surface transportation conformity assumptions and key issues as depicted in **Table 4-1**, CATS provided documentation[26] to FAA confirming that the OM surface transportation projects conform to the approved SIP, and that the transportation conformity requirements of the Clean Air Act were met.

5 GENERAL CONFORMITY

Are previously discussed (Section 3 of this document), the General Conformity Rules contain what are known as de minimis thresholds. A de minimis threshold is a level that provides an indication of the effect that a project may have on local and/or regional air pollutant concentrations. The levels are used to determine if the General Conformity Rules are applicable to a particular action and whether or not a SIP conformity determination is required. If an action's (project's) emissions are lower than a de minimis threshold, the General Conformity Rules are not applicable unless the total project-related emissions are determined to be regionally significant (represent 10 percent or more of the region's total emissions of the pollutant/precursor). If a project's emissions are higher than a de minimis threshold, a SIP conformity determination is required and there is no need to evaluate the regional significance of the project-related emissions (as the requirement to provide a conformity determination has already been prompted).

Because the NAAQS for particulate matter 2.5 microns or less in size are recent, the General Conformity Rules are not yet applicable to this pollutant (the IEPA has not yet prepared, nor has the USEPA approved, a SIP that addresses the annual NAAQS for particulate matter 2.5 microns or less in size). Because the General Conformity Determination for the proposed improvements at O'Hare addresses the air pollutant ozone, project-related emissions of volatile organic compounds[27] and nitrogen oxides were compared to the de minimis levels. Emissions of volatile organic compounds and nitrogen oxides react, in the presence of sunlight, to produce the air pollutant ozone. To determine if project-related emissions of volatile organic compounds and nitrogen oxides exceed the de minimis thresholds, estimated levels of future direct and indirect emissions with the build alternatives were compared to the level of emissions with the no action (no improvement) alternative.

Direct emissions are defined as emissions that are caused or initiated by a Federal action and occur at the same time and place as the action. Indirect emissions are defined as emissions that are caused by the action but may occur later in time and/or may be farther removed in distance from the action itself but are still reasonably foreseeable and, the Federal agency can practicably control and will maintain control over due to a continuing program responsibility. For the

[26] Letter from CATS to FAA dated April 11, 2005 (Included in **Attachment J-4, Final General Conformity Determination – Transportation Conformity Documentation,** in **Appendix J, Air Quality,** of the OM FEIS).

[27] The Illinois Environmental Protection Agency uses the term "volatile organic material" rather than "volatile organic compounds". The State of Illinois definition of volatile organic material is equivalent to the US Environmental Protection Agency's definition of volatile organic compounds. As such the two terms are interchangeable in this document.

evaluation of the O'Hare improvements, direct emissions are considered to be emissions from non-permitted sources: aircraft, ground support equipment, auxiliary power units, motor vehicles, and construction equipment.

Project-related indirect emissions are those emissions that would result from changes in delay at airports other than O'Hare but service O'Hare-related arrivals. These airports are referred to as "originating airports". Indirect emissions would also result due to changes in the aircraft delay associated with the sequencing and vectoring of arrivals to O'Hare. Normally, indirect emissions are included in a general conformity evaluation. However, the changes in emissions at the originating airports would be so far removed from the Chicago area that the emissions would not affect local air pollutant concentrations. Changes in emissions due to changes in sequencing and vectoring delay would occur above the atmospheric mixing height. As such, these emissions would have no discernable impact on ground level pollutant concentrations.[28] Further, with the proposed improvements, the emission estimates for the originating airports and above the mixing height would reduce. As such, excluding these emissions results in a more conservative evaluation of project-related emissions. Therefore, these project-related indirect emissions were not included in this conformity evaluation.

To evaluate the applicability of the General Conformity Rules to the proposed improvements at O'Hare, the USEPA requested that the de minimis levels applicable to the designation associated with the 8-hour ozone non-attainment area (moderate) be used. To be conservative, the de minimis level applicable to the designated associated with the 1-hour ozone non-attainment area (severe) was also considered. Additionally, the USEPA requested that the assumption be made that nitrogen oxides are not exempt (waived) from the applicability evaluation as these emissions have historically been with respect to other 1-hour ozone evaluations within the area.[29]

The de minimis threshold for the severe 1-hour non-attainment area is 25 tons per year of volatile organic compounds or nitrogen oxide emissions. Based on the area's "moderate" designation for the 8-hour ozone standard, the de minimis threshold to evaluate applicability of the General Conformity Rules is 100 tons per year of volatile organic compounds or 100 tons per year of nitrogen oxide emissions.

As previously stated, conformity determinations are also required when net emission levels do not exceed the de minimis threshold but the emissions are determined to be regionally significant (the emissions represent 10 percent or more of the non-attainment area's total emissions of the applicable pollutant(s)). However, if a project's emissions are higher than a de minimis threshold, a SIP conformity determination is required and there is no need to evaluate the regional significance of the project-related emissions (as the requirement to provide a conformity determination has already been established and evaluating the regional significance of a project's emissions would be redundant).

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[28] Consideration of Air Quality Impacts by Airplane Operations at or Above 3,000 feet AGL; Roger L. Wayson, Gregg G. Fleming; John A. Volpe National Transportation Systems Center, Safety and Environmental Technology Division, September 2000.

[29] Conference Call, USEPA, IEPA, FAA, November 3, 2004.

5.1 Emission Estimate Methodologies

Estimates of air pollutant and pollutant precursor emissions by source are known as emission inventories. Emission inventories provide an indication of the potential increase/decrease in air pollutants and pollutant precursors with proposed projects when the level of emissions is compared to those that would occur with a no-action alternative. For this general conformity applicability evaluation, the emission inventories summarize total emissions of volatile organic compounds and nitrogen oxides from aircraft, ground support equipment, and construction activity. The inventories also summarize the quantity of emissions from motor vehicles that would occur with and without the proposed improvements within a defined study area. For the purpose of the applicability evaluation, the emissions are expressed in tons of emissions per year.

The O'Hare-related inventories were prepared for emissions expected over the long-term (operational emissions) both with and without the proposed improvements and for emissions that would occur over the short-term (construction emissions).

5.1.1 Operational Emissions

Operational emissions are those emissions that occur as a result of operation of an airport. This type of emissions would occur with and without the proposed improvements at O'Hare but the level of emissions would be affected by the implementation of any of the Build Alternatives.

The projects for which this Conformity determination is being prepared are listed in **Table 5-1**. Projects that are assumed to be in place at the time the improvements to O'Hare would also be in place (and could affect the results of the analysis for the proposed improvements) are also listed. These projects have previously been determined to conform to Chicago's 1-hour ozone SIP or are presumed to conform.

As also previously stated, there are some action-related emissions that are not subject to conformity. These include emissions from sources subject to new source review. New source review is a term used to describe the USEPA's preconstruction permitting program. This program ensures that air quality conditions are not significantly degraded from the addition of new and modified factories, industrial boilers and power plants. In non-attainment areas, this program assures that new emissions do not slow progress toward cleaner air. With respect to O'Hare, emissions associated with the heating/cooling plant and fire training activities are subject to permitting. As such, emissions from these sources are not considered in the conformity evaluation.

TABLE 5-1
GENERAL CONFORMITY - PROJECT LISTING

Project ID Number	Project Description
Previously Approved Projects	
I-32	360 degree SGI Based Tower Simulator
I-38	Truck Staging Area (P8)
I-39	UAL Headquarters (Phase I) and associated roadway improvements: (See also ID I-71 & I-72)
I-48	Lot E Long-Term Remote Parking Structure (2 locations - previously approved and relocated) (P2 as designated on the Airport Layout Plan) (a)
I-51	Terminals T1, T2, T3 Face Improvements (Bldgs #121, 200, & 300) and Roadway Canopy (3 labels on exhibit) (b)
I-54	Police Facility (Bldg #519) -Relocated to just south of Higgins Road and west of Realigned Bessie Coleman Drive
I-55	Concourse L Hold Room Expansion (Bldg #320) (See also ID II-8)(c)
I-57	O'Hare Express North / Willow-Higgins – Centerpoint Development (See also ID I-60)(d)
I-58	Direct Fuel Feed System Upgrade / Super Satellite Station Removal (Bldg #989)
I-59	Airside Vehicle Access Road & Bridge Project
I-60	City Warehouse and Trades Building (Bldg #891) (See also ID I-57)(d)
I-61	ATS Maintenance & Storage Yard Development (Bldg #522 relocated to Lot F) (A1 as designated on the Airport Layout Plan)
I-62	ATS Realignment & New Station at Terminal 6
I-63	New ATS Station at Consolidated Rental Car Facility (P3 as designated on the Airport Layout Plan)
I-64	Expansion of Terminal Core Elevated Parking Structure (EPS) (P4 as designated on the Airport Layout Plan) (Bldg #410)
I-65	Lot E Parking Reallocation (modified with the Build Alternatives)
I-66	Consolidated Rental Car Facility (P3 as designated on the Airport Layout Plan) (See also ID I-67)
I-67	Relocate the following facilities to Consolidated Rental Car Facility (P3 as designated on the Airport Layout Plan): Bldg #'s: 560, 562, 564, 565, 566, 567, 568, 569, 570, 572, 574, 580 (See also ID I-66)
I-68	Rental Car Storage and Maintenance Facility and Bridge over Mannheim Road (P3 as designated on the Airport Layout Plan) (2 labels on exhibit)
I-69	Lot F Parking ATS Station and Intermodal Connection (Bldg #581) (e)
I-70	Additional 2 Fuel Tanks Developed in Northwest Airfield at Fuel Farm (Bldg #795) (See also ID VII-63)
I-71	50 percent build-out(f)
I-72	Remaining 50 percent build-out(f)
I-81	Residential and School Sound Insulation Program (not shown on exhibits)(r)
II-1	Terminal 2 Redevelopment(g)
II-2	Co-location of FIS Facilities (not included in the Build Alternatives and not shown on exhibit)

TABLE 5-1
GENERAL CONFORMITY - PROJECT LISTING

Project ID Number	Project Description
Previously Approved Projects (Continued)	
II-3	Infrastructure Relocation/Improvement
II-4	Terminal 3 / Concourse K Extension (T3)
II-5	Apron Reconfiguration
II-6	Co-location of FIS Facilities (associated with Terminal 4)
II-7	Taxiway A and B Reconfiguration (3 labels on exhibit)
II-8	Terminal 4 Development (T2) (See also ID I-55)
II-9	Relocate Post #10 Guardhouse North of Terminal 4 (Bldg #330 relocated to GP10 as designated on the Airport Layout Plan)
II-10	Construct/Reconfigure Necessary Taxilanes & Apron
H& R and Support Facility Relocation, II-11 through II-14	
II-11	ComEd Switchyard D177 (R30 as designated on the Airport Layout Plan)
II-12	City Substation RB40 Relocation (Bldg #472) (R30 as designated on the Airport Layout Plan)
II-13	Cooling Towers Relocation (R22 as designated on the Airport Layout Plan)
II-14	Chicago Transit Authority Substation Relocation (R30 as designated on the Airport Layout Plan)
II-15	Co-location of FIS Facilities (associated with Terminals 3 and 4)
II-16	Ameritech Switch Relocation (not shown on exhibit) (h)
II-17	ComEd Switchyard D179 Relocation (S1 as designated on the Airport Layout Plan)
II-18	Terminal 5 Reconfiguration (Bldg #325) (See also ID I-4)
II-19	Terminal 6 Development (T1)
II-20	Relocate Post #11 Guardhouse (Bldg #561 relocated to GP11 as designated on the Airport Layout Plan)
II-21	Public Surface Parking (P4 as designated on the Airport Layout Plan)
II-22	Construct Terminal 6 Ground Access Roadway and Parking Garage (P4 as designated on the Airport Layout Plan)
II-23	Construct Necessary Taxilanes & Apron
II-24	Southern Relocation of Taxiway M between M5 and M7 (See also ID II-30) (i)
II-25	Delta Cargo Facility (Bldg #527) Relocated to south airfield off of Runway 32L (See also ID VII-114)(j)
II-26	Demolish Building #510 (Former LYNX/Chicago Air Cargo) (k)
II-27	Sky Chefs Flight Kitchen Relocation (Bldg #511) Relocated to Northwest Maintenance Area (R7 as designated on the Airport Layout Plan)
II-28	Lockheed Maintenance Facility (Bldg #987)
II-29	Truck Fuel Stand & Airline Glycol Facility (Bldg #988)

TABLE 5-1
GENERAL CONFORMITY - PROJECT LISTING

Project ID Number	Project Description
Previously Approved Projects (Continued)	
II-30	Taxiway (N) Reconfiguration and Service Road Alignment (See also ID II-24)
II-31	Triturator Relocated (Bldg #525)
II-32	Relocation of Electrical, FAA, Communication, & ATS Duct Banks in Terminal 6 Complex Area
PREVIOUSLY APPROVED WORLD GATEWAY PROJECTS	
IV-2	Limo Service Center (P6 as designated on the Airport Layout Plan) (See also ID VII-95)(l)
IV-4	Military Base Relocation to Scott AFB (not shown on exhibit)
IV-5	Demolition of AMC Annex (AMB -Bldg #506) (Redevelopment of area is anticipated some time next year as a comparable use)
AIR TRAFFIC CONTROL PROCEDURES	
V-2	Chicago Terminal Airspace Project (CTAP) (not shown on exhibit)(s)
V-5	Upgrade Runways 27L and 27R to Cat II/III Capability (2 labels on exhibit)
V-7	Airspace changes related to redevelopment of airfield, see **Section E.5.2,** (not shown on exhibit)
CAPITAL IMPROVEMENT PROJECTS	
VI-1	Storage & Multi-Waste Management Facility at Airport Repair and Construction (ARC) Complex (Bldg #798) (R31 as designated on the Airport Layout Plan) (m)
VI-4	Fuel Farm Sewage Lift Station Replacement(n)
VI-5	West Perimeter Service/Security Road at O'Hare(o)
VI-7	Military Site Utilities (Including Fiber Optic Installation) (not shown on exhibit)
VI-9	Various Runway/Taxiway Re-surfacing/Rehabilitation Projects (not shown on exhibit)
VI-10	Runway 4L/22R Rehabilitation, Taxiway C Reconstruction, and Realignment of Service Road around the Runway 22R Safety Area (3 labels on exhibit)
VI-13	Security Enhancements (not shown on exhibit)
VI-14	AVI System for Ground Transportation (not shown on exhibit)
VI-15	Temporary Conversion of Runway 18/36 to Taxiway GG
VI-16	Reconstruct/Rename Taxiway KK (Previously the West Ramp)
VI-17	Rename Taxiway LL (Previously Taxiway V1)

TABLE 5-1
GENERAL CONFORMITY - PROJECT LISTING

Project ID Number	Project Description
CAPITAL IMPROVEMENT PROJECTS (Continued)	
VI-18	Rename Taxiway MM (Previously Taxiway V2)
VI-19	Former Central Field Office Trailer Site - Currently being used as Snow Removal Staging Area (See also ID VI-6)
O'HARE MODERNIZATION PROJECTS	
VII-1	Construct Runway 9L/27R (7,500 x 150 feet)
VII-2	Construct Associated Partial Parallel Taxiway South of New Runway
VII-3	Construct Associated East Taxiway Connector
VII-4	Willow-Higgins Creek Culvert/Relocation (3 labels on exhibit)
VII-5	Northwest Area Land Acquisition - (See also ID VII-21 & VII-53) (2 labels on exhibit)
VII-6	North Airfield Lighting Vault Expansion (#721)
VII-7	Construct Post #1A Guardhouse to South of Runway end 9L (GP1A as designated on the Airport Layout Plan)
VII-8	Relocate Post #1 Guardhouse to North of Runway End 9L (Bldg #700 relocated to GP1 as designated on the Airport Layout Plan)
VII-9	Relocate DOA Communications Center to South of Existing Location (Bldg #701 relocated to R4 as designated on the Airport Layout Plan)
VII-10	Relocate Explosive Chamber to East of Structure 140 (Bldg #706 relocated to R1 as designated on the Airport Layout Plan)
VII-11	Construct Post #6 Guardhouse off Runway End 22R (GP6 as designated on the Airport Layout Plan)
VII-13	Combine Existing North Detention Basins in North Airfield (680 acre-feet) (See also ID I-17 & VII-93)
VII-14	Construct North Air Traffic Control Tower (ATCT)
VII-15	Relocate/Reroute JAWA Water Main
VII-16	Construct 2,856 x 150 ft Extension West of Existing Runway 9R/27L (new 10L/28R) for Overall 13,000 x 150 ft
VII-17	Construct Associated North Parallel Taxiway (Taxiway M Extension)
VII-18	Construct New Cross-overs and High Speed Taxiway Exits (7 labels on exhibit)
VII-19	Relocate NAVAIDS and Approach Light Systems
VII-21	Partial Southwest Area Land Acquisition(See also ID VII-5 & VII-53) (3 labels on exhibit)
VII-22	Construct New Runway 10C/28C (10,800 x 200 ft)
VII-23	Construct Associated North Parallel Taxiway (Taxiway L Extension) (4 labels on exhibit)
VII-24	Construct Parallel Taxiway North of Taxiway M (2 labels on exhibit)

TABLE 5-1
GENERAL CONFORMITY - PROJECT LISTING

Project ID Number	Project Description
O'HARE MODERNIZATION PROJECTS (Continued)	
VII-25	Construct Runway 10C Pad
VII-26	Construct Runway 28C Pad
VII-27	Construct Associated Taxiway Connectors and High Speed Exits (12 labels on exhibit)
VII-28	Construct Associated East End Taxiway Connector (Taxiway F Extension) (2 labels on exhibit)
VII-29	Closure of Taxiway T South of Runway 10C/28C (See also ID I-12)
VII-30	Closure of Taxiway T10 between Taxiways B and T
VII-31	Relocate NAVAIDS and Approach Light Systems for Runway 14R/32L
VII-32	Closure of Runway 32L Pad
VII-33	Runway 18/36 Decommissioning
VII-34	St. Johannes Cemetery Relocation
VII-35	Resthaven Cemetery Relocation
VII-36	South Detention Basin Reconfiguration (1,700 acre-feet)
VII-37	Relocate Air Cargo Simulation Building (Bldg #603 relocated to R18 as designated on the Airport Layout Plan)(p)
VII-38	Relocate Lighting Utility Building (Bldg #604 relocated to R17 as designated on the Airport Layout Plan) (p)
VII-39	Relocate Fueling Utility (Bldg #606 relocated to R19 as designated on the Airport Layout Plan) (p)
VII-40	Relocate Electrical Utility (Bldg #608 relocated to R17 as designated on the Airport Layout Plan) (p)
VII-41	Relocate United Airlines Cargo (Bldg #610 relocated to R14 as designated on the Airport Layout Plan) (See also ID I-31) (p)
VII-42	Relocate Federal Express Metroplex (Bldg #611 relocated to R16 as designated on the Airport Layout Plan) (p)
VII-43	Relocate Federal Express Guardhouse (Bldg #619 relocated to R16 as designated on the Airport Layout Plan) (p)
VII-44	Relocate Federal Express Fueling System (Bldg #620 relocated to R16 as designated on the Airport Layout Plan) (p)
VII-45	Relocate Federal Express Maintenance (Bldg #621 relocated to R15 as designated on the Airport Layout Plan) (p)
VII-46	Oil-Water Separator #1 (Bldg #971) (Relocation to be determined)
VII-47	Relocate Oil-Water Separator #2 (Bldg #973) (Relocation to be determined)
VII-48	Relocate Oil-Water Separator #3 (Bldg #980) (Relocation to be determined)
VII-49	Bensenville Ditch Relocation/Reconfiguration (2 labels on exhibit)

TABLE 5-1
GENERAL CONFORMITY - PROJECT LISTING

Project ID Number	Project Description
O'HARE MODERNIZATION PROJECTS (Continued)	
VII-50	Secure Service Roads and Tunnels (Tunnel extension underneath Runway 10C/28C and new parallel Taxiway North of Taxiway M) (2 labels on exhibit)
VII-51	Secure Service Roads Connecting Future West Terminal to the South Airfield (3 labels on exhibit)
VII-53	Remainder of SW Land Acquisition - (See also ID VII-5 & VII-21)
VII-54	Relocate Post #12 Guardhouse South of New Runway 10C/28C (Bldg #601 relocated to GP12 as designated on the Airport Layout Plan)
VII-55	Construct New South Airport Surveillance Radar (ASR-9) (R26 as designated on the Airport Layout Plan)
VII-56	Relocate ASR-9 (Bldg #936 Relocate to North Airfield Near UAL Reservation Center) (R26 as designated on the Airport Layout Plan)
VII-57	West Terminal - West Satellite Concourse (T4)
VII-58	Taxilanes & Apron
VII-59	West Terminal Detention Basin Reconfiguration (300 acre-feet)
VII-60	Automated People Mover (APM) - Construct APM Track, First 2 Stations and Underground Tunnels from Terminals 1 & 2 (2 labels on exhibit)
VII-61	APM Maintenance Yard /Storage Area (A2 as designated on the Airport Layout Plan)
VII-63	Fuel Farm Improvements (Construct Additional Fuel Tanks adjacent to existing fuel farm) (See also ID I-70)
VII-64	Construct 3,293 x 150 ft Extension to West of Existing Runway 9L/27R for Overall 11,260 x 150 ft
VII-65	Construct Associated South Parallel Taxiway (Taxiway H Extension)
VII-66	Construct Associated North Taxiway (West Taxiway Z Extension)
VII-67	Construct New Cross-overs and Highspeed Taxiway Exits (5 labels on exhibit)
VII-68	Relocate NAVAIDS and Approach Light Systems
VII-69	Construct New Runway 9C/27C (11,245 x 200 ft)
VII-70	Construct New Cross-overs and High-speed Taxiway Exits (5 labels on exhibit)
VII-71	Construct Associated North and South Parallel Taxiways (9 labels on exhibit)
VII-72	Construct Associated West Taxiway Connector (3 labels on exhibit)
VII-73	Construct Associated Parallel Taxiway to Runway 4L/22R (3 labels on exhibit)
VII-74	Construct Runway 9C Pad
VII-75	GPS Antenna Relocation (R28) (See also ID I-30)
VII-76	Relocate GA Terminal Bldg - Signature Flight Services (Bldg #800 Relocated to R21 as designated on the Airport Layout Plan) and Northeast Cargo Aprons (See also ID I-34)
VII-77	Demolish Sections of Runway 14L/32R and Associated Taxiway Sections (Runway 14L/32R Decommissioning) (5 labels on exhibit)

TABLE 5-1
GENERAL CONFORMITY - PROJECT LISTING

Project ID Number	Project Description
O'HARE MODERNIZATION PROJECTS (Continued)	
VII-78	VORTAC Relocation (Bldg #922) To South of Existing Location (R27 as designated on the Airport Layout Plan)
VII-79	Relocate ARFF Station #2 to North of Existing Location (Bldg #702 relocated to R12 as designated on the Airport Layout Plan)
VII-80	Relocate Post #2 Guardhouse as Necessary (Bldg #705) (not shown on exhibit)
VII-81	Relocate Sky Chef Flight Kitchen (Bldg #511 relocated to R7 as designated on the Airport Layout Plan)
VII-82	Relocate AAL Ground Equipment Maintenance (GEM) to North of Existing Location (Bldg #723 relocate to R9 as designated on the Airport Layout Plan)
VII-83	Relocate AAL Fire Pump House to North of Existing Location Adjacent to #723 (Bldg #732 relocated to R24 as designated on the Airport Layout Plan)
VII-84	Relocate AAL Hangar #2 to North of Existing Location (Bldg #725 relocated to R8 as designated on the Airport Layout Plan)
VII-85	Relocation of Sanitary Unit (Bldg #728) (To be determined) (not shown on exhibit)
VII-86	Relocate Dobbs Flight Kitchen #1 to North of Existing Location (Bldg #741 relocated to R10 as designated on the Airport Layout Plan)
VII-87	Relocate Dobbs Flight Kitchen #2 to North of Existing Location (Bldg #742 relocated to R11 as designated on the Airport Layout Plan)
VII-88	Relocate UAL Ground Equipment Maintenance (GEM) to North of Existing Location (Bldg #744 relocated to R3 as designated on the Airport Layout Plan) (See also ID I-29)
VII-89	Relocate UAL Office & Medical Personnel Bldg to Northeast of Existing Location (Bldg #746 relocated to R5 as designated on the Airport Layout Plan)
VII-90	Relocate UAL Hangar 5/5A to North of Existing Location (Bldg #750 relocated to R2 as designated on the Airport Layout Plan)
VII-91	Relocate Aircraft Ground Run-Up Enclosure (Bldg #761 Relocated to R23 as designated on the ALP) to Northeast of Existing Location Along Scenic Hold Pad (See also ID I-19)
VII-92	Scenic Hold Pad Reconfiguration (Pavement Removal) (See also ID I-9)
VII-93	New North Detention Basin (335 acre-feet) (See also ID I-17 & VII-13)
VII-94	Secure Service Roads and Tunnel in Northwest Maintenance Area (See also ID VII-12 & VII-62) (2 labels on exhibit)
VII-95	East-side Commercial Vehicle Staging (P6 & P7 as designated on the Airport Layout Plan) (See also ID IV-2) (2 labels on exhibit)
VII-96	Employee Parking Relocated Outside Aircraft Operations Area- North of Runway 9L (P1 as designated on the Airport Layout Plan) (2 labels on exhibit)
VII-97	Northwest Bus Station at Employee Parking - North of Runway 9L (P10 as designated on the Airport Layout Plan)
VII-98	Northwest Security Checkpoint at Employee Parking - North of Runway 9L (P10 as designated on the Airport Layout Plan)
VII-99	Future Airport Building(q)
VII-100	Construct New Runway 10R/28L (7,500 x 150 ft)
VII-101	Construct New Associated North Parallel Taxiway
VII-102	Construct New Cross-over and Highspeed Taxiway Exits (5 labels on exhibit)
VII-103	Construct Associated West Taxiway Connector to 10C Pad (2 labels on exhibit)

TABLE 5-1
GENERAL CONFORMITY - PROJECT LISTING

Project ID Number	Project Description
O'HARE MODERNIZATION PROJECTS (Continued)	
VII-104	Relocate Post #5 Guardhouse South of New Runway 10R/28L (Bldg #605 relocated to GP6 as designated on the Airport Layout Plan)
VII-105	South Air Traffic Control Tower West of Existing Cargo Area
VII-110	Demolish Sections of Runway 14R/32L and Associated Taxiway Sections (Decommissioning 14R/32L) (4 labels on exhibit)
VII-111	Demolish Section of 4R Pad
VII-112	Construct Necessary West Taxiways, Taxilanes, and Apron (2 labels on exhibit)
VII-113	Rotating Beacon Relocation (R25 as designated on the Airport Layout Plan)
VII-114	Delta Cargo Facility Relocated to south of Runway end 10C (R20 as designated on the Airport Layout Plan) (See also ID II-25)
VII-115	Main West Terminal & Concourse (T5)
VII-116	Heating and Refrigeration Plant (S2 as designated on the Airport Layout Plan)
VII-117	Federal Inspection Services Facility
VII-120	Construct Necessary Taxiways, Taxilanes & Apron (6 labels on exhibit)
VII-121	West Terminal Short Term Public Parking/Rental Car Structure (P4 as designated on the Airport Layout Plan)
VII-122	West Terminal Rental Car Quick Turn Around (P9 as designated on the Airport Layout Plan)
VII-123	Automated People Mover (APM) Station - Construct Final Third Station
VII-124	West Terminal Limo/Bus Staging Area (P6 as designated on the Airport Layout Plan)
VII-125	West Terminal Future Taxi Staging Area (P7 as designated on the Airport Layout Plan)
VII-126	New West Terminal Landside Stormwater Detention Basin (170 acre-feet)
VII-127	Construct Post #12 Guardhouse South of Terminal 7 (GP12 as designated on the Airport Layout Plan)
VII-128	Future Employee Parking (P1 as designated on the Airport Layout Plan)
VII-129	Future Long-Term Parking (P2 as designated on the Airport Layout Plan)
VII-130	Construct New Runway 12/30 (9,946 x 150 ft)
VII-131	Construct New Associated North Parallel Taxiway
VII-132	Construct New Associated South Parallel Taxiway and Cargo Ramp
VII-133	Construct New Cross-over Taxiway Exits on the North
VII-134	Construct Associated Taxiway Connector from Terminal Area south to Runway 12/30
VII-135	Relocate KLM Royal Dutch Cargo Building (Bldg #618)

TABLE 5-1
GENERAL CONFORMITY - PROJECT LISTING

Project ID Number	Project Description
O'HARE MODERNIZATION PROJECTS (Continued)	
VII-136	Relocate USPS facility (Bldg #600)
VII-137	Relocate Federal Express Freight Building (Bldg #612)
VII-138	Relocate Northwest Cargo Building (Bldg #613)
VII-139	Relocate Delta Air Freight (Bldg #527)
VII-140	Relocate American Airlines Cargo Building (Bldg #609)
VII-141	Relocate United Parcel Services Building (Bldg #614)
VII-142	Relocate Lufthansa Cargo Building (Bldg #616)
VII-143	Relocate Air France Cargo Building (Bldg #617)

Notes:
(a) The Lot E Long-Term Parking Structure (approved May 3, 2000) would be relocated with the Build Alternatives.
(b) Terminals T1, T2, T3 Face Improvements (Bldgs #121, 200, & 300) and Roadway Canopy projects are currently underway.
(c) There are no current plans for the development of the Concourse L Hold Room Expansion.
(d) Construction of Building 4 (Bldg #891), the City Warehouse and Trades Building, was completed in July 2003. The construction of O'Hare Express North started in 2002, with the most eastern part of the development. The City Warehouse and Trades Building is the first of 4 buildings to be developed in the area.
(e) Lot F was modified to accommodate employee parking as of September 2002.
(f) With the Build Alternatives, there will be less area available for Eastside Collateral Development; the developable area decreases by 50 percent because of Runway 9C-27C approach and safety requirements.
(g) Terminal 2 Redevelopment will not be included as part of the Build Alternatives.
(h) Ameritech / SBC plans to relocate the switch building and garage to their existing facility in Schiller Park (off-Airport / not shown on exhibit).
(i) The southern relocation of Taxiway M is needed for the construction of Taxiway N, and Taxiway N is needed for aircraft arriving on Runway 10C to get to the terminal core area.
(j) Delta Cargo Facility - original site proposed by the World Gateway Program; relocation site changes with the Build Alternatives (see also ID VII-114) to south of Runway end 10C from east of Post Office Road and north of Old Irving Park Road in the south cargo area.
(k) Building #510 (former LYNX / Chicago Air Cargo) is currently vacant and will not be relocated. LYNX Cargo no longer operates at the Airport.
(l) The Limo Service Center has been proposed by a private developer. Construction was stopped in 2004.
(m) The Airport Repair Construction (ARC) Complex will be relocated southwest of the current location adjacent to the Fuel Farm Facility. The Complex includes the ARC and the Multi-Waste Facility (See also ID VI-1). With the Build Alternatives, Building #798 will be relocated to the Multi-Waste Complex.
(n) Design and construction for the Fuel Farm Sewage Lift Station was completed in 2003.
(o) This is a TSA project.
(p) Final location varies depending on the alternative chosen.
(q) The use of the future building, located in the Northwest Hangar area, is to be determined.
(r) With the Build Alternatives, the O'Hare Residential and School Sound Insulation Program could potentially include different or newly impacted residences. The Residential Sound Insulation Program is undefined for the future years. Currently, there is no funding commitment beyond the current year.
(s) The Chicago Terminal Airspace Project (CTAP) was approved by the FAA in August of 2001

The sources that relate to continued operation of the Airport that were evaluated and are subject to the General Conformity Rules are:

- Aircraft
- Ground support equipment, and
- Auxiliary power units.

Because the level of passenger-related motor vehicle activity is forecast to increase with the proposed improvements, emissions from motor vehicles were also evaluated. Notably, a portion of the change in emissions from motor vehicles would be a direct result of the proposed improvements to the roadways themselves and a portion would result from the increase in forecast passenger-related activity with the improvements. Because the source of the emissions change is not easily extractable, any increase in emissions has been assumed to be a result of the forecast increase in activity levels at O'Hare with the improvements.

Estimates of air pollutant and pollutant precursor emissions by source are known as emission inventories. Emission inventories provide an indication of the potential increase/decrease in air pollutants and pollutant precursors with proposed projects when the level of emissions is compared to those that would occur with a no-action alternative. For this general conformity applicability evaluation, the emission inventories summarize total emissions of volatile organic compounds and nitrogen oxides from aircraft, ground support equipment, and construction activity. The inventories also summarize the quantity of emissions from motor vehicles that would occur with and without the proposed improvements within a defined study area. For the purpose of the applicability evaluation, the emissions are expressed in tons of emissions per year.

The inventories of operational emissions were prepared using the FAA's commercially available Emissions and Dispersion Modeling System (EDMS - Version 4.12, dated October 22, 2003). The FAA requires the use of EDMS when performing air quality analysis for aviation emission sources. EDMS calculates emissions using source-specific emission factors and user-provided source activity levels.

The following provides a summary of the airport-specific information used in the EDMS to calculate the emission inventories. As previously stated, a detailed description of the methodologies is provided in **Appendix J, Air Quality** of the OM FEIS**.**

5.1.1.1 Aircraft

Aircraft activity levels (aircraft arrival and departure operations) and aircraft/engine assignments were provided by Landrum & Brown, Inc., part of the City's Consultant Team (CCT), after a review by Leigh Fisher Associates, one of the FAA's Third Party Contractors (TPC). This data included the aircraft/engine combination currently at use at O'Hare and additional types of aircraft and candidate engines forecast to be in service at the Airport in the future. Aircraft emissions are based on specific engine types and times in each of the four aircraft operating modes: approach, landing, takeoff, and taxi/idle-delay. The aircraft

fleet/operational level data used in the air quality analysis are consistent with those used to assess noise impacts with the proposed improvements.

Activity Levels and Fleet Mixes

O'Hare-specific peak month average week day operations were obtained from the FAA's EIS TAAM modeling. The peak month average week day aircraft operational data were extrapolated to annual aircraft landing/takeoff cycles (LTOs) using design day ratios. A LTO is equal to a landing and a takeoff (2 operations). The number of evaluated annual landing/takeoff cycles is provided in **Table 5-2.**

TABLE 5-2
ANNUAL NUMBER OF LANDING/TAKEOFF CYCLES

Phase	Number of Landing/Takeoff Cycles (LTOs)	
	Alternative A – No Action (a)	AlternativeC, D, or G (a)
Construction Phase I	487,000	513,150
Construction Phase II	487,000	428,600
Build-Out	487,000	560,300
Build-Out+5	487,000	597,000

Note: (a) One landing / takeoff cycle is equal to two operations (an arrival and a departure). Two compare the number of landing / takeoff cycles to the number of operations, the number of landing / takeoff cycles must be multiplied by two.

Aircraft Emission Factors

The FAA's EDMS contains a database of aircraft engine-specific emission factors based on engine make and model and the four engine operational modes (taxi/idle, takeoff, climb out, and approach). EDMS also contains a database of emission factors for ground support equipment and aircraft auxiliary power units. With the exception of the Airbus 380 (A380), the EDMS default aircraft engine emission factors were used in the analysis. Because the EDMS does not contain emission data for the A380 or it's specific engines, compatible substitute aircraft engine data were used. This wide body passenger aircraft (average seating capacity of 555 passengers) will enter airline service in the year 2006. To account for operations of this aircraft, a user-defined aircraft/engine was developed. Emission indices and time in mode data for the aircraft were developed based on data from the International Civil Aviation Organization (ICAO) Engine Exhaust Emissions Data Bank.[30]

Aircraft Temporal Factors

Temporal factors are used to describe the relationship of one period of time to another period of time (i.e., the relationship of the activity during 1-hour to the activity during a 24-hour period). In EDMS, temporal factors are applied to represent varying levels of activity as a fraction of a peak hour. The use of temporal factors gives the model the ability to more accurately reflect real world conditions.

[30] ICAO Annex 16, Volume 2, Part III, Appendix 3, July 1993 with Amendments (www.QinetiQ.com/aviation_emissions_databank)

In order to represent actual aircraft activity at the Airport throughout the entire calendar year, hour-of-day, day-of-week, and month-of-year temporal factors were developed using data from the FAA's EIS TAAM modeling. Notably, the same day or week and month of year temporal factors were used regardless of analysis year or alternative. These aircraft temporal factors (sometimes referred to as operational profiles) were developed using data from the FAA's EIS TAAM.

Time-in-Mode Data

Time-in-mode data are also used as input for the EDMS. With the exception of taxi-in, taxi-out, apron idling, and time spent in runway queues, the default operating times in EDMS were used (for the operational modes of approach, landing roll, takeoff, and climbout). The procedure known as "reverse thrust", was not incorporated in to the analysis because EDMS does not contain emission factors for this procedure. Pilots often use reverse thrust to slow down jet aircraft immediately after landing. Essentially, the thrust that is normally directed toward the rear of the aircraft that propels an aircraft is re-directed toward the front of an aircraft to slow the aircraft down. The time that aircraft are in this mode ranges from 10 to 20 seconds. Because pilots use this procedure for a minimal amount of time and because the trust (and emissions) of the aircraft are essentially just "reversed" in direction, the emissions associated with this procedure would be minimal and would not substantially affect the results of the air quality analysis. The O'Hare specific taxi-in, taxi-out, apron idling, and runway queue delay data were obtained from the results of the FAA's EIS TAAM modeling. Notably, the greatest difference between the No Action Alternative (Alternative A) and the build alternatives are in the unimpeded travel time and queue delay.

Queue length calculations were based on an estimated aircraft length of 250 feet, which includes a nominal space between aircraft. The takeoff departure queue lengths were provided by airfield simulation modeling data and were reviewed and accepted by the FAA.

Aircraft Assignments to Terminals and Taxiways

The airfield simulation modeling assigns the aircraft to the appropriate terminal; based on airline lease agreements, forecast future gate use strategies, and known operations at O'Hare. The simulation taxiway assignments were based on the common and forecast routing paths known to be assigned by ground traffic controllers at O'Hare.

In addition to aircraft activity at the existing and proposed terminal buildings, the future year analysis with the improvements assumed that some aircraft would be parked remotely through Build-Out, due to the unavailability of terminal gates. For the purpose of transporting passengers to/from the remote parking locations, the air quality analysis assumed that remote gate operations would require a bus service. These activities are accounted for in the aircraft operations data, the ground support equipment use data; and the motor vehicle data used in the air quality analyses.

5.1.1.2 Ground Support Equipment/Auxiliary Power Units

Ground support equipment is a term used to describe the vehicles that service aircraft after arrival and before departure at an airport. Auxiliary power units are on-board engines that provide power to an aircraft while at the gate. Emissions from the ground support equipment and auxiliary power units were calculated using EDMS. The number, types of ground support equipment and auxiliary power units, fuel type, and operational times that are used to service each category of aircraft were based on O'Hare specific information. Emissions from these sources are based on the number and type of equipment used to service each aircraft along with the amount of time the equipment is in use per aircraft landing-takeoff cycle.

EDMS contains a database of the emission factors for each type of ground support equipment. The O'Hare specific data[31] that was used to determine the number and fuel type of the equipment servicing the various types of commercial aircraft and the amount of time each piece of equipment spends with individual aircraft were developed from onsite observations conducted by the City of Chicago. The type of ground support equipment at O'Hare includes aircraft tugs, baggage tugs, fuel trucks, food trucks, cargo trailers, water trucks, lavatory trucks, cabin service, belt loaders, and cargo loaders. The types, operational time, and use of ground support equipment are dependent on aircraft type (i.e., passenger wide body, passenger narrow body, commuter, or cargo).

The air quality analysis with the proposed improvements (Alternatives C, D, and G) assumes that terminal gate improvements will include the provision of preconditioned air and 400 Hertz power at new gates. Use of this equipment will eliminate the need for applicable aircraft to use their own power at the gate except for short periods of time during engine start-up and shut-down. The operating time for the auxiliary power units was calculated for each terminal and applied accordingly.[32] It was assumed that operations involving cargo and those aircraft hard standing would have additional needs for this type of equipment. As such, the analysis of cargo and hardstand aircraft assumed the EDMS default time in use of 26 minutes.

5.1.1.3 Motor Vehicle Emissions

The level of emissions that would result from the daily operation of motor vehicles with or without the proposed improvements depends on several factors including the volume of vehicles, the vehicle fleet mix, the motor vehicle emission rates, travel distance, speed, the level of congestion/delay, the year of analysis, and meteorological factors. Notably, the evaluation of motor vehicle emissions does not attempt to segregate airport-related motor vehicle activity from background (non-airport-related) vehicles. Rather, the activities of all motor vehicles (Airport and background) were evaluated within the study area. The Airport-specific motor vehicle fleet mix was assigned to the USEPA MOBILE model fleet mix based on the type of vehicle (i.e., passenger vehicles were assigned as light-duty vehicles) while the background

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[31] Ground Service Equipment Site Survey, Chicago O'Hare International Airport, Landrum & Brown, Inc., July 2000.

[32] U.S. Federal Aviation Administration, 1998. Personal communication between J. A. Draper (Federal Aviation Administration) to J. R. Pehrson (Camp Dresser & McKee Inc.), November 4, 1998. Subject: Air Quality Modeling Protocol for Criteria Pollutants for LAX Master Plan EIS/EIR.

(non-airport-related) motor vehicle fleet was assigned using MOBILE default vehicle mix and registration data for the Chicago area.

Motor vehicle emissions for all on- and off-Airport roadways were a result of the emission factors corresponding to the roadway speed, the year of analysis, and the vehicle-miles-traveled on those roadways. Emissions occurring at terminal curbsides were calculated using estimates of the amount of time a vehicle spends idling at the curbside and the type of vehicle (shuttle, taxi, private auto, etc.). Emissions due to parking facilities were based on: 1) the amount of time a vehicle spends idling at the parking facility, 2) the distance a vehicle travels within the parking facility at a given speed, and 3) the type of vehicle.

As discussed previously, the future year analysis also assumed that buses would be required to transport passengers to/from remotely parked aircraft. The number of buses required to service the remote gate locations was based on a capacity of 25 persons per bus and the capacity of the aircraft using the remote gate. The buses were assumed to travel from the remote gate (located to the east of Terminal 5) to Terminal 2.

For the purpose of the emissions inventory and dispersion analysis, EDMS calculates motor vehicles using area-specific temperature data. For the air quality analysis presented in the FEIS, an annual average temperature of 49.1 degrees F[33] (the mean daily temperature over the period 1971-2000) was assumed. For the purpose of the conformity evaluation, the motor vehicle emissions were adjusted to reflect the mean daily temperature during the summer.

Airport Area Roadways

Average 24-hour traffic volumes and speeds for the average weekday condition for the on- and off-Airport roadway network were used in the EDMS. O'Hare-specific on-airport traffic data were provided by Kimley-Horn and Associates, Inc. [CCT] after review and acceptance by the TPC.

The emission inventories include contributions from vehicles on major roadways in the vicinity of the Airport. Average weekday 24-hour volumes and average travel speeds were provided for facilities such as Interstate 190, Interstate 90, Bessie Coleman Drive, Elmhurst, Irving Parkway, Touhy, and Mannheim Road, and many others. For future with improvement scenarios, the western airport access introduces a series of new roadway configurations and regional arterials. The western access roadway network was assessed as part of the future build scenarios of the air quality analysis. O'Hare-specific regional traffic data was provided by the CCT. The data included motor vehicle volumes and speeds for the roadways at the Airport and on roadways in the near vicinity. Terminal area motor vehicle curbside queues were also included in the roadway network.

Roadway Temporal Factors

In order to represent actual traffic activity throughout the entire calendar year; hour-of-day, day of-week, and month-of-year temporal factors were developed to scale the peak-hour roadway

[33] http://www.crh.noaa.gov/lot/climate/ord_norms.htm

volumes so that the volumes also represent off-peak activity. Beyond the Build out condition, on-airport roadways were further designated as west or east terminal area for each of the build alternatives (Alternatives C, D and G). Curbsides and parking lots used on-airport temporal factors. Daily and monthly temporal factors were assumed to be the same as the aircraft temporal factors for all alternatives.

Roadway Vehicle Mix

Network-specific motor vehicle fleet mixes were developed for use in MOBILE6.2. The off-Airport network regional fleet mix was provided by IEPA. The on-Airport network used an O'Hare-specific mix provided by CCT. The Airport-specific analysis considered all motor vehicles operating within the study area including passenger automobiles, shuttles, trucks, limousines, buses, and taxi cabs.

Terminal Curbside Facilities

Curbside volumes and vehicle dwell times were developed for each Airport terminal.[34] The same dwell times were used for all years of analysis. Demand volumes and average travel speeds for each terminal curbside location were developed by CCT for the average 24-hour condition in each year of analysis.

Airport Parking Facilities

The parking facilities modeled in the emission inventories and dispersion analyses included the proposed and existing public and employee parking garages, and surface lots. Some parking facilities also have exit toll booths that result in parking lot exit queues, which were modeled as line sources.

Peak-hour traffic volumes entering and exiting the parking facilities were developed using data provided by CCT. Motor vehicle volumes for the multi-level parking garages were provided for each level separately. Travel distances within parking facilities and travel speeds for all parking facilities were also provided by CCT.[35]

Hourly on-airport roadway temporal factors were used for the parking lots. Daily and monthly temporal factors were assumed to be the same as the aircraft temporal factors for all alternatives. The parking lots use their own specific fleet mix, provided by CCT. Generally, the vehicle mix was assumed to be 100 percent passenger vehicles, 100 percent trucks, or 90 percent passenger vehicles and 10 percent trucks, depending on the purpose of the parking facility. Average 24-hour demand volumes, speeds, and average travel distances (or engine-on time) for each major parking facility (including the taxicab and limousine holding areas) were used.

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[34] OMP 2002 Surface Transportation Survey, Kimley-Horn and Associates, Inc. [CCT], Revised January 2003.
[35] Guidelines for Evaluating the Air Quality Impacts of Transportation Facilities. North Carolina Department of Environment, Health & Natural Resources, Division of Environmental Management. Raleigh, NC. March 1995.

Motor Vehicle Emission Factors

The MOBILE6.2 program was used to determine volatile organic compounds (as hydrocarbons), sulfur dioxide, particulate matter, nitrogen oxides, and carbon monoxide emission factors for free-flowing motor vehicles. MOBILE6.2 is the current version of the USEPA's motor vehicle emission rate model. MOBILE6.2 input parameters were selected in accordance with guidance provided by the IEPA.[36] Idle emission factors were calculated using the MOBILE6.2 program and the recommended procedure for idle factors contained in the MOBILE5 Information Sheet #2 (dated July 30 1993).[37] Particulate matter emissions include engine exhaust, tire, and brake wear.

Once pollutant emission factors for motor vehicles were determined, the factors were used as input into the EDMS program for both the emission inventory and dispersion modeling analyses.

The following Chicago non-attainment area-specific MOBILE6.2 files were obtained from the IEPA. These data were used in the analysis or used to develop O'Hare-specific data and are incorporated by reference in the OM FEIS:[38]

- FVMTCH07.def – A file containing vehicle-miles-traveled data by facility type (freeway, arterial, local roads, and ramps) for each hour of the day. Data in this file were used to create O'Hare-specific data.
- CHIRD01.d – A file containing the registration distribution of vehicles by year within the Chicago non-attainment area. Differences in this file and default MOBILE6.2 files only exist for light-duty vehicles and light-duty trucks.
- HVMTCH7.sl – A file containing vehicle-miles-traveled by hour of the day. As with the FVMTCH07.def file, the information was used to create O'Hare-specific data.
- ILLOBDIM.d – A file containing specific data related to the Inspection and Maintenance program in the Chicago non-attainment area. It was assumed that 91.5 percent of the gasoline-powered on-highway traffic in the airport area is subject to the Inspection and Maintenance program (to be consistent with Illinois Environmental Protection Agency's regional analysis).[39]
- SVMTCH07.def – A file containing vehicle-miles-traveled data by speed by hour of the day. Information in this file was used to develop O'Hare-specific data.

Using MOBILE6.2, emission factors were developed for a set of vehicle speeds. In turn, each roadway segment was assigned a roadway type based on roadway description. Volume and vehicle speed data were assigned to each road portion by Kimley-Horn and Associates, Inc.

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[36] M. Rogers, Illinois Environmental Protection Agency. November 2, 2000.
[37] MOBILE5 Information Sheet No. 2: Estimating Idle Emission Factors Using MOBILE5, U.S. Environmental Protection Agency, Office of Air Quality and Radiation, Office of Mobile Sources, Emission Planning and Strategies Division. Ann Arbor, MI. July 1993.
[38] Sam Long, IEPA, November 22, 2002.
[39] Meeting with IEPA on December 20, 2002.

[CCT]. Together, the vehicle volume, the coordinates (start and end), vehicle speed, and emission factors were incorporated into the EDMS system to determine the emissions and dispersion air quality impacts.

Operating modes, including hot/cold start percentages, were assumed as MOBILE6.2 national defaults, except parking lots used a 100 percent cold start, where the average stay was considered to be over two hours. General data (provided by IEPA)[40] for the calculation of motor vehicle emission factors through MOBILE6.2 included the following:

- Stage II refueling program applies
- Inspection and Maintenance program applies
- Anti-tampering program applies
- Low altitude location
- Ambient temperature range of 70 and 96º Fahrenheit
- 95 percent absolute humidity
- Gasoline sulfur content of 129 parts per million
- Diesel sulfur content of 500 parts per million (for 2002 condition) and 15 parts per million (for all future conditions).

5.1.2 Construction Emissions

Pollutant emissions resulting from activities associated with the construction of the new runways, extended runways, new and extended taxiways, new terminals, parking facilities, and roadways were also estimated. These emissions would occur only with the proposed improvements at O'Hare.

Data regarding the number of pieces and types of construction equipment to be used on the project, the deployment schedule of equipment (monthly and annually), and the approximate daily operating time (including power level or usage factor) were estimated for each individual construction project based on a schedule of construction activity. These estimates were prepared by the City of Chicago's consulting team (CCT) by project phase, by subcomponent, and by month. The evaluated project timelines (construction activity schedule) for the Original and Delayed Schedules are provided in **Table 5-3** and **Table 5-4.** The construction equipment specifications are available for review on the OM website (www.ompeis.net). The equipment specifications are not provided in this document due to the voluminous nature of the data.

[40] Sam Long, IEPA, November 22, 2002.

TABLE 5-3
OVERVIEW OF PROPOSED CONSTRUCTION PLAN – ORIGINAL SCHEDULE

Proposed Project	Preliminary Construction Schedule	
	Start Date	**End Date**
PHASE 1A – New North Runway 9L/27R and Associated Taxiway Construction		
JAWA Water Main Relocation	July Year 1	May Year 2
Security Related Improvements	July Year 1	December Year 2
Willow Higgins Creek Relocation	July Year 1	June Year 3
Runway Pavement and Shoulders	July Year 2	November Year 3
Taxiway Pavement and Shoulders	July Year 2	November Year 3
New Roadways and Related Infrastructure	April Year 3	November Year 3
North Airfield Lighting Vault	November Year 1	October Year 3
FAA Control Tower	October Year 1	October Year 3
North Basin Expansion	May Year 2	November Year 2
PHASE 1B – Extension to Existing Runway 9R/27L (New Runway 10L/28R) and Associated Taxiway		
Runway Pavement and Shoulders Extension	April Year 4	November Year 4
Taxiway Pavement and Shoulders Extension	April Year 4	November Year 4
Irving Park/York Road Construction	September Year 1	June Year 3
Union Pacific Railroad Relocation	June Year 1	June Year 3
PHASE 1C – New Closely-Spaced South Runway 10C/28C and Associated Taxiways and Holdpads		
St. Johannes Cemetery and Resthaven Cemetery Relocations	June Year 3	November Year 5
Cargo and Maintenance Facility Relocation	July Year 1	December Year 4
South Detention Basin	July Year 1	August Year 3
Runway Pavement, Shoulders, and Holdpads	September Year 2	November Year 5
Taxiway Pavement and Shoulders	September Year 2	November Year 5
South Airfield Lighting Vault	July Year 2	July Year 4
New Roadways and Related Infrastructures	July Year 2	August Year 5
New Central Basin	March Year 4	July Year 5
Bensenville Ditch Relocation	July Year 1	March Year 3
Demolition: Buildings: fire station (602), cargo simulation (603), lighting vault (604), fueling station (606), electrical utilities (608), UAL Cargo (610), basement fill-in (610), Fed Ex metroplex (611), Fed Ex freight (612), MW Cargo (613)	March Year 2	August Year 2
PHASE 1 – West Terminal – West Satellite Concourse		
West Satellite Concourse (T4)	March Year 4	November Year 5
Energy Facility	July Year 4	February Year 5
ATS Station (Active AOA)	December Year 2	February Year 5
ATS Station (West Terminal)	December Year 2	August Year 4
ATS Station (Terminal No. 7)	April Year 3	April Year 4
ATS Tunnel (Bored)	March Year 3	October Year 3
ATS Maintenance Center	June Year 3	June Year 4
ATS System	July Year 4	January Year 6
Fuel Farm Improvements	July Year 1	October Year 3
PHASE 2A – Extension to Exiting Runway 9L/27R (New Runway 9R/27L) and Associated Taxiway		
Runway Pavement and Shoulders Extension	July Year 7	November Year 9
Taxiway Pavement and Shoulders Extension	July Year 7	November Year 9

TABLE 5-3
OVERVIEW OF PROPOSED CONSTRUCTION PLAN – ORIGINAL SCHEDULE

Proposed Project	Preliminary Construction Schedule	
	Start Date	**End Date**
PHASE 2B – New Closely-Spaced North Runway 9C/27C and Associated Taxiways and Holdpad		
GPS Antenna	July Year 1	September Year 1
Cargo and Maintenance Facility Relocation – Site work, parking lots, concrete aprons for and including the construction of the following replacement buildings: Fire Station (702), Flight Kitchen (741), AAL Hangar Maintenance (725), UAL Hangar Maintenance (750), UAL Ground Maintenance (744), AAL Ground Maintenance (723), Flight Kitchen (742), UAL Personnel Building (746), Lift Station (728)	October Year 3	October Year 5
Demolition – moving from old bldgs to new buildings and demo of the old following bldgs: Fire Station (702), Flight Kitchen (741), AAL Hangar Maintenance (725), Lift Station (728) AAL Ground Maintenance (723), UAL Personnel Bldg (746), UAL Hangar Maintenance (750), Flight Kitchen (742) and UAL Ground Maintenance (744)	September Year 4	February Year 5
Runway Pavement and Shoulders and Holdpad	June Year 7	November Year 9
Taxiway Pavement and Shoulders	June Year 7	November Year 9
Runway 14R/32L Demolition	April Year 9	October Year 9
Runway 14R/32L Taxiway Pavement and Shoulder Demolition	April Year 9	October Year 9
New Roadways and Related Infrastructure	September Year 7	October Year 9
Willow Creek Relocation	April Year 6	November Year 7
New North Detention Basin	May Year 6	August Year 8
Future Airport Building move to OMP 9C/27C	July Year 7	October Year 9
New Roads and Related Parking	June Year 8	September Year 9
PHASE 2C – New South Runway 10R/28L		
Security Related Improvements	January Year 7	March Year 7
Runway Pavement and Shoulders	April Year 8	November Year 9
Taxiway Pavement and Shoulders	April Year 8	November Year 9
New Roadways and Related Infrastructure	August Year 8	July Year 9
FAA Control Tower	September Year 7	September Year 9
Rotating Beacon	July Year 1	September Year 1
Delta Cargo Facility	July Year 8	November Year 9
Apron Pavement	February Year 9	June Year 9
PHASE 2 – West Terminal		
Main West Terminal	April Year 6	October Year 10
Baggage Handling System	April Year 7	January Year 9
Parking Lot at Irving Park Road and York Road	July Year 7	April Year 9
Parking Structure	March Year 9	April Year 10
Western Terminal Access Roadway	June Year 6	January Year 8
Parking Lot	April Year 10	September Year 10
PHASE 2 – Projects Previously Approved Through the World Gateway Program		
Terminal 3, Concourse K Extension	July Year 4	December Year 5
Taxiway A and B Reconfiguration at Terminal 3	December Year 4	December Year 5
Reconstruction of Terminal 1/2 Connector	December Year 4	December Year 5
Terminal 4 – Demolition of Existing Concourse L	October Year 10	December Year 10
Construction of Terminal 4	August Year 7	December Year 10
Construction of Terminal 6	January Year 6	December Year 9
Redevelopment of Terminal 5	July Year 8	December Year 9

TABLE 5-3
OVERVIEW OF PROPOSED CONSTRUCTION PLAN – ORIGINAL SCHEDULE

Proposed Project	Preliminary Construction Schedule	
	Start Date	End Date
PHASE 2 – Projects Previously Approved Through the World Gateway Program (Continued)		
Construction of ATS Station at Terminal 6 and ATS Realignment at Terminal 5/6	July Year 8	December Year 9
Construction of Terminal 6 Access Road	January Year 8	December Year 9
Terminal 5 & 6 Parking	August Year 9	December Year 9
Taxiway B East Extension	April Year 5	December Year 5
Construction of new Delta Air Freight and Related Facilities	October Year 8	December Year 9
Demolition of Existing Delta Air Freight and Related Facilities	November Year 9	December Year 9
Demolition of existing Lynxs Cargo and Related Facilities	November Year 9	December Year 9
Construction of new Skychef's Flight Kitchen and Related Facilities	July Year 8	December Year 9
Construction of Skychef's Parking Garage	September Year 8	December Year 9
Demolition of existing Skychef's Flight Kitchen and Related Facilities	November Year 9	December Year 9
Snow Dump Relocation	September Year 9	November Year 9
New Police Facility Construction	January Year 3	August Year 3
Old Police/Warehouse Demo	November Year 9	December Year 9
Construction of new H & R Plant and Related Facilities	December Year 9	December Year 9
Demolition of existing H & R Plant and Related Facilities	August Year 9	December Year 9
Parking Structures in Terminal Core	July Year 3	December Year 4
North LTP2 Construction	September Year 8	December Year 9
Construction of ATS Station at North LTP2	May Year 9	December Year 9
Construction of ATS Extension to North LTP2	May Year 9	December Year 9
Consolidated Rental Car Facility – Demolition of Existing Facilities	November Year 3	December Year 3
Construction of Consolidated Rental Car Facility	July Year 3	December Year 3
Construction of Mannheim Bridge	September Year 2	December Year 3
Construction of Rental Car Storage	March Year 3	December Year 3
ATS Station at New CONRAC	February Year 3	December Year 3
Construction of Balmoral Ave. (Phases II and III)	May Year 2	December Year 3
Construction of Commercial Vehicle Tunnel under I-190	January Year 3	December Year 3
Construction of Road Structure of Commercial Vehicle Tunnel under I-190	January Year 3	December Year 3
New ATS Maintenance Yard Construction	May Year 8	April Year 10
Old ATS Maintenance Yard Demolition	July Year 9	December Year 9
Construction of ATS Extension to new Maintenance Yard	May Year 8	April Year 10
Construction of Mannheim Lot E Fly over Northern Access Roads	October Year 2	February Year 4
Construction of Mannheim Lot E Fly over Southern Access Roads	February Year 3	January Year 4
Construction of Expansion of I-90 Interchange at Lee Street	May Year 2	December Year 3
Construction of Realignment of Bessie Coleman Drive	May Year 3	December Year 3
Zemke Road Extension	April Year 3	January Year 4
Fuel Farm Development in NW Airfield	February Year 3	January Year 4
Military Site Demo per Building #8001	June Year 3	December Year 3
Military Site Demo per Building #0001	November Year 2	December Year 3
Military Site Demo per Building #8023	October Year 3	December Year 3
Military Site Demo per Building #0060	February Year 3	December Year 3
Military Site Demo per Building #0002	July Year 3	December Year 3
Military Site Demo per Building #8002	August Year 3	December Year 3
Eastside Collateral Development pre 2007	May Year 4	April Year 6
Eastside Collateral Development post 2007	May Year 4	December Year 5
Parking Lots South of Zemke & North of I-190	July Year 1	December Year 3

TABLE 5-3
OVERVIEW OF PROPOSED CONSTRUCTION PLAN – ORIGINAL SCHEDULE

Proposed Project	Preliminary Construction Schedule	
	Start Date	**End Date**
PHASE 2 – Projects Previously Approved Through the World Gateway Program (Continued)		
Arterial Roadway Improvements, Bessie Coleman, I-190, Mannheim Rd – Includes all slip ramps, access roads and required secondary roads	July Year 1	December Year 3
Aircraft Apron at Terminal 4	March Year 9	December Year 9
Terminal Upper & Lower level Roadways at Terminal 4 & 6	July Year 8	September Year 9
ALP Redevelopment Projects		
Future Employee Parking at Touhy Ave.	July Year 7	April Year 9

Source: Construction Impacts Draft Technical Working Report, AOR/TOK [CCT], September 2004.

TABLE 5-4
OVERVIEW OF PROPOSED CONSTRUCTION PLAN – DELAYED SCHEDULE

Proposed Project	Preliminary Construction Schedule	
	Start Date	End Date
PHASE 1A – New North Runway 9L/27R and Associated Taxiway Construction		
JAWA Water Main Relocation	September Year 1	July Year 2
Security Related Improvements	September Year 1	February Year 3
Willow Higgins Creek Relocation	September Year 1	August Year 3
Runway Pavement and Shoulders	September Year 2	January Year 4
Taxiway Pavement and Shoulders	September Year 2	January Year 4
New Roadways and Related Infrastructure	June Year 3	January Year 4
North Airfield Lighting Vault	January Year 2	December Year 3
FAA Control Tower	December Year 1	December Year 3
North Basin Expansion	July Year 2	January Year 3
PHASE 1B – Extension to Existing Runway 9R/27L (New Runway 10L/28R) and Associated Taxiway		
Runway Pavement and Shoulders Extension	June Year 4	January Year 5
Taxiway Pavement and Shoulders Extension	June Year 4	January Year 5
Irving Park / York Road Construction	November Year 1	August Year 3
Union Pacific Railroad Relocation	August Year 1	August Year 3
PHASE 1C – New Closely-Spaced South Runway 10C/28C and Associated Taxiways and Holdpads		
St. Johannes Cemetery and Resthaven Cemetery Relocations	August Year 3	January Year 6
Cargo and Maintenance Facility Relocation	September Year 1	February Year 5
South Detention Basin	September Year 1	October Year 3
Runway Pavement, Shoulders, and Holdpads	November Year 2	January Year 6
Taxiway Pavement and Shoulders	November Year 2	January Year 6
South Airfield Lighting Vault	September Year 2	September Year 4
New Roadways and Related Infrastructures	September Year 2	October Year 5
New Central Basin	May Year 4	September Year 5
Bensenville Ditch Relocation	September Year 1	May Year 3
Demolition: Buildings: fire station (602), cargo simulation (603), lighting vault (604), fueling station (606), electrical utilities (608), UAL Cargo (610), basement fill-in (610), Fed Ex metroplex (611), Fed Ex freight (612), MW Cargo (613)	May Year 2	March Year 5
PHASE 1 – West Terminal – West Satellite Concourse		
West Satellite Concourse (T4)	May Year 4	January Year 6
Energy Facility	September Year 4	June Year 6
ATS Station (Active AOA)	February Year 3	June Year 6
ATS Station (West Terminal)	February Year 3	October Year 4
ATS Station (Terminal No. 7)	June Year 3	June Year 4
ATS Tunnel (Bored)	May Year 3	December Year 3
ATS Maintenance Center	August Year 3	August Year 4
ATS System	September Year 4	March Year 6
Fuel Farm Improvements	September Year 1	December Year 3
PHASE 2A – Extension to Exiting Runway 9L/27R (New Runway 9R/27L) and Associated Taxiway		
Runway Pavement and Shoulders Extension	September Year 7	January Year 10
Taxiway Pavement and Shoulders Extension	September Year 7	January Year 10

TABLE 5-4
OVERVIEW OF PROPOSED CONSTRUCTION PLAN – DELAYED SCHEDULE

Proposed Project	Preliminary Construction Schedule	
	Start Date	**End Date**
PHASE 2B – New Closely-Spaced North Runway 9C/27C and Associated Taxiways and Holdpad		
GPS Antenna	September Year 1	November Year 1
Cargo and Maintenance Facility Relocation – Site work, parking lots, concrete aprons for and including the construction of the following replacement buildings: Fire Station (702), Flight Kitchen (741), AAL Hangar Maintenance (725), UAL Hangar Maintenance (750), UAL Ground Maintenance (744), AAL Ground Maintenance (723), Flight Kitchen (742), UAL Personnel Building (746), Lift Station (728)	December Year 3	December Year 5
Demolition – moving from old bldgs to new buildings and demo of the old following bldgs: Fire Station (702), Flight Kitchen (741), AAL Hangar Maintenance (725), Lift Station (728) AAL Ground Maintenance (723), UAL Personnel Bldg (746), UAL Hangar Maintenance (750), Flight Kitchen (742) and UAL Ground Maintenance (744)	November Year 4	June Year 6
Runway Pavement and Shoulders and Holdpad	August Year 7	January Year 10
Taxiway Pavement and Shoulders	August Year 7	January Year 10
Runway 14R/32L Demolition	June Year 9	December Year 9
Runway 14R/32L Taxiway Pavement and Shoulder Demolition	June Year 9	December Year 9
New Roadways and Related Infrastructure	November Year 7	December Year 9
Willow Creek Relocation	June Year 6	January Year 8
New North Detention Basin	July Year 6	October Year 8
Future Airport Building move to OMP 9C/27C	Sep Year 7	December Year 9
New Roads and Related Parking	August Year 8	November Year 9
PHASE 2C – New South Runway 10R/28L		
Security Related Improvements	March Year 7	May Year 7
Runway Pavement and Shoulders	June Year 8	January Year 10
Taxiway Pavement and Shoulders	June Year 8	January Year 10
New Roadways and Related Infrastructure	October Year 8	September Year 9
FAA Control Tower	November Year 7	November Year 9
Rotating Beacon	September Year 1	November Year 1
Delta Cargo Facility	September Year 8	January Year 10
Apron Pavement	April Year 9	August Year 9
PHASE 2 – West Terminal		
Main West Terminal	June Year 6	December Year 10
Baggage Handling System	June Year 7	March Year 9
Parking Lot at Irving Park Road and York Road	September Year 7	June Year 9
Parking Structure	May Year 9	June Year 10
Western Terminal Access Roadway	August Year 6	March Year 8
Parking Lot	June Year 10	November Year 10
PHASE 2 – Projects Previously Approved Through the World Gateway Program		
Terminal 3, Concourse K Extension	September Year 4	February Year 6
Taxiway A and B Reconfiguration at Terminal 3	February Year 5	February Year 6
Reconstruction of Terminal 1/2 Connector	February Year 5	February Year 6
Terminal 4 – Demolition of Existing Concourse L	December Year 10	February Year 11
Construction of Terminal 4	October Year 7	February Year 11
Construction of Terminal 6	Mar Year 6	February Year 10

TABLE 5-4
OVERVIEW OF PROPOSED CONSTRUCTION PLAN – DELAYED SCHEDULE

Proposed Project	Preliminary Construction Schedule	
	Start Date	End Date
PHASE 2 – Projects Previously Approved Through the World Gateway Program (Continued)		
Redevelopment of Terminal 5	September Year 8	February Year 10
Construction of ATS Station at Terminal 6 and ATS Realignment at Terminal 5/6	September Year 8	February Year 10
Construction of Terminal 6 Access Road	March Year 8	February Year 10
Terminal 5 & 6 Parking	October Year 9	February Year 10
Taxiway B East Extension	June Year 5	February Year 6
Construction of new Delta Air Freight and Related Facilities	December Year 8	February Year 10
Demolition of Existing Delta Air Freight and Related Facilities	January Year 10	February Year 10
Demolition of existing Lynxs Cargo and Related Facilities	January Year 10	February Year 10
Construction of new Skychef's Flight Kitchen and Related Facilities	September Year 8	February Year 10
Construction of Skychef's Parking Garage	November Year 8	February Year 10
Demolition of existing Skychef's Flight Kitchen and Related Facilities	January Year 10	February Year 10
Snow Dump Relocation	November Year 9	January Year 10
New Police Facility Construction	March Year 3	October Year 3
Old Police/Warehouse Demo	January Year 10	February Year 10
Construction of new H & R Plant and Related Facilities	February Year 8	February Year 10
Demolition of existing H & R Plant and Related Facilities	October Year 9	February Year 10
Parking Structures in Terminal Core	September Year 3	February Year 5
North LTP2 Construction	November Year 8	February Year 10
Construction of ATS Station at North LTP2	July Year 9	February Year 10
Construction of ATS Extension to North LTP2	July Year 9	February Year 10
Consolidated Rental Car Facility – Demolition of Existing Facilities	January Year 4	February Year 4
Construction of Consolidated Rental Car Facility	September Year 3	February Year 4
Construction of Mannheim Bridge	November Year 2	February Year 4
Construction of Rental Car Storage	May Year 3	February Year 4
ATS Station at New CONRAC	April Year 3	February Year 4
Construction of Balmoral Ave. (Phases II and III)	July Year 2	February Year 4
Construction of Commercial Vehicle Tunnel under I-190	March Year 3	February Year 4
Construction of Road Structure of Commercial Vehicle Tunnel under I-190	March Year 3	February Year 4
New ATS Maintenance Yard Construction	July Year 8	June Year 10
Old ATS Maintenance Yard Demolition	September Year 9	February Year 10
Construction of ATS Extension to new Maintenance Yard	July Year 8	June Year 10
Construction of Mannheim Lot E Fly over Northern Access Roads	December Year 2	April Year 4
Construction of Mannheim Lot E Fly over Southern Access Roads	April Year 3	March Year 4
Construction of Expansion of I-90 Interchange at Lee Street	July Year 2	February Year 4
Construction of Realignment of Bessie Coleman Drive	July Year 3	February Year 4
Zemke Road Extension	June Year 3	March Year 4
Fuel Farm Development in NW Airfield	April Year 3	March Year 4
Military Site Demo per Building #8001	August Year 3	February Year 4
Military Site Demo per Building #0001	January Year 3	February Year 4
Military Site Demo per Building #8023	December Year 3	February Year 4
Military Site Demo per Building #0060	April Year 3	February Year 4
Military Site Demo per Building #0002	September Year 3	February Year 4
Military Site Demo per Building #8002	October Year 3	February Year 4
Eastside Collateral Development pre 2007	July Year 4	June Year 6
Eastside Collateral Development post 2007	July Year 4	February Year 6
Parking Lots South of Zemke & North of I-190	September Year 1	February Year 4

TABLE 5-4
OVERVIEW OF PROPOSED CONSTRUCTION PLAN – DELAYED SCHEDULE

Proposed Project	Preliminary Construction Schedule	
	Start Date	End Date
PHASE 2 – Projects Previously Approved Through the World Gateway Program (Continued)		
Arterial Roadway Improvements, Bessie Coleman, I-190, Mannheim Rd – Includes all slip ramps, access roads and required secondary roads	September Year 1	February Year 4
Aircraft Apron at Terminal 4	May Year 9	February Year 10
Terminal Upper & Lower level Roadways at Terminal 4 & 6	September Year 8	November Year 9
ALP Redevelopment Projects		
Future Employee Parking at Touhy Ave.	September Year 7	June Year 9

Sources: Crawford, Murphy, and Tilly, Inc. [TPC], analysis of information received from the AOR/TOK, December 2004.

Emissions from construction activities were estimated based on the projected construction activity schedule, the number of vehicles/pieces of equipment, and vehicle/equipment utilization rates. Emissions from several components of construction activities were evaluated. These include emissions from on-site construction equipment (i.e., backhoes, bulldozers, graders, etc.); haul vehicles (i.e., cement trucks, dump trucks, etc.); and construction worker vehicles getting to and from the site.

The construction equipment specification data provided by the CCT was segregated in to four categories: OMP, World Gateway Project, Airport Layout Plan (ALP), and FACE (terminal improvements). The OMP and World Gateway Project assignments were assessed cumulatively for air quality impacts in the FEIS and are being assessed cumulatively for conformity purposes. The ALP and FACE projects were assessed for cumulative impacts in the FEIS but not conformity purposes because these projects are not part of the proposed improvements.

The construction-related emission inventories were calculated using emission factors obtained from the USEPA's Nonroad Engine and Vehicle Emission Study,[41] the publicly available NONROAD model (Version 2.2d)[42] databases and support information, the Compilation of Air Pollutant Emission Factors (AP-42), and/or the publicly available MOBILE6.2.[43] The selection of these models, support material, and databases was made in consultation with the IEPA and USEPA.[44]

[41] Nonroad Engine and Vehicle Emission Study - Report. U.S. Environmental Protection Agency. Office of Transportation and Air Quality. Research Triangle Park, NC. Report number EPA-460/3-91-02. November 1991.
[42] NONROAD, Version2.2d, U.S. Environmental Protection Agency, December 2002. The NONROAD model can be downloaded at: http://www.epa.gov/otaq/nonrdmdl.htm.
[43] The MOBILE model can downloaded at: http://www.epa.gov/otaq/m6.htm
[44] Air Quality Analysis Protocol – Criteria Pollutants, O'Hare Modernization Program Environmental Impact Statement, August 5, 2003.

A total of approximately 50 individual construction projects comprise the proposed project.[45] The analysis of construction activities evaluates the level of pollutant and pollutant precursor emissions directly related to construction. The main construction activities are:

- Clearing and grubbing;
- Site Excavation, Movement, Storage, and Removal;
- Grading of the site;
- Demolition;
- On-site Production of New Construction Materials;
- Providing for drainage throughout the site;
- Construction of runways at grade;
- Constructing parking lots at grade; and
- Constructing the West Terminal and parking lots.

To calculate emissions that would result from the construction activities, an estimate of daily equipment requirements for each general construction activity (i.e., demolition, earthwork, building construction, subgrade preparation and paving). Equipment requirements were then assigned to each activity. The types of equipment include (but are limited to) motor graders, rollers, water trucks, loaders, cranes, drill rigs, pavers, asphalt spreaders, excavators, pickup trucks and dual tandem trucks. Emission factors for all equipment except pick-up and dual tandem trucks (i.e., on-road certified vehicles) were obtained from the NONROAD model[46] and documentation and databases prepared in support of the model.[47] Emission factors for each equipment type were applied to the anticipated equipment work output (horsepower-hours of expected equipment use or hours of operation). Operating times for the equipment were conservatively based on a six-day workweek and a ten-hour workday during which the equipment would be running continuously except for two 15-minute breaks and a 1-hour lunch break. A usage factor accounting for the percentage of daily operation was also used.

Emission factors for pickup, flat bed, bucket, and dual tandem trucks were obtained from the MOBILE6.2 motor vehicle emission rate model. Appropriate input for annual vehicle mileage accumulation, inspection/maintenance programs, anti-tampering and program effectiveness was obtained from the IEPA. Pickup trucks were modeled as light trucks with a gross vehicle weight less than 6,000 pounds (small pickup trucks) and trucks with a gross vehicle weight less than 8,500 pounds (larger pickup trucks). Flat bed, bucket and dual tandem trucks were modeled as heavy diesel powered vehicles. Emission factors for all on-road certified vehicles were obtained from the MOBILE6.2 model at vehicle speeds that were dependent on type of

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[45] Construction Logistics Equipment Plan based on the Airport Layout Plan, AOR/TOK [CCT], March 24, 2004.
[46] NONROAD, Version 2.2d, December, 2002. U.S. Environmental Protection Agency.
[47] Median Life, Annual Activity, and Load Factor Values for Nonroad Engine Emissions Modeling. Christian E. Lindhjem and Megan Beardsley. U.S. Environmental Protection Agency, Office of Mobile Sources (now Office of Transportation and Air Quality). Report No. NR-005A. December 9, 1997, revised June 15, 1998. (Documentation for NONROAD model development).

activity. Estimates of emissions attributable to construction-related employee vehicle trips were also evaluated, as well as onsite busing.

5.2 Annual Emission Estimates

Tables 5-5 and **5-6** provide the O'Hare-related estimated annual operational and construction-related emission inventories of volatile organic compounds and nitrogen oxides, respectively. The annual estimates are provided for the original, compressed, and delayed construction schedules and for conditions estimated to occur with Alternative A (No Action Alternative), and Alternatives C, D, and G (the Build Alternatives for the O'Hare improvements). Notably, the construction-related inventories provided in **Tables 5-5** and **5-6** are those estimated to occur with the 9.4 MCY construction scenario. This scenario would result in the greatest estimated level of volatile organic compounds and nitrogen oxide emissions.

5.3 Applicability Analysis

As previously stated, if an action's (project's) emissions are lower than a de minimis threshold, the General Conformity Rule is not applicable. If a project's emissions are higher than a de minimis threshold, a SIP conformity determination is required.

The de minimis threshold for the severe 1-hour non-attainment area is 25 tons of volatile organic compounds or nitrogen oxide emissions. Based on the area's "moderate" designation for the 8-hour ozone standard, the de minimis thresholds to evaluate applicability of the General Conformity Rules are 100 tons of volatile organic compounds or nitrogen oxide emissions.

With respect to proposed improvements at O'Hare, project-related emissions are those emissions that would occur with the improvements when compared to the emissions that would occur without the improvements (the net change in emission level).

Table 5-8 presents the estimated increase in emissions of volatile organic compounds and nitrogen oxides with the proposed improvements at O'Hare, respectively (the project-related emissions). As shown, the greatest level of annual project-related emissions of volatile organic compounds and nitrogen oxides are 299 and 1,165 tons (estimated to occur in the year 2019). These levels exceed the 1-hour and 8-hour de minimis thresholds of 25 and 100 tons, respectively. As such, a conformity determination is required. Notably, because the project-related emissions exceed the de minimis threshold, it is not necessary to evaluate the regional significance of the emissions because this comparison is an additional applicability "test" to determine if conformity determinations are required. Because the conformity determination requirement is triggered by the project's estimated emissions exceeding the de minimis threshold, performing the regional significance applicability test would be redundant.

TABLE 5-5
EMISSION INVENTORIES - VOLATILE ORGANIC COMPOUNDS (TONS)

		Original Construction Schedule				Compressed Construction Schedule				Delayed Construction Schedule			
Alternative	**Source**	**CP I 2007**	**CP II 2009**	**Build Out 2013**	**Build Out +5 2018**	**CP I 2007**	**CP II 2009**	**Build Out 2013**	**Build Out +5 2018**	**CP I 2008**	**CP II 2010**	**Build Out 2014**	**Build Out +5 2019**
A (No Action)	Aircraft	352	331	309	310	352	331	309	310	348	320	311	310
	GSE / APU	410	403	399	399	410	403	399	399	405	401	397	398
	Roadways / Parking Lots	752	632	424	329	752	632	424	329	690	571	394	320
	Construction	0	0	0	0	0	0	0	0	0	0	0	0
	Total	1,514	1,366	1,132	1,038	1,514	1,366	1,132	1,038	1,443	1,292	1,102	1,028
C	Aircraft	397	428	429	466	397	428	429	466	407	439	437	476
	GSE / APU	425	429	442	461	425	429	442	461	423	434	443	466
	Roadways / Parking Lots	770	643	453	358	770	643	453	358	704	588	418	349
	Construction	38	11	5	0	57	11	5	0	35	10	7	0
	Total	1,630	1,511	1,329	1,285	1,649	1,511	1,329	1,285	1,569	1,471	1,305	1,291
D	Aircraft	397	428	453	508	397	428	453	508	407	439	460	519
	GSE / APU	425	429	442	461	425	429	442	461	423	434	443	466
	Roadways / Parking Lots	770	643	453	358	770	642	453	353	704	588	418	349
	Construction	38	11	5	0	57	11	5	0	35	10	7	0
	Total	1,630	1,511	1,353	1,327	1,649	1,511	1,353	1,327	1,569	1,471	1,328	1,334
G	Aircraft	397	428	422	464	397	428	422	464	407	439	426	473
	GSE / APU	425	429	442	461	425	429	442	461	423	434	443	466
	Roadways / Parking Lots	770	643	453	358	770	642	453	358	704	588	418	349
	Construction	38	11	5	0	57	11	5	0	35	10	7	0
	Total	1,630	1,511	1,322	1,283	1,649	1,511	1,322	1,283	1,569	1,471	1,294	1,288

Note: CPI = Construction Phase I, CPII = Construction Phase II.
Source: Environmental Science Associates, 2005

TABLE 5-6
EMISSION INVENTORIES - NITROGEN OXIDES (TONS)

		Original Construction Schedule				Compressed Construction Schedule				Delayed Construction Schedule			
Alternative	**Source**	**CP I 2007**	**CP II 2009**	**Build Out 2013**	**Build Out +5 2018**	**CP I 2007**	**CP II 2009**	**Build Out 2013**	**Build Out +5 2018**	**CP I 2008**	**CP II 2010**	**Build Out 2014**	**Build Out +5 2019**
A (No Action)	Aircraft	4,322	4,370	4,921	5,359	4,322	4,370	4,921	5,359	4,357	4,478	5,027	5,359
	GSE / APU	446	422	394	380	446	422	394	380	430	413	388	378
	Roadways / Parking Lots	1,586	1,306	798	457	1,586	1,306	798	457	1,439	1,165	705	422
	Construction	0	0	0	0	0	0	0	0	0	0	0	0
	Total	6,354	6,098	6,113	6,196	6,354	6,098	6,113	6,196	6,226	6,056	6,120	6,159
C	Aircraft	4,410	4,694	5,524	6,242	4,410	4,694	5,524	6,242	4,486	4,993	5,659	6,327
	GSE / APU	458	446	428	417	458	446	428	417	446	444	423	420
	Roadways / Parking Lots	1,623	1,366	847	494	1,623	1,366	847	494	1,451	1,168	747	457
	Construction	400	126	20	0	633	126	20	0	373	97	31	0
	Total	6,891	6,632	6,819	7,153	7,124	6,632	6,819	7,153	6,756	6,702	6,860	7,204
D	Aircraft	4,410	4,694	5,588	6,358	4,410	4,694	5,588	6,358	4,486	4,993	5,710	6,445
	GSE / APU	458	446	428	417	458	446	428	417	446	444	423	420
	Roadways / Parking Lots	1,623	1,366	847	494	1,623	1,366	847	494	1,451	1,168	747	457
	Construction	400	126	20	0	633	126	20	0	373	97	31	0
	Total	6,891	6,632	6,883	7,269	7,124	6,632	6,883	7,269	6,756	6,702	6,911	7,322
G	Aircraft	4,410	4,694	5,505	6,236	4,410	4,694	5,505	6,236	4,486	4,993	5,629	6,319
	GSE / APU	458	446	428	417	458	446	428	417	446	444	423	420
	Roadways / Parking Lots	1,623	1,366	847	494	1,623	1,366	847	494	1,451	1,168	747	457
	Construction	400	126	20	0	633	126	20	0	373	97	31	0
	Total	6,891	6,632	6,800	7,147	7,124	6,632	6,800	7,147	6,756	6,702	6,830	7,196

Note: CPI = Construction Phase I, CPII = Construction Phase II.
Source: Environmental Science Associates, 2005

TABLE 5-7
PROJECT-RELATED EMISSIONS (TONS)

		Original Construction Schedule				Compressed Construction Schedule				Delayed Construction Schedule			
Pollutant Precursor	**Alternative**	**CP I 2007**	**CP II 2009**	**Build Out 2013**	**Build Out +5 2018**	**CP I 2007**	**CP II 2009**	**Build Out 2013**	**Build Out +5 2018**	**CP I 2008**	**CP II 2010**	**Build Out 2014**	**Build Out +5 2019**
Volatile Organic Compounds	C	116	145	197	247	135	145	197	247	126	179	203	263
	D	116	145	221	289	135	145	221	289	126	179	226	306
	G	116	145	190	245	135	145	190	245	126	179	192	260
Nitrogen Oxides	C	537	534	706	957	770	534	706	957	530	646	740	1,045
	D	537	534	770	1,073	770	534	770	1,073	530	646	791	1,163
	G	537	534	687	951	770	534	687	951	530	646	710	1,037

Note: CPI = Construction Phase I, CPII = Construction Phase II.
Source: Environmental Science Associates, 2005.

5.4 Conformity Evaluation

5.4.1 Evaluated Cases

As previously stated, the General Conformity Rules require that the analysis of project-related emissions reflect the scenarios that are expected to occur under each of the following cases:

- The Act mandated attainment year or, if applicable, the farthest year for which emissions are projected in the maintenance plan;
- Any year for which the applicable SIP specifies an emission budget; and
- The year during which the total of direct and indirect emissions *from the action* is expected to be the greatest on an annual basis.[48] For the purpose of this Conformity Determination, the emissions from the action are referred to as "project-related" emissions.

The following discusses each of the above cases as each relates to the proposed improvements at O'Hare.

5.4.1.1 Act Mandated Attainment Year

The Act mandated attainment year for the 1-hour ozone NAAQS is 2007. However, the 1-hour ozone NAAQS will be revoked on June 15, 2005. The Act mandated attainment year for the 8-hour ozone NAAQS is 2010. To be conservative, project-related emissions in both 2007 (1-hour) and 2010 (8-hour) were subjected to the conformity evaluation. There are currently no maintenance plans in place for either the 1- or 8-hour ozone NAAQS. Therefore, the requirement to evaluate the farthest year for which emissions are projected in the maintenance plan is not applicable.

5.4.1.2 Regional Emission Budgets

The 1-hour ozone attainment demonstration SIP also includes Rate of Progress based regional emission target levels for the years 2002 and 2005. The earliest that the proposed improvements would have an affect on local or regional air quality conditions is the year 2005 (assuming that the FAA issues a Record of Decision for the proposed improvements in 2005 and construction began). As such, project-related emission estimates for the year 2005 were subjected to the conformity evaluation.

5.4.1.3 Greatest Annual Project-Related Emissions

Project-related emissions were estimated for the last year of each of the planning horizons (Construction Phase I, Construction Phase II, and Build Out) and for a year five-years from the design year of the improvements (Build Out +5). To determine in which year the total direct and indirect emissions from the proposed improvements at O'Hare are expected to be the

[48] 40 CFR 93, Subpart B (Section 93.158).

greatest on an annual basis from the start of construction (the start of Construction Phase I) through the design year (Build Out), interim annual data were interpolated. No such interpolation was performed for the years between Build Out and Build Out +5 because project-related emission levels in these years would be lower than those estimated for the Build Out +5 condition. Notably, construction emission estimates were available for each of the years in which construction activity would occur (from start of construction though Build Out), therefore, construction emission estimates were not interpolated (annual calculated emission estimates were used).

Tables 5-8 through **5-13** present the estimated volatile organic compound and nitrogen oxide emission estimates for the last year of each of the planning horizons (Construction Phase I, Construction Phase 2, Build Out and Build Out +5) and the interpolated annual emission estimates with and without the proposed improvements at O'Hare.

As previously stated, with respect to the proposed improvements at O'Hare, project-related emissions are those emissions that would occur with the improvements when compared to the emissions that would occur without the improvements (the net change in emission levels).

Table 5-14 presents the estimated increase in emissions of volatile organic compounds and nitrogen oxides with the proposed improvements at O'Hare. As shown, the greatest total direct and indirect project-related emissions of volatile organic compounds and nitrogen oxides would occur in the year 2019 with the Delayed Construction Schedule (299 and 1,165 tons, respectively). As such, project-related emission estimates for the year 2019 were also subjected to the conformity evaluation.

TABLE 5-8
INTERPOLATED EMISSIONS – VOLATILE ORGANIC COMPOUNDS – ORIGINAL CONSTRUCTION SCHEDULE (TONS)

			Construction Phase I				Construction Phase II		Build Out				Build Out +5
Alternative	**Source**	**2002**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2018**
A (No Action)	Aircraft	424	395	381	366	352	342	331	326	320	315	309	310
	GSE / APU	414	412	412	411	410	407	403	402	401	400	399	399
	Roadways and Parking Lots	1160	997	915	834	752	692	632	580	528	476	424	329
	Construction	0	0	0	0	0	0	0	0	0	0	0	0
	Total	1998	1804	1708	1611	1514	1440	1366	1308	1249	1191	1132	1038
C	Aircraft	424	395	381	366	397	413	428	428	429	429	429	466
	GSE / APU	414	412	412	411	425	427	429	432	436	439	442	461
	Roadways and Parking Lots	1160	997	915	834	770	707	643	596	548	501	453	358
	Construction	0	28	51	48	38	24	11	22	27	27	5	0
	Total	1998	1832	1759	1659	1630	1570	1511	1478	1439	1395	1329	1285
D	Aircraft	424	395	381	366	397	413	428	434	441	447	453	508
	GSE / APU	414	412	412	411	425	427	429	432	436	439	442	461
	Roadways and Parking Lots	1160	997	915	834	770	707	643	596	548	501	453	358
	Construction	0	28	51	48	38	24	11	22	27	27	5	0
	Total	1998	1832	1759	1659	1630	1570	1511	1484	1451	1413	1353	1327
G	Aircraft	424	395	381	366	397	413	428	427	425	424	422	464
	GSE / APU	414	412	412	411	425	427	429	432	436	439	442	461
	Roadways and Parking Lots	1160	997	915	834	770	707	643	596	548	501	453	358
	Construction	0	28	51	48	38	24	11	22	27	27	5	0
	Total	1998	1832	1759	1659	1630	1570	1511	1476	1436	1390	1322	1283

Note: Prior to the end of Construction Phase I, emissions from sources other than construction were assumed to be the same as Alternative A (No Action).

TABLE 5-9
INTERPOLATED EMISSIONS – VOLATILE ORGANIC COMPOUNDS – COMPRESSED CONSTRUCTION SCHEDULE (TONS)

			Construction Phase I			Construction Phase II		Build Out				Build Out +5
Alternative	**Source**	**2002**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2018**
A (No Action)	Aircraft	424	381	366	352	342	331	326	320	315	309	310
	GSE / APU	414	412	411	410	407	403	402	401	400	399	399
	Roadways and Parking Lots	1160	915	834	752	692	632	580	528	476	424	329
	Construction	0	0	0	0	0	0	0	0	0	0	0
	Total	1998	1708	1611	1514	1440	1366	1308	1249	1191	1132	1038
C	Aircraft	424	381	366	397	413	428	428	429	429	429	466
	GSE / APU	414	412	411	425	427	429	432	436	439	442	461
	Roadways and Parking Lots	1160	915	834	770	707	643	596	548	501	453	358
	Construction	0	30	71	57	24	11	22	27	27	5	0
	Total	1998	1738	1662	1649	1570	1511	1478	1439	1395	1329	1285
D	Aircraft	424	381	366	397	413	428	435	441	447	453	508
	GSE / APU	414	412	411	425	427	429	432	436	439	442	461
	Roadways and Parking Lots	1160	915	834	770	707	643	596	548	501	453	358
	Construction	0	30	71	57	24	11	22	27	27	5	0
	Total	1998	1738	1682	1649	1570	1511	1484	1451	1413	1353	1327
G	Aircraft	424	381	366	397	413	428	427	425	424	422	464
	GSE / APU	414	412	411	425	427	429	432	432	439	442	461
	Roadways and Parking Lots	1160	915	834	770	707	643	596	548	501	453	358
	Construction	0	30	71	57	24	11	22	27	27	5	0
	Total	1998	1738	1682	1649	1570	1511	1476	1436	1390	1322	1283

Note: Prior to the end of Construction Phase I, emissions from sources other than construction were assumed to be the same as Alternative A (No Action).

TABLE 5-10
INTERPOLATED EMISSIONS – VOLATILE ORGANIC COMPOUNDS – DELAYED CONSTRUCTION SCHEDULE (TONS)

			Construction Phase I				Construction Phase II		Build Out				Build Out +5
Alternative	**Source**	**2002**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2019**
A (No Action)	Aircraft	424	394	378	363	348	334	320	318	316	313	311	310
	GSE / APU	414	410	409	407	405	403	401	400	399	398	397	398
	Roadways and Parking Lots	1160	972	878	784	690	631	571	527	483	438	394	320
	Construction	0	0	0	0	0	0	0	0	0	0	0	0
	Total	1998	1776	1665	1554	1443	1368	1292	1245	1197	1150	1102	1028
C	Aircraft	424	394	378	363	407	423	439	439	438	438	437	476
	GSE / APU	414	410	409	407	423	429	434	436	439	441	443	466
	Roadways and Parking Lots	1160	972	878	784	704	646	588	546	503	461	418	349
	Construction	0	20	53	38	35	24	10	21	28	19	7	0
	Total	1998	1796	1718	1592	1569	1522	1471	1441	1408	1358	1305	1291
D	Aircraft	424	394	378	363	407	423	439	444	450	455	460	519
	GSE / APU	414	410	409	407	423	429	434	436	439	441	443	466
	Roadways and Parking Lots	1160	972	878	784	704	646	588	546	503	461	418	349
	Construction	0	20	53	38	35	24	10	21	28	19	7	0
	Total	1998	1796	1718	1592	1569	1522	1471	1447	1419	1375	1328	1334
G	Aircraft	424	394	378	363	407	425	439	436	433	429	426	473
	GSE / APU	414	410	409	407	423	429	434	436	439	441	443	466
	Roadways and Parking Lots	1160	972	878	784	704	646	588	546	503	461	418	349
	Construction	0	20	53	38	35	24	10	21	28	19	7	0
	Total	1998	1796	1718	1592	1589	1522	1471	1439	1402	1350	1294	1288

Note: Prior to the end of Construction Phase I, emissions from sources other than construction were assumed to be the same as Alternative A (No Action).

TABLE 5-11
INTERPOLATED EMISSIONS – NITROGEN OXIDES – ORIGINAL CONSTRUCTION SCHEDULE (TONS)

			Construction Phase I				Construction Phase II		Build Out				Build Out +5
Alternative	**Source**	**2002**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2018**
A (No Action)	Aircraft	3956	4102	4176	4249	4322	4346	4370	4508	4646	4783	4921	5359
	GSE / APU	479	466	459	453	446	434	422	415	408	401	394	380
	Roadways and Parking Lots	2144	1921	1809	1698	1586	1446	1306	1179	1052	925	798	457
	Construction	0	0	0	0	0	0	0	0	0	0	0	0
	Total	6579	6489	6444	6399	6354	6226	6098	6102	6106	6109	6113	6196
C	Aircraft	3956	4102	4176	4249	4410	4552	4694	4902	5109	5317	5524	6242
	GSE / APU	479	466	459	453	458	452	446	442	437	433	428	417
	Roadways and Parking Lots	2144	1921	1809	1698	1623	1495	1366	1236	1107	977	847	494
	Construction	0	453	717	549	400	193	126	248	244	169	20	0
	Total	6579	6942	7161	6948	6891	6692	6632	6827	6897	6895	6819	7153
D	Aircraft	3956	4102	4176	4249	4410	4552	4694	4918	5141	5365	5588	6358
	GSE / APU	479	466	459	453	458	452	446	442	437	433	428	417
	Roadways and Parking Lots	2144	1921	1809	1698	1623	1495	1366	1236	1107	977	847	494
	Construction	0	453	717	549	400	193	126	248	244	169	20	0
	Total	6579	6942	7161	6948	6891	6692	6632	6843	6929	6943	6883	7269
G	Aircraft	3956	4102	4176	4249	4410	4552	4694	4897	5100	5302	5505	6236
	GSE / APU	479	466	459	453	458	452	446	442	437	433	428	417
	Roadways and Parking Lots	2144	1921	1809	1698	1623	1495	1366	1236	1107	977	847	494
	Construction	0	453	717	549	400	193	126	248	244	169	20	0
	Total	6579	6942	7161	6948	6891	6692	6632	6823	6887	6881	6800	7147

Note: Prior to the end of Construction Phase I, emissions from sources other than construction were assumed to be the same as Alternative A (No Action).

TABLE 5-12
INTERPOLATED EMISSIONS – NITROGEN OXIDES – COMPRESSED CONSTRUCTION SCHEDULE (TONS)

			Construction Phase I			Construction Phase II		Build Out				Build Out +5
Alternative	**Source**	**2002**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
A (No Action)	Aircraft	3956	4176	4249	4322	4346	4370	4508	4646	4783	4921	5359
	GSE / APU	479	459	453	446	434	422	415	408	401	394	380
	Roadways and Parking Lots	2144	1809	1698	1586	1446	1306	1179	1052	925	798	457
	Construction	0	0	0	0	0	0	0	0	0	0	0
	Total	6579	6444	6399	6354	6226	6098	6102	6106	6109	6113	6196
C	Aircraft	3956	4176	4249	4410	4552	4694	4902	5109	5317	5524	6242
	GSE / APU	479	459	453	458	452	446	442	437	433	428	417
	Roadways and Parking Lots	2144	1809	1698	1623	1495	1366	1236	1107	977	847	494
	Construction	0	424	906	633	193	126	248	244	169	20	0
	Total	6579	6868	7305	7124	6692	6632	6827	6897	6895	6819	7153
D	Aircraft	3956	4176	4249	4410	4552	4694	4918	5141	5365	5588	6358
	GSE / APU	479	459	453	458	452	446	442	437	433	428	417
	Roadways and Parking Lots	2144	1809	1698	1623	1495	1366	1236	1107	977	847	494
	Construction	0	424	906	633	193	126	248	244	169	20	0
	Total	6579	6868	7305	7124	6692	6632	6843	6929	6943	6883	7269
G	Aircraft	3956	4176	4249	4410	4552	4694	4897	5100	5302	5505	6236
	GSE / APU	479	459	453	458	452	446	442	437	433	428	417
	Roadways and Parking Lots	2144	1809	1698	1623	1495	1366	1236	1107	977	847	494
	Construction	0	424	906	6331	193	126	248	244	169	20	0
	Total	6579	6868	7305	7124	6692	6632	6823	6887	6881	6800	7147

Note: Prior to the end of Construction Phase I, emissions from sources other than construction were assumed to be the same as Alternative A (No Action). I.

TABLE 5-13
INTERPOLATED EMISSIONS – NITROGEN OXIDES – DELAYED CONSTRUCTION SCHEDULE (TONS)

			Construction Phase I				Construction Phase II		Build Out				Build Out +5
Alternative	**Source**	**2002**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2019**
A (No Action)	Aircraft	3956	4116	4197	4277	4357	4418	4478	4615	4753	4890	5027	5359
	GSE / APU	479	459	450	440	430	422	413	407	401	394	388	378
	Roadways and Parking Lots	2144	1854	1713	1573	1433	1297	1161	1046	932	817	702	420
	Construction	0	0	0	0	0	0	0	0	0	0	0	0
	Total	6579	6438	6367	6297	6226	6141	6056	6072	6088	6104	6120	6159
C	Aircraft	3956	4116	4197	4277	4486	4740	4993	5160	5326	5493	5659	6327
	GSE / APU	479	459	450	440	446	445	444	439	434	428	423	420
	Roadways and Parking Lots	2144	1862	1721	1580	1451	1310	1168	1063	958	852	747	457
	Construction	0	295	732	434	373	206	97	212	254	127	31	0
	Total	6579	6733	7099	6731	6756	6700	6702	6873	6971	6900	6860	7204
D	Aircraft	3956	4116	4197	4277	4486	4740	4993	5172	5352	5531	5710	6445
	GSE / APU	479	459	450	440	446	445	444	439	434	428	423	420
	Roadways and Parking Lots	2144	1862	1721	1580	1451	1310	1168	1063	958	852	747	457
	Construction	0	295	732	424	373	206	97	212	254	127	31	0
	Total	6579	6733	7099	6731	6756	6700	6702	6886	6997	6938	6911	7322
G	Aircraft	3956	4102	4176	4249	4533	4667	4800	4997	5194	5390	5587	6321
	GSE / APU	479	459	450	440	446	445	444	439	434	428	423	420
	Roadways and Parking Lots	2144	1862	1721	1580	1451	1310	1168	1063	958	852	747	457
	Construction	0	295	732	424	373	206	97	212	254	127	31	0
	Total	6579	6733	7099	6731	6756	6700	6702	6866	6956	6878	6830	7196

Note: Prior to the end of Construction Phase I, emissions from sources other than construction were assumed to be the same as Alternative A (No Action). .

TABLE 5-14
SUMMARY OF PROJECT-RELATED EMISSIONS

Ozone Precursor	Construction Schedule	Alternative	Tons												
			2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2018	2019
Volatile Organic Compounds	Original	C	28	51	48	116	130	145	171	190	205	197	NA	247	NA
		D	28	51	48	116	130	145	177	202	223	221	NA	289	NA
		G	28	51	48	116	130	145	169	187	199	190	NA	245	NA
	Compressed	C	NA	30	71	135	130	145	171	190	205	197	NA	247	NA
		D	NA	30	71	135	130	145	177	202	223	221	NA	289	NA
		G	NA	30	71	135	130	145	169	187	199	190	NA	245	NA
	Delayed	C	NA	20	53	38	126	154	179	197	211	208	203	NA	263
		D	NA	20	53	38	126	154	179	203	222	226	226	NA	306
		G	NA	20	53	38	126	154	179	194	205	200	192	NA	260
Nitrogen Oxides	Original	C	453	717	549	537	466	534	726	791	786	706	NA	957	NA
		D	453	717	549	537	466	534	742	823	834	770	NA	1073	NA
		G	453	717	549	537	466	534	721	782	771	687	NA	951	NA
	Compressed	C	NA	424	906	770	466	534	726	791	786	706	NA	957	NA
		D	NA	424	906	770	466	534	742	823	834	770	NA	1073	NA
		G	NA	424	906	770	466	534	721	782	771	687	NA	951	NA
	Delayed	C	NA	295	732	434	530	559	646	801	883	796	740	NA	1045
		D	NA	295	732	434	530	559	646	814	909	834	791	NA	1163
		G	NA	295	732	434	530	559	646	794	868	774	710	NA	1037

Note: Prior to the end of Construction Phase I, emissions from sources other than construction were assumed to be the same as Alternative A (No Action).

5.4.1.4 Summary

Table 5-15 summarizes the years and levels of project-related emissions meeting the requirements of the General Conformity Rules. It should be noted that the construction schedules (Original, Compressed, and Delayed) and Build Alternatives (Alternatives C, D, and G) vary by scenario and by pollutant precursor. These combinations of years and emissions reflect the levels of project-related emissions that would occur in 1) the Clean Air Act mandated attainment years for the 1-hour and 8-hour ozone standards, 2) the year in which the SIP contains an emissions budget and the project would have an affect on local and/or regional air quality conditions, and 3) the years in which the greatest *project-related* emissions of the volatile organic compounds and nitrogen oxide emissions are estimated to occur with the improvements to O'Hare.

The greatest annual project-related emissions of volatile organic compounds and nitrogen oxides would occur in the year 2019 (Build-Out+5) with Alternative D and the Delayed Construction Schedule (306 and 1,163 tons, respectively). These levels of emissions are the greatest total project-related direct and indirect emissions estimated to occur over the planning horizon regardless of year, alternative, or construction schedule.

TABLE 5-15
PROJECT-RELATED EMISSION LEVELS SUBJECT TO CONFORMITY DETERMINATION

		Annual Emission Level (tons)					
		Volatile Organic Compounds			Nitrogen Oxides		
Scenario		Year	Project-Related	Alternative/ Construction Schedule	Year	Project-Related	Alternative/ Construction Schedule
State Implementation Plan Budget		2005	51	C, D, G / Original	2005	717	C, D, G / Original
Act Mandated Attainment Years	1-Hour Ozone	2007	135	C, D, G / Compressed	2007	770	C, D, G / Compressed
	8-Hour Ozone	2010	179	C, D, G / Delayed	2010	742	D / Original-Compressed
Greatest Total Project-Related Emissions		2019	306	D / Delayed	2019	1,163	D / Delayed

Source: Environmental Science Associates, 2005.

5.4.2 Project-Related Summer Weekday Emission Levels

The IEPA emission estimates are expressed in tons of volatile organic compounds and nitrogen oxides emitted on a *summer weekday*. Summer weekday emissions are used by States to assess regional emissions of volatile organic compounds and nitrogen oxide emissions, precursor emissions to the air pollutant ozone, because the ozone NAAQS are generally exceeded during

ozone season[49] weekdays when the precursor emissions are greatest and meteorological conditions are more conducive to ozone formation.

For the purpose of comparing the O'Hare-related emission estimates to the IEPA-prepared regional and O'Hare-related inventories, the source emissions were converted from tons per year to tons per summer weekday. The conversion was performed as follows:

- Annual emission estimates for aircraft, ground support equipment, auxiliary power units, and motor vehicles were converted to typical summer weekday estimates using aircraft operational profiles. The aircraft temporal factors were developed using data from the FAA's TAAM modeling. The profiles, provided in **Table 5-16** indicate that approximately 0.28 percent of O'Hare-related emissions occur on any given summer weekday.

TABLE 5-16
AIRCRAFT DAILY AND MONTHLY OPERATIONAL PROFILES

Day	Fraction	Month	Fraction
Monday	0.9995	January	0.84281
Tuesday	0.9933	February	0.78238
Wednesday	0.9884	March	0.87025
Thursday	0.9908	April	0.87574
Friday	1.0000	May	0.91243
Saturday	0.8516	June	0.89423
Sunday	0.9296	July	0.87864
		August	0.96000
		September	0.94836
		October	0.95911
		November	0.87973
		December	1.00000

Note: The same daily and monthly operational profiles were used for all analysis years and project alternatives
Source: Environmental Science Associates, Inc. [TPC] analysis of TAAM data (Airport Temporals - Daily Weekly), 2004/2005.

- Aircraft emissions of volatile organic compounds and nitrogen oxides were increased by 1 and 8 percent, respectively, to reflect differences in the average annual mixing height used in the FEIS (2,510 feet) and a mixing height that is more representative of average summer conditions (2,890 feet). To be conservative, total aircraft emissions (not just those that are affected by the height of the mixing layer) were adjusted.
- Annual construction-related emissions were converted to typical summer weekday estimates using operational profiles developed from information provided by the CCT. These profiles indicate that approximately 0.45 percent of O'Hare-related construction emissions would occur on any given summer weekday (it was conservatively assumed that construction would occur 6 days each summer week minus holidays).

[49] April 1st through October 31st .

The action, no-action, and project-related typical summer weekday emission estimates are provided in **Table 5-17**. Notably, when considering both annual and typical summer weekday emissions of volatile organic compound emissions, the year that the greatest project-related emissions are estimated to occur is 2019. However, when considering both annual and typical summer weekday emissions of nitrogen oxides, the year of greatest project-related emissions on an annual basis is 2019 while the year in which the greatest typical summer weekday emissions are estimated to occur is 2006. This difference is a result of the factors used to convert annual estimates to typical summer weekday estimates (the level of aircraft and construction emissions would be higher on a typical summer weekday than on an average day of the year) and adjustments to the aircraft estimates to account for meteorological variances on an annual versus summer basis.

TABLE 5-17
PROJECT-RELATED TYPICAL SUMMER WEEKDAY EMISSIONS

Alternative	Source	Volatile Organic Compounds (tons)				Nitrogen Oxides (tons)			
		2005	2007	2010	2019	2005	2007	2010	2006(a)
A (No Action)	Aircraft (b)	1.09	1.01	0.94	0.89	12.83	13.28	13.85	13.06
	GSE / APU	1.17	1.17	1.14	1.13	1.31	1.27	1.18	1.29
	Roadways / Parking Lots	2.60	2.14	1.65	0.91	5.15	4.51	3.36	4.83
	Construction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total	4.87	4.32	3.73	2.93	19.29	19.07	18.39	19.18
Action	Aircraft (b)	1.09	1.14	1.25	1.49	12.83	13.55	15.11	13.06
	GSE / APU	1.17	1.21	1.23	1.33	1.31	1.30	1.26	1.29
	Roadways / Parking Lots	2.60	2.19	1.69	0.99	5.15	4.62	3.52	4.83
	Construction	0.22	0.26	0.10	0.00	3.24	2.86	1.12	4.09
	Total	5.10	4.80	4.27	3.81	22.53	22.34	21.01	23.27
Project-Related	Aircraft (b)	0.00	0.13	0.31	0.60	0.00	0.27	1.26	0.00
	GSE / APU	0.00	0.04	0.09	0.20	0.00	0.03	0.08	0.00
	Roadways / Parking Lots	0.00	0.05	0.04	0.08	0.00	0.11	0.16	0.00
	Construction	0.23	0.26	0.10	0.00	3.24	2.86	1.12	4.09
	Total	0.23	0.48	0.54	0.88	3.24	3.27	2.62	4.09
Alternative		C, D, G	C, D, G	D	D	C, D, G	C, D, G	D	C, D, G
Construction Schedule		Original	Compressed	Original / Compressed	Delayed	Original	Compressed	Original / Compressed	Compressed
Criteria		SIP Budget	1-hour ozone attainment year	8-hour ozone attainment year	Greatest total project-related emissions	SIP Budget	1-hour ozone attainment year	8-hour ozone attainment year	Greatest total project-related emissions

Note: Prior to the end of Construction Phase I, emissions from sources other than construction were assumed to be the same as Alternative A (No Action).
(a) The year 2019 is the year in which the greatest project-related emissions would occur on an annual basis while the year 2006 is the year in which the greatest project-related emissions would occur on a typical summer weekday.
(b) Includes aircraft refueling emissions.
Source: Environmental Science Associates, 2005.

5.4.3 Comparison of Project-Related Emissions to SIP Based Inventories

As previously stated, the General Conformity Rule states that when projects are located within ozone non-attainment areas and project-related emissions of volatile organic compounds or nitrogen oxides exceed the de minimis thresholds, one of the criteria for determining conformity is that the emissions from the project (action) are specifically identified and accounted for in the SIP. As also stated, the USEPA recognizes that emissions associated with airport-related development programs are not typically specifically identified and/or accounted for in SIPs. As such, guidance issued jointly by the USEPA and FAA states that if the airport source emissions are not readily identifiable in a SIP inventory, the airport operator should work with the State to determine what, if any portion of a category could or would be allocated to an airport.[50]

For the purposes of this General Conformity Determination, the IEPA provided their SIP-based O'Hare-specific emission estimates for aircraft and ground support equipment. While the IEPA's emission estimates for aircraft and ground support equipment are specific to O'Hare, no such specific calculations (or estimates) are available for either construction-related or motor vehicle-related emissions.

The following presents a comparison of O'Hare project-related emissions and IEPA's O'Hare-related emission estimates for aircraft, ground support equipment, and auxiliary power units. Comparisons of O'Hare project-related construction emissions to IEPA's projected local and regional construction emissions and O'Hare project-related motor vehicle emissions to IEPA/CATS regional motor vehicle emissions are also provided.

5.4.3.1 Milestone Budget Year (2005)

The year 2005 is considered a milestone year with respect to attaining the 1-hour ozone NAAQS. In 2005, there would be minimal project-related emissions. With the improvements, the only Airport-related source of emissions would be construction activities.

At the time the USEPA prepared the IEPA's 1990 estimates of emissions from construction-related activities for the Chicago non-attainment area, the City of Chicago would not have had an estimate of construction-related equipment emissions for the proposed improvements at O'Hare. Further, due to the methodology used by the USEPA to calculate IEPA's regional emissions from this type of source, it can be said that no individual projects were considered. As such, the inventories prepared in support of the attainment demonstration for the 1-hour ozone NAAQS do not specifically identify construction-related emissions for any of the build alternatives under consideration.

Table 5-18 presents the IEPA's 2005 emission projections for construction activities. The greatest estimated emission levels for the year 2005 with the proposed improvements at O'Hare are also presented.

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[50] Question 22:General Conformity Guidance for Airports – Questions and Answers, September 25, 2002; Federal Aviation Administration and United States Environmental Protection Agency.

To evaluate whether the level of year 2005 project-related construction emissions could be considered to be included within the IEPA's year 2005 estimates for this type of activity, the project-related construction emissions were compared to the IEPA's projected regional construction emissions for the non-attainment area. The results of the comparison are summarized in **Table 5-18.** As shown, when comparing project-related construction emissions of volatile organic compounds and nitrogen oxides to the IEPA's 2005 total regional emissions, project-related emissions would represent 1 and 4 percent of the emissions, respectively.

As previously stated, individual projects are not specifically identified in the IEPA's construction emission projections. However, because the O'Hare-related construction emission estimates represent a relatively small percentage of the IEPA's regional projection, the FAA, in consultation with the IEPA, has determined that it can be assumed that the O'Hare-related construction emissions can reasonably be accounted for in the inventories for the 1-hour ozone attainment demonstration SIP.[51]

[51] 40 CFR 93.158(a)(5) and Questions 17, 21, and 22 of the General Conformity Guidance for Airports – Questions and Answers, September 25, 2002; Federal Aviation Administration and United States Environmental Protection Agency.

TABLE 5-18
CONSTRUCTION ACTIVITIES -
COMPARISON OF PROJECT-RELATED AND SIP BASED INVENTORIES – MILESTONE BUDGET YEAR (2005)

Ozone Precursor	IEPA SIP Emission Levels (tons/summer weekday	O'Hare EIS Emission Levels (tons/summer weekday	Alternative	Construction Schedule	Percent of Total Estimates
Volatile Organic Compounds	15.41	0.22	C,D,G	Compressed	1%
Nitrogen Oxides	86.44	3.24	C,D,G	Compressed	4%

Note: Project-related construction emissions in this table are the greatest estimated emission levels regardless of alternative or construction schedule.
(-) = Not applicable

COMPARISON:
2005 project-related emissions are compared to the IEPA's projected 2005 emissions for the non-attainment area.

Source: SIP emission levels: Illinois Environmental Protection Agency; Project-related emissions levels: Environmental Science Associates, 2005.

5.4.3.2 1-Hour Ozone NAAQS Act Mandated Attainment Year (2007)

This section of the documentation provides a discussion of the evaluation of project-related emissions that would occur in the CAA mandated attainment year for the 1-hour ozone NAAQS (2007). Project-related emissions from aircraft, ground support equipment, auxiliary power units, construction activities, and the operation of motor vehicles within the defined study area were evaluated.

Aircraft/Ground Support Equipment/Auxiliary Power Units

The calculations used by the IEPA that serve as the base for the Chicago 1-hour ozone attainment demonstration SIP (the applicable SIP) specifically identify and account for O'Hare-related aircraft and ground support equipment emissions (year 1990 estimates). The 1990 inventories were modified by the IEPA to reflect projected year 2007 conditions using growth and control factors. Notably, the IEPA's ground support equipment emissions (calculated by the USEPA) are presumed to include emissions from auxiliary power units. Emissions from auxiliary power units would represent a minimal portion of the total ground support equipment emissions.

Table 5-19 presents the IEPA's 1990 and 2007 O'Hare-related emission estimates for aircraft, ground support equipment, and auxiliary power units. The estimated emission levels for the year 2007 with the proposed improvements at O'Hare (project-related and total) from the EIS are also presented.

To evaluate whether the level of year 2007 project-related aircraft, ground support equipment, and auxiliary power unit emissions are included within the IEPA's year 2007 projected emissions for these sources, the following comparisons were made:

Comparison 1: Individual project-related source emissions were compared to the IEPA's projected growth in individual source emissions from the year 1990 to 2007 (i.e, project-related aircraft emissions were compared to the projected increase in aircraft emissions from 1990 to 2007 and project-related ground support equipment emissions were compared to the projected increase in ground support equipment emissions from 1990 to 2007);

Comparison 2: Total source emissions (the emissions estimated to occur for an individual source without the improvements (Alternative A- No Action) plus the emissions increase for the source with the improvement) were compared to the IEPA's projected level of emissions for the source for the year 2007 (i.e., total O'Hare-related aircraft emissions with the proposed improvements were compared to the IEPA's projected level of aircraft emissions for O'Hare for the year 2007);

Comparison 3: Combined total emissions for all sources (aircraft/ground support equipment/auxiliary power units) were compared to the combined total growth in emissions for these sources from the year 1990 to 2007; and

Comparison 4: Combined total emissions for all sources were compared to the combined total emissions for these sources for the year 2007.

Comparison 1 is considered to be the most conservative evaluation of whether the emissions with the proposed improvements are accounted for in the SIP inventories. While each of the consecutive comparisons (Comparisons 2 through 4) become less and less conservative in nature, the comparisons still serve as a demonstration as to whether project-related and O'Hare-related emissions are accounted for in the SIP inventories.

The results of the comparisons are summarized in **Table 5-19**. As shown, when comparing the inventories of volatile organic compounds, both the project-related and total O'Hare-related emission estimates are lower than both the growth in emissions projected to occur by the IEPA from the year 1990 to 2007 and the total IEPA projected emissions for each source. As such, the FAA, in consultation with the IEPA, has determined that project-related emissions of volatile organic compounds from aircraft, ground support equipment, and auxiliary power units are accounted for in the SIP.[52]

When comparing inventories of nitrogen oxides for aircraft, both project-related emissions and total O'Hare-related emissions are lower than both the growth in emissions from the year 1990 to 2007 and the total emissions for this source. However, when comparing the inventories of nitrogen oxides for ground support equipment/auxiliary power units, project-related emissions are higher than the growth in emissions projected to occur from the year 1990 to 2007. The reason the project-related and total emissions from ground support equipment are higher is the IEPA assumed a decline in emissions from 1990 to 2007. The IEPA assumed that the reduction in emissions from this source would occur due to the phase in of the use of ground support equipment meeting new, more stringent, Federally-mandated emission standards on non-road engines (even though the actual amount of equipment in use would likely be higher).

Because 2007 project-related and total O'Hare-related nitrogen oxide emissions are higher than the assumed growth in emissions from the Airport sources, the project-related and total emissions from aircraft, ground support equipment, and auxiliary power units (14.85 tons/summer weekday) were compared to the total IEPA emission estimate for these sources (24.10 tons/summer weekday). The total emissions are lower than the total IEPA emission estimates for these sources. As such, the FAA, in consultation with the IEPA, has determined that project-related emissions of nitrogen oxides from aircraft, ground support equipment, and auxiliary power units are accounted for in the SIP.[53]

[52] 40 CFR 93.158(a)(1).
[53] 40 CFR 93.158(a)(1).

TABLE 5-19
AIRCRAFT/GROUND SUPPORT EQUIPMENT/AUXILIARY POWER UNITS - COMPARISON OF PROJECT-RELATED, TOTAL O'HARE-RELATED AND SIP BASED INVENTORIES – ATTAINMENT YEAR (2007)

			IEPA SIP Emission Levels (tons/summer weekday)			O'Hare EIS Emission Levels (tons/summer weekday)					Comparisons			
Ozone Precursor	Source		1990	2007	Emissions Growth 1990-2007	Project	Total	Alternative	Year	Construction Schedule	1	2	3	4
Volatile Organic Compounds	Aircraft	All Activities Except Refueling	6.02	6.60	0.58	0.13	1.14	C,D,G	2007	Compressed	< Growth	< 2007	--	--
		Refueling	0.46	0.50	0.04	<0.01	<0.01	C,D,G	2007	All	< Growth	< 2007		
	Ground Support Equipment/ Auxiliary Power Units		1.88	2.06	0.18	0.04	1.21	C,D,G	2007	Compressed	< Growth	< 2007	--	--
	Total		8.36	9.16	0.80	0.18	2.36	NA	NA	NA	NA	NA	< Growth	< 2007
Nitrogen Oxides	Aircraft		13.52	14.83	1.31	0.27	13.55	C,D,G	2007	Compressed	< Growth	< 2007	--	--
	Ground Support Equipment/ Auxiliary Power Units		11.52	9.27	-2.25	0.03	1.30	C,D,G	2007	Compressed	> Growth	< 2007	--	--
	Total		25.04	24.10	-0.94	0.30	14.85	NA	NA	NA	NA	NA	> Growth	< 2007

Note: The project-related and total O'Hare-related emissions in this table are the greatest estimated emission levels regardless of alternative or construction schedule.
(-) = Not applicable

COMPARISONS:
1 – EIS project-related source emissions are compared to IEPA's 1990 to 2007 growth for the source.
2 – EIS total source emissions are compared to IEPA's 2007 source emission levels.
3 – EIS total aircraft, ground support equipment, and auxiliary power unit emissions are compared to IEPA's total 1990 to 2007 growth for all sources.
4 – EIS total aircraft, ground support equipment, and auxiliary power unit emissions are compared to IEPA's total 2007 emission levels for all sources.

Source: 1990-2007 IEPA O'Hare-related estimates; Illinois Environmental Protection Agency; EIS project and total O'Hare-related emission estimates: Environmental Science Associates, 2005.

Construction

Table 5-20 presents the IEPA's 2007 emission projections for construction activities. The estimated emission levels for the year 2007 with the proposed improvements at O'Hare are also presented.

To evaluate whether the level of year 2007 project-related construction emissions could be considered to be included within the IEPA's year 2007 estimates for this type of activity, the project-related construction emissions were compared to the IEPA's total construction emissions for the non-attainment area.

The results of the comparisons are summarized in **Table 5-20**. As shown, when comparing the project-related construction emissions of volatile organic compounds and nitrogen oxides to the IEPA's projected 2007 emissions for the non-attainment area, project-related emissions would represent 2 and 3 percent of the emissions, respectively.

As with the 2005 inventories, individual projects are not specifically identified in the IEPA's construction emission projections. However, because the O'Hare-related construction emission estimates represent a relatively small percentage of the IEPA's regional projection, the EGAS factors used by the IEPA to project year 2007 regional construction emissions are based on population estimates for the Chicago area, and it is reasonable to assume that an infrastructure improvement project such as the improvements proposed at O'Hare would occur in an area populated at the Chicago level, the FAA, in consultation with the IEPA, has determined that it can be assumed that the O'Hare-related construction emissions can reasonably be accounted for in the inventories for the 1-hour ozone attainment demonstration SIP.[54]

[54] 40 CFR 93.158(a)(5) and Questions 17, 21, and 22 of the General Conformity Guidance for Airports – Questions and Answers, September 25, 2002; Federal Aviation Administration and United States Environmental Protection Agency.

TABLE 5-20
CONSTRUCTION ACTIVITIES -
COMPARISON OF PROJECT-RELATED AND SIP BASED INVENTORIES – ATTAINMENT YEAR (2007)

Ozone Precursor	IEPA SIP Emission Levels (tons/summer weekday)	O'Hare EIS Emission Levels (tons/summer weekday)	Alternative	Construction Schedule	Percent of Total Estimates
Volatile Organic Compounds	15.75	0.26	C,D,G	Compressed	2%
Nitrogen Oxides	86.05	2.86	C,D,G	Compressed	3%

Note: Project-related construction emissions in this table are the greatest estimated emission levels regardless of alternative or construction schedule.
(-) = Not applicable

COMPARISON:
2007 project-related emissions are compared to the IEPA's 2007 projected emissions for the non-attainment area

Source: SIP emission levels: Illinois Environmental Protection Agency; Project-related emissions levels: Environmental Science Associates, 2005.

Roadways and Parking Lots

As with construction emissions, O'Hare-related motor vehicle emissions can not be isolated within the regional estimates of emissions from this source. O'Hare-related motor vehicle emissions would occur from the operation of cars, trucks, and buses by Airport-related employees, passengers, and vehicles that service the Airport (shuttles, limos, taxis, etc.).

Table 5-21 presents the year 2007 regional motor vehicle emission budgets (for the entire non-attainment area). The projected level of year 2007 emissions recently prepared by CATS in support of the transportation conformity determination addressing the 8-hour ozone standard are also presented. In non-attainment areas for ozone, the USEPA requires that attainment demonstrations contain an estimate of the motor vehicle-related levels of volatile organic compounds and nitrogen oxides that will be emitted in the attainment year and in milestone years. These emission estimates, along with estimates of emissions from all other sources, must be consistent with the attainment demonstration for the ozone standard and with ROP plans for the area. For transportation conformity purposes, the motor vehicle emission estimates are known as motor vehicle emission "budgets".

Project-related motor vehicle emission levels for the year 2007 are also provided in **Table 5-21**. These estimates are the greatest that would occur regardless of alternative or construction schedule.

To evaluate whether year 2007 project-related motor vehicle emissions could be accommodated within the IEPA's year 2007 motor vehicle emission budget, the following comparisons were made:

Comparison 1: Project-related motor vehicle emissions were compared to CATS projected levels of emissions for the year 2007, and

Comparison 2: Project-related motor vehicle emissions were compared to the emissions difference between the CATS projected year 2007 emissions and the emission budgets.

As for comparisons for the other Airport-related sources, Comparison 1 is considered to be the most conservative evaluation of whether the emissions with the proposed improvements could reasonably be accounted for in the SIP based inventories.

The results of the comparisons are summarized in **Table 5-21**. As shown, when comparing the project-related motor vehicle emissions of volatile organic compounds to the CATS projected emissions and to the difference in CATS projected emissions and the motor vehicle emissions budget, project-related emissions would account for approximately 0.04 and 0.46 percent of the emissions, respectively. As also shown, when comparing the project-related motor vehicle emissions of nitrogen oxides to the CATS projections and the difference in CATS projections and the motor vehicle emission budgets, the project-related emissions would account for approximately 0.04 and 0.39 percent of the emissions, respectively.

Because the comparisons of project-related motor vehicle emissions of volatile organic compounds and nitrogen oxides to CATS emission projections and the difference in CATS

projected emissions and the motor vehicle emission budgets for the non-attainment area indicate that project-related emissions would represent a relatively small portion of either estimate, the FAA, in consultation with the IEPA, has determined that it is reasonable to assume that the emissions can be accommodated in the SIP inventories.[55]

[55] 40 CFR 93.158(a)(5) and Questions 17, 21, and 22 of the General Conformity Guidance for Airports – Questions and Answers, September 25, 2002; Federal Aviation Administration and United States Environmental Protection Agency.

TABLE 5-21
ROADWAYS/PARKING LOTS -
COMPARISON OF PROJECT-RELATED AND SIP BASED INVENTORIES – ATTAINMENT YEAR (2007)

Ozone Precursor	CATS SIP Emission Levels (tons/summer weekday)			O'Hare EIS Emission Levels (tons/summer weekday)	Alternative	Year	Construction Schedule	Comparisons	
	Budget	CATS Estimates	Difference					1- % of CATS Estimates	2 - % of Emission Difference(a)
Volatile Organic Compounds	127.42	116.45	10.97	0.05	C,D,G	2007	Delayed	0.04%	0.46%
Nitrogen Oxides	280.40	252.20	28.20	0.11	C,D,G	2007	Compressed	0.04%	0.39%

Note: Project-related construction emissions in this table are the greatest estimated emission levels regardless of alternative or construction schedule.
(a) Difference in emission levels between CATS estimated level of emissions for the year 2007 and the motor vehicle emissions budget for the year 2007.

COMPARISONS:
1 – Project-related emissions are compared to the CATS projected level of emissions that would occur in the non-attainment area.
2 – Project-related emissions are compared to the emission difference between the budget and CATS estimates for the non-attainment area.

Source: SIP based inventories: Illinois Environmental Protection Agency; Project-related emissions levels: Environmental Science Associates, 2005.

5.4.3.3 Greatest Individual Source Emissions

As previously stated, the IEPA has not yet completed development of the 8-hour ozone attainment demonstration SIP. Therefore, a detailed regional emissions projection for the attainment year 2010 is not available. As such, it is not possible to compare project-related year 2010 or future year 2018 and 2019 emission estimates to regional estimates for the same years.

To be conservative and to provide an indication of the magnitude of Airport-related emissions beyond the mandated attainment year with respect to emission levels in the 1-hour ozone attainment demonstration SIP (2007), the greatest emission levels from each individual source were compared to the regional projections previously presented for the year 2007. The individual source emission levels used in this comparison are the greatest estimated levels for O'Hare International Airport with the proposed improvements, regardless of year, construction schedule, construction scenario, or alternative. Notably, because, for some sources, the estimates are for different years, the total emissions from the sources would not be expected to occur in any given year. **Table 5-22** summarizes the greatest individual O'Hare-related source emissions.

TABLE 5-22
GREATEST INDIVIDUAL SOURCE EMISSIONS

Ozone Precursor	Source		Greatest O'Hare EIS Emission Level (tons/summer weekday)	Year	Construction Schedule	Alternative
Volatile Organic Compounds	Aircraft	All Activities Except Refueling	1.49	2019	Delayed	D
		Refueling	<0.01	All	All	C, D, G
	Ground Support Equipment/ Auxiliary Power Units		1.33	2019	Delayed	C, D, G
	Roadways/Parking Lots(a)		0.08	2018	Original/ Compressed	C, D, G
	Construction		0.32	2006	Compressed	C, D, G
Nitrogen Oxides	Aircraft		19.81	2019	Delayed	D
	Ground Support Equipment/ Auxiliary Power Units		1.33	2005	Original/Delayed	C, D, G
	Roadways/Parking Lots(a)		0.17	2009	Original/ Compressed	C, D, G
	Construction		4.09	2006	Compressed	C, D, G

Notes: (a) Emissions for roadways and parking lots are project-related only. All other sources are total Airport-related.
Source: Environmental Science Associates, 2005.

Aircraft/Ground Support Equipment/Auxiliary Power Units

Table 5-23 presents the IEPA's 2007 O'Hare-related emission projections for aircraft, ground support equipment, and auxiliary power units and the greatest total Airport source-related emissions. To evaluate whether the OM EIS level of emissions could be considered to be

included within the IEPA's year 2007 projections for these sources, the following comparisons were made:

Comparison 1: Total individual aircraft and ground support equipment/auxiliary power unit emissions (the emissions estimated to occur for an individual source without the improvements (Alternative A- No Action plus the emissions increase for the source with the improvement) were compared to the IEPA's projected level of emissions for these source for the year 2007 (i.e., total O'Hare-related aircraft emissions with the proposed improvements were compared to the IEPA's projected total level of aircraft emissions for O'Hare for the year 2007);

Comparison 2: Combined total emissions for aircraft, ground support equipment, and auxiliary power units were compared to the combined total emissions for these sources for the year 2007.

As previously stated, Comparison 1 is considered to be the most conservative evaluation of whether the emissions with the proposed improvements could reasonably be accounted for in the SIP based inventories. The results of the comparisons are summarized in **Table 5-23**. As shown, when comparing the inventories of volatile organic compounds, total O'Hare-related emission estimates are lower than the total IEPA projected emissions for each source. As such, the FAA, in consultation with the IEPA, has determined that regardless of year,[56] construction schedule,[57] construction scenario,[58] or alternative,[59] Airport-related emissions of volatile organic compounds from aircraft, ground support equipment, and auxiliary power units are accounted for in the SIP.[60]

When comparing inventories of nitrogen oxides for aircraft, total O'Hare-related emissions are higher than the IEPA's projected emissions for this source. When comparing the inventories of nitrogen oxides for ground support equipment/auxiliary power units, total O'Hare-related emissions are less than the IEPA's projected emissions for this source. Finally, when comparing total emissions for aircraft, ground support equipment, and auxiliary power units to the IEPA's total emission projections for these sources, the total O'Hare-related emissions are less than the total emission estimates. Because the total emissions from the aircraft, ground support equipment, and auxiliary power units are lower than the total IEPA emission estimates for these sources, the FAA has determined, in consultation with the IEPA, that the Airport-related emissions of nitrogen oxides from aircraft, ground support equipment, and auxiliary power units are accounted for in the SIP regardless of year, construction schedule, construction scenario, or alternative.[61]

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[56] The years evaluated were 2004 through 2019.
[57] Three potential construction schedules were evaluated - Original, Compressed, and Delayed.
[58] Three potential construction scenarios were evaluated in the DEIS. The scenario with the greatest level of emissions was evaluated in this Final General Conformity Determination (referred to as the 9.4 Million Cubic Yard scenario).
[59] Three Build Alternatives were evaluated – Alternatives C, D, and G.
[60] 40 CFR 93.158(a)(1).
[61] 40 CFR 93.158(a)(1).

TABLE 5-23
AIRCRAFT/GROUND SUPPORT EQUIPMENT/AUXILIARY POWER UNITS - COMPARISON OF GREATEST INDIVIDUAL SOURCE EMISSIONS TO SIP BASED INVENTORIES

Ozone Precursor	Source		Tons/Summer Weekday: IEPA SIP Emission Levels	Tons/Summer Weekday: O'Hare EIS Emission Levels (Total)	Comparison
Volatile Organic Compounds	Aircraft	All Activities Except Refueling	6.60	1.49	1 - < Total
		Refueling	0.50	<0.01	1 - < Total
	Ground Support Equipment/ Auxiliary Power Units		2.06	1.33	1 - < Total
	Total		9.16	2.82	2 - < Total
Nitrogen Oxides	Aircraft		14.83	19.81	1 - > Total
	Ground Support Equipment/ Auxiliary Power Units		9.27	1.33	1 - < Total
	Total		24.10	21.14	2 - < Total

Note: The OM FEIS emission estimates in this table are the greatest estimated emission levels regardless of source, year, construction schedule, construction scenario, or alternative.

COMPARISONS:
1 – OM EIS individual source emissions are compared to the IEPA's projected 2007 source emission levels.
2 – OM EIS total source emissions are compared to the IEPA's total projected 2007 source emission levels.

Source: 2007:Illinois Environmental Protection Agency; OM FEIS: Environmental Science Associates, 2005.

Construction

Table 5-24 presents the IEPA's 2007 emission projections for construction activities. The greatest estimated emission level for the year 2007 with the proposed improvements at O'Hare is also presented.

To evaluate whether the greatest level of project-related construction emissions could be considered to be reasonably accounted for within the IEPA's year 2007 estimates for this type of activity, project-related construction emissions were compared to the IEPA's projected construction emissions for the non-attainment area for the year 2007.

The results of the comparisons are summarized in **Table 5-24**. As shown, when comparing the greatest potential construction emissions of volatile organic compounds and nitrogen oxides to the IEPA's 2007 emissions inventories for the non-attainment area, the Airport-related emissions would account for 2 and 5 percent of the emissions, respectively.

As previously stated, individual projects are not specifically identified in the IEPA's construction emission projections. However, because the greatest O'Hare-related construction emission estimates represent a relatively small percentage of the IEPA's regional projection, the EGAS factors used by the IEPA to project year 2007 regional construction emissions are based on population estimates for the Chicago area, and it is reasonable to assume that an infrastructure improvement project such as the improvements proposed at O'Hare would occur

in an area populated at the Chicago level, the FAA, in consultation with the IEPA, has determined that it can be assumed that the O'Hare-related construction emissions can reasonably be accounted for in the inventories for the 1-hour ozone attainment demonstration SIP regardless of year, construction schedule, construction scenario, or alternative.[62]

Roadways and Parking Lots

Table 5-25 presents CATS year 2007 regional motor vehicle emission budgets (for the entire non-attainment area) and the greatest project-related emissions. Notably, the project-related emission estimates are the greatest emission estimates regardless of year, construction schedule, construction scenario, or alternative.

To evaluate whether year 2007 project-related motor vehicle emissions could reasonably be accounted for within the IEPA's year 2007 motor vehicle emission budget, the following comparisons were made:

Comparison 1: Project-related emissions were compared to CATS projected levels of emissions for the year 2007, and

Comparison 2: Project-related emissions were compared to the emissions difference between the CATS projected year 2007 emissions and the emission budgets.

As with comparisons for the other Airport-related sources, Comparison 1 is considered to be the most conservative evaluation of whether the emissions with the proposed improvements could reasonably be accounted for in the SIP based inventories.

The results of the comparisons are summarized in **Table 5-25**. As shown, when comparing the project-related motor vehicle emissions of volatile organic compounds to the CATS projected emissions and to the difference in CATS projected emissions and the motor vehicle emission budget, the greatest project-related emissions would account for approximately 0.07 and 0.73 percent of the emissions, respectively. As also shown, when comparing the project-related motor vehicle emissions of nitrogen oxides to the CATS projections and to the difference in CATS projected emissions and the motor vehicle emission budget, the greatest project-related emissions would account for approximately 0.07 and 0.60 percent of the emissions, respectively.

Because the comparisons of project-related motor vehicle emissions of volatile organic compounds and nitrogen oxides to CATS emission projections and the difference in CATS projected emissions and the motor vehicle emission budgets indicate that project-related emissions would represent a relatively small portion of either estimate, the FAA has

[62] 40 CFR 93.158(a)(5) and Questions 17, 21, and 22 of the General Conformity Guidance for Airports – Questions and Answers, September 25, 2002; Federal Aviation Administration and United States Environmental Protection Agency.

determined, in consultation with FAA, that it is reasonable to assume that the emissions can be accounted for in the attainment demonstration SIP inventories.[63]

TABLE 5-24
CONSTRUCTION ACTIVITIES - COMPARISON OF GREATEST EMISSION LEVEL AND SIP BASED INVENTORIES

	Tons/Summer Weekday		
Ozone Precursor	**IEPA SIP Emission Levels – 2007**	**O'Hare EIS Greatest Emission Levels**	**Percent of Total Estimates**
Volatile Organic Compounds	15.75	0.32	2%
Nitrogen Oxides	86.05	4.09	5%

Note: The construction emissions in this table are the greatest estimated emission levels regardless of year, construction schedule, construction scenario, or alternative.
(-) = Not applicable

COMPARISON:
Greatest project-related emissions are compared to the IEPA's 2007 projections for the non-attainment area.

Source: SIP emission levels: Illinois Environmental Protection Agency; Greatest Airport-related emissions levels: Environmental Science Associates, 2005.

[63] 40 CFR 93.158(a)(5) and Questions 17, 21, and 22 of the General Conformity Guidance for Airports – Questions and Answers, September 25, 2002; Federal Aviation Administration and United States Environmental Protection Agency.

TABLE 5-25
ROADWAYS/PARKING LOTS -
COMPARISON OF GREATEST PROJECT-RELATED EMISSIONS AND SIP BASED INVENTORIES

Ozone Precursor	CATS SIP Emission Levels – 2007 (tons/summer weekday)			O'Hare EIS Greatest Emission Level (Project Related)	Comparisons	
	Budget	CATS Estimates	Difference		1- % of CATS Estimates	2 - % of Emission Difference(a)
Volatile Organic Compounds	127.42	116.45	10.97	0.08	0.07%	0.73%
Nitrogen Oxides	280.40	252.20	28.20	0.17	0.07%	0.60%

Note: Project-related construction emissions in this table are the greatest estimated emission levels regardless of alternative or construction schedule.
(a) Difference in emission levels between CATS estimated level of emissions for the year 2007 and the motor vehicle emissions budget for the year 2007.

COMPARISONS:
1 – Greatest project-related emissions are compared to the CATS projected level of emissions that would occur in the non-attainment area.
2 – Greatest project-related emissions are compared to the emission difference between the budget and CATS estimates for the non-attainment area.

Source: SIP based inventories: Illinois Environmental Protection Agency; Project-related emissions levels: Environmental Science Associates, 2005.

5.5 Summary

Within areas designated non-attainment or maintenance for any of the National Ambient Air Quality Standards (NAAQS), the Clean Air Act requires that federal agencies ensure that their actions conform to State Implementation Plans (SIPs). The requirements for determining conformity to SIPs are detailed in Title 40, Chapter I, Subchapter C, Part 51 of the Code of Federal Regulations (40 CFR 51).

In accordance with Section 176 of the Clean Air Act, the FAA has assessed whether pollutant and pollutant precursor emissions that would result from the FAA's actions with respect to the proposed improvements at O'Hare International Airport (referred to as the O'Hare Modernization) are in conformance with the Illinois State Implementation Plan (SIP).

The emission estimates for the General Conformity Determination were prepared:

- Using the latest planning assumptions,
- Using the latest and most accurate emission estimation techniques, and
- Are based on the applicable air quality models, data bases, and other requirements specified in the most recent version of the USEPA's Guideline on Air Quality Models, including supplements.

Based on the results of the evaluation, the total direct and indirect project-related emissions of volatile organic compounds and nitrogen oxides were determined to be either:

- Accounted for in the emission projections incorporated into the Chicago 1-hour ozone attainment demonstration SIP (the applicable SIP), or
- Could reasonably be accounted for in established emission totals and or excess regional emission estimates.

For these reasons, the FAA, in consultation with the IEPA, has determined that the emissions associated with the proposed O'Hare Modernization Program improvements conform to the applicable SIP, and thus the Clean Air Act, regardless of construction schedule, construction scenario, or alternative.

5.6 Reporting Requirements/Frequency of Determinations

Following the requirements of the General Conformity Rules, Federal agencies must make public their draft and final conformity determinations by placing a notice in a daily newspaper of general circulation in the area affected by the action and by providing 30 days to obtain any written public comments prior to taking any formal action of the determinations. Also required is the response to all comments received on the Draft General Conformity Determination. These responses have to be made available by the Federal agency within 30 days of the agency's final conformity determination.

The Draft General Conformity Determination was published by the FAA in May of 2005. Responses to comments on the Draft document are provided in **Attachment J-5** to **Appendix J**, **Air Quality**, of the OM FEIS. It is the intent of the FAA to publish notices of the availability of this Final General Conformity Determination in the following newspapers:

- Chicago Tribune
- Chicago Sun-Times
- Daily Herald
- Daily Southtown

The conformity status of a Federal action automatically lapses after a period of 5 years (from the date a Final Conformity Determination is reported) unless the Federal action has been completed or a continuous program has been commenced to implement the Federal action within a reasonable time. Additionally, if, after the Final Conformity Determination is made, the Federal action is changed so that there is an increase in the total direct and indirect emissions from the action, above the de minimis levels, a new conformity determination is required.

ATTACHMENT J-3

FINAL GENERAL CONFORMITY DETERMINATION - CORRESPONDENCE

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ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276 – (217) 782-3397
JAMES R. THOMPSON CENTER, 100 WEST RANDOLPH, SUITE 11-300, CHICAGO, IL 60601 – (312) 814-6026

ROD R. BLAGOJEVICH, GOVERNOR DOUGLAS P. SCOTT, DIRECTOR

July 13, 2005

Mr. Michael W. MacMullen
Airports Environmental Program Manager
Federal Aviation Administration
2300 East Devon Avenue
Des Plaines, Illinois 60018

Re: General Conformity Determination for the O'Hare Modernization Program

Dear Mr. MacMullen:

The Illinois Environmental Protection Agency (Illinois EPA) has reviewed the General Conformity Determination developed by the Federal Aviation Administration (FAA) for the O'Hare Modernization Program. The document indicates that construction and implementation of the O'Hare Modernization program will generate emissions of volatile organic compounds (VOC) and oxides of nitrogen (NOx) that exceed the General Conformity *de minimis* levels. Therefore, a determination by the state air quality agency is required indicating that the project's emissions are accounted for within the State Implementation Plan (SIP) for the area.

The applicable SIP for the Chicago area is the Attainment Demonstration for the one-hour ozone National Ambient Air Quality Standard. This SIP was approved by the U.S Environmental Protection Agency (USEPA) on July 11, 2001. In addition to the Attainment Demonstration, this plan included documentation of the required Rate-of-Progress emission reductions for the years 2002, 2005, and 2007. Although, this SIP did not explicitly include additional VOC and NOx emissions to account for the O'Hare Modernization Program, sufficient emissions were incorporated into both the Attainment Demonstration modeling and the Rate-of-Progress emissions projections to accommodate the emissions projected to result from the O'Hare Modernization Program.

The Illinois EPA worked with the FAA in the preparation of the General Conformity Determination, providing information on the level of VOC and NOx emissions incorporated into the SIP for O'Hare aircraft, aircraft refueling, and ground service equipment operations, as well as regional construction equipment and motor vehicle emissions. Comparing the level of emissions projected for the construction and operation of the O'Hare Modernization Program in the General Conformity Determination for the necessary analysis requirements, the Illinois EPA concurs that such emissions are accounted for within the 1-hour ozone Attainment Demonstration SIP for the Chicago region.

ROCKFORD – 4302 North Main Street, Rockford, IL 61103 – (815) 987-7760 • DES PLAINES – 9511 W. Harrison St., Des Plaines, IL 60016 – (847) 294-4000
ELGIN – 595 South State, Elgin, IL 60123 – (847) 608-3131 • PEORIA – 5415 N. University St., Peoria, IL 61614 – (309) 693-5463
BUREAU OF LAND - PEORIA – 7620 N. University St., Peoria, IL 61614 – (309) 693-5462 • CHAMPAIGN – 2125 South First Street, Champaign, IL 61820 – (217) 278-5800
SPRINGFIELD – 4500 S. Sixth Street Rd., Springfield, IL 62706 – (217) 786-6892 • COLLINSVILLE – 2009 Mall Street, Collinsville, IL 62234 – (618) 346-5120
MARION – 2309 W. Main St., Suite 116, Marion, IL 62959 – (618) 993-7200

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Please contact Laurel L. Kroack, Chief of the Bureau of Air, at (217) 785-4140 with any questions you may have.

Very truly yours,

Douglas P. Scott
Director

2

Conference Call with USEPA and IEPA
Air Quality Discussion

Meeting Summary

Meeting Date: November 3, 2004

Location: Conference Call

Project: O'Hare Modernization – Environmental Impact Statement (EIS)

Participants: Patricia Morris (USEPA)
Mike Rodgers (IEPA)
Dave Stonefield (USEPA)
Mike MacMullen
Chuck Prock
Amy Hanson
Steve Taber (FAA)
Sherry Kampke(USEPA)
Suzanne King (USEPA)
Rob Kaleel (IEPA)
Rachael ? (IEPA)
Mike Ratte (ESA)
Carrol Bryant (KBE)

The purpose of the call was to discuss General Conformity requirements. The USEPA/IEPA had been discussing what the applicable State Implementation Plan (SIP) should be for our analysis and came to a consensus that the "applicable SIP" is the one-hour ozone SIP. Use of the one-hour SIP would make the General Conformity requirements consistent with the guidance for Transportation Conformity which is also using the one-hour SIP until an eight-hour ozone SIP is approved. Dave Stonefield also requested that we use the de minimis threshold that is consistent with the designation for the 8-hour ozone non-attainment area and that we should assume that there is not a nitrogen dioxide (NOx) waiver.

The USEPA also stated that the PM2.5 designations would (at that time) be made in a couple of weeks. The effective data for conformity to apply to PM2.5 emissions will be approximately February 1st, 2006. When conformity applies, the de minimis level for PM2.5 will be 100 tons.

Chuck Prock requested a letter from USEPA stating that the conformity test is a future action to no action comparison not an existing to future comparison. USEPA staff stated that there is a letter from the USEPA to Wally Woo (Burbank Airport) available on USEPA's website that would suffice.

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ATTACHMENT J-4

FINAL GENERAL CONFORMITY DETERMINATION - TRANSPORTATION CONFORMITY DOCUMENTATION

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U.S. Department
of Transportation
**Federal Aviation
Administration**

Great Lakes Region
Illinois, Indiana, Michigan,
Minnesota, North Dakota,
Ohio, South Dakota,
Wisconsin

2300 East Devon Avenue
Des Plaines, Illinois 60018

April 7, 2005

Tom Murtha, Chief Transportation Planner
Chicago Area Transportation Study
300 West Adams Street, 2nd Floor
Chicago, Illinois 60606

Re: O'Hare Modernization Transportation Conformity

Dear Mr. Murtha:

As you may be aware, the Federal Aviation Administration (FAA) is in the process of preparing an Environmental Impact Statement (EIS) for the City of Chicago's proposed O'Hare Modernization Program (OMP). The Draft EIS identifies the potential environmental impacts associated with proposed major development at O'Hare International Airport and reasonable alternatives pursuant to the National Environmental Policy Act. Additionally, as required by the Clean Air Act Amendments of 1990, the FAA must ensure that surface transportation components of the Build Alternatives conform to the approved State Implementation Plan (SIP), and that the transportation conformity requirements of the Clean Air Act are met.

The purpose of this letter is to request that CATS formally review and concur with the conformity assumptions used in the completion of the attached Transportation Conformity Matrix. This matrix summarizes our understanding of the conformity status of all roadway projects that were included in the entire EIS surface transportation model, and demonstrates that the portion of roadway projects that are part of the O'Hare Modernization are currently part of a CATS Transportation Improvement Program (TIP) and conform to the approved SIP. Additionally, we conclude that all of the identified surface transportation projects that could have been conformed have been conformed, and that the FAA takes this to signify that transportation conformity has been demonstrated.

Please note that conformity was not demonstrated for a few projects "by others". These projects are not directly part of the O'Hare Modernization, but were deemed "reasonably foreseeable" by the other sponsoring agencies, and as a result were included in the EIS surface transportation model. Although these projects were previously part of a prior conforming TIP, their funding was no longer available, and hence were not included in the most recent conformity analysis by CATS. It is our understanding that although a conformity demonstration is currently not required for these projects, a conformity analysis would be completed in the future, by the appropriate sponsoring agency, when these projects are proposed for inclusion with a new or amended TIP.

Thanks again for you continued cooperation and input into this matter, and please direct your response, in writing, to my attention. In the meantime, please contact me at (847) 294-7522 if you have any additional questions or comments.

Sincerely,

Michael W. MacMullen
Airports Environmental Program Manager

TRANSPORTATION CONFORMITY MATRIX:
ROADWAY PROJECTS IN THE CATS TRANSPORTATION IMPROVEMENT PROGRAM AND IN THE CHICAGO O'HARE MODERNIZATION PROGRAM TRANSPORTATION MODEL

TIP I.D. No.	CATS TIP Project Description	Work Type (from TIP)	O'Hare Modernization DEIS Description	OMP Project #	OMP Year of Operation	Conformity
PREVIOUSLY APPROVED PROJECTS						
01-02-0023	Zemke Rd from Bessie Coleman (W of existing) (Cook/Chicago) to US 12 45 Mannheim Rd (Cook/Chicago) N. end of Bessie Coleman Dr at O'Hare – Conformed UN, Highway/Road – Reconst with change in use or width of lane extension of airport access – new road.	Road Reconstruction	Mannheim Road: Continuous SB through and right turn lane from Higgins to Zemke	I-40	2007	Exempt
			Mannheim Road: Extension of NB left turn lane at Zemke	I-41	2007	Exempt
			Zemke Road: Addition of 2nd left turn lane on EB Zemke onto NB Mannheim	I-42	2007	Exempt
			Zemke Road: Addition of WB through lane on Zemke at Mannheim Road	I-43	2007	Exempt
			Zemke Road: Right turn-only from EB Zemke to SB Mannheim	I-44	2007	Exempt
			Zemke Road: Right turn-only from EB Zemke to SB Bessie Coleman	I-45	2007	Exempt
01-02-0023	Zemke Rd from Bessie Coleman (W of existing) (Cook/Chicago) to US 12 45 Mannheim Rd (Cook/Chicago)	Road Reconstruction	Bessie Coleman Drive: Addition of right turn lane onto EB Zemke Road	I-46	2007	Exempt
03-96-0004	Interchange element was coded with ISTHA Northwest Tollway add-lanes element. Neither element was funded at time of conformity determination, so neither element was conformed.	Highway Additional Lanes, Interchange Reconfigure	Lee Street/Northwest Tollway Interchange (addition of Lee St. on-ramp to WB I-90 and EB I-90 off-ramp to Lee St.)	I-73	2007	Not Conformed 1/
01-00-0077	Bessie Coleman Drive from IL 72 Lee St (Cook/Chicago) to I-190 (North of) (Cook/Chicago). Realign and Extend Bessie Coleman Dr north to Lee St.	Road Extension, Road Alignment	Westerly relocation and widening of the northern portion of Bessie Coleman Drive to Higgins Road	I-74	2007	Conformed
01-02-0023	Zemke Rd from Bessie Coleman (W of existing) (Cook/Chicago) to US 12 45 Mannheim Rd (Cook/Chicago) N. end of Bessie Coleman Dr at O'Hare.	Road Reconstruction	Zemke Road Extension (includes intersection improvements to Zemke and Mannheim Roads)	I-75	2007	Not Regionally Significant
04-00-0022	Balmoral from Bessie Coleman (Cook/Chicago) to US 12 45 East of Mannheim Road (Cook/Rosemont),– Provide full access from Mannheim to Balmoral	New Bridge, New Interchange, Road Extension	Balmoral Avenue Ramps at SB Mannheim	I-77	2007	Conformed
04-00-0022	Balmoral from Bessie Coleman (Cook/Chicago) to US 12 45 East of Mannheim Road (Cook/Rosemont),– Provide full access from Mannheim to Balmoral	New Bridge, New Interchange, Road Extension	Balmoral Extension over Mannheim Road	I-78	2007	Conformed
01-98-0114	I-190 O'Hare access roads from US 12 45 Mannheim Rd (Cook/Chicago) to I-294 Cumberland Ave (Cook/Rosemont)	Corridor Improvement	Mannheim Fly-over ramp from Bessie Coleman Drive to SB Mannheim Road	I-76	2007	Conformed
N/A	Local access only. Not required in TIP/Plan conformity.	N/A	Southeast Service Road and Spine Road Conversion	I-79	2009	Exempt
			Johnson Road: Extension to the east with a right turn only to SB Mannheim Road	I-47	2007	Exempt
			Commercial Vehicle Tunnel	I-80	2007	Exempt
ADDITIONAL ROADWAY IMPROVEMENTS BY OTHERS						
01-98-0114	I-190 O'Hare access roads from US 12 45 Mannheim Rd (Cook/Chicago) to I-294 Cumberland Ave (Cook/Rosemont)	Corridor Improvement	Mannheim Road: Widening of Mannheim Road to 3 lanes each direction between Higgins and Irving Park - Illinois Department of Transportation (IDOT Project)	III-1	2007	Conformed
			I-190 Improvements (IDOT Project)	III-5	2007	Conformed
04-95-0003	I-294 Tri-State Tollway at Devon Avenue (Cook/Rosemont).	Interchange Expansion, Bridge Reconfiguration	Addition of Partial Interchange on I-294 at Devon Avenue (add SB off-ramp to Devon) - Illinois State Toll Highway Authority (ISTHA Project)	III-2	2009	Not Conformed 2/
03-96-0004	Interchange element was coded with ISTHA Northwest Tollway add-lanes element. Neither element was funded at time of conformity determination, so neither element was conformed.	Highway Additional Lanes, Interchange Reconfigure	Expansion of I-90 Interchange at Elmhurst Road (add Elmhurst Road on-ramps to WB I-90 and EB I-90 off-ramps to Elmhurst Road) (ISTHA Project)	III-3	2009	Not Conformed 1/
N/A	Project maintains current access, so it is exempt from conformity analysis.	N/A	Irving Park Road and York Road Intersection Improvements (IDOT Project)	III-4	2009	Exempt
03-96-0004	I-90 Northwest Tollway from Plaza #9 – Elgin (Kane/Elgin) to I-294 Tri-State Tollway (Cook/Rosemont) MP 0.0 – 24.8.	Add Lanes	I-90 add lanes from I-294 to Illinois Route 53	III-6	2009	Not Conformed 1/
08-02-9039	O'Hare Western Access from O'Hare Bypass at Elgin-O'Hare Expy (DuPage/Bensenville) to O'Hare West Terminal (Cook/Chicago)	New Road	York/Thorndale grade separation and interchange improvements including 'off-airport' improvements all of which will be within the existing York/Thorndale right-of-way	III-7	2013	Conformed
PROJECTS BY OTHERS						
04-00-0022	Balmoral from Bessie Coleman (Cook/Chicago) to US 12 45 East of Mannheim Road (Cook/Rosemont),– Provide full access from Mannheim to Balmoral	New Bridge, New Interchange, Road Extension	Balmoral Avenue SB Tunnel	IV-1	2007	Conformed
O'HARE MODERNIZATION PROGRAM PROJECTS						
N/A	Local access only. Not required in TIP/Plan conformity.	N/A	Construct Public Access Road to USPS Complex	VII-106	2013	Exempt
			Construct Public Access Road and Tunnel in Southwest Cargo Area	VII-107	2013	Exempt
			Construct South Access Road Extension West of Main Cargo Road	VII-52	2009	Exempt
01-05-0006	IL 19 Irving Park Road from York Road (DuPage/Bensenville) to Cargo Rd/Taft Road (Cook). Relocation of a section of Irving Park Road between just east of York Rd to 0.3 miles east of Cargo Road/Taft Road.	Road Alignment, Reconstruct in Kind	Irving Park Road Relocation	VII-109	2009	Exempt
08-02-9039	O'Hare Western Access from O'Hare Bypass at Elgin-O'Hare Expy (DuPage/Bensenville) to O'Hare West Terminal (Cook/Chicago)	New Road	West Terminal Ground Access Roadways (on Airport only) in conjunction with York/Thorndale interchange roadways	VII-119	2013	Conformed
			Commercial Vehicle Staging Area Return Roadway	VII-118		
N/A	Local access only. Not required in TIP/Plan conformity.	N/A	Relocate Mount Prospect Road	VII-12	2007	Exempt
N/A	Freight rail infrastructure is not included in travel demands. No impact on passenger service. Not required to be in TIP/Plan conformity.	N/A	Union Pacific Railroad Relocation	VII-20	2009	Exempt
N/A	Local access only. Not required in TIP/Plan conformity.	N/A	Secure Service Road &Tunnel Connecting North Airfield from Relocated Mt. Prospect Rd	VII-62	2013	Exempt
N/A	Local access only. Not required in TIP/Plan conformity.	N/A	Secure Service Roads and Tunnel Construction in South Airfield	VII-108	2013	Exempt

Notes:
1/ Project originally included in conforming TIP FY 02-06, but no longer funded and not included in the conformity analysis. Project included in EIS surface transportation model per ISTHA. A sensitivity analysis performed on the project confirmed that the removal of this project would have only minor effects on modeling.
2/ Project originally included in conforming TIP FY 02-06, but no longer funded. Project was included in EIS surface transportation model per ISTHA. The project is outside the EIS study area but was included in the background trip modeling. The removal of this project would cause some redistribution of trips, but would not have a major effect on the modeling.

[redacted]

CHICAGO AREA TRANSPORTATION STUDY 300 West Adams Street Chicago, Illinois 60606 (312) 793-3456 Fax (312) 793-3481

[redacted]

April 11, 2005

APR 12 2005

Mr. Michael W. MacMullen
Airports Environmental Program Manager
Federal Aviation Administration
2300 East Devon Avenue
Des Plaines, Illinois 60018

Re: O'Hare Modernization Transportation Conformity

Dear Mr. MacMullen:

I am writing to affirm that Chicago Area Transportation Study staff has reviewed and concurred with the information shown on the Transportation Conformity Matrix transmitted with your letter of April 7, 2005. However, we note the following as a footnote:

> The "not regionally significant" status of the Zemke Road extension from Bessie Coleman Drive to Mannheim Road (01-02-0023) is contingent upon interagency consultation pursuant to 40 CFR 93.105. Since this appears to be a collector road, providing primarily local access, it is not regionally significant as defined by 40 CFR 93.101, and need not be included in conformity networks.

We concur that all of the projects requiring a conformity determination and which could be conformed given fiscal constraints at the time of the conformity analysis were conformed. In addition, we concur with your analysis that a number of the planned projects not conformed because of fiscal constraints are likely to be conformed and constructed in the future given recently approved and forthcoming additional funding.

Thank you for the opportunity to comment on the transportation conformity matrix. If you have questions, please contact Tom Murtha of my staff at 312-793-3466.

Sincerely,

Donald P. Kopec

Donald P. Kopec
Acting Executive Director

Cc: Luann Hamilton, CDOT

POLICY COMMITTEE: TIMOTHY W. MARTIN-CHAIRMAN, Secretary, Illinois Department of Transportation; **MIGUEL d'ESCOTO**-VICE CHAIRMAN, Commissioner, Department of Transportation, Representing City of Chicago; **PAULA THIBEAULT**, Executive Director, Representing Regional Transportation Authority; **RAE RUPP SRCH**, Commissioner, Representing Northeastern Illinois Planning Commission; **JEFFERY SCHIELKE**, Mayor, City of Batavia, Representing Council of Mayors; **JAMES ELDRIDGE, JR.**, Chief Administrative Officer, Representing Cook County; **TOM CUCULICH**, Director of Economic Development & Transportation Planning, Representing DuPage County; **KAREN McCONNAUGHAY**, County Board Chairman, Kane County; **SUZI SCHMIDT**, County Board Chairman, Lake County; **KENNETH D. KOEHLER**, County Board Chairman, McHenry County; **SHELDON LATZ**, County Engineer, Representing Will County; **FRANK KRUESI**, President, Representing Chicago Transit Authority; **MICHAEL W. PAYETTE**, Vice President, Union Pacific Railroad, Representing Class I Railroad Companies; **JEFFREY R. LADD**, Chairman, Commuter Rail Board-Metra; **JOHN D. RITA**, South Suburban Mass Transit District, Representing Mass Transit Districts; **JOHN McCARTHY**, President, Continental Air Transport, Representing Private Transportation Providers; **JOHN J. CASE**, Chairman, Representing Suburban Bus Board-Pace; **LEANNE P. REDDEN**, Chief of Planning, Representing Illinois State Toll Highway Authority; **NORMAN R. STONER**, Division Administrator, Representing Federal Highway Administration; **JOEL P. ETTINGER**, Regional Administrator, Representing Federal Transit Administration; **DONALD KOPEC**-SECRETARY, Acting Executive Director, Chicago Area Transportation Study.

2/05

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ATTACHMENT J-5

FINAL GENERAL CONFORMITY DETERMINATION - COMMENTS/RESPONSES

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jean public
<jeanpublic@yahoo
.com>
05/28/2005 02:15
PM

To
9-AGL-600-OMPEIS/AGL/FAA@FAA
cc
rodney.frelinghuysen@mail.house.gov
Subject
public comment on federal register
of 5/18/05 vol 70 no 95 pg 28594

usdot faa - public comment on draft air quality general conformity determination for new runways at chicago o hare.

my public comment is that the FAA distorts the figures on air quality. the air around airports is disastrous for life. absolutely disastrous. w hen one examines what is in aviation gasoline, it is clear that breathing it, along with de icing chemicals will kill you sooner rather than later.

FAA of course tries to lie about it. FAA tries to deceive the american public. FAA is in the pocket of the aviation industry who runs roughshod over the american people. FAA destroyed the noise council which tried to get a handle on the awful noise from aviation.

This ohare area has the same issues as all o ther airports. they have noise, danger and pollution issues. Building them bigger acts as if the sky is infinite. The sky is not infinite. the world is not infinite. we need to get a handle on that and control the human race. we are disastrously endangering the world's health with no real forethought.

this building is ill advised. it should be stopped no matter who is getting the graft money from it. 1

b. sachau
15 elm st
florham park nj 07932

Do You Yahoo!?
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http://mail.yahoo.com

Comment	Response
1	The FAA respectfully disagrees with the commenter's opinions, including that the levels of airport-related emissions reported in the Draft (or Final) General Conformity Document are distorted. The emission levels were calculated using industry and USEPA-accepted emission indices (rates) for the airport-related sources included in the analysis. The FAA also respectfully disagrees that the air around airports is "disastrous for life". The USEPA established National Ambient Air Quality Standards (NAAQS) for some criteria air pollutants including carbon monoxide, ozone, nitrogen dioxide, sulfur dioxide, particulate matter and lead. With the exception of lead, the results of the air quality analysis to evaluate the effects of the proposed improvements at O'Hare indicate that airport-related emissions will not exceed the standards or, with the case of ozone, be at such a level that they would contribute to exceeding a standard. Airport related sources are not significant emitters of lead. Notably, the City of Chicago has committed to measures, which will reduce emissions associated with the proposed improvements.

"Roukaya McCaffrey" <RMcCaffrey@ildceo.net>
06/07/2005 11:55 AM

To
9-AGL-600-OMPEIS/AGL/FAA@FAA

cc
"Roslyn Jackson" <RJackson@ildceo.net>

Subject
FAA

Mr. Cooper, Your request for comments on the FAA Federal Air Quality drafts are not necessary from my office. The requests were passed on to me from Ms Roslyn Jackson. It is not something our agency or the Illinois State Cle4aringhouse reviews or sends out for review. If you have any questions, please feel free to contact me. Thank you. 1

Roukaya McCaffrey
Dept. of Commerce and Economic Opportunity
620 East Adams St., 6th Floor Springfield, IL 62701
Phone: 217-524-0188
Fax: 217-558-0473
rmccaffrey@ildceo.net

Comment	Response
1	Comment noted.

050615_01

Sac & Fox Tribe of the Mississippi in Iowa

349 Meskwaki Road, Tama, IA 52339-9629 • (641) 484-4678 FAX (641) 484-5424

"MESKWAKI NATION"

RECEIVED JUN 20 2005 By

June 15, 2005

Mr. Mike MacMullen
Federal Aviation Administration
2300 East Devon Avenue
Des Plaines, IL 60018

Dear Mr. MacMullen:

Thank you for your letters of June 03, 2005 concerning the projects:

Draft O'Hare Modernization
Section 3/4 (f) and Section 6 (f)
Chicago, IL

Draft Air Quality General Conformity Determination
Chicago O'Hare International Airport
Chicago, IL

At this time, the Historical Preservation Department of the Sac and Fox of the Mississippi in Iowa has determined the above listed has:

- ☐ No interest in the area geographically
- ☐ No comment on the proposed undertaking
- ☑ No objections. However, if human skeletal remains and/or any objects falling under NAGPRA are uncovered during construction, please stop immediately and notify the NAGPRA Representative, Johnathan L Buffalo.
- ☐ Have an objection or require additional project information. Please send the following: _____.

1

Sincerely,

Johnathan L. Buffalo
Historical Preservation Coordinator
Sac and Fox of the Mississippi in Iowa

Cc: File

Comment	Response
1	FAA acknowledges that the Sac & Fox Tribe of the Mississippi in Iowa has no objection to the Section 4(f) and Section 6(f) Evaluation. If human skeletal remains and/or any objects falling under NAGPRA are uncovered during construction, the NAGPRA Representative of the Sac & Fox Tribe of the Mississippi in Iowa will be notified.

050620_01

Leslie.Michael@epamail.epa.gov
06/20/2005 03:57 PM

To Michael W MacMullen/AGL/FAA@FAA
cc Mooney.John@epamail.epa.gov, Kamke.Sherry@epamail.epa.gov
bcc
Subject Draft O'Hare Modernization General Conformity Determination

History: This message has been replied to and forwarded.

I have reviewed the Draft O'Hare Modernization (OMP) General Conformity Determination. The FAA completed a general conformity applicability analysis which quantified emissions of the OMP. The emissions were above the de-minimis levels for Volatile Organic Compound and Oxides of Nitrogen. For this reason a general conformity finding for the OMP is necessary. 1

FAA is demonstrating conformity for the OMP by showing that these emissions included in the applicable State Implementation Plan (SIP). The applicable SIP for the purposes of this demonstration is Illinois Environmental Protection Agency's (IEPA) 1-hour ozone attainment demonstration. In the analysis, FAA states that SIP information was developed in coordination with IEPA, but there is no written statement from IEPA to that effect. If the project's emissions are specifically identified and accounted for in the SIP, then no letter is necessary. "Specifically identified" has generally means that the project and its emissions are identified in the SIP. If the project is not "specifically identified" in the SIP then a letter would be needed. For example, if FAA and the State claim that the emissions are included in a general category such as construction emissions or off road mobile source emissions, then they would be included in the SIP but not specifically identified. This OMP emissions are not specifically identified in the SIP. 2

In the final conformity determination, FAA needs a written statement from IEPA stating that the details (growth rates, emissions, etc.) of the attainment demonstration were included in the analysis, and that they concur with the finding that OMP conforms to the SIP. 3

Michael Leslie, P.E.
USEPA - Region 5 (AR-18J)
77 W. Jackson Blvd.
Chicago, IL 60604
Phone: (312) 353-6680
Fax: (312) 886-0617

Comment	Response
1	The Draft General Conformity Determination was published by the FAA on May 18, 2005. The Final General Conformity Determination is provided as **Attachment J-2** of this Final EIS.
2	FAA acknowledges that the USEPA requested that the General Conformity Determination for the OM be performed considering the Illinois Environmental Protection Agency's (IEPA's) 1-hour ozone attainment demonstration State Implementation Plan (SIP) as the "applicable" SIP. In point of fact, FAA utilized the IEPA 1-hour ozone attainment demonstration SIP, as requested by USEPA. While the Draft General Conformity Determination did not include a written statement from the IEPA that project-related emissions are either specifically identified in the SIP-based emission inventories (as is the case for emissions from aircraft, ground support equipment, and auxiliary power units) or reasonable accounted for in the SIP inventories (as is the case for emissions from construction activity and motor vehicles), these conclusions were made in consultation with the IEPA. Understandably, the IEPA desired to provide the written statement in the Final General Conformity Determination to insure that there were no significant modifications to any of the OM-related values between the Draft and Final documents on which the statement would be made. After reviewing the final OM-related air emissions data, the IEPA provided the USEPA-requested documentation (included in **Attachment J-3** of **Appendix J.3** of this Final EIS).
3	Please see **Attachment J-3** of **Appendix J.3** of this Final EIS for the IEPA's statement regarding the conformance of the proposed project with the IEPA's 1-hour ozone attainment demonstration SIP.

050620_02

BEFORE THE
FEDERAL AVIATION ADMINISTRATION
CHICAGO AIRPORTS DISTRICT OFFICE

In the matter of the	)
	)
DRAFT GENERAL CONFORMITY DETERMINATION FOR THE O'HARE MODERNIZATION PROGRAM (OMP)	)

PRELIMINARY COMMENTS ON
AND OBJECTIONS TO THE
DRAFT GENERAL CONFORMITY DETERMINATION
FOR THE O'HARE MODERNIZATION PROGRAM

Communications with respect to this document should be addressed to:

Joseph V. Karaganis
KARAGANIS WHITE & MAGEL LTD
414 North Orleans Street
Chicago, Illinois 60610
(312) 836-1177

jkaraganis@k-w.com

Counsel for St. John's United Church of Christ, Helen Runge, Shirley Steele, Rest Haven Cemetery Association, Robert Placek and Leroy Heinrich and Roxanne Mitchell

Robert E. Cohn
Latane Montague
Alexander Van der Bellen
HOGAN & HARTSON LLP
555 Thirteenth Street, NW
Washington, DC 20004
202-637-4999
recohn@hhlaw.com

Counsel for The Village of Bensenville and Elk Grove Village

June 20, 2005

\\\DC - 23869/0003 - 2133582 v6

BEFORE THE
FEDERAL AVIATION ADMINISTRATION
CHICAGO AIRPORTS DISTRICT OFFICE

In the matter of the	)
	)
DRAFT GENERAL CONFORMITY DETERMINATION FOR THE O'HARE MODERNIZATION PROGRAM	)
	)
(OMP)	)

PRELIMINARY COMMENTS ON
AND OBJECTIONS TO THE
DRAFT GENERAL CONFORMITY DETERMINATION
FOR THE O'HARE MODERNIZATION PROGRAM

The Village of Bensenville and Elk Grove Village (the "Community Objectors"), St. John's United Church of Christ, Helen Runge, Shirley Steele, Rest Haven Cemetery Association, Robert Placek and Leroy Heinrich (the "Religious Objectors") and Roxanne Mitchell representing the Homeowner Objectors[1] hereby submit these preliminary comments[2] on and objections to the Federal Aviation Administration's ("FAA") Draft Air Quality General Conformity Determination for Proposed New Runways and Associated Development at Chicago O'Hare International Airport (hereinafter,

[1] The Community, Religious and Homeowner Objectors are collectively referred herein to as the "Objectors"

[2] The Objectors will file additional supplemental comments on June 24, 2005 per communication from Michael MacMullen dated June 14, 2005.

\\\DC - 23869/0003 - 2133582 v6

"Conformity Determination").[3] The Conformity Determination fails to demonstrate conformity of the proposed project with the Illinois State Implementation Plan ("SIP") and therefore is inconsistent with applicable statutes, regulations, administrative orders, and administrative guidance documents. 1

The Conformity Determination is flawed and contains the following errors and omissions:

(1) Illinois has failed to determine and document that project-related emissions (along with all other emissions in the relevant area) will not exceed the established SIP emission budgets under 40 C.F.R. § 93.158(a)(5)(i)(A); 2

(2) The FAA has impermissibly relied on the assumption that simply because project-related emissions are a small percentage of the SIP budget, the emission increases will not exceed the SIP budget levels; and 3

(3) The FAA has failed to quantitatively demonstrate that total emissions in the relevant area will not exceed the SIP budget,

[3] *See* 70 Fed. Reg. 28,594 (2005).

-2-

\\\DC - 23869/0003 - 2133582 v6

Comment	Response
1	The FAA respectfully disagrees that the General Conformity Determination fails to demonstrate conformity of the proposed project with the Illinois 1-hour ozone attainment demonstration State Implementation Plan (SIP).
2	FAA disagrees with the commenter's assertion that the only way to demonstrate conformity is to determine and document that project-related emissions (along with all other emissions in the area) will not exceed the established SIP emission budgets. The USEPA's implementing regulations for demonstrating conformity, 40 CFR 93.158(a)(1), provide that a project's emissions can be determined to conform if the emissions are "specifically identified and accounted for in the applicable SIP." Additional guidance, issued by the USEPA and FAA (General Conformity Guidance for Airports, Questions and Answers, dated September 25, 2002) further confirms that the FAA's methodology is appropriate. FAA, in consultation with USEPA and IEPA, has determined that O'Hare-related aircraft/GSE emissions are specifically identified in the SIP and construction/motor vehicle emissions are accounted for in the SIP. The FAA performed a quantitative analysis of airport-related emissions. The General Conformity Determination was prepared in consultation with the IEPA. As documented in the Draft General Conformity Determination (published by the FAA on May 8, 2005) and in the Final General Conformity Determination (**Appendix J-2 of the FEIS**), the level of volatile organic compounds and nitrogen oxide emissions from O'Hare and OM-related aircraft, auxiliary power units, and ground support equipment are lower than the emission data prepared by the IEPA for the 1-hour ozone attainment demonstration SIP. Further, the FAA has concluded, and the IEPA has concurred (see **Attachment J-3** to **Appendix J**), that

but merely concludes that the SIP budget could "reasonably accommodate" the net emission increase from the project. 4

For these reasons, as explained in more detail below, the draft report's determination of conformity fails applicable legal and policy requirements and as a result the project cannot go forward. 5

I. A POSITIVE CONFORMITY DETERMINATION IS REQUIRED BY THE CLEAN AIR ACT, ITS IMPLEMENTING REGULATIONS, AND FAA GUIDANCE DOCUMENTS

The FAA is prohibited from approving the O'Hare modernization program unless the FAA affirmatively determines that air quality-related impacts of the project conform to the requirements of State of Illinois' SIP developed under the Clean Air Act[4]. Section 7506(b)(1) of the Act bars agencies of the federal government from approving activities that will interfere with the attainment and maintenance of the National Ambient Air Quality Standards ("NAAQS").[5] EPA regulations implementing Section

---

4 42 U.S.C. § 7601, *et seq.* (hereinafter, "the Act").

5 Section 7605(b)(1) states:

> No department, agency, or instrumentality of the Federal Government shall engage in, support in any way or provide financial assistance for, license or permit, or approve, any activity which does not conform to an implementation plan after it has been approved or promulgated under section 7410 of this title.

Id. § 7506(b)(1).

\\\DC - 23869/0003 - 2133582 v6

Comment	Response
2 (cont)	emissions due to construction of the proposed improvements and motor vehicles associated with the proposed improvements can reasonably be accounted for in the emission inventories prepared by the IEPA and the Chicago Area Transportation Study (CATS) for these sources. According to implementing regulations, 40 CFR 93.158(a)(1), the State of Illinois is not required to determine and/or document that project-related emissions (along with all other emissions in the relevant area) will not exceed the established SIP emission budgets.
3	In its quantitative analysis, the FAA demonstrated that the emission level for aircraft, auxiliary power units, and ground support equipment with the OM improvements is below the emission level of the IEPA's emission inventories for these sources and the levels on which the 1-hour ozone attainment demonstration SIP was prepared. The assumption that emissions due to construction and motor vehicles will not exceed the SIP budget levels because project-related emissions represent a small percentage (less than 5 percent) of the SIP budget/inventories was made in consultation with, and was acceptable to, the IEPA. In lieu of providing a written statement of concurrence with this assumption, the IEPA decided to provide such a statement in the Final General Conformity Determination to insure that there were no significant modifications to any of the OM-related values between the Draft and Final documents on which the statement would be made. After reviewing the final OM-related air emissions data, the IEPA provided the USEPA-requested documentation (see **Attachment J-3** to **Appendix J** of the Final EIS).

7605(b)(1) identify four relevant methods that may be used to demonstrate conformity for ozone and nitrogen dioxide ("NO_2").[6 & 7]

First, the FAA may demonstrate that the O'Hare project is in conformity if the total of direct and indirect emissions of any criteria pollutant from the project are specifically identified and accounted for by Illinois in its approved SIP.[8]

Second, the FAA may demonstrate conformity for ozone and NO_2 emissions if the project-related emissions increases are fully offset within the air quality control region ("AQCR").[9]

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6 *See* 40 C.F.R. § 93.158(a)(1)–(5). Illinois' conformity-related regulations do not appear to have been approved by EPA for inclusion in the Illinois SIP, so the federal regulations at 40 C.F.R. Part 93, Subpart B apply to the FAA's conformity analysis.

7 The FAA limits its analysis to these two criteria pollutants. Sections 93.158(a)(3) & (4) relate only to criteria pollutants other than ozone and NO_2, and are therefore not addressed in these comments. Section 93.158(a)(5)(v) deals only with water and wastewater projects, and are therefore not addressed in these comments. Section 93.158(a)(5)(iv) deals with SIP revisions approved prior to 1990. Because the relevant Illinois SIP was last approved November 13, 2001, these comments will not address subsection (a)(5)(iv). Section 93.158(a)(5)(ii) deals with projects that have already been included in a conforming transportation plan. Because the proposed project is not a part of a conforming transportation plan, these comments will not address subsection (a)(5)(ii).

8 "[A project is in conformity when for] any criteria pollutant, the total of direct and indirect emissions from the action are specifically identified and accounted for in the applicable SIP's attainment or maintenance demonstration." *Id.* § 93.158(a)(1).

9 "[A project is in conformity when for] ozone or nitrogen dioxide, the total of direct and indirect emissions from the action are fully offset within the same nonattainment or maintenance area through a revision to the applicable SIP or a similarly enforceable measure that effects emissions reductions so that there is no net increase in emissions of that pollutant . . . ." *Id.* § 93.158(a)(2). *Accord id.* § 93.158(a)(5)(iii).

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Comment	Response
4	The FAA respectfully disagrees that we have failed to quantitatively demonstrate that O'Hare-related and OM-related emissions, along with all other emissions within the area will not exceed the SIP budget. See Responses to Comments 2 and 3.
5	The FAA respectfully disagrees that the Draft General Conformity Determination failed any applicable legal or policy requirements.

Third, where the Illinois SIP does not specifically identify and account for project-related emissions, the FAA may make a conformity demonstration if Illinois determines and documents that project-related emissions of ozone or NO_2—taken together with all other emissions in the AQCR—will not exceed the emissions budget in the SIP.[10]

Fourth, if Illinois cannot determine and document that project-related emissions of ozone or NO_2 will not exceed the SIP budget, Illinois may—under precisely-defined requirements—make a commitment to EPA to revise the SIP within eighteen months[11] after the conformity determination to modify the SIP budget in the AQCR to accommodate the project-related emissions.[12]

6

[10] "[A project is in conformity when for] ozone or nitrogen dioxide . . . each portion of the action or the action as a whole meets any of the following requirements: (i) Where EPA has approved a revision to an area's attainment or maintenance demonstration after 1990 and the State makes a determination as provided in paragraph (a)(5)(i)(A) of this section * * * (A) The total of direct and indirect emissions from the action (or portion thereof) is determined and documented by the State agency primarily responsible for the applicable SIP to result in a level of emissions in the non-attainment (or maintenance) area, would not exceed the emissions budgets specified in the applicable SIP."

Id. § 93.158(a)(5)(i)(A).

[11] *See id.* § 93.158(a)(5)(i)(C).

[12] "[A project is in conformity when for] ozone or nitrogen dioxide . . . each portion of the action or the action as a whole meets any of the following requirements: (i) Where EPA has approved a revision to an area's attainment or maintenance demonstration after 1990 and the State makes a determination as provided in paragraph (a)(5)(i)(B) of this section * * * (B) The total of direct and indirect emissions from the action (or portion thereof) is determined by the State agency responsible for the applicable SIP to result in a level of emissions which, together with all other emissions in the nonattainment (or maintenance)

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Comment	Response
6	See Response to Comments 2 and 3.

The FAA's own internal guidance—as well as guidance jointly-issued with EPA—confirm and explicate the use of these methods to demonstrate conformity.[13] As set forth in more detail below, the draft O'Hare conformity report fails to demonstrate conformity with the Illinois SIP for construction- and motor vehicle-related emissions under any of these methods, including the second method, which the FAA attempted to employ for this purpose. 7

II. THE FAA'S DRAFT CONFORMITY DETERMINATION FAILS TO SHOW THAT ILLINOIS DETERMINED AND DOCUMENTED THAT PROJECT EMISSIONS WILL NOT EXCEED THE RELEVANT EMISSIONS BUDGET

The FAA's Draft Conformity Determination divides the project-related emissions into four categories: aircraft, ground support equipment, auxiliary power units, motor vehicles, and construction equipment.[14] For the first

area, would exceed an emissions budget specified in the applicable SIP and the State Governor or the Governor's designee for SIP actions makes a written commitment to EPA which includes the following: [(1) a SIP revision schedule; (2) a plan to keep overall emissions beneath relevant budget; (3) a demonstration that all existing SIP requirements are being implemented; (4) a determination that the federal agency making the conformity determination has reasonably mitigated project-related emission increases; and (5) written documentation, including air quality analyses, supporting the conformity determination]." *Id.* § 93.158(a)(5)(i)(B).

13 *See, e.g.*, Environmental Impacts: Policies and Procedures; Notice, 69 Fed. Reg. 33,778 (2004) (noticing FAA Order 1050.1E) (hereinafter "Order 1050.1E"); FEDERAL AVIATION ADMINISTRATION, U.S. DEP'T OF TRANSPORTATION, AND ENVIRONMENTAL PROTECTION AGENCY, GENERAL CONFORMITY GUIDANCE FOR AIRPORTS QUESTIONS AND ANSWERS (2002) (hereinafter "EPA Q&A"); FEDERAL AVIATION ADMINISTRATION, U.S. DEP'T OF TRANSPORTATION, PUB. NO. FAA-AEE-97-03, AIR QUALITY PROCEDURES FOR CIVILIAN AIRPORTS AND AIR FORCE BASES (1997) (hereinafter "PROCEDURES").

14 *See* CONFORMITY DETERMINATION at 43.

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Comment	Response
7	See Responses to Comments 2 and 3 above. Additionally, the FAA agrees that it is prohibited from approving the OM unless it is determined that the emissions increase attributable to the proposed improvements conforms to the requirements of the one-hour ozone attainment demonstration SIP (the applicable SIP). In making its General Conformity Determination, the FAA utilized the first method referenced by the commenter.

three categories (i.e. aircraft, ground equipment, auxiliary power units), the FAA summarily concludes without any factual demonstration that the current SIP specifically identifies and accounts for project-related emission increases as compared to the 2005 and 2007 SIP budgets.[15] 8

The draft determination fails to provide SIP emission-related data from IEPA. Without access to this data, commenters are unable to properly assess and analyze the quantitative conclusions in the report. Until these data are provided, the draft report fails to provide sufficient information to support its determination of conformity with respect to these sources. 9

For the last two categories—motor vehicles and construction equipment—the FAA admits that emissions from the project are not specifically identified and accounted for in the Illinois SIP: "While the IEPA's emission estimates for aircraft and ground support equipment are specific to O'Hare, no such specific calculations (or estimates) are available for either construction-related or motor vehicle-related emissions."[16] As a result, the FAA attempts to show that the construction-related and motor vehicle-

[15] *See id.* at 93 ("As such, the FAA, in consultation with the IEPA, has determined that project-related emissions of nitrogen oxides from aircraft, ground support equipment, and auxiliary power units are accounted for in the SIP."). This determination was performed only for SIP budget year 2007, because the FAA asserts that there will be no planned emission increases from these three categories of sources in 2005. *See id.* at 89.

[16] *See id.* at 89.

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Comment	Response
8	See Responses to Comments 2 and 3.
9	FAA disagrees with the commenter's assertion. IEPA's data was included in several of the tables within the Draft General Conformity Document. For example, see **Tables 5-18** through **5-21** and **Tables 5-23** through **5-25** in the Final General Conformity Document for IEPA SIP data.

related emissions from the project will not—taken together with all other emissions in the relevant AQCR—exceed the emissions budget in 2005 and 2007 for those pollutants.[17] For the reasons set forth below, the Conformity Determination wholly fails to demonstrate conformity. 10

A. Summary of the FAA's conformity demonstration method 11

After concluding without any factual support that emissions from aircraft, ground support equipment, and auxiliary power units conformed to the SIP under the first conformity method in Section 93.158(a)(1),[18] the FAA attempted to analyze the emissions from construction and motor vehicles under the third method, set forth at Section 93.158(a)(5)(i)(A). Illinois has prepared SIP budgets for attainment demonstration milestone years 2005 and 2007. The conformity regulations require Illinois to add the expected project-related emissions in 2005 and 2007 to the expected emissions from the rest of the AQCR, and then compare that total against the SIP budget for 2005 and 2007. If the total is less than the relevant SIP budget, then project conformity may be demonstrated under Section 93.158(a)(5)(i)(A). If the total exceeds the relevant SIP budget, an alternative conformity method must be used to demonstrate conformity.

17 *See* 40 C.F.R. § 93.158(a)(5)(i)(A).

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Comment	Response
10	FAA disagrees with the commenter's assertion. See Responses to Comments 2 and 3. O'Hare's aircraft and GSE emissions are specifically identified in the SIP; construction and motor vehicle emissions are accounted for in the SIP.
11	FAA did not utilize the "third" method as referenced by the commenter. See Responses to Comments 2 and 3.

Because the FAA asserts that only construction-related emissions could occur in 2005, only construction-related emissions were included in the 2005 comparison—thus, motor vehicle emissions were not compared to the 2005 SIP budget.[19] As a result, the FAA analyzed the construction-related emissions expected in 2005 in light of the 2005 SIP budget, and analyzed both construction- and motor vehicle-related emissions expected in 2007 against the 2007 SIP budget. After performing these three comparisons, the FAA concluded as follows:

> ***Construction versus 2005 SIP Budget.*** "[B]ecause the O'Hare-related construction emission estimates represent a relatively small percentage of the IEPA's regional projection, the FAA, in consultation with the IEPA, has determined that it can be assumed that the O'Hare-related construction emissions can reasonably be accounted for in the inventories for the 1-hour ozone attainment demonstration SIP."[20]

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18 *See* CONFORMITY DETERMINATION at 93.

19 *See id.* at 89.

20 *Id.* at 90.

Construction versus 2007 SIP Budget. "[B]ecause the O'Hare-related construction emission estimates represent a relatively small percentage of the IEPA's regional projection . . . the FAA, in consultation with the IEPA, has determined that it can be assumed that the O'Hare-related construction emissions can reasonably be accounted for in the inventories for the 1-hour ozone attainment demonstration SIP . . ."[21]

Motor vehicle versus 2007 SIP Budget. "[B]ecause the comparisons of project-related motor vehicle emissions of volatile organic compounds and nitrogen oxides . . . indicate that project-related emissions would represent a relatively small portion of either estimate . . . the FAA, in consultation with the IEPA, has determined that it is reasonable to assume that the emissions can be accommodated in the SIP inventories."[22]

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21 *Id.* at 95.

22 *Id.* at 97–98.

The FAA failed to compare the project-related plus other AQCR emissions against the relevant SIP budgets. This failure—evident in three ways as discussed below—is fatal to the FAA's conformity determination, and as a result the project cannot be approved by the FAA. . 11

B. The FAA's conformity determinations for construction- and motor vehicle-related emissions are unlawful. 12

First, it is the obligation of Illinois, not the FAA, to make the determination that the emissions will not exceed the SIP emission budgets. The conformity regulations require that this no-exceedence finding must be "determined and documented by the State agency primarily responsible for the applicable SIP"—in this case, Illinois. From the face of each of the three conclusions above, it is clear that while Illinois may have been "consulted," Illinois has not made the requisite written determination that the emissions will not exceed the budgets. The FAA is without authority to conclude that project emissions do not exceed the SIP budget. Until the draft conformity report is amended to reflect that *Illinois* has made the requisite conclusion, the FAA cannot make a determination of conformity.[23] In the absence of the requisite determination, which it has not yet be made, the Draft Conformity Determination is a nullity and the project cannot be approved.

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Comment	Response
11 (repeated for clarification purposes)	FAA did not utilize the "third" method as referenced by the commenter. See Responses to Comments 2 and 3.
12	FAA is not required to, nor did it utilize the "third"method as referenced by the commenter. See Responses to Comments 2 and 3.

Second, the basis for the FAA's central conclusion—that the project-related emissions represent only a small percentage of the SIP emission budgets—does not comport with legal requirements. It is a qualitative conclusion, not an affirmative quantitative determination as required by law.

The conformity regulations and FAA's guidance documents require that the there is an affirmative demonstration that project-related emissions, along with all other emissions in the AQCR, "*would not exceed* the emissions budgets."[24] In other words, an affirmative quantitative demonstration must be made that combines the expected project and other AQCR emissions and compares the total to the SIP budget.

It is facially inadequate and wholly insufficient to conclude that because project-related emissions are a low overall percentage of the budget that the budget will not be exceeded. Indeed, quite the opposite may be true. It may be that even a small overall percentage increase in emissions may cause an exceedence of the SIP budget. The FAA does not reveal whether this may be the case, because it has not done the required evaluation and simply relies on a conclusory, improper qualitative exercise. Instead, Illinois

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23 *See* 40 C.F.R. § 93.158(d) ("Any analyses required under this section must be completed . . . before the determination of conformity is made."). The FAA's citation—without comment or analysis—to the EPA Q&A is unavailing of its position.

24 *Id.* § 93.158(a)(5)(i)(A) (emphasis added).

must quantitatively and affirmatively compare the sum of the estimated project emissions and all other AQCR emissions against the SIP budgets for the relevant years. Until Illinois makes an affirmative mathematical determination that the combined project and other-AQCR emissions will not exceed the SIP emission budget, the FAA cannot make a determination of conformity.[25] 12

Third, the FAA's conclusion is defective because it is plainly based on ***assumptions*** about the emission budgets "reasonably accommodating" the project emission increases. The conformity regulations do not allow for ***assumptions*** about the impact of project-related emissions—the regulations require quantitative analyses that affirmatively demonstrate that the project is in conformity with SIP provisions that are intended to attain and maintain national health-based air quality standards. It is wholly improper to rely merely on assumptions about whether the SIP budget will reasonably accommodate project-related emission increases. Until Illinois makes an affirmative finding based on quantitative analyses—not assumptions, the FAA cannot make a determination of conformity and the project cannot be approved. 13

[25] *See* 40 C.F.R. § 93.158(d) ("Any analyses required under this section must be completed . . . before the determination of conformity is made.").

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Comment	Response
12(repeated for clarification purposes)	FAA is not required to, nor did it utilize "third"method as referenced by the commenter. See Responses to Comments 2 and 3.
13	The FAA disagrees that the conformity regulations do not allow assumptions to be made with respect to project-related emissions. The IEPA's SIP-based emission estimates of volatile organic compounds and nitrogen oxide emissions were prepared for the year 1990 and then adjusted by the IEPA to reflect future (year 2005 and 2007) conditions. At the time the IEPA's 1990 estimates of emissions from construction-related activities for the Chicago non-attainment area were prepared, the City of Chicago would not have had an estimate of construction-related equipment emissions for the proposed improvements at O'Hare. Further, due to the methodology used to calculate regional emissions from these types of sources, it can be said that no individual projects are considered. The USEPA and the FAA issued guidance with respect to this method of demonstrating compliance for proposed airport improvements (General Conformity Guidance for Airports, Questions and Answers, September 25, 2002; FAA and USEPA). As stated in the guidance, "the determination as to whether the action/project is specifically identified in the SIP is made on a case-by-case basis and should be done in consultation with the State/local air quality agency and the EPA Regional Office." As stated in the Draft and Final General Conformity Determinations, the determination that O'Hare-related and OM-related emissions from aircraft, auxiliary power units, ground support equipment, construction, and motor vehicles are either specifically identified or reasonably accounted for in the inventories prepared by the IEPA for the one-hour ozone attainment demonstration SIP was made in consultation with the IEPA and USEPA.

For the foregoing reasons, the FAA's draft Conformity Demonstration is fatally flawed, and does not support a proper determination of conformity as required before the FAA may approve or permit the project. 14

Respectfully submitted,

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Comment	Response
14	The FAA disagrees that the Draft General Conformity Determination (or the Final General Conformity Determination) is fatally flawed. The FAA has demonstrated, using criteria outlined in 40 CFR 93.158 and additional guidance issued by the USEPA and FAA, that volatile organic compound and nitrogen oxide emissions that would result from the improvement of O'Hare are specifically identified and accounted for in the inventories prepared by the IEPA for the one-hour ozone attainment demonstration SIP.

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050621_01

"To achieve a balance between public health and the economy"

June 21, 2005

VIA FACSIMILE and email

Mr. Mike MacMullen
Federal Aviation Administration
2300 E. Devon Ave.
Des Plaines, IL 60018
Fax (847) 294-7046 ompeis@faa.gov

Subject: Conformity Comments Filing...Errata

Dear Mr. MacMullen:

In our rush to meet the filing deadline, we subsequently noticed a transpositional error (VOC instead of NOx) in the filing, in the section titled: Conformity to an Illinois SIP (ozone) that may already be in trouble. The attached copy corrects that error.

Thank you.

Regards

Jack Saporito
Executive Director

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June 21, 2005

VIA FACSIMILE and email

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Fax (847) 294-7046 ompeis@faa.gov

Subject: Comments, Draft Air Quality General Conformity Determination, OMP, May 2005…ERRATA

PM2.5
The document does not address any PM2.5 Conformity issues. Though seemingly logical, based on the fact that there is not yet an Illinois PM2.5 SIP, the net result is that massive changes due to O'Hare airport expansion will be allowed, independent of resulting PM2.5 emissions, as long as the expansion plans are approved by the FAA (e.g., ROD) before the required SIP is created and approved by the USEPA.

While we might consider a "go ahead" position, given a letter from the Governor of Illinois, committing that the to-be-created SIP will incorporate any and all OMP PM2.5 emissions, we cannot in this case because we disagree with the current OMP method of calculating PM2.5 emissions inventories and the inventory totals.[1] The USEPA has expressed similar concerns.[2]

Until that problem is fixed, such that reasonably accurate PM2.5 inventories can be assessed and projected for the various OMP Alternatives, expansion of O'Hare operations via any OMP alternative (other than A) must be assumed to cause a significant worsening of the already bad Chicago non-attainment area's PM2.5 levels and resulting negative impacts on the health and well-being of it's millions of people.

Furthermore, we state that it is totally irresponsible and potentially harmful to the health of millions of Illinois citizens for the Illinois EPA (IEPA) to declare that they will incorporate these DEIS PM2.5 (or whatever kind of PM is calculated in the DEIS…an unknown) into their required future PM2.5 SIP, without fully understanding what or how these PM amounts were calculated in the DEIS[3]. 1

[1] See AReCO's Comments to the OMP DEIS as well as subsequent interaction letters between AReCO and IEPA and the FAA (Barry Cooper).
[2] See USEPA Comments to the DEIS.
[3] Letter from IEPA to AReCO, April 6, 2005.

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Comment	Response
1	The effective date of the USEPA designations for particulate matter 2.5 microns or less in size (PM2.5) was April 5, 2005. On April 5, 2005, a one-year "grace period" began. As such, the USEPA does not require conformity determinations with respect to this pollutant until April 5 of 2006. To disclose the potential impact of the proposed improvements at O'Hare on ambient levels of particulate matter 2.5 microns or less in size, the FAA prepared an emissions inventory and performed dispersion modeling for the pollutant. A summary of the results of the analysis is presented in **Section 5.6.3, Alternatives Analysis, of this FEIS.** Detailed information regarding the methodology used to estimate levels of this pollutant and detailed results of the analysis are provided in **Appendix J, Air Quality** of this FEIS (**Sections J.2.2.1-Aircraft, J.2.2.5-Construction Emissions, J.2.2.6-Conversion of Total Hydrocarbons to Volatile Organic Compounds and Particulate Matter 10 Microns or Less in Size to Particulate Matter 2.5 Microns or Less in Size, J.2.2.7-Emission Inventory Results – Airport-Related Sources, and J.2.3-Dispersion Analysis**). As previously stated in IEPA's letter to AReCO dated April 6, 2005, "although the estimates [IEPA's and those in the EIS] differ, this difference is justified and does not negatively affect the emissions analysis…" The letter further states that "The Illinois EPA will incorporate these updated estimates in its planning to attain the 8-hour ozone and fine particulate matter standards." (A copy of the IEPA's letter in provided in **Attachment J-3** of **Appendix J**).

AReCO-MAAP
6/21/05
- 2 -

ERRATA

Ozone and Precursors
We have previously pointed out, to both the IEPA and FAA,[4] the huge inconsistencies of the aircraft/GSE NOx and VOC emissions inventories as calculated in the DEIS versus those used in the existing Illinois ozone SIP. This Conformity document confirms these inconsistencies, for example in Table 5-23, where for instance, the DEIS calculated VOC amounts are only about one fifth of that calculated by IEPA in the SIP.

IEPA's response to our query in this regard[5] was basically, "The [smaller] DEIS numbers are correct", attributing these very substantial differences primarily to changes (obviously reductions) in the aircraft and GSE emissions factors contained within EDMS (and the reduction of diesel-powered GSE). Our several attempts to get a listing of the emission factors used in the DEIS analyses, from the FAA[6] were rebuffed and we therefore maintain our stated position that aircraft/GSE emissions inventory calculations are erroneous (too low). Additionally, our requests to the FAA to implement a third party independent audit of these inventories[7] were also rejected.

This creates an unsustainable "Catch-22" situation where the FAA puts forth unaudited emission inventory numbers for EIS purposes, which the IEPA accepts (we believe without complete EDMS analyses on their part) and states, "The Illinois EPA will incorporate these updated estimates in its planning to attain the 8-hour ozone and fine particulate matter standards," followed by a subsequent Illinois SIP revision to these reduced emission values. That is, the revised SIP will be "marked up" to agree with the subject Conformity document (perhaps yet without any formal audit). Catch-22.

Thus, this Draft Conformity document is unacceptable until the emission inventory numbers have been audited by an independent third party consultant, and the IEPA should not "mark up" their existing SIP to conform to match the numbers presented in this Conformity document until then. 2

Conformity to an Illinois SIP (ozone) that may already be in trouble.
This Conformity document draws comparisons to the existing Illinois ozone SIP, concluding that the OMP (any expansion Alternative) "conforms". That carries with it the basic assumption that the existing attainment plan (the SIP) is and will remain an acceptable plan, leading to eventual (in several years) attainment of the USEPA NAAQS requirements for to ozone precursors (i.e., NOx and VOC).

However, we believe that the existing SIP is no longer a good, workable plan, because of recent USEPA relaxations on the emissions requirements for power plants. The reason this is significant in Illinois, with its many power plants, is that the existing SIP counts very heavily on reductions of NOx emissions that are imported into and emitted within the non-attainment area, choosing to not seek significant reductions in the other VOC's precursor.[8]

[4] See footnote 1.
[5] See footnote 3.
[6] See footnote 1.
[7] Along with subsequent audits of the dispersion analyses results.
[8] These kinds of tradeoffs are allowed via waiver by the USEPA.

Comment	Response
2	As previously stated in IEPA's letter to AReCO dated April 6, 2005, "although the estimates [IEPA's and those in the EIS] differ, this difference is justified and does not negatively affect the emissions analysis…" The letter further states that "The Illinois EPA will incorporate these updated estimates in its planning to attain the 8-hour ozone and fine particulate matter standards." (a copy of the IEPA's letter is provided in **Attachment J-2** of **Appendix J**). As indicated in FAA's letter to AReCO dated April 25, 2005, the FAA utilized the emissions factors contained within EDMS model. FAA's letter also provided information on how to acquire this commercially-available model at a nominal charge. FAA employed a Third Party Contractor to assist in developing the O'Hare Modernization EIS and related materials, including those associated with the Draft General Conformity Determination (DGCD). In addition, the DGCD was widely circulated for review to members of the public and to key air quality agencies, including both USEPA and IEPA. Such a wide distribution, and the thorough review provided by USEPA and IEPA (IEPA's staff and the staff of our Third Party Contractor exchanged and reviewed each others data independently), assures that all matters discussed in the DGCD were fully analyzed. This work was performed objectively and independently by a firm with well-established expertise in the subject area. The FAA disagrees that the DGCD is unacceptable. As stated above, the emission inventory data was prepared by a Third Party Contractor, was widely circulated, and was reviewed and commented upon by both the USEPA and IEPA. FAA's Final General Conformity Determination is fully consistent with the comments received from both USEPA and IEPA.

AReCO-MAAP
6/20/05
- 3 -

ERRATA

The net affect of the recent federal administration driven USEPA relaxations is that, to a high probability, Illinois will not be able to meet the existing Chicago area SIP plan NOx reduction requirements,[9] which could, upon SIP revision, greatly increase the OMP NOx and VOC emissions (as corrected) impacts. 3

OMP calculated emissions inventories are worthless without operational level guarantees.
We restate here, as we have in our DEIS Comments, that emissions inventory calculations are worthless unless some guarantee exists that the operational levels (number of flight operations per year) assumed for the calculations will not be exceeded in the foreseeable future.

These calculations currently assume an operational level of about 1.2 million ops/year, yet it is estimated that if full OMP implementation is allowed (e.g., Alternative C), at least 2.0 million ops/yr (with existing delays) will be capable without exceeding FAA safety requirements.

Thus, we have stated, and here restate, that the FAA must either officially place a cap on future expanded O'Hare operations at 1.2 million ops/yr or reevaluate all emission inventory calculations (and dispersion analyses) to a new maximum capability operational level for the new configuration (some level greater than 2 million ops/yr).

Since the FAA usually maintains that they do not have legal authority to cap operations (e.g. the past "slot controls"), we conclude that the current emission inventory numbers used in this Conformity document are totally unacceptable, until revised to "maximum operational capability" levels. 4

Regards,

Jack Saporito
Executive Director

c: K. Feith
S. Kamke
S. King
B. Manning
P. Morris
T. Pastika
D. Pino
S. Rothblatt
K. Westlake

[9] Unless Illinois can reverse these effects/impacts through lawsuits or negotiations with all of the existing "legacy" power plants. Even this may not be sufficient, if VOC imports from other states are also adversely affected by the revised USEPA rules.

Comment	Response
3	In the absence of an approved State Implementation Plan (SIP) that addresses the 8-hour ozone National Ambient Air Quality standard (the IEPA will submit such a plan to the USEPA on or before the mandated submittal date in June of 2007), the USEPA requested that the conformance of OM-related emissions be demonstrated using the currently approved 1-hour ozone attainment demonstration SIP (the "applicable SIP). It is not known, by the FAA, USEPA, or IEPA, whether or not the applicable SIP will remain an acceptable plan for bringing the area in to compliance with the 8-hour ozone NAAQS. The FAA utilized the 1-hour ozone attainment demonstration SIP, as requested by both IEPA and USEPA. Comments regarding the validity of this SIP would best be directed to IEPA and USEPA.
4	FAA respectfully disagrees with this comment. Both the DEIS and the DGCD address project-related emissions for the reasonably foreseeable future (i.e., 2018-2019). FAA also notes that IEPA will need to develop new attainment demonstrations for both the 8-hour ozone NAAQS and the NAAQS for particulate matter 2.5 microns or less in size. The IEPA will submit these SIPs on or before the mandated submittal dates to the USEPA (June of 2007 and April of 2008, respectively). The IEPA has advised that the new SIP will contain updated emission estimates in its planning to attain the 8-hour ozone and fine particulate matter standards, including O'Hare's emissions.

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"To achieve a balance between public health and the economy"

June 21, 2005

VIA FACSIMILE and email

Mr. Mike MacMullen
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Subject: Conformity Comments Filing...Errata

Dear Mr. MacMullen:

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Thank you.

Regards

Jack Saporito
Executive Director

Proud Recipient: *1995 Environmental Merit Award, Arlington Heights - 1996, '99 Illinois State Senate Recognition*
Protecting the Health and Safety of Millions of O'Hare Affected Citizens

AReCO
THE ALLIANCE OF RESIDENTS CONCERNING O'HARE, Inc. A Not-for-Profit Corporation
PO Box 1702 ○ Arlington Heights, IL 60006-1702 ○ Fax: 847/506-0202 ○ Tel: 847/506-0670 ○ www.areco.org
"To achieve a balance between public health and the economy"

June 21, 2005

VIA FACSIMILE and email

Mr. Mike MacMullen
Federal Aviation Administration
2300 E. Devon Ave.
Des Plaines, IL 60018
Fax (847) 294-7046 ompeis@faa.gov

Subject: Comments, Draft Air Quality General Conformity Determination, OMP, May 2005…ERRATA

PM2.5
The document does not address any PM2.5 Conformity issues. Though seemingly logical, based on the fact that there is not yet an Illinois PM2.5 SIP, the net result is that massive changes due to O'Hare airport expansion will be allowed, independent of resulting PM2.5 emissions, as long as the expansion plans are approved by the FAA (e.g., ROD) before the required SIP is created and approved by the USEPA.

While we might consider a "go ahead" position, given a letter from the Governor of Illinois, committing that the to-be-created SIP will incorporate any and all OMP PM2.5 emissions, we cannot in this case because we disagree with the current OMP method of calculating PM2.5 emissions inventories and the inventory totals.[1] The USEPA has expressed similar concerns.[2]

Until that problem is fixed, such that reasonably accurate PM2.5 inventories can be assessed and projected for the various OMP Alternatives, expansion of O'Hare operations via any OMP alternative (other than A) must be assumed to cause a significant worsening of the already bad Chicago non-attainment area's PM2.5 levels and resulting negative impacts on the health and well-being of it's millions of people.

Furthermore, we state that it is totally irresponsible and potentially harmful to the health of millions of Illinois citizens for the Illinois EPA (IEPA) to declare that they will incorporate these DEIS PM2.5 (or whatever kind of PM is calculated in the DEIS…an unknown) into their required future PM2.5 SIP, without fully understanding what or how these PM amounts were calculated in the DEIS[3]. 1

[1] See AReCO's Comments to the OMP DEIS as well as subsequent interaction letters between AReCO and IEPA and the FAA (Barry Cooper).
[2] See USEPA Comments to the DEIS.
[3] Letter from IEPA to AReCO, April 6, 2005.

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Comment	Response
1	The effective date of the USEPA designations for particulate matter 2.5 microns or less in size (PM2.5) was April 5, 2005. On April 5, 2005, a one-year "grace period" began. As such, the USEPA will not require conformity determinations with respect to this pollutant until April 5 of 2006. To disclose the potential impact of the proposed improvements at O'Hare on ambient levels of particulate matter 2.5 microns or less in size in the vicinity of the Airport, the FAA prepared an emissions inventory and performed dispersion modeling for the pollutant. A summary of the results of the analysis is presented in **Section 5.6.3, Alternatives Analysis, of this Final EIS.** Detailed information regarding the methodology used to estimate levels of this pollutant and detailed results of the analysis are provided in **Appendix J, Air Quality** of this Final EIS (**Sections J.2.2.1-Aircraft, J.2.2.5-Construction Emissions, J.2.2.6-Conversion of Total Hydrocarbons to Volatile Organic Compounds and Particulate Matter 10 Microns or Less in Size to Particulate Matter 2.5 Microns or Less in Size, J.2.2.7-Emission Inventory Results – Airport-Related Sources, and J.2.3-Dispersion Analysis**). As previously stated in IEPA's letter to AReCO dated April 6, 2005, "although the estimates [IEPA's and those in the EIS] differ, this difference is justified and does not negatively affect the emissions analysis…" "The Illinois EPA will incorporate these updated estimates in its planning to attain the 8-hour ozone and fine particulate matter standards." (a copy of the IEPA's letter is provided in **Attachment J-3** of **Appendix J**).

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Ozone and Precursors
We have previously pointed out, to both the IEPA and FAA,[4] the huge inconsistencies of the aircraft/GSE NOx and VOC emissions inventories as calculated in the DEIS versus those used in the existing Illinois ozone SIP. This Conformity document confirms these inconsistencies, for example in Table 5-23, where for instance, the DEIS calculated VOC amounts are only about one fifth of that calculated by IEPA in the SIP.

IEPA's response to our query in this regard[5] was basically, "The [smaller] DEIS numbers are correct", attributing these very substantial differences primarily to changes (obviously reductions) in the aircraft and GSE emissions factors contained within EDMS (and the reduction of diesel-powered GSE). Our several attempts to get a listing of the emission factors used in the DEIS analyses, from the FAA[6] were rebuffed and we therefore maintain our stated position that aircraft/GSE emissions inventory calculations are erroneous (too low). Additionally, our requests to the FAA to implement a third party independent audit of these inventories[7] were also rejected.

This creates an unsustainable "Catch-22" situation where the FAA puts forth unaudited emission inventory numbers for EIS purposes, which the IEPA accepts (we believe without complete EDMS analyses on their part) and states, "The Illinois EPA will incorporate these updated estimates in its planning to attain the 8-hour ozone and fine particulate matter standards," followed by a subsequent Illinois SIP revision to these reduced emission values. That is, the revised SIP will be "marked up" to agree with the subject Conformity document (perhaps yet without any formal audit). Catch-22.

Thus, this Draft Conformity document is unacceptable until the emission inventory numbers have been audited by an independent third party consultant, and the IEPA should not "mark up" their existing SIP to conform to match the numbers presented in this Conformity document until then. 2

Conformity to an Illinois SIP (ozone) that may already be in trouble.
This Conformity document draws comparisons to the existing Illinois ozone SIP, concluding that the OMP (any expansion Alternative) "conforms". That carries with it the basic assumption that the existing attainment plan (the SIP) is and will remain an acceptable plan, leading to eventual (in several years) attainment of the USEPA NAAQS requirements for to ozone precursors (i.e., NOx and VOC).

However, we believe that the existing SIP is no longer a good, workable plan, because of recent USEPA relaxations on the emissions requirements for power plants. The reason this is significant in Illinois, with its many power plants, is that the existing SIP counts very heavily on reductions of NOx emissions that are imported into and emitted within the non-attainment area, choosing to not seek significant reductions in the other VOC's precursor.[8]

[4] See footnote 1.
[5] See footnote 3.
[6] See footnote 1.
[7] Along with subsequent audits of the dispersion analyses results.
[8] These kinds of tradeoffs are allowed via waiver by the USEPA.

Comment	Response
2	As previously stated in IEPA's letter to AReCO dated April 6, 2005, "although the estimates [IEPA's and those in the EIS] differ, this difference is justified and does not negatively affect the emissions analysis…" "The Illinois EPA will incorporate these updated estimates in its planning to attain the 8-hour ozone and fine particulate matter standards." (a copy of the IEPA's letter is provided in **Attachment J-3** of **Appendix J**). As indicated in FAA's letter to AReCO dated April 25, 2005, the FAA utilized the emissions factors contained within EDMS model. FAA's letter also provided information on how to acquire this commercially-available model at a nominal charge. FAA employed a Third Party Contractor to assist in developing the O'Hare Modernization EIS and related materials, including those associated with the Draft General Conformity Determination (DGCD). In addition, the DGCD was widely circulated for review to members of the public and to key air quality agencies, including both USEPA and IEPA. Such a wide distribution, and the thorough review provided by USEPA and IEPA (IEPA's staff and the staff of our Third Party Contractor exchanged and reviewed each others data independently), assures that all matters discussed in the DGCD were fully analyzed. This work was performed objectively and independently by a firm with well-established expertise in the subject area. The FAA disagrees that the DGCD is unacceptable. As stated above, the emission inventory data was prepared by a Third Party Contractor, was widely circulated, and was reviewed and commented upon by both the USEPA and IEPA. FAA's Final General Conformity Determination is fully consistent with the comments received from both USEPA and IEPA.

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The net affect of the recent federal administration driven USEPA relaxations is that, to a high probability, Illinois will not be able to meet the existing Chicago area SIP plan NOx reduction requirements,[9] which could, upon SIP revision, greatly increase the OMP NOx and VOC emissions (as corrected) impacts. 3

OMP calculated emissions inventories are worthless without operational level guarantees.
We restate here, as we have in our DEIS Comments, that emissions inventory calculations are worthless unless some guarantee exists that the operational levels (number of flight operations per year) assumed for the calculations will not be exceeded in the foreseeable future.

These calculations currently assume an operational level of about 1.2 million ops/year, yet it is estimated that if full OMP implementation is allowed (e.g., Alternative C), at least 2.0 million ops/yr (with existing delays) will be capable without exceeding FAA safety requirements.

Thus, we have stated, and here restate, that the FAA must either officially place a cap on future expanded O'Hare operations at 1.2 million ops/yr or reevaluate all emission inventory calculations (and dispersion analyses) to a new maximum capability operational level for the new configuration (some level greater than 2 million ops/yr).

Since the FAA usually maintains that they do not have legal authority to cap operations (e.g. the past "slot controls"), we conclude that the current emission inventory numbers used in this Conformity document are totally unacceptable, until revised to "maximum operational capability" levels. 4

Regards,

Jack Saporito
Executive Director

c: K. Feith
S. Kamke
S. King
B. Manning
P. Morris
T. Pastika
D. Pino
S. Rothblatt
K. Westlake

[9] Unless Illinois can reverse these effects/impacts through lawsuits or negotiations with all of the existing "legacy" power plants. Even this may not be sufficient, if VOC imports from other states are also adversely affected by the revised USEPA rules.

Comment	Response
3	In the absence of an approved State Implementation Plan (SIP) that addresses the 8-hour ozone National Ambient Air Quality standard (the IEPA will submit such a plan to the USEPA on or before the mandated submittal date in June of 2007), the USEPA requested that the conformance of OM-related emissions be demonstrated using the currently approved 1-hour ozone attainment demonstration SIP (the "applicable SIP). It is not known, by the FAA, USEPA, or IEPA, whether or not the applicable SIP will remain an acceptable plan for bringing the area in to compliance with the 8-hour ozone NAAQS. The FAA utilized the 1-hour ozone attainment demonstration SIP, as requested by both IEPA and USEPA. Comments regarding the validity of this SIP would best be directed to IEPA and USEPA.
4	FAA respectfully disagrees with this comment. Both the DEIS and the DGCD address project-related emissions for the reasonably foreseeable future (i.e., 2018-2019). FAA also notes that IEPA will need to develop new attainment demonstrations for both the 8-hour ozone NAAQS and the NAAQS for particulate matter 2.5 microns or less in size. The IEPA will submit these SIPs on or before the mandated submittal dates to the USEPA (June of 2007 and April of 2008, respectively). The IEPA has advised that the new SIP will contain updated emission estimates in its planning to attain the 8-hour ozone and fine particulate matter standards, including O'Hare's emissions.

LEONARD ROGUS
<lmjr34@yahoo.com
>
To
9-AGL-600-OMPEIS/AGL/FAA@FAA
06/24/2005 01:35 PM
cc
Subject
DRAFT AIR QUALITY CONFORMITY DETERMINATION

I STILL DON'T SEE ANY POSITIVE MOVE TOWARD ELIMINATING DESTRUCTIVE AIR POLLUTION AT O'HARE. LEONARD ROGUS
lmjr34@yahoo.com 1

Do You Yahoo!?
Tired of spam? Yahoo! Mail has the best spam protection around
http://mail.yahoo.com

Comment	Response
1	The FAA respectfully disagrees that the air pollutant emissions, or the levels of emissions, are destructive. The USEPA established National Ambient Air Quality Standards (NAAQS) for some criteria air pollutants including carbon monoxide, ozone, nitrogen dioxide, sulfur dioxide, particulate matter and lead. With the exception of lead, the results of the air quality analysis to evaluate the effects of the proposed improvements at O'Hare indicate that airport-related emissions will not exceed the standards or, with the case of ozone, be at such a level that they would contribute to exceeding a standard. Airport related sources are not significant emitters of lead. Notably, the City of Chicago has committed to measures, which will reduce emissions associated with the proposed improvements.

050624_02

BEFORE THE
FEDERAL AVIATION ADMINISTRATION
CHICAGO AIRPORTS DISTRICT OFFICE

In the matter of the	)
DRAFT GENERAL CONFORMITY	)
DETERMINATION FOR THE O'HARE	)
MODERNIZATION PROGRAM (OMP)	)

SUPPLEMENTAL COMMENTS ON
AND OBJECTIONS TO THE
DRAFT GENERAL CONFORMITY DETERMINATION
FOR THE O'HARE MODERNIZATION PROGRAM

Communications with respect to this document should be addressed to:

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Counsel for The Village of Bensenville and Elk Grove Village

June 24, 2005

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BEFORE THE
FEDERAL AVIATION ADMINISTRATION
CHICAGO AIRPORTS DISTRICT OFFICE

In the matter of the	)
DRAFT GENERAL CONFORMITY	)
DETERMINATION FOR THE O'HARE	)
MODERNIZATION PROGRAM	)
(OMP)	)
	)

SUPPLEMENTAL COMMENTS ON
AND OBJECTIONS TO THE
DRAFT GENERAL CONFORMITY DETERMINATION
FOR THE O'HARE MODERNIZATION PROGRAM

The Village of Bensenville and Elk Grove Village (the "Community Objectors"), St. John's United Church of Christ, Helen Runge, Shirley Steele, Rest Haven Cemetery Association, Robert Placek, and Leroy Heinrich (the "Religious Objectors") and Roxanne Mitchell representing the Homeowner Objectors[1] hereby submit these supplemental comments[2] on and objections to the Federal Aviation Administration's ("FAA") Draft Air Quality General Conformity Determination for Proposed New Runways and Associated Development at Chicago O'Hare International Airport (hereinafter, "Conformity Determination").[3] For the reasons set forth herein and in our June 24, 2004 preliminary comments, the FAA has failed

[1] The Community, Religious and Homeowner Objectors are collectively referred herein to as the "Objectors."

[2] The Objectors are filing these additional supplemental comments on pursuant to our communication from Michael MacMullen dated June 14, 2005.

[3] *See* 70 Fed. Reg. 28,594 (2005) (hereinafter, "CONFORMITY DETERMINATION").

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to demonstrate conformity of the proposed project with the Illinois State Implementation Plan ("SIP") and the project cannot go forward. [1]

This conclusion is further supported by the fact that the project as currently planned will unavoidably require additional discrete federal actions that will take place after the Illinois SIP is modified in 2008 to include provisions dealing with non-attainment with $PM_{2.5}$ and 8-hour ozone NAAQS.

As discussed below, it is clear from the limited data provided in the draft Conformity Determination that the expanded O'Hare project will be a major source contributor to likely violations of both the $PM_{2.5}$ and 8-hour ozone NAAQS, and that the State of Illinois must have a modified SIP in place by 2008 to demonstrate compliance with $PM_{2.5}$ and 8-hour ozone NAAQS. Since the major portion of the federal funding for the project (both in terms of grant AIP funding for the full OMP and actual collection and use of PFC funds) will take place *after* the $PM_{2.5}$ and 8-hour ozone SIP revisions are in place, no federal funding authorizations for either AIP funds or PFC collections may be given for post-2008 funding without a demonstration of conformity with the $PM_{2.5}$ and 8-hour ozone SIP provisions.

As a result, under 40 C.F.R. § 93.150, a new conformity determination will be required after the 2008 SIP revision and prior to the occurrence of the post-2008 federal actions. No federal commitment or authorization of federal funds to be collected or disbursed after 2008 should be allowed without a prior finding (after the 2008 SIP revision) that the project is in conformity with the $PM_{2.5}$ and 8-hour ozone SIP provisions.

3

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Comment	Response
1	The FAA disagrees that the FAA has failed to demonstrate conformity of the proposed improvements at O'Hare with the one-hour ozone attainment demonstration SIP (the applicable SIP). The FAA has demonstrated that emissions resulting from the improvements do conform to the one-hour ozone attainment demonstration SIP. See the Final General Conformity Determination (**Attachment J-2** to **Appendix J**).

And because it will be difficult, if not impossible, to demonstrate conformity with the revised SIP, the current draft conformity determination should, at a minimum as to the 8-hour ozone NAAQ, be modified to include assurances from Illinois under 40 C.F.R. § 93.158(a)(5)(i)(B) that the SIP will be revised to specifically account for emissions of ozone and ozone precursors from the project that will take place after the 2008 SIP revision. 2

The bases for our conclusion are set forth in more detail below.

I. A New Conformity Determination Will Be Required After the SIP is Revised to Account for $PM_{2.5}$ and 8-hour Ozone Non-attainment

EPA's conformity regulations will require the FAA to prepare a new conformity determination for the O'Hare project in 2008.[4] EPA's regulations provide that each and every "Federal action" must be subjected to a conformity determination.[5] And the regulations specify that any *changes* to a previously completed Federal action that will increase direct or indirect emissions will require a *new* conformity determination.[6] The term "Federal action" is defined, in relevant part, as: "any activity engaged in by a department, agency, or instrumentality of the Federal government, or any activity that a department, agency or instrumentality

[4] 40 C.F.R. §§ 93.150(a)–(b), 152.

[5] Section 93.150(b) provides that: "A Federal Agency must make a determination that a Federal action conforms to the applicable implementation plan in accordance with the requirements of this subpart before the action is taken." *Id.* § 93.150(b).

[6] Section 93.158(b) provides that: "If, after the conformity determination is made, the Federal action is changed so that there is an increase in the total of direct and indirect emissions . . . a new conformity determination is required." *Id.* § 93.158(b). The only federal actions that do not trigger the new conformity determination obligation are those ongoing federal activities at a site that are specifically within the scope of the original conformity determination. *See id.* § 93.157(b)

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Comment	Response
2	We intend to work closely with the U.S. EPA to evaluate whether general conformity requirements for these new standards would apply to approval of federal financial assistance after the FAA issues a Record of Decision. Assuming, without conceding, that additional conformity determinations must be made after the SIPs to demonstrate attainment with the 8-hour ozone and/or the fine particulate matter NAAQS are approved, the FAA disagrees that it will be "difficult, if not impossible" to demonstrate conformity. Moreover, in a letter to Alliance of Residents Concerning O'Hare on April 6, 2005 the IEPA indicated it will incorporate the emissions included in the O'Hare EIS in its planning for attaining the 8-hour ozone and fine particulate standards. This indicates the FAA would likely not have difficulty demonstrating conformity.

of the Federal government supports in any way, provides financial assistance for, licenses, permits, or approves . . .[7] This definition goes on to further explain that "[w]here the Federal action is a permit, license, or other approval for some aspect of a non-Federal undertaking, the relevant activity is the part, portion, or phase of the non-Federal undertaking that requires the Federal permit, license, or approval."[8]

These regulatory provisions clearly establish that any element of the O'Hare project that occurs after the SIP revision in 2008 must be analyzed in a new conformity determination. For any federal action taking place after Illinois revises its SIP to take into account $PM_{2.5}$ and 8-hour ozone NAAQS, the FAA must demonstrate conformity with those revised SIP provisions prior to the implementation of the federal action. That this project requires this precise sort of post-SIP revision federal action is indisputable.

First, the much of the AIP funds and all of the PFC fund collections scheduled for Phase One will be disbursed or collected after the SIP revision. Similarly, virtually all of the AIP and PFC funds for Phase II of the project are not scheduled for disbursement or collection until after the SIP revision. As a result, it is clear that the FAA must demonstrate—after the SIP revision—that the project will conform to the $PM_{2.5}$ and 8-hour ozone elements of the revised SIP. 3

Comment	Response
3	Please see response to comment 2.

[7] *Id.* § 93.152 (definition of "Federal action").

[8] *Id*

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II. Because Demonstrating Conformity with the Revised 8-hour Ozone SIP Will Be So Difficult, the FAA Must Secure Assurances Now from Illinois that Conformity Will be Demonstrated

Illinois will have a very difficult time demonstrating attainment with the new $PM_{2.5}$ and 8-hour ozone NAAQS, which are some of the most stringent in the history of the Clean Air Act.[9] With a project of this scope, the fact is that the FAA will most likely not be able to demonstrate conformity with the revised Illinois SIP for $PM_{2.5}$ and 8-hour ozone after 2008.[10] And by not addressing this imminent nonconformity in the current draft conformity determination, the FAA is unlawfully dividing the proposed project into tiers.[11] Only with a commitment from Illinois to build in the emissions from the project into its SIP revision may the draft conformity plan avoid the prohibited tiering of the project.

Under EPA's conformity regulations, if the emissions from the O'Hare project exceed the SIP budget (or in this case, reasonably expected to exceed a forecasted

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[9] Because of the stringency of these new standards proposed in 1997, it will have taken over a decade to implement the new NAAQS when Illinois revises its SIP in 2008.

[10] Based on the current emissions inventory provided in the draft conformity determination, the airport is a significant source of ozone precursors, emitting approximately 6,000 tpy of NO_x and 1,500 tpy of VOCs. The OMP is predicted to increase emissions of NO_x by between 1,000 and 2,000 tpy by the end of the project. The airport is also expected to be a significant source of $PM_{2.5}$, and the project will likely increase $PM_{2.5}$ emissions. As such, the airport is undoubtedly a major contributor to exceedances of the ozone and $PM_{2.5}$ NAAQS in Chicago. The 8-hour standard will be more difficult to meet than the 1-hour standard, as demonstrated by the number of exceedances between 1999 and 2003 of the 8-hour standard (11, 4, 8, 18, and 2, respectively) as compared to the 1-hour standard (2, 0, 0, 7, and 0, respectively). *See* Table 5.6-6 at 5.6-17 of the DEIS. The Chicago area also had 5, 8, 8, 7, and 5 exceedances of the $PM_{2.5}$ standard between 1999 and 2003. It is likely that pollutant reductions beyond those specified in the 1-hour SIP will be necessary to meet the more stringent 8-hour NAAQS.

[11] *See, e.g.*, 58 Fed. Reg. 63,214, 63,240 ("A full conformity determination on all aspects of an activity must be completed before any portion of the activity is commenced.") (emphasis added).

SIP budget), a conformity determination may still be made, but only upon the receipt of certain assurances from Illinois that the SIP will be revised in such a way so as to take the increased emissions into account. The regulation states, in relevant part:

> [If the] total of direct and indirect emissions from the action . . . is determined by [Illinois] to result in a level of emissions which, together with all other emissions in the nonattainment (or maintenance) area, would exceed an emissions budget specified in the application SIP and the [Illinois] governor [or designee] makes a written commitment to EPA which includes the following: (1) [a specific schedule for revising the SIP]; (2) [identification of specific measures to ensure that the SIP budgets are not exceeded]; (3) [a demonstration that all other SIP requirements are being met]; (4) a determination that the [FAA has] required all reasonable mitigation measures associated with [its] action; [and] (5) written documentation including all air quality analyses supporting the conformity determination . . . .[12]

Though this option is typically exercised in light of a current SIP budget that would be violated by a federal action, it must be exercised here in order to avoid the tier-based conclusion that because the project can demonstrate conformity with 1-hour ozone and NO_2 NAAQS, that somehow the post 2008 funding schedule for Phases I and II will not represent Federal financial support for a project that is no longer in conformity with SIP in effect, which will include the 8-hour ozone NAAQS. Until Illinois provides the proper assurances under the conformity regulations that the SIP will be revised to account specifically for emissions of ozone and ozone

[12] 40 C.F.R. § 93.158(a)(5)(i)(B).

precursors from the project, the FAA has failed to demonstrate conformity with the SIP.[13] 4

For these reasons, the FAA's draft conformity demonstration is fatally flawed, and does not support a proper determination of conformity as required before the FAA may approve or permit the project. 5

Respectfully submitted,

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Counsel for The Village of Bensenville and The Village of Elk Grove Village

[13] Similarly, because the FAA will be required to demonstrate that additional federal actions must conform to the $PM_{2.5}$ provisions of the revised SIP, the FAA should secure additional assurances now from Illinois similar to those under Section 93.158(a)(5)(i)(B) so that the future conformity demonstration under Section 93.158(a)(1) will be valid. Even with such assurances, FAA must still make an independent conformity determination after the 2008 SIP revisions to insure that the OMP will meet the SIP requirements as to the $PM_{2.5}$ and 8-hour ozone NAAQs before allowing post-2008 PFC and AIP funding to proceed.

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Comment	Response
4	Please see response to comment 2.
5	The FAA respectfully disagrees that the Draft General Conformity Determination (or the Final General Conformity Determination) is fatally flawed. The FAA has demonstrated, using criteria outlined in 40 CFR 93.158 and additional guidance issued by the USEPA and FAA, that volatile organic compound and nitrogen oxide emissions that would result from the improvement of O'Hare are specifically identified and accounted for in the inventories prepared by the IEPA for the one-hour ozone attainment demonstration SIP.

050628_01

TRIBAL HISTORIC PRESERVATION OFFICE

June 28, 2005

US Dept. of Transportation
Federal Aviation Administration
Attn: Barry Cooper
2300 East Devon Ave.
Des Plaines, IL 60018

RE: Draft O'Hare Modernization Sec 303/4(f) and Sec 6(f); Draft Air Quality General Conformity Determination

To Whom It May Concern:

The Osage Tribe of Oklahoma has evaluated the above reference sites, and we have determined that the site could have religious or cultural significance to the Osage Tribe being our former reservation & homeland. However, if construction activities should expose Osage archeological materials, such as bone, pottery, chipped stone, etc., we ask that construction activities cease, and this office be contacted so that an evaluation can be made. 1

Should you have any questions, you can reach me at (918) 287-5446.

Thank you.

Sincerely,

Anthony P. Whitehorn
Tribal Enterprise Manager

627 Grandview, Pawhuska, OK 74056, (918) 287-5446, Fax (918) 287-5562

Comment	Response
1	Comment noted. If construction activities should expose Osage archaeological materials, the Osage Tribe of Oklahoma will be contacted so that an evaluation can be made.

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