APPENDIX G

SURFACE TRANSPORTATION

This Appendix contains background material, which supplements the surface transportation-related material contained in **Chapter 5, Environmental Consequences.** This appendix consists of the following sections:

- G.1 Existing Surface Transportation Setting
- G.2 Future Conditions
- G.3 Surface Transportation Methodology
- **Attachments G-1** through **G-5**

G.1 EXISTING SURFACE TRANSPORTATION SETTING

There are a number of major arterial roadways that border the Airport, such as Mannheim Road (US Route 12/45), Higgins Road (Illinois Route 72), Touhy Avenue, and Irving Park Road (Illinois Route 19). These roadways carry airport-related traffic, but are primarily used for non-airport related trips.

Traffic volumes on the roadways surrounding the airport service a densely developed urban area and carry a large number of trips through the area. The high levels of traffic congestion and delays on these roadways, especially during the peak hours, are typical for the Chicago metropolitan area. The congestion and delay in the area reaches a peak in the late afternoon when the commuter traffic in the area overlaps with the airport-related traffic.

The level of activity at the airport has grown substantially over the past 30 years. During that time, intensive urban development has occurred in the areas surrounding the airport. Roadway capacity in the area has not kept pace with this growth and development. Congestion is especially severe on I-190, the major access road into and out of the Airport and the only access road to the central terminal area. The large number of closely spaced ramps along I-190 also restricts traffic flow. The configuration of this roadway has not changed significantly in over 30 years. The Canadian National railroad bridge over I-190, constrains this access roadway to two through travel lanes in each direction. The Illinois Department of Transportation (IDOT) is currently expanding the railroad bridge over I-190, which when complete will accommodate both additional railroad tracks above and additional through lanes below. The large number of closely spaced ramps along I-190 also restricts traffic flow.

The airport has developed passenger services east of the central core, including long-term parking and rental car facilities, and constructed an Airport Transit System (ATS) to connect long term parking with the terminals ATS. Terminal 5, the Airport's international terminal, is also located east of the central core and is connected to parking and the other terminals via the

ATS. These facilities have generally reduced the volume of airport-generated traffic in the terminal core area.

Roadway traffic conditions in the airport environs are complemented by the mature transit system serving the airport. The City has a well-developed passenger rail system, including the CTA Rapid Transit Blue Line, a direct line from downtown Chicago to the Airport's terminal area. Based on a 1988 survey of airport passengers and employees, approximately four percent of the airport's origin and destination (O-D) passengers and 18 percent of its employees have historically used this line.[1] These passengers and employees have virtually no impact on the roadway system near the airport. Another survey was conducted by the CTA at the O'Hare station in 2000.[2] The results of this survey were generally consistent with those of the 1988 survey.

There are currently two levels of Department of Homeland Security alerts that require inspection of vehicles entering the terminal area. They are level orange and level red. Level orange requires random screening of passenger vehicles entering the terminal area; level red requires screening of all vehicles. In 2003 level orange was in effect twice. According to airport security personnel, there was no adverse impact on traffic during the periods when this screening level was in effect. If level red screening were ever implemented, it would likely last for a short period of time (such as 1 day or less), according to airport security staff.

G.1.1 On-Airport Transportation Facilities

Interstate Highway 190 (I-190)

The average daily traffic volume on I-190 was approximately 50,000 vehicles in each direction between Mannheim Road and Bessie Coleman Drive.[3] Major arterial roadways surrounding the airport and connecting to, or indirectly leading to, I-190 include: Touhy Avenue, Mannheim Road, Irving Park Road, and York Road. **Exhibit 5.3-3** in **Section 5.3**, **Surface Transportation**, illustrates the location of these roadways.

In late 1998, minor ramp/roadway modifications were made to the I-190 westbound and eastbound lanes. In the westbound direction, the right lane of I-190 was converted to a through lane to accommodate traffic exiting the Illinois State Toll Highway Authority (ISTHA) tollbooth on the ramp from eastbound I-90 and southbound I-294. This right lane, between the tollbooth and the west side of the Mannheim Road interchange, was previously a ramp-merge lane. Vehicles leaving the tollbooth can now stay in this right lane all the way to the terminals. This traffic lane is shared with vehicles entering and exiting Mannheim Road. In 1999, in the eastbound direction, the right shoulder of I-190 near the Mannheim Road interchange was fitted with overhead lane signals to allow vehicles to use the shoulder as a through lane at designated peak times.

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1 Terminal Support Work Group Ground Access Study, City of Chicago Department of Aviation, November 9, 1990.
2 O'Hare Airport CTA Customer Travel Survey, Chicago Transit Authority, June 2000.
3 Chicago O'Hare International Airport, O'Hare Modernization Program, Surface Transportation Survey. Kimley-Horn and Associates, Inc. [CCT], January 2003.

Terminal Curbfront Roadways

A two-level curbfront roadway serves the domestic terminals (Terminal 1, Terminal 2, and Terminal 3) as shown in **Exhibit G-1**. The upper level roadway provides access to the ticketing (departures) area, and the lower level roadway serves the baggage claim (arrivals) area. As depicted, the upper level curbfront accommodates both commercial and private vehicles in the same area, while the lower level roadway is designed to segregate operations between commercial vehicle traffic and private autos. On the lower level, three sets of curbfront segregate vehicles by type with commercial vehicles located on the inner two curbs, and private vehicles on the outer curb. In 2002, the traffic volumes in the central terminal area were approximately 42,000 vehicles per day.[4]

The Terminal 5 curbfront roadway, which is located off of Bessie Coleman Drive, also has two levels, an upper level for departures and a lower level for arrivals. The Terminal 5 access design and curbfront lane schematics are shown in **Exhibit G-2**. As depicted, the lower level roadway is designed with two inner lanes to serve taxicabs, buses, and Airport Express vans, while the outer lanes serve all other vehicles. Two curbfront areas are available for the arriving passenger demand.

Airport Transit System (ATS)

In the spring of 1993, the ATS began operation as a fully automated, electric-powered transit system that transfers passengers between Terminals 1, 2, 3, and 5, and long-term parking. The existing ATS alignment and maintenance facility location are shown in **Exhibit 5.3-3** in **Section 5.3**, **Surface Transportation**. Along the 2.7-mile guideway, five stations are located to serve the three domestic terminals (Terminals 1, 2, and 3), the International Terminal (Terminal 5), and Long-Term Parking (Lot E). The ATS provides the transportation for connecting passengers between the International Terminal and the domestic terminals.

Today, the City owns and operates 15 vehicles on the ATS system. The 15-vehicle fleet typically consists of five two-car trains in operation, one two-car train on standby, and three vehicles in maintenance. Vehicle capacity is 65 passengers.

[4] Chicago O'Hare International Airport, O'Hare Modernization Program, Surface Transportation Survey. Kimley-Horn and Associates, Inc. [CCT], January 2003.

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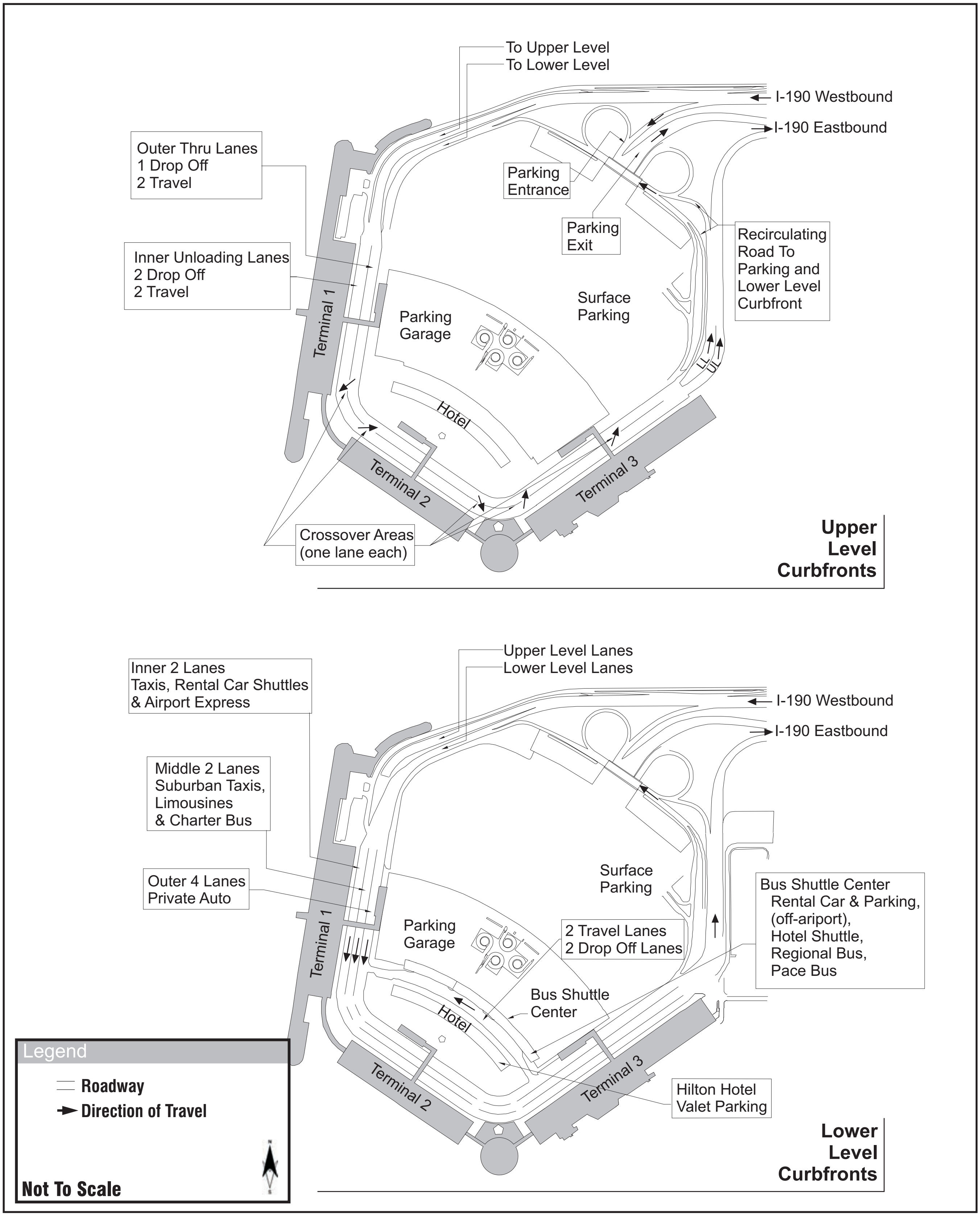

Source: Landrum and Brown, INC [CCT], November, 2003

Chicago O'Hare International Airport

O'Hare Modernization
Environmental Impact Statement

Terminal Core Area Roadway

▶ Exhibit G-1

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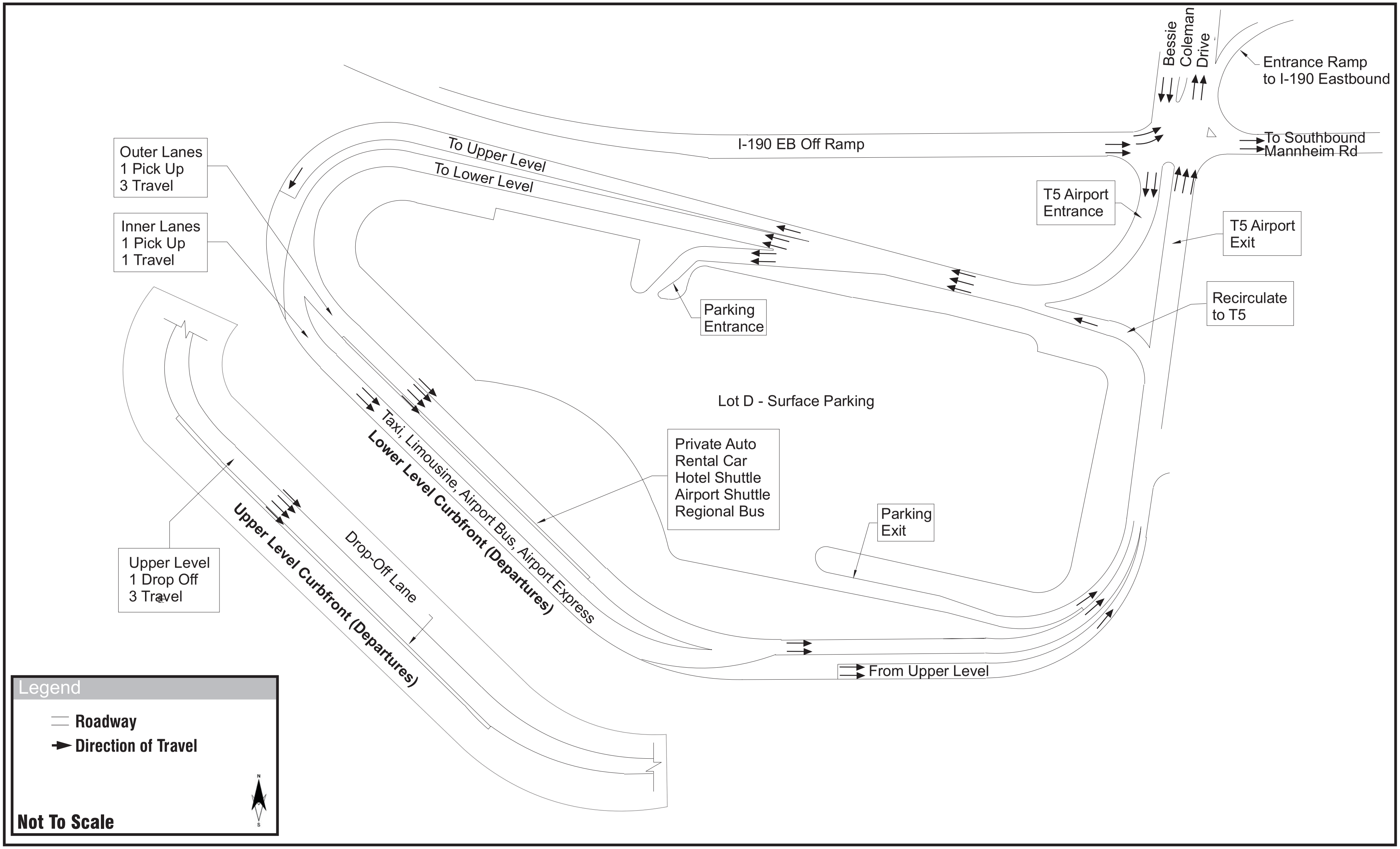

Source: Landrum and Brown, INC [CCT], November, 2003.

Chicago O'Hare International Airport

O'Hare Modernization Environmental Impact Statement

Terminal 5 Roadway

Exhibit G-2

G.1.2 Off-Airport Transportation Facilities

The major off-airport transportation facilities include the Interstate Highway System, regional highways, arterial roadways, public transportation system, and railroads. This section identifies the off-airport facilities and existing usage. **Exhibit G-3** illustrates the off-airport roadways near the airport.

Off-Airport Expressways

Three interstate highways are within the project area:

- I-90 (Kennedy Expressway/Northwest Tollway) extends from downtown Chicago, and passes to the north of the airport where it becomes a part of the ISTHA highway system. I-90 has ramp connections with the I-190 spur and to the adjacent arterial roadways, including Lee Street and Elmhurst Road (with restricted access). I-90 has six lanes and had a 2001 average daily traffic volume, west of I-190, of approximately 142,000 vehicles. The total daily traffic volume on I-90 east of I-190 was approximately 268,000 vehicles, based on 2001 IDOT data.[5]
- I-294 (Tri-State Tollway) is located on the east side of the airport. I-294 serves as a by-pass highway to the west around the City, with six to eight lanes. I-294 connects to the north at I-94 and extends south to I-80. To the south of the I-190 interchange, I-294 carried an average daily traffic volume of approximately 177,000 vehicles, based on 2001 IDOT data. I-294 has three interchanges near the airport at I-190, Touhy Avenue, and Irving Park Road.[6]
- I-290 (Eisenhower Expressway and Eisenhower Extension) is located to the west and south of the airport. I-290 is a six to eight-lane freeway that serves traffic from the northwest suburbs to points in the City. There are interchanges with I-290 at Thorndale Avenue to the west of the airport, and York Road and Busse Road to the south of the airport. To the north of the Thorndale interchange, I-290 carried a 2001 average daily traffic volume of approximately 163,000 vehicles, while south of the interchange it carried 207,000 vehicles daily. To the east of the York Road interchange, I-290 carried a 2001 average daily traffic volume of 162,000 vehicles; west of the York Road interchange, between York Road and Busse Road it carried 137,000 vehicles; and west of Busse Road it carried approximately 124,000 vehicles.[7]

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5 Screen Captures from IDOT Website for Average Daily Traffic Counts. www.dot.state.il.us/public/html (IDOT provided 2000 date for tollways/expressways.)

6 Screen Captures from IDOT Website for Average Daily Traffic Counts. www.dot.state.il.us/public/html (IDOT provided 2000 date for tollways/expressways.)

7 Screen Captures from IDOT Website for Average Daily Traffic Counts. www.dot.state.il.us/public/html (IDOT provided 2000 date for tollways/expressways.)

G.1.3 Public Transportation Services

The location of connections with public transportation services are shown in **Exhibit 5.3-3** in **Section 5.3**, **Surface Transportation**. The three main public transit services that provide transportation to the airport are the Chicago Transit Authority, Pace Suburban Bus Service, and Metra Commuter Train Service.

Chicago Transit Authority (CTA)

The CTA operates the nation's second largest public transportation system, which covers the City of Chicago and 40 surrounding suburbs. On an average weekday, 1.5 million rides are taken on the CTA. During an average week in April 2000, 30 percent of the total number of CTA riders on the Blue Line traveled to and from the airport.[8]

The CTA is an independent governmental agency created by state legislation, which began operating on October 1, 1947, after it acquired the properties of the Chicago Rapid Transit Company and the Chicago Surface Lines. On October 1, 1952, CTA became the sole operator of Chicago transit when it purchased the Chicago Motor Coach system.[9] CTA rapid transit service to and from O'Hare was introduced in 1984. Since then, it has played a key role in the region's transportation system, providing individuals an affordable transportation option to and from O'Hare, as well as relieving congestion on area roadways.[10]

The CTA maintains a double track line between O'Hare and downtown Chicago, which follows Interstate 90/94 from downtown to the junction, and then Interstate 90 before branching off and reaching the CTA station in the lower level of Terminal 2. From the O'Hare CTA station, the Blue Line leaves for downtown approximately every ten minutes with a one-way trip time of approximately 40 minutes.

The CTA provides rapid transit service between downtown Chicago and the airport, via Chicago's northwest side on the O'Hare Rapid Transit Blue Line. This service terminates at the O'Hare CTA station located in the Terminal Core Area underneath the elevated parking structure (EPS). CTA service operates 24 hours a day, seven days a week. In April 2002, there were approximately 9,650 people getting on and off the train at the O'Hare station on an average weekday.[11]

Pace Suburban Bus Service

Pace, the Suburban Bus Division of the Regional Transportation Authority (RTA), operates bus service to the airport core on two routes, the 220 and the 330. Route 220 serves the area north of the airport in Des Plaines and Glenview. Route 330 serves the area south of the airport along Mannheim Road. Pace buses have one stop at the airport core area, in the Bus Shuttle Center

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8 O'Hare Airport CTA Customer Travel Survey, Chicago Transit Authority, June 2000.
9 Chicago Transit Authority Web site, www.transitchicago.com, Chicago Transit Authority, 2002.
10 O'Hare Airport CTA Customer Travel Survey, Chicago Transit Authority, June 2000.
11 Chicago O'Hare International Airport, O'Hare Modernization Program, Surface Transportation Survey. Kimley-Horn and Associates, Inc. [CCT], January 2003.

located in the roadway between the Hilton Hotel and the elevated parking structure (refer to **Exhibit 5.3-3** in **Section 5.3**, **Surface Transportation**). These routes operate on weekdays and Saturdays. No service is provided on Sundays or holidays. Service to the airport operates at 30 to 60-minute intervals. Employees are also served by Route 332. Route 332 serves areas south and east of the airport on York Road, Irving Park Road and River Road, with service on 50 to 60 minute intervals. This route has four stops on Main Cargo Road: at the Post Office, P & D Center, Northwest Airlines Cargo area, and Federal Express. This route operates seven days a week, with no service on holidays.

Metra Commuter Train Service

Metra provides commuter rail service on 12 lines to and from downtown Chicago. On the east side of the airport, the Canadian National Railroad maintains a single-track freight line that is adjacent to airport property from north of I-190 to the south of long-term parking Lot E. Metra commuter rail passenger service began on this line in 1996. This created a new link between downtown Chicago and Antioch and also provided new access to the airport. The O'Hare Transfer Station is located east of the intersection of Mannheim Road and Zemke Road, as shown on **Exhibit 5.3-3** in **Section 5.3**, **Surface Transportation**. A shuttle bus service takes passengers between the Metra station and the ATS station at Lot E for transfer to the airport.

An environmental assessment was completed in April 2000,[12] which included the analysis of adding commuter stations along the Canadian National Railroad in Rosemont, Schiller Park, and Franklin Park, and the addition of up to two tracks at five locations along this rail line. The proposed stations and track additions are related to the overall corridor improvements, which are necessary due to the increasing congestion on the existing railway network. The proposed station for Rosemont would be located on the west side of the Canadian National tracks, east of Mannheim Road just south of where Balmoral Avenue crosses the rail lines. The southern portion of the station and platform would be located within the Runway Protection Zone (RPZ) and Object Free Area (OFA) for Runways 27L and 22L. The Rosemont station would be in addition to the existing station located at Zemke Road. The proposed station location for Schiller Park would be at Lawrence Avenue, and the proposed station location for Franklin Park would be at Belmont Avenue. The proposed Schiller Park and Franklin Park stations would not be located in any RPZ or OFA. At this time, Metra does not have firm plans to develop these commuter stations and would be looking to the communities to fund and build the stations. IDOT is currently expanding the railroad bridge over I-190 to accommodate the additional railroad tracks.

Metra began an expansion of North Central Line in June 2002, which will add 16.3 miles of double track and 2.3 miles of triple track along a 55-mile route that runs from Union Station to Antioch.[13] The project is expected to be complete by December 31, 2005. The expansion of the North Central Line it is not expected to significantly increase the demand for parking spaces at the O'Hare Transfer Station. Metra currently operates five trains inbound and five trains

[12] Metra – North Central Service Corridor Environmental Assessment, Federal Transit Administration, April 2000.
[13] Karen Schwartz, "Towns foresee benefits from Metra expansion," Chicago Tribune, June 4, 2003.

outbound on the North Central line. Metra plans to expand this service to 22 trains per day starting in late 2005, with ridership projected to grow from 2700 to 8400 average weekday boardings on the North Central line by the year 2020. **Table G-1** includes the 2002 Baseline schedule for North Central Line weekday service at the O'Hare Transfer Station.

TABLE G-1
METRA 2002 WEEKDAY SCHEDULE – NORTH CENTRAL LINE AT THE O'HARE TRANSFER STATION

Antioch to Chicago	6:22 AM	6:55 AM	7:29 AM	7:58 AM	4:24 PM
Chicago to Antioch	1:54 PM	4:59 PM	5:29 PM	6:15 PM	6:46 PM

Source: Metra / Northeast Illinois Regional Commuter Railroad Corporation, Effective January 8, 2001.

On the weekday survey in April 2002 there was a total of 136 passengers who used this station. Airport passengers and employees use a shuttle bus from the station to the Lot E ATS station to travel to the terminal area. There were 32 people using this shuttle bus on the survey day to get to the Airport. The other Metra passengers traveled to the surrounding office buildings.

G.1.4 Railroads

Railroad lines encircle and intersect the airport property, transporting both rail passengers and cargo in the airport environs. Three rail lines handle freight movement, and two of the three freight lines are also used by Metra for commuter rail service. As shown in **Exhibit 5.3-3** in **Section 5.3**, **Surface Transportation**, the Canadian National freight line runs along the east side of the airport, and shares the corridor with the Metra North Central Service line. The existing Union Pacific Railroad freight line runs along the northwest and west sides of the airport property, and then bisects the southwest quadrant of the airport property before continuing to the south. The Canadian Pacific Railway (CP) line runs along the southern edge of the airport property, and shares the corridor with the Metra Milwaukee District West Line.[14]

Most of the Canadian National line has a double track, except for some of the track north of I-190 and the track over I-190, which is a single track. On the east side of O'Hare, the Canadian National Railroad maintains a single-track freight line that is adjacent to airport property from north of I-190 to the south of long-term parking Lot E. As noted earlier, Metra began an expansion of North Central Service line in June 2002. IDOT is currently expanding the railroad bridge over I-190 to accommodate the additional railroad tracks. According to Canadian National staff, there are 10 to 12 freight trains a day operating on this part of the line, depending on the season. The trains do not run on a published schedule.

A rail yard belonging to CP is located on the south side of the airport property, just south of Irving Park Road. This yard serves as a major intermodal hub for CP, sending and receiving cargo to and from trucks and the airport. Not only does the rail yard aid in the transfer and movement of freight across airport property, it also functions as a switching yard for the Metra Milwaukee District West Line, and two Union Pacific freight lines.

[14] Chicago Operating Rules Association (CORA) Chicago District Terminal Map, April 2000.

G.1.5 Automobile Parking

The airport automobile parking system accommodates several types of parking groups: the public (passengers/visitors); employee; commercial vehicles; and rental car vehicles. Public parking includes short-term parking for passenger pick-up and drop-off, and daily and long-term parking for airline passengers. The airport also provides a staging lot for commercial vehicles (i.e., taxicabs, limousines), and a rental car area. **Exhibit G-3** illustrates the various parking areas at the Airport.

G.1.5.1 Passenger and Visitor Parking

As of 2002, there were approximately 22,560 public parking spaces on airport property in three areas: the Terminal Core Area (Lot A (the EPS) and Lots B and C); Terminal 5 (Lot D); and the Long-Term Parking Area (Lots E, F, and G).[15]

In the Terminal Core Area, there is valet parking, structured covered parking, and uncovered surface lot parking available in approximately 12,030 spaces.[16] There are approximately 937 surface lot spaces available at Terminal 5. Lots E and G have approximately 6,878 and 2,714 spaces, respectively. Lot F has been closed for public parking since the fall of 2001, but has been open for employee parking since fall of 2002. Lot G has a shuttle bus service, which moves passengers from Lot G to the Lot E ATS station for airport transfer. On average, overall parking occupancy on the airport during peak travel periods is close to 80 percent. The lot with the highest occupancy most of the time is Lot E. However, the Terminal Core Area parking garage frequently experiences near capacity conditions as well.

A new six-level parking structure with approximately 6,000 spaces is planned for Lot E, just north of the Mannheim Flyover. When the Lot E garage is completed, there will be a net gain of approximately 4,800 spaces. The total public parking supply on the airport will include approximately 27,360 spaces at the end of construction.

Based on previous counts, there are approximately 1,250 public parking spaces are available in private off-airport lots.[17] Shuttle buses bring patrons to and from the airport, where they drop-off and pickup at the Bus Shuttle Center located in the EPS or on the Terminal 5 lower level.

G.1.5.2 Employee Parking

Parking for Airport employees is dispersed throughout the property, but located primarily in the northwest maintenance area, southwest cargo area, and southeast services area. Several lots provide shuttle bus service for employees to the terminals. In 2002, there were approximately 17,000 spaces available for employees.

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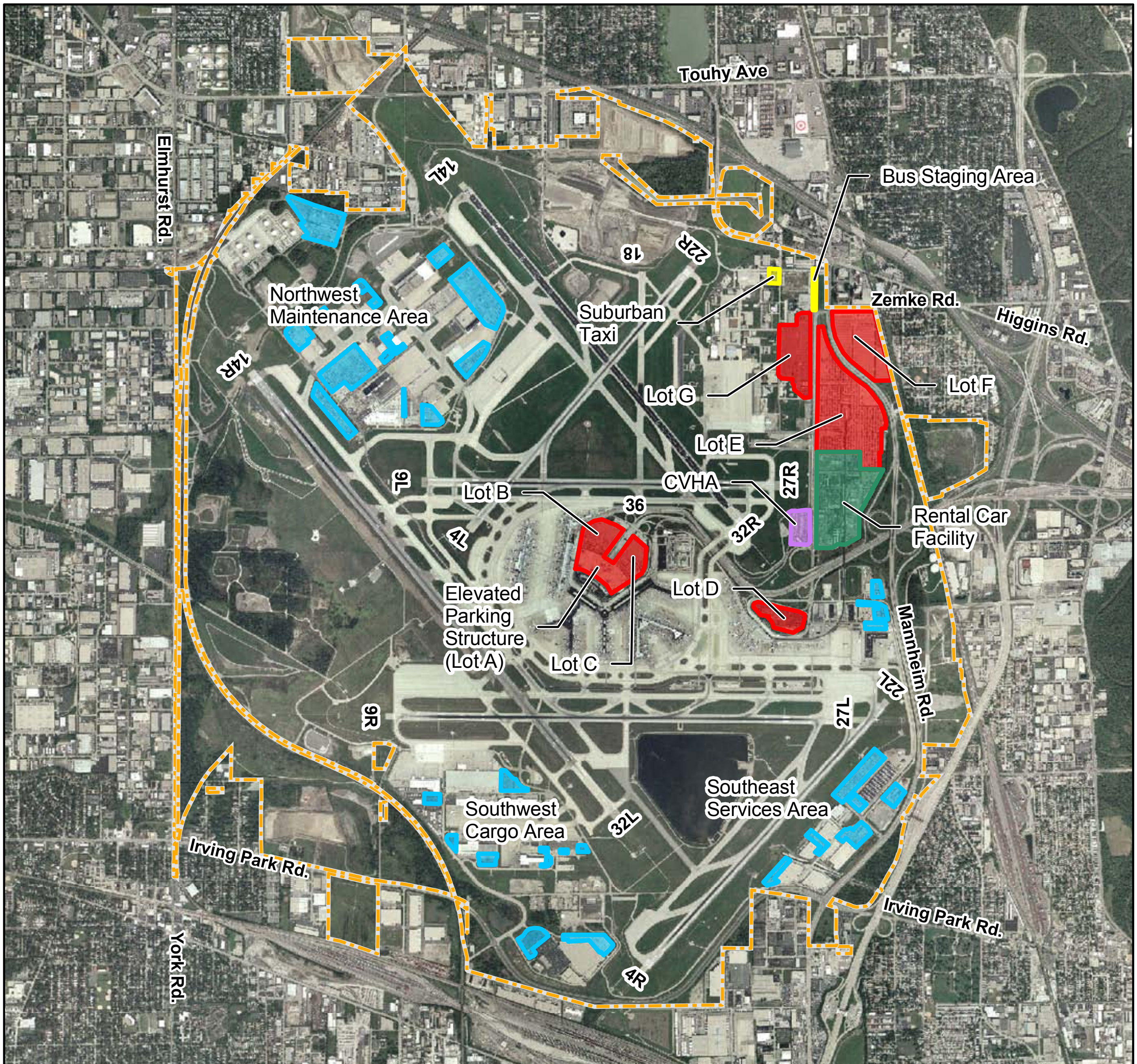
[15] Summary of Airport Demand and Future Parking Options, Chicago O'Hare International Airport. Barton-Aschman Associates, April 27, 1999.
[16] Some of these spaces may be unavailable during high security conditions.
[17] 2002 Surface Transportation Survey, Kimley-Horn and Associates, Inc. Revised January 2003.



Legend

- Public Parking
- Employee Parking
- Rental Car Parking
- Commercial Vehicle Holding Area
- Staging Areas
- Existing Airport Property

0 0.5 1
Miles

Locations	Capacity
Public Parking	
EPS Lot A	9,207
Lot B	1,648
Lot C	1,175
Lot D	937
Lot E	6,878
Lot F	Closed
Lot G	2,714

Locations	Capacity
Employee Parking Areas:	
NW Maint. Area/Southeast Cargo Area/ SE Service Area	16,971
Staging Areas	
Commercial Vehicle Holding Area	675
Rental Car	4,500
Bus Staging Area	18
Suburban Taxi Staging Area	140

Source: Aerial; Aerial Express, September, 2000; Parking: O'Hare ALP, 2003, Ricondo and Associates, Inc [CCT; Kimley-Horn and Assoc.[CCT], 2004

Chicago O'Hare International Airport

O'Hare Modernization Environmental Impact Statement

Existing Airport Parking Facilities

Exhibit G-3

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G.1.5.3 Rental Car Parking

The on-airport rental car facilities are located on the east side of Bessie Coleman Drive, south of Lot E. These facilities accommodate the five on-airport rental car companies: Avis, Hertz, National, Budget, and Dollar. Each company operates the areas they lease from the City independently, providing their own entrance, exit, wash and fueling area, and customer service building. Each company operates its own fleet of buses to shuttle customers to and from the terminals. There are approximately 4,500 on-airport rental car ready and return spaces.

Access to the Avis, Hertz, and National lots is through a one-way driveway on the east side of the Bessie Coleman Drive/I-190 westbound ramp intersection. The exit for these companies and entrance/exit for Dollar is located on Bessie Coleman Drive at Rental Car Road. Budget Rent-A-Car has a separate entrance and exit on Bessie Coleman Drive. In 1999, the daily traffic volume for the rental car area was approximately 18,000 vehicles.[18]

Other rental car companies that serve the airport are located off of airport property. Most, such as Alamo, are located on Mannheim Road north or south of the airport. Each of these companies provides individual shuttle bus service to the airport. The shuttle buses pickup and drop-off customers at the Bus Shuttle Center on the ground floor of the core parking garage or on the Terminal 5 lower level.

G.1.5.4 Commercial Vehicle Holding Area

The Commercial Vehicle Holding Area (CVHA) is located on the west side of Bessie Coleman Drive, north of I-190. Limousines and city taxicabs wait at the CVHA until dispatched to the lower level terminal curbfronts to pick up passengers. These dispatching procedures allow the airport to regulate the flow of commercial vehicles into the terminal areas. The CVHA lot holds approximately 450 taxicabs and 225 limousines.[19]

Suburban taxicabs are held and dispatched from another holding area located in the old military site on Johnson Road which is northwest of the intersection of Mannheim Road and Zemke Road. This area accommodates approximately 140 suburban taxicabs.

Regional buses and charter buses are dispatched from a parking area on Bessie Coleman Drive in the old military site located just north of Zemke Road. This area accommodates approximately 18 buses.

[18] 2002 Suface Transportation Survey, Kimley-Horn and Associates, Inc. Revised January 2003.
[19] 2002 Suface Transportation Survey, Kimley-Horn and Associates, Inc. Revised January 2003.

G.2 FUTURE CONDITIONS

G.2.1 No Action and With Project Surface Transportation Projects

In order to evaluate the impact of the proposed alternatives for each of the four future years of analysis, a set of projects was defined at the start of the surface transportation analysis. **Table G-2,** which presents the surface transportation project list in a matrix format (the project definition matrix), illustrates the construction phase when each project is expected to be implemented, and whether each project will be present in the No Action Alternative (Alternative A), the Build Alternatives (Alternative C, D, and G), or both. This set of projects was refined as the study progressed, but was locked in once the detailed modeling commenced. Some relatively minor adjustments to the project list were addressed by conducting sensitivity analyses to determine the extent of impact if changed. A set of specific geometric characteristics were developed for each project based on existing project data from the Chicago Area Transportation Study (CATS), the project sponsors, or assumed based on engineering judgment.

TABLE G-2
SURFACE TRANSPORTATION PROJECT DEFINITION MATRIX
NO ACTION (ALTERNATIVE A) AND PROPOSED BUILD ALTERNATIVES

Project ID.(a)	Project Description	Construction Phase I		Construction Phase II		Build Out		Build Out +5	
		No Action (Alternative A)	Build Alternatives (Alternative C, D, and G)	No Action (Alternative A)	Build Alternatives (Alternative C, D, and G)	No Action (Alternative A)	Build Alternatives (Alternative C, D, and G)	No Action (Alternative A)	Build Alternatives (Alternative C, D, and G)
	I. PREVIOUSLY APPROVED PROJECTS AT O'HARE (late 1980's through 2002)								
I-22	Bessie Coleman Widening	X	X	X	X	X	X	X	X
I-40	Mannheim Road: Continuous SB through and right turn lane from Higgins to Zemke		X		X		X		X
I-41	Mannheim Road: Extension of NB left turn lane at Zemke		X		X		X		X
I-42	Zemke Road: Addition of 2nd left turn lane on EB Zemke onto NB Mannheim		X		X		X		X
I-43	Zemke Road: Addition of WB through lane on Zemke at Mannheim Road		X		X		X		X
I-44	Zemke Road: Right turn-only from EB Zemke to SB Mannheim Road		X		X		X		X
I-45	Zemke Road: Right turn-only from EB Zemke to SB Bessie Coleman		X		X		X		X
I-46	Bessie Coleman Drive: Addition of right turn lane onto EB Zemke Road		X		X		X		X
I-47	Johnson Road: Extension to the east with a right turn only to SB Mannheim Road		X		X		X		X
	O'Hare Roadway Improvements								
I-73	Lee Street / Northwest Tollway Interchange (addition of Lee St. on-ramp to WB I-90 and EB I-90 off-ramp to Lee St.)		X		X		X		X
I-74	Westerly relocation and widening of the northern portion of Bessie Coleman Drive to Higgins Road		X		X		X		X
I-75	Zemke Road Extension		X		X		X		X
I-76	Mannheim Fly-over ramp from Bessie Coleman Drive to SB Mannheim Road	X	X	X	X	X	X	X	X
I-77	Balmoral Avenue Ramps at SB Mannheim	X	X	X	X	X	X	X	X
I-78	Balmoral Extension over Mannheim Road	X	X	X	X	X	X	X	X
I-79	Southeast Service Road and Spine Road Conversion				X		X		X
	III. ADDITIONAL ROADWAY IMPROVEMENTS BY OTHERS								
III-1	Mannheim Road: Widening of Mannheim Rd to 3 lanes each direction (Higgins to Irving Park) (IDOT)	X	X	X	X	X	X	X	X
III-2	Addition of Partial Interchange on I-294 at Devon Avenue (add SB off-ramp to Devon) (ISTHA)				X		X		X
III-3	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)				X		X		X

TABLE G-2
SURFACE TRANSPORTATION PROJECT DEFINITION MATRIX
NO ACTION (ALTERNATIVE A) AND PROPOSED BUILD ALTERNATIVES

		Construction Phase I		Construction Phase II		Build Out		Build Out +5	
Project ID.(a)	**Project Description**	**No Action (Alternative A)**	**Build Alternatives (Alternative C, D, and G)**	**No Action (Alternative A)**	**Build Alternatives (Alternative C, D, and G)**	**No Action (Alternative A)**	**Build Alternatives (Alternative C, D, and G)**	**No Action (Alternative A)**	**Build Alternatives (Alternative C, D, and G)**
III-4	Irving Park Road and York Road Intersection Improvements (IDOT)			X	X	X	X	X	X
III-5	I-190 Improvements (IDOT)	X	X	X	X	X	X	X	X
	IV. PROJECTS BY OTHERS								
IV-1	Balmoral Avenue SB Tunnel		X		X		X		X
	VII. O'HARE MODERNIZATION PROGRAM PROJECTS								
VII-12	Relocate Mt. Prospect Road		X		X		X		X
VII-106	Construct Public Access Road to USPS Complex						X		X
VII-107	Construct Public Access Road and Tunnel in Southwest Cargo Area						X		X
VII-109	Irving Park Road Relocation				X		X		X
VII-119	West Terminal Ground Access Roadways						X		X

Notes: (a) Project I.D numbers as shown on **Exhibit E-17** and **Exhibit E-18** in **Appendix E**, **Alternatives**.
IDOT – Illinois Department of Transportation
ISTHA – Illinois State Toll Highway Authority

G.3 SURFACE TRANSPORTATION METHODOLOGY

G.3.1 Introduction

This section summarizes some of the key methods and assumptions used in the surface transportation modeling process for the EIS. Two main methodological areas are discussed in this section. The first is the travel demand modeling methodology and the second is the evaluation measures methodology. Many resources were used to develop the information needed for the surface transportation analysis. The October 2003 proposed Airport Layout Plan (ALP) and the project definition matrix were keys in determining the phases of all alternatives. A 2002 data collection effort was undertaken to gather Baseline data for the surface transportation modeling process. The information and resources cited in this section were used in the development of the surface transportation analysis.

The data collection for the 2002 Baseline, and the surface transportation modeling was performed by Kimley-Horn and Associates, Inc. as part of the City of Chicago's Consultant Team (CCT). The FAA's Third Party Contractor (TPC) reviewed and concurred with the modeling results.

The most significant components of the Build Alternatives affecting the surface transportation analysis are the construction of four parallel runways and a new west terminal with new western access to the airport. A secure people mover will be constructed between the West Terminal and Terminal 1, and a shuttle also will take passengers on the external roadways from the West Terminal and Terminal 1. Western access assumptions include:

- West Terminal and Terminal 1 passengers can access the Airport through either the east or west side of the airport.
- Passengers traveling to/from Terminals 2 through 6 can access the Airport through the West Terminal only if they do not have checked baggage.

The study area for the surface transportation analyses is shown in **Exhibit G-4.** The study area is bounded generally by River Road on the east and Touhy Avenue/Higgins Road to the north. To the south, the study area is bounded by Irving Park Road, except between Busse Road and York Road where it extended to I-290. On the west, it is bounded by Busse Road south of Thorndale Avenue, extended west to I-290 along Thorndale Avenue, and is bounded by Elmhurst Road north of Thorndale Avenue. As described in subsequent sections (see **Section G.3.6.2**, **Study Area**), further study area confirmation was performed and additional intersections were added.

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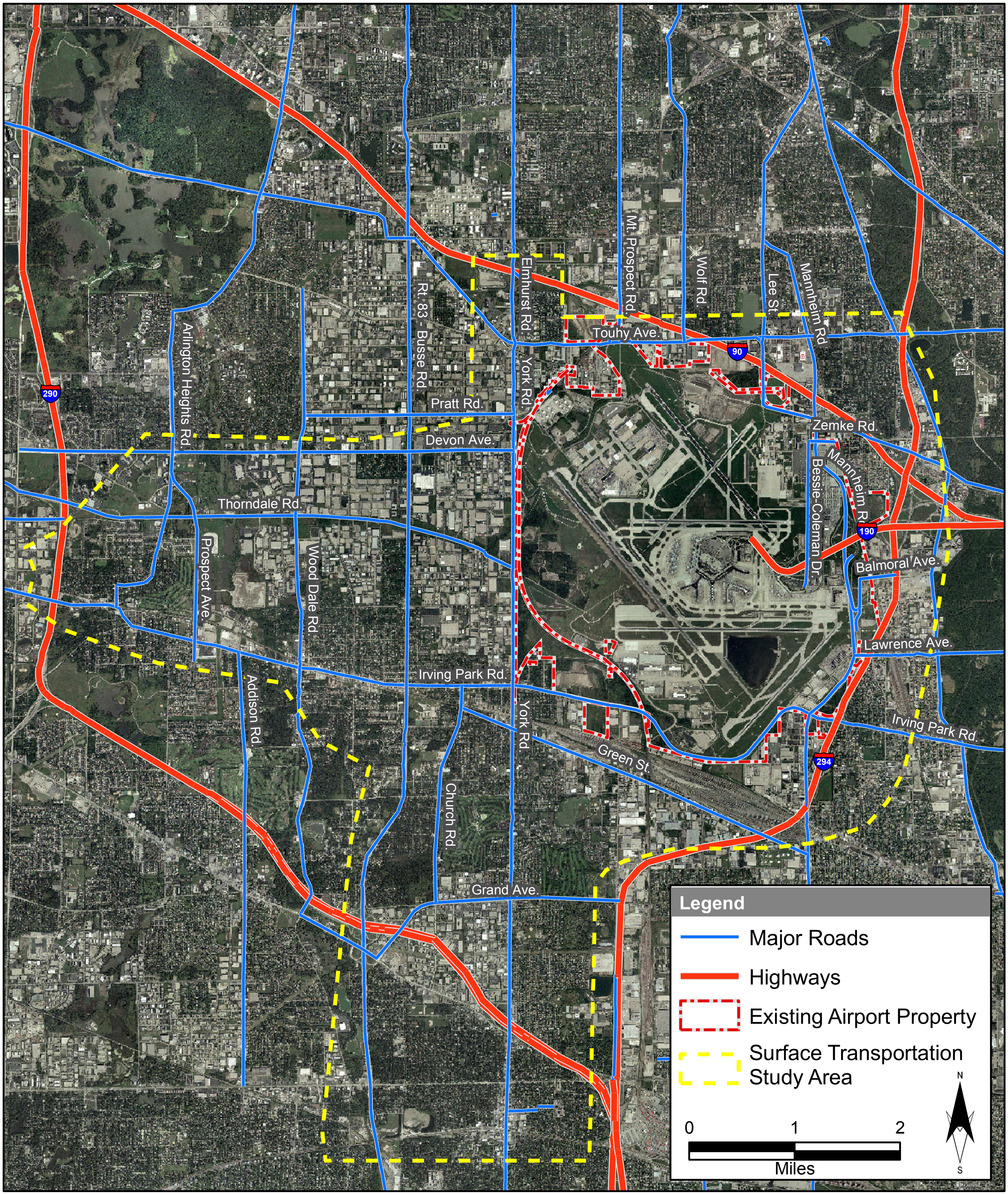

Source: AerialsExpress, September 2002. StreetmapUSA, ESRI 2003. Jacobs Engineering [TPC], 2004.

Chicago O'Hare International Airport

O'Hare Modernization Environmental Impact Statement

Surface Transportation Study Area

▶ Exhibit G-4

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Exhibit G-5 illustrates the overall approach to the EIS surface transportation modeling and evaluation. Each component of this flow chart is discussed in the remainder of this section. The surface transportation model consists of six major trip classifications. The classifications are background trips, airport passenger-related trips, employee trips, cargo trips, construction trips, and Eastside Collateral Development trips. Trips from these six classifications were generated, distributed, and assigned to the model network.

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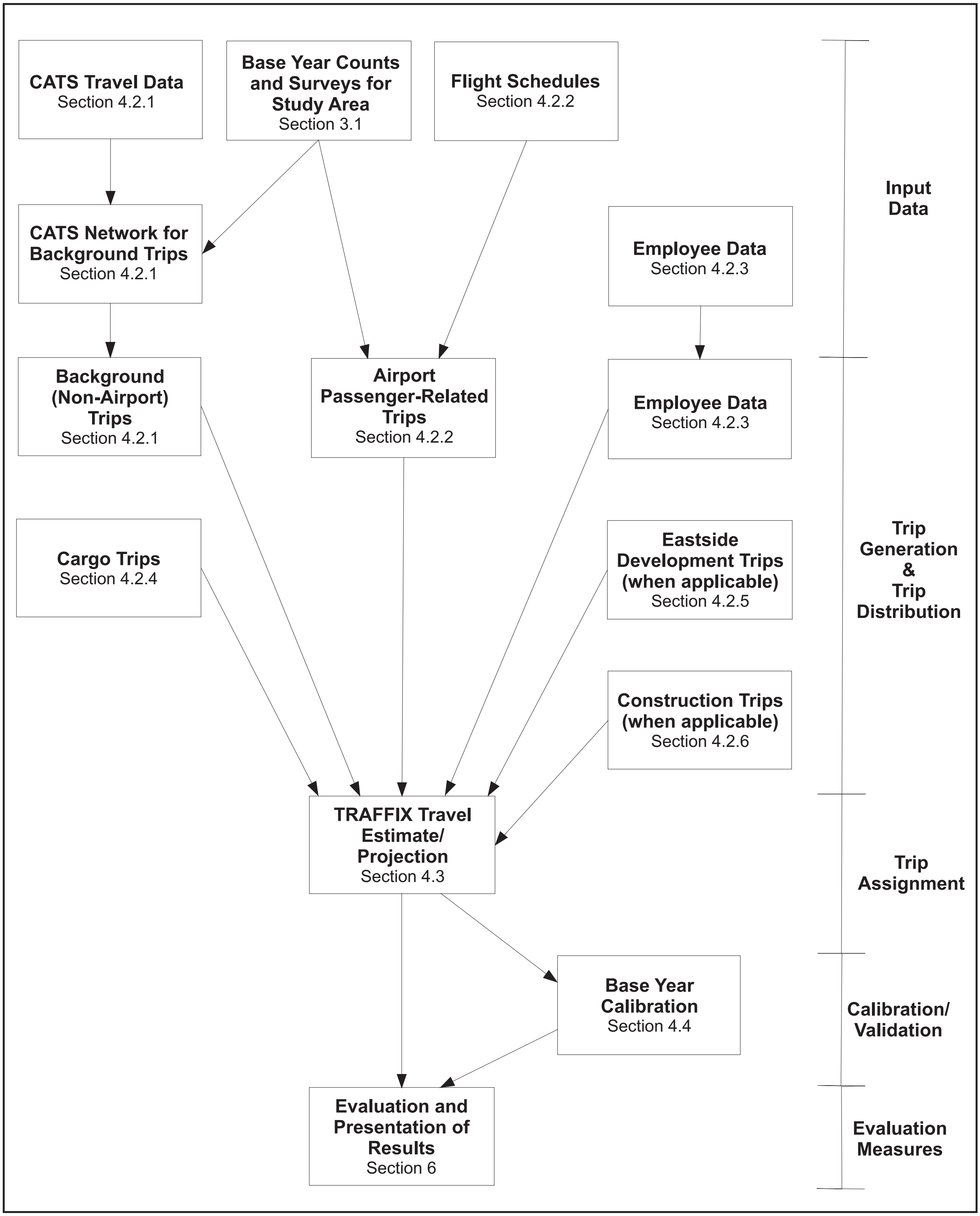

Source: Kimley-Horn & Associates, Inc. [CCT] November 17, 2004

Surface Transportation Modeling Approach

Exhibit G-5

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G.3.2 Model Usage (Commercially-Available Models)

G.3.2.1 EMME/2

This is a demand modeling software that is used by CATS for demand forecasting. For this study, the EMME/2 data bank that was developed by CATS for various analysis years is used to generate background traffic. Outputs from EMME/2 assignment were also used to distribute traffic beyond ALPS network.

G.3.2.2 ALPS

ALPS (Advanced Landside Performance Simulation) is the commercially-available airport planning software that was used for this EIS. For this study, a sub network within the study area was modeled in ALPS. Passenger-related traffic was generated, distributed and assigned on this network using ALPS. The major inputs to this model included passenger activity data, mode choice data and parking data.

G.3.2.3 TRAFFIX

TRAFFIX is a software that accepts trip generation and trip distribution data and manually defined paths as input and produces link volumes and turning movements. Thus, all five types of trips (see **Exhibit G-5**) are combined into one "master" trip table that is used as input to TRAFFIX. Furthermore, one or more paths were manually defined for each O-D pair in TRAFFIX. Based on these two sets of input for each year of analysis, TRAFFIX was used to produce link volumes and turning movements that were, in turn, used to produce evaluation measures of this study.

G.3.2.4 SYNCHRO

Synchro is a traffic signal optimization software program that accepts intersection geometry, vehicular turning movements, and parameters related to traffic signal and vehicles (e.g. mix, gap acceptance, etc.) and resulting delay and LOS as output. Thus, for each year of analysis, output from TRAFFIX was used as input to the Synchro software to determine associated delays and intersection LOS.

G.3.3 Peak Hour

The peak hour for analysis of the surface transportation impacts was determined though analysis of the peak month average day (PMAD) airline passenger activity patterns using airport flight activity data, and traffic count data gathered at several locations on Wednesday, Thursday and Fridays of April 2002. The analysis of these traffic data indicated that 4:30-5:30 PM on Friday was the appropriate analysis hour for this study. See **Appendix B**, **Aviation Demand Forecast**, for more detail.

The system-wide peak hour was modeled. The software program TRAFFIX was used to build the model network and compile six trip types (i.e., background trips, airport passenger trips, employee trips, cargo trips, construction trips and Eastside Development trips) into one model. Path assignment was done manually in TRAFFIX to obtain traffic volumes and turning movements at intersections. This methodology was approved by the CATS and the approval letter is included in this appendix (see **Attachment G-1**).

G.3.4 Data Sources

G.3.4.1 Field Data Collection

The 2002 Surface Transportation Survey[20] describes the data collection effort and includes the following six categories of data.

- Passenger Surveys
- Roadway Traffic Counts
- Intersection Traffic Counts
- Parking Lot Counts
- Terminal Curbfront Counts
- Transit Station Counts

As part of the 2002 passenger surveys, passengers were surveyed to determine which routes they used to travel to the airport. Based on this information, the following directional distribution was determined for passengers arriving at the airport in private automobiles.

TABLE G-3
DIRECTION OF APPROACH FOR O'HARE PASSENGERS

Direction	Percent
I-90 East	36.8%
I-90 West	16.3%
I-294 South	25.4%
I-294 North	16.7%
Mannheim Rd. North	2.2%
Mannheim Rd. South	1.8%
Other	0.8%

Source: Chicago O'Hare International Airport, O'Hare Modernization Program, 2002 Surface Transportation Survey, Technical Memorandum, Summary of Data Collection, Analysis of Survey Results. Kimley-Horn and Associates, June 27, 2002 (revised January 2003).

The following mode split was assigned to the passengers based on information collected during the 2002 passenger survey and from data collected in 1997.[21]

[20] Chicago O'Hare International Airport, O'Hare Modernization Program, 2002 Surface Transportation Survey, Technical Memorandum, Summary of Data Collection, Analysis of Survey Results. Kimley-Horn and Associates, Inc., June 27, 2002 (revised January 2003).

TABLE G-4
MODE SPLIT FOR PASSENGERS TRAVELING TO O'HARE

Mode	Percent of Passengers
Private Auto	39.4%
Limo	13.5%
City Taxi	16.1%
Rental Car	12.4%
Hotel/Motel Shuttle	4.9%
Bus/Metra/CTA	11.9%
Other	1.8%

Source: Chicago O'Hare International Airport, O'Hare Modernization Program, 2002 Surface Transportation Survey, Technical Memorandum, Summary of Data Collection, Analysis of Survey Results. Kimley-Horn and Associates, June 27, 2002 (revised January 2003).

G.3.4.2 Direction of Approach for Airport Traffic

As noted, passenger surveys were conducted in 1997 and 2002 to determine the directional distribution of airport traffic.[22] The collected and historical survey and tube count data route information were used to determine the future year directional distributions. It was assumed that the cardinal directions of the trips would remain the same for each of the four future years of analysis as they were in the 2002 Baseline. Since passengers are expected to begin (or terminate) their trips from the same areas, the future general directional distributions would remain the same. However, in the future year, the routing or assignment changes from the Baseline would be due to the new access points to the airport and new interstate ramp configurations. The distributions for the Build Out + 5 phase ALPS model "gates" (i.e., links on the periphery of the ALPS model network area) were determined using the known origin areas and applying the new roadway changes for the Build Out + 5 phase network. Also, the following additional boundary nodes were included in the ALPS network: Bessie Coleman Drive, York Road, Elmhurst Road, Thorndale Avenue and Balmoral Avenue. Because of these network changes, the Build Out + 5 phase directional distribution changed from the 2002 Baseline percentages. Also, the Terminal 1 and West Terminal directional distributions are expected to differ from the other terminals due to the west terminal. An example of a future network change is the addition of ramps at Lee Street and Elmhurst Road on I-90. In general, all programmed facilities for the network and the airport were evaluated and the reasonable distributions were applied. A discussion of the distribution of surface access traffic at the West Terminal is presented in a memo[23] that is included as **Attachment G-2** to this appendix.

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[21] Chicago O'Hare Ground Access Survey, Technical Memorandum Analysis of 1997 Survey Results, Barton-Aschman Associates, Inc., March 4, 1998.

[22] Chicago O'Hare Ground Access Survey, Technical Memorandum Analysis of 1997 Survey Results, Barton-Aschman Associates, Inc., March 4, 1998.

[23] Memorandum from Shawn Kinder, Ricondo & Associates [CCT], to OMP Surface Transportation Team, June 16, 2003.

G.3.4.3 CATS Data

CATS maintains a regional travel demand model which is used to prepare future year traffic projections and air quality conformity analyses. The traffic assignment portion of the model is performed using EMME/2. The EMME/2 databanks were obtained from the CATS for use in the EIS study and used to generate the background traffic. Also, information from traffic assignment was used in distributing airport traffic beyond the ALPS network.

G.3.4.4 Passenger Activity Data

Detailed airline passenger activity data in 10-minute increments--sorted by terminal location, international vs. domestic flights, and originating-terminating passengers vs. connecting passengers --were developed through a collaborative effort by the FAA's TPC and the City of Chicago. The data was reviewed and approved by the FAA[24, 25] and used as input to the ALPS model.

G.3.4.5 Cargo Data

Cargo tonnage data for base and future years was developed by Ricondo & Associates, Inc. [CCT]. These data were used to predict cargo traffic for the future years of analysis. It was assumed that increases in cargo related surface transportation traffic would be linearly proportional to cargo tonnage.

G.3.4.6 Eastside Development

A traffic impact study was carried out for the Eastside Development area at the airport in April 2000.[26] The data sets developed for this traffic impact study were refined to account for the decrease in buildable land caused by the additional runways for the proposed alternatives and the shifting of parking Lot E to the north. In particular, the above mentioned differences between the Eastside Development traffic impact study and this EIS study resulted in fewer trips generated by the Eastside Development area of the airport.

G.3.5 Trip Types

G.3.5.1 Eastside Development Trips

Network

The Eastside Collateral Development is a proposed group of land uses located on Airport property south of Higgins Road, west of Mannheim Drive, east of the Airport, and north of I-

[24] Memorandum from Chris Oswald, TPC, to Richard Kula, FAA, May 18, 2004.
[25] Memorandum from Brian Mohr, TPC, to Richard Kula, FAA, January 14, 2004.
[26] Traffic Impact Analysis: Eastside Development, Chicago O'Hare International Airport, Kimley-Horn and Associates, Inc., April 2000.

190. The Eastside Development traffic impact analysis report[27] describes the proposed roadway network in greater detail. This roadway layout presented in this traffic analysis report was modified because of the closely spaced north parallel runway in the City's proposal. Other modifications were made to accommodate the 2003 ALP, including the relocation of the Lot E parking garage and the relocation of Bessie Coleman Drive.

Trip Generation

Trip generation was based on the Eastside Development traffic impact analysis report. It was reduced due to the decrease in buildable land caused by the additional runways in the O'Hare Modernization and the shifting of Lot E parking to the north. The City's modified Eastside Collateral Development assumptions are shown in **Table G-5**. This table also shows the revised trip generation for the Eastside Development for the Build Out phase, Build Out + 5 phase, and Construction Phase II Build Alternatives. In Construction Phase II for the Build Alternatives, the Eastside Development is not fully built-out (the office and warehouse parcels are built to 50 percent).

TABLE G-5
PM PEAK HOUR EASTSIDE DEVELOPMENT TRIP GENERATION

Land Use	Construction Phase II (Build Alternatives)		Build Out and Build Out + 5 (Build Alternatives)	
	IN	OUT	IN	OUT
Single Corporate Office (1,000,00 SF) (50% Built in the Construction Phase II – Build Alternative)	77	619	153	1,237
Police Facility (32,000 SF)	47	70	47	70
Warehouse / Cargo Space (500,00 SF) (50% Built in the Construction Phase II – Build Alternative)	40	93	79	185

Source: Jacobs Engineering Group, Inc.[TPC] analysis of information supplied by Kimley-Horn and Associates, Inc. [CCT].

Trip Distribution

The trip distribution was based on the Eastside Development traffic impact analysis report and revised due to changes in land use. Once the distribution out of the immediate Eastside Development area was determined, the trips were further distributed to TRAFFIX gates using a select link analysis. A select link analysis of trips entering/exiting the airport in EMME/2 was used to distribute the trips to the TRAFFIX gates. The select link analysis creates a weighted distribution based on the trips generated in the EMME/2 model for each gate in the TRAFFIX model.

Trip Assignment

The trip assignment used the roadway assignments from the Eastside Development traffic impact analysis report as the starting point for the assigned paths. CATS data were used to

[27] Traffic Impact Analysis: Eastside Development, Chicago O'Hare International Airport, Kimley-Horn and Associates, Inc., April 2000.

distribute the Eastside Development trips beyond the immediate Eastside Development area. The assignment of Eastside Development traffic was based on the distribution of employee traffic used by CATS.

G.3.5.2 Employee Trips

Network

Employee trips use the airport roadway network to access the parking facilities. All employee trips originate or terminate in the following parking areas:

- Northwest Hangar Area
- Airport Maintenance Complex (AMC) Area
- Southwest Cargo Area
- Terminal Core Area (Lots A, B, and C)
- Lot D
- Lot E
- Lot F

Trip Generation

Employee trip generation is based on the 2002 Baseline, non-confidential badge information obtained from the O'Hare Badging Office. This badge information includes employer, badge type, and home zip code for each badged employee. Badged employees with residential locations outside of the Chicago metropolitan area were assumed to work only occasionally at the airport and were thus removed from the database. The remaining list of badged employees was then factored to determine the number of employees leaving the airport during a typical PM peak hour.

The hourly adjustment factors were based on information on employee behavior collected through surveys of the top ten airport employers. For future years, the number of terminal-based employees (such as flight crews, ticketing agents, and terminal security personnel) was generated using a relationship between the 2002 Baseline and respective future year analysis enplanements. The increase in the number of cargo employees was generated using a relationship between the 2002 Baseline and respective future year cargo tonnage amounts.

In most cases, the individual employee parking lot information was based on data collected for each lot in 1999,[28] such as peak hour entering and exiting vehicles. During the 2002 Surface Transportation Survey effort, the occupancy was recorded for nine of the larger employee parking areas around the airport. These lots contain a majority of the parking spaces for employees at the airport. Using this information, a relationship was developed between these

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[28] Chicago O'Hare International Airport Environmental Review, Surface Transportation Data Collection Program, Kimley-Horn and Associates, Inc., October 1999.

lot occupancies observed in 1999 and the occupancies observed in 2002. This relationship was applied to the smaller employee lots to determine their occupancy and entering/exiting vehicles in 2002. For future years, the occupied spaces in each lot were determined by one of three methods:

- Public parking lot occupancies were based on the results of the ALPS model for the future year with the appropriate employees included.
- Occupancies of employee parking lots associated with cargo facilities were increased based on the increase in cargo tonnage from the 2002 Baseline to the future year.
- Occupancies of all other employee parking lots were increased based on the increase in enplanements between the 2002 Baseline and the future year.

The entering/exiting volumes were then grown based on the increase in occupied spaces from the 2002 Baseline to the future year. This was done by first determining the ratio between the future year occupancy and the 2002 Baseline occupancy. The 2002 Baseline entering and exiting volumes were then multiplied by this ratio to obtain the future year entering and exiting volumes.

As an example, the estimated terminal and cargo employment for the Build Alternatives in the Build Out + 5 phase are shown in **Table G-6.** Employees for all other alternatives were determined in a similar manner. For all future year alternatives, an additional modification was made for Transportation Security Administration (TSA) employees. It is anticipated that the TSA will use more employees per security checkpoint in the future than were used in the Baseline as the TSA role increases.

TABLE G-6
ESTIMATED GROWTH IN EMPLOYEES

	2002 Baseline	Build Out + 5
Annual Enplanements	32,918,936	50,372,000
Terminal Employees	2,422	3,706
Annual Cargo Tonnage	1,288,818	2,565,890
Cargo Employees	645	1,284

Source: Jacobs Engineering Group, Inc. [TPC] analysis of information received from Kimley-Horn and Associates, Inc. [CCT]

Trip Distribution

Employee zip code information from the badging office was used to determine the cardinal direction of approach (north, south, east, or west) to the airport for all airport employees. Many employees also use the CTA Blue Line to travel to O'Hare. Data on the number of CTA passengers on the Blue Line was collected during the 2002 survey. Based on past findings of the CTA, approximately two-thirds of the passengers using the Blue Line at this location were airport employees. The employee trips not using the CTA were further distributed to TRAFFIX gates using a select link analysis. This select link analysis was performed in EMME/2 to determine the distribution of employee trips entering/exiting the airport in the EMME/2 model. A weighted distribution of these trips was then used to distribute the trips in the TRAFFIX model to the TRAFFIX gates.

Trip Assignment

CATS data were used to distribute the employee traffic among the roadway links exiting and entering the study area in each cardinal direction of travel. The assignment of employee traffic was based on the distribution of airport employee traffic used by CATS.

Employee Overflow

In some of the No Action Alternative (Alternative A) projects, all employees could not be accommodated in their desired lots due to limited capacity, creating an overflow situation. This resulted in the need to accommodate the excess employees elsewhere, by reallocating them to other lots around the Airport. For example, employee parking in public lots was determined using a two-step process. First, a number of parking spaces were held in reserve during the airport trips modeling process to accommodate a minimum number of the employees desiring to park in the public lots. Next, the available occupancy in these lots was determined for the different alternatives based on the results from the ALPS analysis. Once the number of employees that could be accommodated in the public lots was determined, the remaining employees were overflowed to other lots around the Airport.

G.3.5.3 Cargo (Truck) Trips

Network

All cargo trips terminate at the cargo areas listed below:

- AMC/O'Hare Express Center Area
- South Cargo Area
- Northwest Cargo Area
- O'Hare Express Center North Area (future year alternatives)

Trip Generation

The 2002 Baseline cargo (truck) trips were based on the existing driveway counts into and out of the cargo facilities. Truck trips were assumed to account for 10 percent of the driveway volumes based on truck traffic for similar developments. To determine the future cargo trips, a linear relationship between growth in cargo tonnage and growth in cargo trips was assumed. Based on the projected cargo tonnage in the future year, future cargo trips were determined.

Trip Distribution

The truck trip distribution was determined using the truck trips in the CATS regional data. The percentage of trips entering/leaving the study area on each roadway link was based on the relative volume of background truck traffic on each of those links. The medium and heavy traversal matrices from the EMME/2 model run were used to determine the origins/destinations of the cargo truck trips.

Trip Assignment

CATS data were used to distribute the cargo traffic among the roadway links exiting and entering the study area in each cardinal direction of travel.

G.3.5.4 Background Trips (EMME/2)

To develop background traffic, automobile and truck origin-destination trip tables and highway network data were acquired from CATS in the form of EMME/2 databanks. EMME/2 is the transportation planning software package used by CATS for highway traffic assignments. CATS networks and databanks were obtained for four CATS analysis years: 2002, 2007, 2015, and 2020. As a general policy, CATS will distribute data and results from their model, but will not distribute the EMME/2 macro language job stream they have developed to execute the model. The first step in developing background trips for this project was to create a base assignment macro language job stream that applied the factors, functions, and procedures discussed in Appendix B of the CATS Conformity Analysis Documentation. To create non-airport trips for input into the TRAFFIX model, EMME/2 macro language was written to perform traffic assignments and variable manipulations in the EMME/2 software, in order to develop tables of trips in the study area not destined to O'Hare. To create these tables, the following procedure was employed for each time-of-day period:

- Vehicle occupancy and time-of-day table factors were applied to the daily trip tables to create time-of-day trip tables.
- Separate time-of-day trip tables were created for heavy truck passenger car equivalents (PCEs), medium truck PCEs, and an aggregation of auto vehicle and b-plate trucks, and light trucks. These trip tables excluded trips originating or destined to either of the O'Hare Traffic Analysis Zones (TAZ) (terminal or non-terminal).
- A full assignment was performed for a given time-of-day scenario. The final loaded travel times from this assignment were saved to a network variable.
- A network variable was created to mark links on the periphery of the study area and links to all TAZs within the study area as "gates." Marking these links allows the storage of trip volumes that cross any pair of gates (i.e., pass through the study area).
- The EMME/2 additional assignment option was used to assign the auto vehicle/B-Plate truck/light truck, non-O'Hare sub-matrix to the network using travel times and paths from the full assignment.
- Additional assignments were run using the stored paths and travel times from the full assignment to assign the non-O'Hare truck sub-matrices to the network.
- A matrix of the gate-to-gate interchanges (traversal matrix) was stored for each of the non-O'Hare sub-matrices.

This procedure was repeated for each of the time-of-day periods. As noted in Appendix B of the Conformity Analysis Documentation, for time periods two through eight, the loaded link time from the final iteration of the previous time period's full assignment was used as the link travel time for the first iteration of that period's assignment.

Following completion of a run of all time-of-day periods, the sub-matrices for each time period were imported into a spreadsheet. The PM peak period used by CATS is from 4 PM to 6 PM. A conversion factor of 0.5 was applied in order to convert the two-hour PM peak period matrices to a PM peak hour.

Network

The CATS action scenarios (which include expansion of O'Hare) were used as the basis of future year networks. The 2015 CATS network was used as the basis for obtaining 2018 trips. Assumptions for the background network were based on information from the Transportation Improvement Program (TIP), 2020 Long Range Plan, and the Unified Work Plan, as summarized in the project definition matrix. The CATS networks were modified as necessary to reflect the surface transportation modeling assumptions.

Trip Generation

Trip tables were provided for each EMME/2 databank provided by CATS. In some instances, it was necessary to interpolate trip tables for O'Hare Modernization analysis years that did not have a corresponding trip table developed by CATS. For example, CATS does not use a 2018 analysis year, so trip tables for the Build Out +5 phase (2018) were derived through linear interpolation of the 2015 and 2020 trip tables. Generation of trips entering and leaving the study area is captured in the traversal matrix, as described above. This traversal matrix captures all trips entering or leaving the study area boundary or any TAZ within the boundary, except those trips originating at or destined for the O'Hare TAZs.

Trip Distribution

As described above, a traversal matrix was calculated for the O'Hare surface transportation study area. This traversal matrix provides the distribution of all trips entering and leaving the study area.

Trip Assignment

Paths were assigned in TRAFFIX for trips from each gate to every other gate in the study area. The roadways that cross the study area boundary in the CATS network are gates in the TRAFFIX model, as are the TAZs that lie within the study area in the CATS network.

G.3.5.5 Airport trips (ALPS)

Airport modeling was performed using the commercially available Advanced Landside Performance System, ALPS 2000 (ALPS), software. The ALPS program uses the flight schedule and assigned passenger and vehicle characteristics to quantify the overall flows of people, baggage, and vehicles throughout the airport for 24 hours.

The airport passenger and vehicle characteristics, such as mode split and vehicle occupancy, were obtained from the 2002 data collection effort and were used as an input into the ALPS model. More detail on the ALPS network, trip generation, distribution and assignment, are provided in the following sections.

Network

The ALPS networks were based on existing conditions information and were modified based on the project definition matrix (**Table E-19** in **Appendix E, Alternatives**) and the proposed ALP[29] for each alternative. The Build Alternatives (Alternatives C,D, and G) roadway networks were based on the ALP. The Terminal 1, 2, 3, and 5 curbfronts were assumed to remain the same, the Terminal 4 curbfront was assumed to mirror the Terminal 3 curbfront, and the Terminal 6 curbfront was based on the Terminal 6 layout in the ALP and the access plans for Terminal 6. The west side terminal roadway layout was based on the ALP and plans from the *O'Hare Modernization Program Project Definition Report*.[30] The locations of public parking facilities were based on parking location and supply in the project matrix and in the O'Hare Master Plan.[31] For these modeling purposes, the ALPS model network was simplified from the larger TRAFFIX network to represent only the roadways in the immediate vicinity of the airport.

Trip Generation

Trip generation was based on the origin/destination (O-D) air passenger flight activity data for each of the four future years of analysis. **Table G-7** shows the annual O-D passengers for the Build Alternatives. Arrival and departure curves, mode split, parking, and vehicle occupancy data were used in the ALPS model to convert the airline passenger flight activity data into vehicular arrivals and departures at various airport locations (curbfronts and parking lots). The passenger early arrival curve, mode of arrival, parking locations, and visitor assumptions were based on data collected during the 2002 passenger survey. It was assumed that passengers departing the airport would have characteristics similar to passengers arriving at the airport.

TABLE G-7
ANNUAL ORIGINAL/DESTINATION ENPLANEMENTS BY ALTERNATIVE YEAR

Year of Analysis	Build Alternatives (Alternative C, D, or G)	No Action Alternative (Alternative A)
2002 Baseline	15,956,000	N / A
Construction Phase I	18,434,500	18,404,500
Construction Phase II	19,692,000	19,364,500
Build Out	22,702,500	21,504,000
Build Out + 5	27,251,500	24,775,500

Source: Leigh Fisher Associates [TPC] analysis, 2004.

Trips were also generated for the O'Hare Hilton Hotel, which is located in the Core Terminal area and shares roadway and parking facilities with the Airport. Trips were generated for the

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29 Airport Layout Plan, O'Hare International Airport, City of Chicago, Department of Aviation, October 2003.
30 O'Hare Modernization Program. Project Definition Report, Ricondo & Associates, Inc. [CCT], January 2003.
31 O'Hare International Airport Master Plan, Ricondo & Associates, Inc. [CCT], February 2004.

Hilton based on Institute of Transportation Engineers trip generation rates,[32] which were adjusted to account for the unique characteristics of the O'Hare Hilton, an airport-oriented hotel, compared to a typical hotel.

Trip Distribution

General trip distribution to the ALPS boundary nodes was based on the 2002 passenger survey. The data was compared and reconciled with actual traffic counts at parking lot entrances/exits and directional distributions of each mode. The TRAFFIX gates were then grouped together and assigned to the most logical ALPS boundary node based on TRAFFIX gate locations and the roadway network surrounding the ALPS boundary node. In very few cases, a TRAFFIX gate could be served by more than one ALPS boundary node. The airport trips were further distributed from the ALPS nodes to the TRAFFIX gates based on a select link analysis. This select link analysis was performed in EMME/2 to determine the distribution of airport trips entering/exiting the airport in the EMME/2 model. A weighted distribution of these trips was then used to distribute the trips to the TRAFFIX gates.

Trip Assignment

Paths are developed in the ALPS model based on the shortest travel time unless a path has been signed to indicate a specific manner of access and egress. Where multiple paths exist, a manual split of the path was used based on observed traffic patterns. The curbfront assignment is based on vehicles that are permitted to use each curb and the dwell time associated with the vehicles, as measured during the 2002 Surface Transportation Survey.

G.3.6 TRAFFIX Model

The TRAFFIX roadway network was defined based on the October 2003 proposed ALP, the CATS network in the surface transportation study area, and the assumptions detailed in the project definition matrix. All external gates and traffic analysis zones from the CATS network, as well as all airport generators, were created in the TRAFFIX model as gates and zones that acted as sources and sinks (locations where traffic enters and leaves the network) for trips. Paths for each gate and zone to each gate and zone were manually input using the most likely path, taking into consideration factors such as projected travel time and shortest logical path. In general, paths were routed to the interstate highways, the highest functional class of road, whenever possible.

O-D matrices were formed for each of the trip classifications listed above (airport, background, cargo, Eastside Development, and employee) based on the trip generation and distribution methodology for each trip classification. These O-D matrices were summed to create a master O-D matrix for the scenario. This matrix was then entered into the TRAFFIX model and assigned to the roadways in TRAFFIX using the defined paths. Running the TRAFFIX model

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[32] Trip Generation, 7th Edition, Institute of Transportation Engineers, 2003.

produced a file containing the turning movement volumes at each intersection. These volumes were then exported for use in the link and intersection analysis.

G.3.6.1 Sensitivity Analyses and Post-Processing

Various improvements within the study area involved a degree of uncertainty. The preferred approach to address this uncertainty was through sensitivity analyses. When results from sensitivity analyses suggested a need to perform additional analyses, post-processing techniques, using standard analysis procedures, were completed. The methodology for post-processing involved the application of growth percentages to the existing vehicular movement counts for the post-processed intersections. The growth percentages were developed by comparing applicable modeled base year intersection approach data to the applicable future modeled intersection approach data. This factor was then applied to the base year intersection turning movement counts to determine the future year intersection volumes for the post-processed intersections.

G.3.6.2 Study Area

The study area, depicted in **Exhibit G-4**, was determined based on subjective assessment of the impact of Build Alternatives. Furthermore, the EMME/2 model was run with and without the Build Alternatives to confirm that he study area adequately included the "total" effect of the Build Alternatives. The results from EMME/2 showed that the following intersections needed to be included in the study area, and were included in the surface transportation analysis:

- WoodDale and Irving Park Road
- Devon Avenue & WoodDale Road
- Devon Avenue & Arlington Heights
- Irving Park & Addison Road
- Irving Park & Prospect Avenue
- Grand Avenue & Church Road

G.3.6.3 I-294

The EMME/2 databank from CATS had the same number of lanes on I-294 in the Build Out +5 phase, and existing conditions (i.e. 2002 Baseline). However, it was confirmed later that I-294 was programmed to be widened in 2007. A number of scenarios were already run and analyzed when this information was received. The obvious approach to handle this inconsistency was through sensitivity analysis. The worst case for the sensitivity analysis was the Build Alternatives in the Build Out + 5 phase. Therefore, EMME/2 runs were performed for the Build Alternatives in the Build Out + 5 phase with existing number of lanes on I-294, and with the additional lanes on I-294. The results showed little difference in traffic volumes and speeds. Therefore, it was concluded that the discrepancy with regard to widening of I-294 would not affect the results for evaluating the surface transportation impacts of the proposed alternatives.

G.3.6.4 I-90

The EMME/2 databank from CATS had four lanes in each direction on I-90. It was confirmed later that there was no plan to increase the number of lanes on I-90 and hence only three lanes should have been modeled on I-90. However, at that time, a number of scenarios were already modeled and results were analyzed. Thus, the obvious approach to address this inconsistency was to perform a sensitivity analysis. Sensitivity analysis was performed by modeling three lanes on I-90 for the 2002 Baseline and the Build Alternatives in the Build Out + 5 phase. The comparison between three-lane and four-lane cases showed very little difference in traffic volumes (and hence speed). Thus, it was concluded that a revised modeling, and hence duplicating all the effort with three lanes on I-90, was not required.

G.3.7 Evaluation Measures Methodology

Once the surface transportation model was complete, the surface transportation components were evaluated. These components include:

- Roadway elements
- Intersection elements
- Parking elements
- Curbfront elements

The peak hour for this analysis is 4:30 PM – 5:30 PM. This peak hour, the system-wide peak-hour, is a combination of the airport and off-airport peak.

G.3.7.1 Roadway Elements

Link Volumes

Peak-hour link volumes were extracted from the TRAFFIX model output. Daily link volumes were derived by determining the percentage of total daily traffic occurring in the peak hour using temporal factors. This was calculated from the machine traffic count data collected in 15 minute intervals during the 2002 Surface Transportation Survey. The modeled traffic volumes were then divided by the percentage of daily traffic occurring in the peak hour for on- and off-airport locations, in order to obtain a projection of daily traffic on selected links within the study area.

Link Widths / Number of Lanes

Roadway link width and number of through lanes were provided for all alternatives. These factors were based on the 2002 Baseline and include the implementation of any planned improvements applicable to each of the four future years of analysis based on the project definition matrix.

Volume/Capacity Ratio

The overall operating performance of roadway links is determined by the relationship between traffic volumes and the capacity of the roadway. When this volume-to-capacity (V/C) ratio is greater than 1.0, the road is over capacity, based on a theoretical estimate of capacity as explained in the next paragraph. The peak-hour V/C ratios were determined using traffic volumes from the TRAFFIX model. Link volumes reported by the model and the capacities of the roadways were used to determine the V/C ratios. Capacities of the roadways were determined using Table A-1 in Appendix B of the CATS 2020 Regional Transportation Plan for Northeastern Illinois.[33] This table estimates capacity based on characteristics such as roadway width, availability of on-street parking, and the surrounding land use. Roadway widths were determined using aerial photography, as well as field measurements and observations.

Link Speeds

The peak-hour link speeds for arterials were determined using a formula adapted from the Bureau of Public Roads (BPR) curves and used by CATS. For a detailed mathematical representation of the formula, readers are referred to CATS 2020 Regional Transportation Plans. To determine daily link speeds, the traffic volumes on each roadway during each hour of the day were estimated using the daily temporal distributions (discussed below) and the estimated total daily traffic. Based on these volumes, link speeds were calculated for each hour of the day using the same methodology used for the peak hour, as previously discussed. The daily speeds were determined by calculating the average of the hourly speeds, weighted by hourly volume.

Vehicle Class

Vehicle classifications were determined for both on-airport and off-airport facilities. For the on-airport facilities, vehicle classifications were taken from the ALPS model. For off-airport facilities, vehicle classifications provided by the Illinois Environmental Protection Agency (IEPA) for each analysis year were used.

Temporal Distribution

Temporal distributions were established for the roadway volumes based on machine traffic count information collected during the 2002 Surface Transportation Survey. Separate temporal distributions were calculated for the on-airport and off-airport roadways. To calculate the temporal distributions, the total volumes for all days from all relevant machine traffic count locations were summed for each hour of the day. The hourly sums were divided by the sum of all daily traffic to determine the percentage of the total daily traffic occurring in each hour of the day.

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[33] 2020 Regional Transportation Plan; Transportation Improvement Program for Northeastern Illinois; Fiscal Years 1998-2002; Conformity Analysis Documentation; Appendix B Chicago Area Transportation Study, November 1997.

G.3.7.2 Intersection Elements

Intersections / Peak Hour Approach Speed

Approach speeds were calculated for each approach of each signalized intersection under analysis for all alternatives. Existing approach speeds were gathered through field observations as part of the 1999 Surface Transportation Data Collection Program.

Signalized Intersections Analysis

The signalized intersection analysis was conducted using the Synchro, Version 5.0. This program uses the techniques described in the *Highway Capacity Manual 2000* (HCM) to analyze the efficiency of traffic operations at signalized intersections. Inputs for Synchro include traffic volumes, lane configurations, and traffic signal timings (phasings, cycle lengths, and phase splits). Analyses were run for weekday afternoon peak-hour conditions. The Synchro analyses are provided for all of the intersections for each alternative. Several global assumptions were made to perform the signalized intersection analyses. The global assumptions relevant to this analysis include:

- 120-second cycle lengths
- 4-second yellow phases
- 2-second red phases
- Optimized phase splits
- Uncoordinated signals

The 120-second cycle length assumption is consistent with the cycle lengths assumed for the signalized traffic analyses performed for the Eastside Development traffic study. In addition, the 120-second cycle length is close to the actual cycle lengths observed in the 1999 Surface Transportation Data Collection Program. The 4- and 2-second yellow and red phases, respectively, are based on field observations from the 1999 Surface Transportation Data Collection Program. Phase splits were optimized for every intersection analysis. Field observations in 2002 indicated actuated signal operations for existing intersections. It is assumed that future intersections also will also have actuated signal operations.

Intersection red times were determined for all signalized intersections in the study area for each alternative. The intersection red times were calculated by determining the amount of time a vehicle is at a stopped position during each cycle, based on the optimized phase splits determined in the Synchro analysis. Red times were calculated for each movement on each approach at each intersection.

Intersection Layout Exhibits

Intersection layout exhibits[34] at a scale of 1" = 100' were provided for all intersections that were analyzed. Information used to create these drawings included data collected in the field, aerial photography, and in the future year alternatives, information presented on the October 2003 proposed ALP, and in the project definition matrix.

G.3.7.3 Parking Lot Elements

Parking Lot Analysis

The data contained in the parking tables includes:

- Lot identification and location
- Lot status (2002 Baseline, expansion, relocation, new)
- Primary lot user (employee, public, other)
- Projected parking capacity, occupancy, and percent occupancy
- Vehicle mix (percent autos and trucks)
- Projected entering and exiting volumes (daily and PM peak hour)
- Average travel distance from center of lot or structure to parking exit
- Average travel speed in parking lot or structure
- Exit delays (relevant only to parking areas with exit plazas, i.e., public parking and rental car areas)
- Exit queues (relevant only to parking areas with exit plazas, i.e., public parking and rental car areas)
- Exit lanes present/open during the peak and over a 24-hour period (relevant only to parking areas with exit plazas, i.e., public parking and rental car areas)

The following are assumptions that were used in the development of the parking analysis tables:

- The project definition matrix was used to determine the parking relocations, closures, openings, and expansions necessary for future parking conditions.
- Public parking locations were based on existing locations for the 2002 Baseline and the October 2003 proposed ALP and the project matrix for all other alternatives.
- Employee parking locations were assumed to remain in the same location as in the 2002 Baseline unless otherwise specified in the project definition matrix or where employees were diverted in an overflow condition.

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[34] Chicago O'Hare International Airport; O'Hare Modernization Program: Surface Transportation Technical Report, Attachment E Intersection Layout Drawings, Kimley-Horn and Associates, Inc. [CCT], November 2004.

- Public parking demand (number of trips entering and exiting was taken from the surface transportation model).
- 2002 Baseline terminal employee parking demand (occupancy and entrances/exits) was assumed to increase from the 1997 demand based on the ratio of occupancy between 2002 and 1997.
- Terminal employee parking demand (occupancy and entrances/exits) for future year alternatives was assumed to increase in relation to the total projected enplanement growth from 2002 to each future year of analysis, while the cargo lots were assumed to increase based on the total tonnage growth in cargo from 2002 to each future year.
- Parking demand (occupancy and entrances/exits) associated with the rental car lots was assumed to increase with expected growth in O-D passengers from 2002 to each future year of analysis.
- Future year parking demand (occupancy and entrances/exits) associated with the Eastside Development was modified for this EIS study based on the revised Eastside Collateral Development plan.
- Exit plaza delays and queue lengths were assumed to remain consistent with 1999 values for public parking facilities and the consolidated rental car facility. They are assumed to be negligible at the CVHA, employee parking lots, and parking facilities associated with the Eastside Development.
- The vehicle mix (percent autos and percent heavy vehicles) and travel speeds were assumed to remain consistent with the 2002 Baseline for the public, employee, CVHA, and rental car facilities.
- Parking associated with the Eastside Development was assumed to consist of autos only and travel speeds in the parking structures associated with this development were assumed to be 10 mph.
- Travel distances from the center of each parking lot and parking garage to the parking exit were estimated based on expansion or construction plans for existing and future public parking facilities and the future CVHA, as well as field measurements of 1999 employee parking facilities and the existing rental car area.

All of the parking structures or lots fall into one of the following categories:

- Public parking
- Employee parking
- Airport services or "other" parking (rental car and commercial vehicle holding area)
- Parking related to Eastside Development

On-Airport Parking Map

The on-Airport parking map[35] graphically portrays some of the information listed in the parking analysis tables. As a result, the sources of data and methodology for the drawing are the same as those listed above for the parking tables. The only additional information provided on the parking layout drawing that is not contained in the parking tables relates to the idling percentages (percent of vehicles idling while in the CVHA).

The idling percentages published in the 1999 Surface Transportation Data Collection Program were used as the basis for the idling percentages shown on the parking layout drawing. The travel paths and distances shown in orange on the parking layout drawing are representative of horizontal distances necessary to travel from the parking areas to their respective exits. However, both horizontal and vertical distances contribute to the total travel distance required to exit the parking structures. Therefore, tables are displayed on the parking figures to illustrate the total travel distances necessary to exit each level of the various parking structures.

G.3.7.4 Curbfront Elements

Volumes and Vehicle Class

Terminal curbfront volumes (and the number of stopping vehicles and the vehicle classifications) at the upper level and lower level of each terminal and the Bus/Shuttle Center were determined using the ALPS model.

Dimensions

The curbfront dimension figures for each terminal and the Bus Shuttle Center are based on existing conditions for the Baseline and apply any future changes from the project matrix and ALP for the future years.

Capacity

The curbfront capacity analysis shows the relative demand to capacity at the curbfronts. The percent of the curbfront utilized is based on the curbfront volumes, dwell time, vehicle length, curbfront lengths and the allowable percentage of double parked vehicles. This is calculated for each lane group for all terminals for all scenarios.

Speeds

Curbfront speeds were estimated for each lane, for both upper and lower curbfronts, at all terminals. Speed estimates were generated for both peak- hour conditions and daily conditions. From past field studies at the airport in 1997 and 1999, the following findings were determined:

- Curbfront speeds are not heavily influenced by traffic volumes, as long as the curbfront capacity is not exceeded.

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[35] Chicago O'Hare International Airport; O'Hare Modernization Program: Surface Transportation Technical Report, Attachment F On-Airport Parking Facilities Maps, Kimley-Horn and Associates, Inc. [CCT], November 2004.

- Curbfront speeds vary by lane and depend on the overall layout of the curbfront (whether the curbfront has a 2-2-4 (two inner lanes, two middle lanes, and four outer lanes separated by medians) or 2-4 (two inner lanes and four outer lanes, separated by a median) configuration.

Dwell Times

At the terminal curbfronts, no technology changes, curbfront layout changes, or enforcement strategy changes have been assumed in the future years of analysis. Future year of analysis vehicle curbfront dwell times were assumed to be the same as those observed in the 2002 Baseline.

ATTACHMENT G-1

LETTER FROM CHICAGO AREA TRANSPORTATION STUDY (CATS) TO FAA REGARDING CONSISTENCY OF OMP SURFACE TRANSPORTATION MODELING METHODOLGY WITH CATS METHODS

(05/12/2003)

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CHICAGO AREA TRANSPORTATION STUDY 300 West Adams Street Chicago, Illinois 60606 (312) 793-3456 Fax (312) 793-3481

May 12, 2003

Mr. Michael W. MacMullen
Airports Environmental Program Manager
USDOT, Federal Aviation Administration
Chicago Airports District Office
2300 E. Devon Avenue
Des Plaines, IL 60018

Dear Mr. MacMullen:

This letter is in response to your request for comments regarding the materials discussed at our April 25, 2003 meeting at CATS. At that meeting you provided documentation prepared by consultants for City of Chicago and USDOT regarding the O'Hare Modernization Program (OMP) Surface Transportation Analysis. You asked that CATS review the materials and comment on four elements:

- Consistency of the OMP methods with CATS' modeling procedures.
- Linear interpolation between 2015 and 2020 triptables.
- Implication of west terminal trips being modeled as originating from the east terminal.
- Fixing background traffic volumes during manual path assignment.

Upon reviewing your materials and consulting with other participants in this study, our initial assessment is that:

> The OMP Surface Transportation Analysis appears to be an evaluation of traffic operations under a constrained set of background assumptions. The background traffic data required for such an evaluation was derived from CATS regional planning products. In order to validate the OMP traffic operations analysis, the CATS data was assimilated in a tightly controlled fashion. This is consistent and appropriate use of CATS regional data in local traffic operations analysis.

Following is an elaboration of the four elements you raised.

3/03

Consistency of the OMP methods with CATS' modeling procedures

The CATS modeling procedures are developed as regional planning evaluation tools. Although CATS employs a reasonably fine-grained socioeconomic and network geography and validates travel behavior to a generally recognized standard, our principal objective is to account for the elastic nature of travel demand based on transportation supply characteristics. Our methods account for the socioeconomic vagaries of tripmaking, origin, destination, mode and path choice. Our technique involves seeking an equilibrium condition such that both transportation supply and demand patterns will change across the board if any single variable is changed. The OMP Surface Transportation Analysis employs a conventional traffic operations approach which requires a much higher standard of validation, but does not necessarily equilibrate all of the variables present in a regional analysis. The conclusion is that the OMP methods are different but not inconsistent with CATS methods.

Linear interpolation between 2015 and 2020 triptables.

CATS triptables are developed individually based on unique scenario-based socioeconomic and network inputs. If the assumptions associated with the two are temporally plausible, then linear interpolation is an acceptable sketch planning method. In the OMP analysis, the interpolation is based on annualizing a five-year forecast from 2015 to 2020. At some point during that time, CATS assumes a set of new major facility will be introduced. These new facilities will have two interrelated effects: 1) Existing traffic will find new, more efficient routes and 2) regional tripmaking, origins and destination patterns will rearrange themselves to take advantage of the new accessibility. The linear interpolation captures only the second of these and then only in a general way. In most small scale operations analyses, this interpolation method is considered sufficient because the network simulation will capture all or most of the change in traffic patterns.

Implication of west terminal trips being modeled as originating from the east terminal.

This element is related to the triptable concern, but more specifically relates to network accessibility to the airport at large. CATS has traditionally treated additional highway access to O'Hare as an unrestricted path choice. That is, highway travelers may reach the terminal of their choice from any access point the network scenario permits. The OMP Surface Transportation Analysis partitions highway travel to O'Hare based on airside travel patterns. Traversing the airport itself is limited to secured inter-terminal transfers. At this point, there are no modeling implications because the OMP assumption is clearly stated. The more critical concern is whether the OMP assumption of restricted terminal access is consistent with regional planning assumptions that are used to evaluate the western access and bypass facilities.

Fixing background traffic volumes during manual path assignment.

CATS employs a multi-path equilibrium traffic assignment procedure that is standard to most regional planning applications. For large networks, this approach allows for congestion-induced path diversions that reflect the effects of capacity and accessibility changes. This approach is often not used for evaluating localized traffic operations, because path choice is assumed fixed. The OMP analysis assumes that the background traffic derived from CATS will remain unaffected by manually reassigning airport traffic under different operational scenarios. Doing this frees some computational capacity in the OMP analysis for more elaborate consideration of small-scale traffic analysis of signals, intersections and other traffic control concerns. The adequacy of manual traffic assignment is typically determined by a prior assessment of whether traffic and congestion management techniques are expected to divert traffic to other paths.

Thank you for the opportunity to comment on this important analysis. If you have any further questions, please call me. (312) 793-0438.

Sincerely,

Kermit W. Wies
Director of Plan Development

Cc:

Ms. Kitty Friedheim
Managing Deputy Commissioner
Chicago Department of Aviation
Chicago O'Hare International Airport
Terminal 2, Upper Level
Post Office Box 66142
Chicago, IL 60666

Mr. Pat Pechnick
Engineer of Program Development
Illinois Department of Transportation
District One
201 West Center Court
Schaumburg, Illinois 60196

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ATTACHMENT G-2

MEMORANDUM FROM RICONDO TO OMP SURFACE TRANSPORTATION TEAM REGARDING SURFACE TRANSPORTATION ASSUMPTIONS FOR WESTERN TERMINAL

(06/16/03)

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DRAFT

MEMORANDUM

Date: June 16, 2003

To: OMP Surface Transportation Team

From: Shawn M. Kinder ________________________

Subject: SURFACE TRANSPORTATION ASSUMPTIONS FOR WESTERN TERMINAL

This memo describes the proposed assumptions to be utilized in the surface transportation modeling effort for the O'Hare Modernization Program (OMP) regarding ground access trips to/from the airport and their relationship to the proposed western terminal complex.

For the OMP Environmental Impact Statement (EIS), two years of analysis (i.e., 2013 and 2018) include an environment where the proposed western terminal and roadway access is available. In both of these analysis years, ground access is available to the airport from both the existing east and future west entrances. In addition to these ground access facilities, both of these periods include the availability of a secure Automated People Mover (APM) system that connects the existing terminal core to the future western terminal complex.

Estimates of daily passengers arriving and departing each terminal have been developed based on the design day schedules and gate assignments defined in support of the airfield simulation efforts, including estimates of origin/destination passengers for each flight. Utilizing these estimates, as well as assumptions on how passengers will access the airport in the future, volumes of vehicular traffic on the east and west entrance roads can be estimated.

Due to the proximity of the western terminal complex to Terminal 1, and considering the gate allocation assumptions utilized in the airfield simulation analysis, it is assumed that access to gates in the western terminal complex and Terminal 1 can occur through either Terminal 1 (east) or western terminal access points (west). Therefore, a recommended assumption is that all passengers utilizing gates in the western terminal complex or Terminal 1 will utilize the airport entrance nearest to their point of origin. For purposes on this discussion, "nearest" is defined as the airport entrance that is the shortest driving distance from the point of origin.

It is also assumed that some passengers not utilizing gates in the western terminal complex or Terminal 1 may utilize the west entrance if it is closer to their origin/destination point. It is assumed that these passengers would be processed through security at the western terminal and utilize the secure APM. Table 1 details the traffic levels for the range of possibilities for the level of passengers utilizing the western entrance from flights not operating in the western terminal or Terminal 1.

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OMP Surface Transportation Team
June 16, 2003
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Table 1

Alternative Assumption	Traffic Utilizing West Entrance	Traffic Utilizing East Entrance
Low Range: Passengers accessing flights that operate in T2, T3, T4, T5, or T6 use east entrance. All others access the airport from the nearest entrance.	16 percent 2,125 trips in peak hour	84 percent 11,201 trips in peak hour
High Range: All passengers access the airport from the nearest entrance	29 percent 3,802 trips in peak hour	71 percent 9,515 trips in peak hour

Note: Numbers in chart have been rounded.

Given the level of inconvenience experienced by the passengers utilizing the west entrance but destined to facilities other than the western terminal complex or Terminal 1, it is not reasonable to expect that all passengers would opt for the west entrance even if it were the nearest entrance. In addition, it is not possible to predict whether all airlines at the airport would maintain the ability to process checked baggage at both entrances. Therefore, for purposes of this modeling effort, it is recommended that the following assumptions be utilized:

- All passengers who are accessing flights in the western terminal complex or Terminal 1 will access the airport at the nearest entrance.
- All passengers accessing flights that operate in Terminals 2, 3, 4, 5, or 6 that do not require baggage check will utilize the nearest airport entrance. All other passengers will utilize the existing eastern airport entrance. This results in the traffic allocation for 2018 as described in Table 2.

Table 2

Recommended Assumption	Traffic Utilizing West Entrance	Traffic Utilizing East Entrance
All passengers accessing flights in the western terminal complex or Terminal 1 utilize the nearest entrance. Passengers accessing flights that operate in T2, T3, T4, T5, or T6 without checking bags will utilize the nearest entrance. All other passengers will utilize the east entrance.	22 percent 2,860 trips in peak hour	78 percent 10,458 trips in peak hour

Note: Numbers in chart have been rounded.

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The recommended assumption allows for a reasonable estimation of the airport traffic split between the two airport entrances for purposes of the surface transportation modeling effort. Recognizing that the ultimate development scenario and gate allocations are not possible to predict with great accuracy, this recommended assumption allows for modeling work to proceed in a manner that is not dependent on either the extreme low range or high range of traffic splits between the entrances.

cc: 02-01-0215-03
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ATTACHMENT G-3

MEMORANDUM FROM KIMLEY-HORN TO RICONDO REGARDING WESTERN ACCESS DOCUMENTATION REQUEST

(09/17/03)

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Kimley-Horn and Associates, Inc.

Preliminary Draft
For Discussion Purposes Only
L. Reznar memo, September 17, 2003
Page 1

Memorandum

To:	Lisa Reznar Ricondo & Associates
Copy to:	Shawn Kinder, Ricondo & Associates Peter Mandle, Leigh Fisher Bill Willkie, Leigh Fisher Michael MacMullen, FAA Bruce Jacobson, CMT Laura Kramer, CMT Gene Peters, Ricondo & Associates
From:	Foster de la Houssaye Jennifer Bihl Jill Capelli
Date:	September 17, 2003
Subject:	O'Hare Modernization Program; LFA 9/15/03 Western Access Documentation Request

This memo addresses the comments by Leigh Fisher Associates (LFA), received on 9/16/03, regarding the 8/19/03 response by Kimley-Horn and Associates (KHA) to the Western Access Information Request. The KHA response (copy attached) addressed questions from LFA concerning the 6/16/03 Western Access Sensitivity Analysis prepared by Ricondo & Associates. This memo summarized a few scenarios for the operation of the West Terminal and presented a recommended alternative.

The following addresses the issues raised by LFA in their annotations to KHA's 8/19/03 Western Access Information Request response.

Item 1: Relationship of the Regional Roadway Network to the East and West Entrances

To show how the regional roadway network relates to the east and west entrances, labels were added to Figure 1. These labels in Figure 1 correspond directly to the boundary nodes (access points) listed in Table 2. We have also added the approximate locations of the interstate highway routes surrounding the airport.

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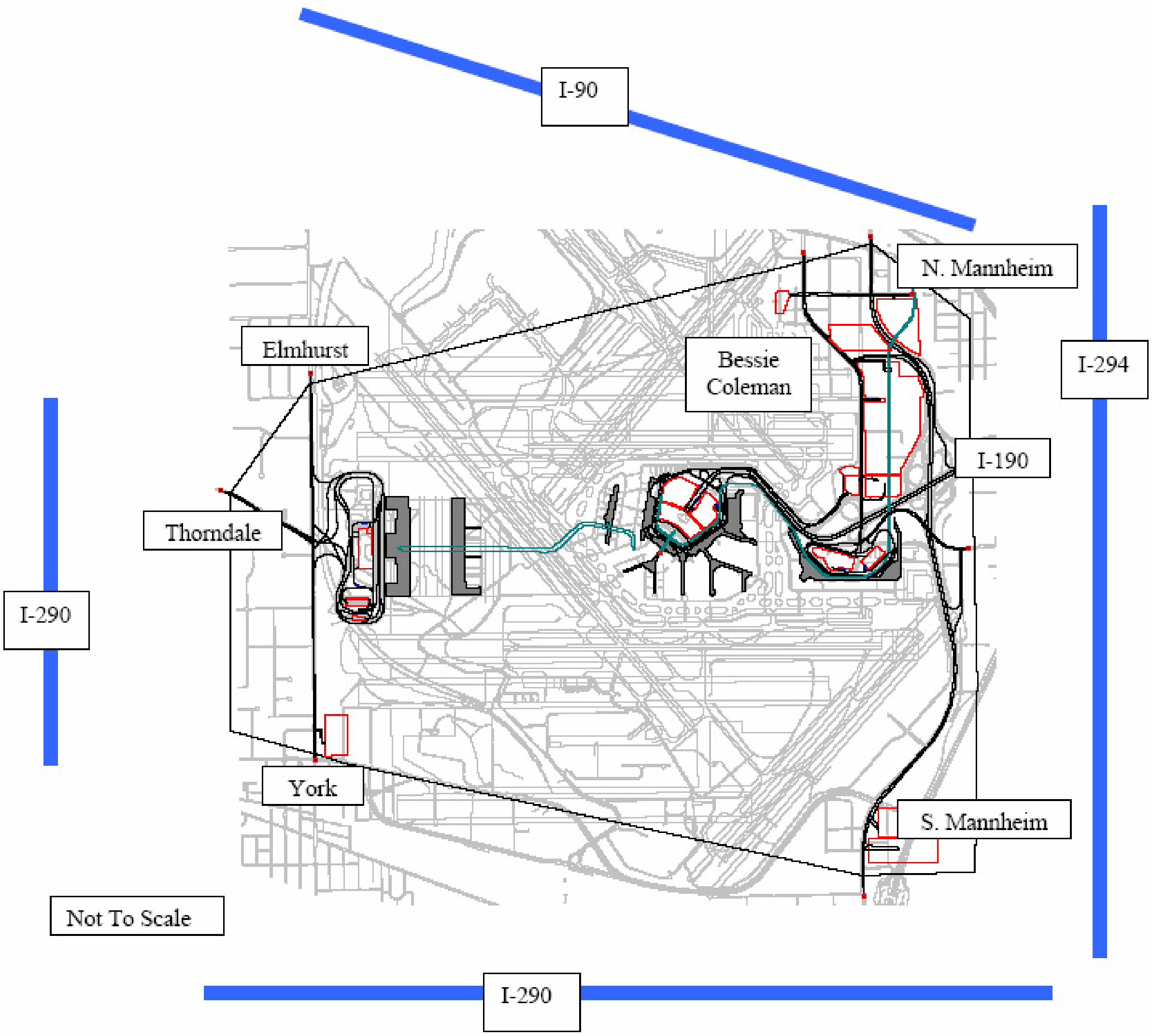
Figure 1. ALPS™ Network



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Items 2 and 3: Translation of Data between Tables 1 and 2

The purpose of Table 1 is to illustrate the passenger directional distributions based on three sources of traffic data. The purpose of Table 2 is to present the directional distributions that were input into the 2018 Build ALPS™ model.

These directional distributions are associated with the West Terminal "Low Range" option, which assumes that passengers accessing flights that operate in T2, T3, T4, T5, and T6 use the east entrance, while all others access the airport from the nearest entrance.

For the 2018 directional distributions, it was assumed that the cardinal directions of the trips will remain the same for the future years as they were in the base year. Moreover, since passengers will begin their trips from the same areas, the future "general" distributions will remain the same. In the future years, however, the routing or path assignment in the ALPS™ model does change from the base year due to the new access points to the airport (the extension of Bessie Coleman Drive; access to the West Terminal along York Road, Elmhurst Road, and Thorndale Avenue; and the extension of Balmoral Avenue) and the proposed new interstate highway ramp configurations (i.e., Lee Street ramps and Elmhurst Road ramps along I-90).

Since there is no data to indicate that there will be a significant change to the directional distribution of passenger traffic into the airport in the future, the future year alternatives will use the existing general directional distribution. The 2018 directional distributions were established using the existing trip origin information and the applying the new roadway changes.

Table 3 summarizes the process used to determine the directional distributions for Terminals 2 through 6. The traffic volume data associated with the 2002 tube count data from Table 1 was used to establish the directional distributions. Engineering judgment was applied when determining the percent of trips that will use the new Lee Street Ramps on I-90.

It was determined that most of the trips already traveling EB on I-90 would access the airport from the Lee Street ramps (Bessie Coleman Drive ALPS node).Therefore, we determined that 15% of the 18% of the trips traveling EB on I-90 would use the Bessie Coleman Drive ALPS™ boundary node. More information on the relationship between Tables 2 and 3 is provided in Item 5 below.

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Item 4: Directional Distribution Differences

Terminal 1 and the West Terminal directional distributions are different from the other terminals due to the project assumptions associated with the West Terminal. In the West Terminal "Low Range" option, it was assumed that passengers accessing flights that operate in T2, T3, T4, T5, and T6 will use the east entrance; all others will access the airport from the nearest entrance and use the secure people mover, if needed. These are the directional distributions shown in Table 2. In the "High Range," however, the directional distributions for all terminals will be the same.

Item 5: Clarification of Table 3 and Table Translation between Tables 2 and 3

Table 3 illustrates the normalization of the 2002 Base Year directional distributions used to adjust for the additional boundary nodes added in the 2018 Build scenario at Terminals 2-6. The first column of Table 3 includes the individual interstate highways used to access the airport in the Base Year. The second column shows the 2002 tube count volumes collected as part of the 2002 survey effort. The third column shows the adjusted 2002 tube count volumes. Specifically, the combined I-90 EB and I-294 NB tube counts were split based on the 1995 volumes. The fourth column shows the percent of total traffic that each of these facilities carries as a percent of the total volumes. This figure was calculated by dividing the adjusted volume on each interstate highway route by the total volume for all four facilities.

In the 2002 Base Year, I-190 is the main access point into the airport. Traffic from other interstate highways in the vicinity accesses the airport through the I-190 ALPS™ boundary node. In 2018, however, additional access points to the airport are included such as the Western Terminal and the ramp expansions on I-90 at Lee Street.

As discussed previously, with the new access at Lee Street to I-90 (Bessie Coleman Drive ALPS boundary node), it is logical that many passengers will take the shortest path coming from areas west and northwest to get to the east terminal and will exit I-90 at Lee Street rather than taking I-90 to the I-294 SB ramp and around to I-190 WB. Also, in the future year, a small percentage (1% to 2%) of the distribution was applied to all gates to represent the expected access to the Airport. Based on our experience at the airport, it is realistic that a small amount of traffic will access the airport through all of the access points.

To derive the numbers presented in the fifth column of Table 3, the total traffic volume using the interstate routes was normalized to incorporate the distributions to the new access points. As mentioned in the Table 3 footnotes, each of five

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routes (Elmhurst, York, Thorndale, N. Mannheim, and S. Mannheim) will get 2% of the traffic in the future. With the 1% assumed to access the airport using Balmoral, this will result in a total of 11% of the total directional distribution to the new access points. Subtracting the 11% from the previous total of 100% leaves a remainder of 89% that will continue to use the existing interstate highway routes for access to the airport. The normalization of the existing interstate highway access to the resulting 89% is shown in the fifth column of Table 3.

The final two columns of Table 3 reallocate the I-90 EB traffic between I-190 and Bessie Coleman Drive (BCD). The increased percentage of trips using BCD is due to the additional ramps at Lee Street that will provide more direct access to the airport via BCD. The actual percentage is based on engineering judgment based on the explanation above.

The directional distributions for Terminals 2 through 6 are based on Table 3; however, the following line-by-line summary is provided as requested by LFA:

- N. Mannheim – 2% of the total directional distribution was assumed, based on 2002 survey data. This percentage is presented in Table 2 and in Table 3 as part of the third footnote of the table.

- S. Mannheim – 2% of the total directional distribution was assumed, based on 2002 survey data. This percentage is presented in Table 2 and in Table 3 as part of the third footnote of the table.

- I-190 – Table 2 indicates that the directional distributions used in the ALPS™ model cover a smaller area than the TRAFFIX model of the entire study area. Within the ALPS™ model, traffic accessing Terminals 2-6 from I-190, I-90, and I-294 enters the model via the I-190 boundary node (see Figure 1 for exact location of the boundary node). Therefore, the percent of traffic accessing Terminals 2-6 from I-190 is the total represented in the sixth column of Table 3 (74%).

- Bessie Coleman – 15% of the total directional distribution for Terminals 2-6 was assumed to access the airport via Bessie Coleman. This percentage is presented in Table 3 in the seventh and final column. Discussion on how this percentage was derived is presented above.

- York – 2% of the total directional distribution for Terminals 2-6 was assumed. In the future year, a small percentage (1% to 2%) of the distribution was applied to all gates so as not to dismiss any trip coming from those gates. It is expected that a small amount of traffic will access the airport through all of the access points.

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- Elmhurst – 2% of the total directional distribution for Terminals 2-6 was assumed. In the future year, a small percentage (1% to 2%) of the distribution was applied to all gates so as not to dismiss any trip coming from those gates. It is expected that a small amount of traffic will access the airport through all of the access points.
- Thorndale – 2% of the total directional distribution for Terminals 2-6 was assumed. In the future year, a small percentage (1% to 2%) of the distribution was applied to all gates so as not to dismiss any trip coming from those gates. It is expected that a small amount of traffic will access the airport through all of the access points.
- Balmoral – 1% of the total directional distribution for Terminals 2-6 was assumed. In the future year, a small percentage (1% to 2%) of the distribution was applied to all gates so as not to dismiss any trip coming from those gates. It is expected that a small amount of traffic will access the airport through all of the access points.

Items 6 and 7: Terminal 1 and West Terminal Directional Distribution Assumptions

As discussed above in Item 4, Terminal 1 and the West Terminal directional distributions are different from the other terminals due to the project assumptions associated with the West Terminal. The directional distributions and reallocations presented in Table 4 were determined based on the additional access points to the airport and on ramp improvements in the study area. The specific directional distribution percentages were derived using knowledge of the area, base year cardinal direction information, the future year roadway network, as well as engineering judgment.

In general, the West Terminal and Terminal 1 air passengers were assumed to access the terminal at the closest boundary node. It was assumed that more people bound for these terminals access the airport from the west side using the I-90/Elmhurst Road, I-290/Thorndale Avenue, I-290/York Road, or I-290/Busse Road interchanges than for the other terminals. This assumption is based on passengers now being able to access the west side of the airport using a more direct route.

For Terminal 1 and the West Terminal (Low Range Option) and all terminals (High Range Option), distributions were increased for Thorndale Avenue, York Road, and Elmhurst Road because they directly access the West Terminal. It was assumed that accessing the airport via Elmhurst Road and checking into the West Terminal or accessing via Bessie Coleman Drive and checking into Terminal 1

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are equally attractive options to the passenger. The West Terminal is closer to the Elmhurst ALPS™ access point, however, the passenger must go through multiple signalized intersections to access the terminal.

Table 4 shows how the 2018 Low Range Option for Terminal 2-6 directional distributions was reassigned for west access cases.

Using the West Terminal and Terminal 1 assumption that the passenger will arrive at the terminal closest to their origin changes the distribution. With the option of western access to the airport, some of the passengers currently coming from the north or south may choose to access the airport differently. This is seen mainly at the Elmhurst, Thorndale, and York boundary nodes.

For Terminals 2 through 6, 74% of the traffic was distributed to the I-190 boundary node. This 74% includes traffic from I-90, I-294, and I-290. For Terminal 1 and the West Terminal, 6% of this distribution was transferred to Elmhurst and Thorndale (mainly trips from I-90 from the west and I-294 from the north), and 8% of this distribution was transferred to York (mainly trips from I-294 from the south now using I-290). These are trips that could access the east side via I-90 (from the northwest) to I-190 or I-294 (from the south) to I-190, but are closer in origin to the West Terminal. After the transfer of these percentages, the I-190 boundary node will maintain 60% of the trip distribution.

Under the "Low Range" west access assumption for Terminals 2 through 6, 15% of the traffic was distributed to the Bessie Coleman Drive boundary node. For Terminal 1 and the West Terminal, 6% of this distribution was transferred to Thorndale and 3% was transferred to Elmhurst (mainly trips from I-90 from the west). These are trips that could access the east side from I-90 (from the northwest) to Bessie Coleman Drive, but are closer in origin to the West Terminal. After the transfer of these percentages, the Bessie Coleman Drive boundary node will maintain 6% of the trip distribution.

These percentages were derived using engineering judgment, knowledge of the area, and familiarity with the roadway network.

Item 8: Updated In-Flight Passenger Survey

A complete In-flight Passenger Survey has not been undertaken since 1997. However, several questions were asked in the 2002 Airport Passenger Survey regarding luggage, including Question 15 (How many of each type bag did you check?) and Question 16 (How many bags are you carrying onto the aircraft?). Since this information was not needed for the surface transportation analysis (it was requested by the people mover consultant), it has not been tabulated.

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General Note: Differences between Scenarios and Update to Table 6

The purpose of the Western Access Sensitivity Analysis was to determine the recommended check-in restrictions associated with the West Terminal.

Table 6 segregates the individual travel classes from ALPS into the various check-in locations for the Recommended Range. Table 6 was not intended to summarize the High or Low Ranges. Additional annotation and summary data have been added to this table, as shown below.

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Updated Table 6:
Vehicle Assignment to the West Terminal or East Terminals for the PM Peak Hour - Reccomended Alternative

Travel Class	Accessing or Egressing	# of Total Vehicles[1]	# of Vehicles Closest to Western Access going to/from West Terminal/ Terminal 1[2]	# of Vehicles Closest to Western Access going to/from Terminals 2 - 6[3]	% Vehicles not checking bags –(closest to West Access only)[4]	# of Vehicles Closest to Western Access using West Terminal	# Vehicles Closes to Western Access using Eastern Terminals	Total Trips Accessing West Side (Columns 4 + 7)
Curb Drop Passengers	Accessing	793	101	126	43.8%	55	71	156
	Egressing	630	83	98	43.8%	43	55	126
Arriving Passengers	Accessing	264	35	41	43.8%	18	23	53
	Egressing	344	100	49	43.8%	21	28	121
Parking Passengers	Accessing	681	94	109	43.8%	48	61	142
	Egressing	686	93	105	43.8%	46	59	139
Limousines	Accessing	271	33	40	43.8%	18	22	51
	Egressing	432	101	57	43.8%	25	32	126
Public Transit	Accessing	327	0	0	43.8%	0	0	0
	Egressing	279	0	0	43.8%	0	0	0
City Taxi	Accessing	403	35	42	43.8%	18	24	53
	Egressing	791	237	72	43.8%	32	40	269
Suburban Taxi	Accessing	101	13	15	43.8%	7	8	20
	Egressing	151	40	21	43.8%	9	12	49
On-Airport Rental Cars	Accessing	329	43	52	43.8%	23	29	66
	Egressing	176	20	29	43.8%	13	16	33
Off-Airport Rental Cars	Accessing	32	6	3	43.8%	1	2	7
	Egressing	34	7	4	43.8%	2	2	9
Hotel Shuttles	Accessing	78	0	0	43.8%	0	0	0
	Egressing	65	19	0	43.8%	0	0	19
Visitors with Departing Passengers	Accessing	199	28	31	43.8%	14	17	42
	Egressing	206	30	30	43.8%	13	17	43
Charter Bus	Accessing	14	2	0	43.8%	0	0	2
	Egressing	12	1	0	43.8%	0	0	1
Visitors with Arriving Passengers	Accessing	325	68	46	43.8%	20	26	88
	Egressing	368	78	56	43.8%	25	31	103
Airport Express	Accessing	26	3	2	43.8%	1	1	4
	Egressing	25	4	2	43.8%	1	1	5
Total		8,042	1,274	1,030		453	577	1,727
Percentages		100.0%	15.8%	12.8%				21.5%

1. Based on 2018 Build Flight Activity with mode split application
2. Using directional distributions for West Terminal and T1 from Table 2
3. Using directional distributions for Terminals 2 - 6 to be the same as shown for the West Terminal and Terminal 1 in Table 2
4. From 1997 In-Flight Passenger Survey by Landrum and Brown

SUMMARY OF WEST ACCESS SCENARIOS

	Calculated %	
Low Range	15.8%	Only passengers using Terminal 1 or West Terminal that are closest to the West Terminal use West Access
High Range	28.6%	All passengers that are closest to the West Terminal use West Access
Recommended Range	21.5%	Passengers using Terminal 1 or West Terminal that are closest to the West Terminal, and passengers using T2-T6 that are closest to West Terminal and not checking baggage use West Access.

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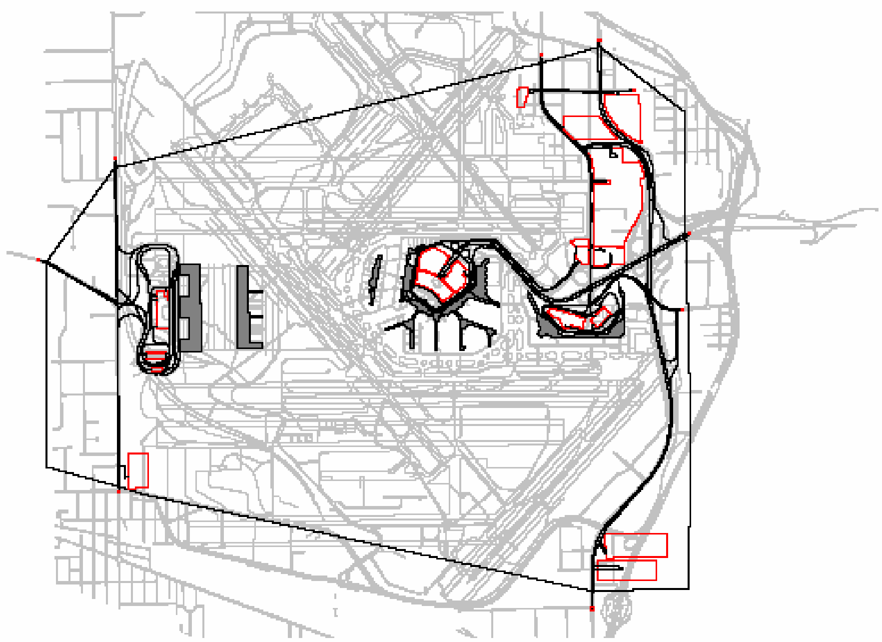
Western Access Information Request

1. *An illustration or calculation of the percentage of passengers for whom the western access would be most convenient. We understand that the ultimate source of this assumption was a passenger survey based on zip codes. Could we get a graphic showing the zip codes and roadway network that illustrates the result of the survey? What calculations were made to arrive at the percentage of peak hour vehicles using that data?*

   The attractiveness and convenience of the western access was determined primarily from the directional distributions within the model. A sketch of the ALPS model is shown in Figure 1. Origin/Destination and route data (instead of zip code data) were collected in the 2002 passenger survey. The collected and historical survey and tube count data route information (Table 1) were used to determine the future year directional distributions shown in Table 2. It was assumed that the cardinal directions of the trips will remain the same for the future year as they were in the base year. It was also assumed that the direction of approach would not change for the peak hour. Since passengers will begin their trips from the same areas, the future general distributions will remain the same. However, in the future year, the routing or assignment does change from the base year due to the new access points to the airport and new interstate ramp configurations.

Figure 1: ALPS Network



1

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Table 1:
Directional Distributions for O'Hare

Path	1995 Travel Atlas*	2002 Tube Counts	2002 Passenger Survey
From South on I-294 (Tollway) to I-190	14.49%	17.28%	25.40%
From North on I-294 (Tollway) to I-190	13.69%	16.74%	16.70%
From West on I-90 (Northwest Tollway) to I-190	13.82%	16.74%	16.30%
From East on I-90/94 (Kennedy) to I-190	44.26%	33.49%	36.80%
From North on Lee-Mannheim Road (IL 12/45) to I-190	4.65%	5.51%	2.20%
From South on Mannheim Road (IL 12/45) to I-190	9.09%	10.25%	1.80%
From South on York Road	-	-	-
From North on York Road	-	-	-
From West on Thorndale Ave.	-	-	-
Other	-	-	0.80%
All Paths	100.00%	100.00%	100.00%

* 1995 Travel Atlas for the Northeastern Illinois Expressway System. CATS. 1998.

The data in Table 1 were used to help determine the 2018 directional distributions in Table 2. Year 2018 Distributions for each terminal to/from each gate are shown in Table 2.

Table 2:
2018 Build ALPS model private vehicle distribution (%)

Boundary Node	T1	T2	T3	T4	T5	T6	West Terminal
N. Mannheim	2	2	2	2	2	2	2
S. Mannheim	2	2	2	2	2	2	2
I-190	60	74	74	74	74	74	60
Bessie Coleman	6	15	15	15	15	15	6
York	10	2	2	2	2	2	10
Elmhurst	6	2	2	2	2	2	6
Thorndale	13	2	2	2	2	2	13
Balmoral	1	1	1	1	1	1	1

The distributions for the 2018 ALPS model gates were determined using the known origin areas and applying the new roadway changes for the 2018 network. Also in 2018, there are additional boundary nodes in the ALPS network: Bessie Coleman Drive, York Road, Elmhurst Road, Thorndale Avenue and Balmoral Avenue. Because of these network changes, the 2018 directional distribution change from the base year percentages. More specific information by terminal is supplied below.

2

Terminals 2, 3, 4, 5, and 6

In the base year approximately 95% of the traffic used the I-190 ALPS gate to access the airport. In the base year, trips originating from I-90 W, I-294 N, I-294 S, and I-90 E were all assumed to access the airport using I-190 based on the roadway network and ramp restrictions. Based on tube count information and the passenger survey, the traffic coming from I-190 is broken down to the interstates in the following manner shown in Table 3.

Table 3:
2018 Terminal 2 – Terminal 6 ALPS Distributions for the I-190 and Bessie Coleman Drive (BCD) Boundary Nodes

Interstate used to access airport	2002 Tube Count Volume	Adjusted Volume	% of Total	Normalized to 89% total***	% of trips to I-190	% of trips to BCD
I-190 WB	16,436	16,436	40%	35%	35%	
I-90 EB	16,434*	8,254**	20%	18%	3%	15%
I-294 NB		8,180**	20%	18%	18%	
I-294 SB	8,481	8,481	20%	18%	18%	
Total	41,351	41,351			**74%**	**15%**

*In the 2002 data collection, these movements were counted at a location where they formed one ramp, so individual counts were not available

**In the 1995 CATS Travel Atlas, these ramps have separate volumes. The 1995 volumes were used to split the 2002 combined volume between the two ramps.

***100% (from base year) – 2% (future Elmhurst North) – 2% (future York South) – 2% (future Thorndale) –1% (future Balmoral) – 2% (future Mannheim North) – 2% (future Mannheim South) = 89%

Terminal 1 and the West Terminal

In 2018, the operational assumptions for Terminal 1 and the West Terminal are different from the other terminals.

Based on distributions for Terminals 2-6, the West Terminal and Terminal 1 assumptions, and the changes to the roadway network, the following changes in Table 4 were made to create the West Terminal and Terminal 1 distributions.

These percentages were derived using the engineering judgment, knowledge of the area and the roadway network as well as the west access assumptions from OMP.

Table 4:
2018 Distributions in ALPS for the West Terminal and Terminal 1

2018 Distribution of trips to ALPS Boundary Nodes for Terminals 2-6		2018 Distribution of trips to ALPS Boundary Nodes for West Terminal and Terminal 1							
		I-190	BCD	Mannheim N	Mannheim S	Elmhurst	Thorndale	York	Balmoral
I-190	74%	60%				1%	5%	8%	
Mannheim N	2%			2%					
Mannheim S	2%				2%				
BCD	15%		6%			3%	6%		
Elmhurst	2%					2%			
Thorndale	2%						2%		
York	2%							2%	
Balmoral	1%								1%
Total		**60%**	**6%**	**2%**	**2%**	**6%**	**13%**	**10%**	**1%**

2. *A description of the calculation on which the percentage of passengers not checking baggage was based. We understand that passenger survey data was also the ultimate source for this assumption. Could we see the calculations used to arrive at the percentage? You did provide a summary percentage of people who are both closest to the western access, would use the west terminal and/or T-1, and would not check bags - it would be helpful to see the contribution of each factor.*

The percent of passengers not checking bags was determined during the 1997 In-Flight Passenger Survey at O'Hare. The table from the report is shown in Table 5.

Table 5
Number of Checked Bags By Originating Passengers

Number of Checked Bags	Percent of Originating Passengers
None	43.8%
One	27.7%
Two	19.1%
Three	5.3%
Four	2.1%
More than Four	2.0%

Chicago O'Hare International Airport, 1997 In-Flight Passenger Survey. Final Report, December 31, 1997. Landrum & Brown

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Table 6 shows the number of vehicles for each travel class that are closest to the western access, the percent that do not check bags, and the resulting vehicles assigned to the east and west sides of the airport.

Table 6:
Vehicle Assignment to the West Terminal or East Terminals for the PM Peak Hour – Recommended Alternative

Travel Class	Accessing or Egressing	# of Total Vehicles	# of Vehicles Closest to Western Access going to/from West Terminal/ Terminal 1	# of Vehicles Closest to Western Access going to/from Terminals 2 - 6	% Vehicles not checking bags –(closest to West Access only)	# of Vehicles Closest to Western Access using West Terminal	# of Vehicles Closest to Western Access using Eastern Terminals
Curb Drop Passengers	Accessing	793	101	126	43.8%	55	71
	Egressing	630	83	98	43.8%	43	55
Arriving Passengers	Accessing	264	35	41	43.8%	18	23
	Egressing	344	100	49	43.8%	21	28
Parking Passengers	Accessing	681	94	109	43.8%	48	61
	Egressing	686	93	105	43.8%	46	59
Limousines	Accessing	271	33	40	43.8%	18	22
	Egressing	432	101	57	43.8%	25	32
Public Transit	Accessing	327	0	0	43.8%	0	0
	Egressing	279	0	0	43.8%	0	0
City Taxi	Accessing	403	35	42	43.8%	18	24
	Egressing	791	237	72	43.8%	32	40
Suburban Taxi	Accessing	101	13	15	43.8%	7	8
	Egressing	151	40	21	43.8%	9	12
On-Airport Rental Cars	Accessing	329	43	52	43.8%	23	29
	Egressing	176	20	29	43.8%	13	16
Off-Airport Rental Cars	Accessing	32	6	3	43.8%	1	2
	Egressing	34	7	4	43.8%	2	2
Hotel Shuttles	Accessing	78	0	0	43.8%	0	0
	Egressing	65	19	0	43.8%	0	0
Visitors with Departing Passengers	Accessing	199	28	31	43.8%	14	17
	Egressing	206	30	30	43.8%	13	17
Charter Bus	Accessing	14	2	0	43.8%	0	0
	Egressing	12	1	0	43.8%	0	0
Visitors with Arriving Passengers	Accessing	325	68	46	43.8%	20	26
	Egressing	368	78	56	43.8%	25	31
Airport Express	Accessing	26	3	2	43.8%	1	1
	Egressing	25	4	2	43.8%	1	1

ATTACHMENT G-4

LETTER FROM RICONDO & ASSOCIATES TO FAA REGARDING WESTERN ACCESS ASSUMPTIONS

(04/12/04)

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RICONDO & ASSOCIATES

DRAFT MEMORANDUM **VIA E-MAIL**

Date: April 14, 2004

To: Amy Hanson, Federal Aviation Administration
Mike MacMullen, Federal Aviation Administration

From: Lisa Reznar [ORIGINAL SIGNED]

Subject: WESTERN ACCESS ASSUMPTIONS

In response to the FAA's April 6, 2004 memorandum regarding western access assumptions, we are submitting for review data that support the underlying aircraft and passenger activity used to generate vehicle trips during the peak hour (4:30-5:30 p.m.). This memorandum describes the differences in trip volumes documented in the CCT's September 17, 2003 from those documented in the CCT's March 22, 2004 memorandum.

The information in the CCT's September 17, 2003 memorandum was generated from the flight and passenger activity based on the 2001 TAF PMAD forecast for 2018 with Project. The March 22, 2004 memorandum documents passenger and flight activity based on the 2002 TAF PMAD forecast for 2018 with Project

The CCT completed **Tables 1** and **2** for the peak hour of 4:30 to 5:30 p.m., as requested by the FAA. As compared to the 2001 PMAD schedule, the 2002 PMAD schedule results in fewer Terminal 1 and West Terminal peak hour total passengers and O&D passengers. Additional information defining the relationship between flight activity and peak hour vehicles is included in **Supplemental Tables 1** and **2** and discussed below to better illustrate how flight and passenger activity relates to peak hour vehicles.

Peak hour vehicle trip calculations take into account mode splits, vehicle occupancies, and time distribution curves, which account for vehicle trips generated by flights departing and arriving during the hours surrounding the 4:30-5:30 p.m. hour (i.e., time distribution curves account for the time passengers actually use the local roadway network).

Exhibits 1 and **2** demonstrate that the peak hour vehicles on the roadway network will be influenced by O&D passengers from flights before and after the peak hour. For example, Exhibit 1 shows that approximately 35 percent of domestic originating passengers arrive over two hours in advance of their flight; therefore, a percentage of passengers on a 6:30 p.m. departing flight would generate some of the vehicle trips observed during the peak hour. For this reason, additional time periods were incorporated into the attached supplemental tables (Supplemental Tables 1 and 2). Exhibits 1 and 2 also illustrate that the time distribution

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curves vary slightly between international and domestic passengers. For this reason, the supplemental tables provided are expanded to include a summary of the domestic and international arrivals and departures. In particular, the domestic and international departures were summarized by hour for the 4:30 p.m. to 8:30 p.m. time period and the domestic and international arrivals were summarized by hour for the 3:30 p.m. to 5:30 p.m. time period. These extended time periods will capture the majority of the O&D passenger activity that generates vehicle trips during the 4:30 p.m. to 5:30 p.m. peak period.

KHA's methodology includes development of an interim step between O&D passenger activity based on the flight schedule and the development of vehicle trips – the development of O&D passengers during the peak hour with the time distribution curves applied (i.e., the time passengers actually use the local roadway network). This step is included in the supplemental tables, and is the number to which mode splits and vehicle occupancy rates are applied to generate the actual vehicle trips.

Please note that after the mode splits are applied, the vehicle trips are no longer classified as international or domestic; therefore, only the total peak hour vehicle trips are presented in the tables. Also, it should be noted that the vehicle occupancies and mode splits changed as part of the base year recalibration as documented in the KHA memo "O'Hare Modernization Program; Jacobs 8/7/03 April 2002 Base Year Calibration Data Request" dated 8/12/04.

Table 2 and Supplemental Table 2, summarizing data from the 2002 TAF PMAD flight schedules for 2018 with Project, were generated from information contained in the flight activity schedule spreadsheet from the FAA's TPC (e.g., airline, flight time, equipment, origin/destination, etc.) in addition to gating detail based on methodology approved by the FAA and TPC on January 14, 2004 (see attached). The data files used to develop all tables summarized in the memorandum are attached as well.

We hope this information provides the detail necessary to validate the development of peak hour vehicle trips based on the 2002 TAF PMAD schedule. We look forward to discussing this information with you on Tuesday.

Attachments

cc: Bill Wilkie, LFA
Laura Kramer, CMT
Steve Mikottis, Jacobs
Gene Peters, Ricondo & Associates, Inc.
Foster de la Houssaye, Kimley-Horn and Associates

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& ASSOCIATES

Read File

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Table 1
2018 with Project PMAD Schedule Based on the 2001 TAF

Terminal	Peak Hour Flights	Peak Hour Passengers	Peak Hour O&D Passengers	Peak Hour Vehicles
T1	61	7,845	3,436	2,869
TW	49	5,938	2,454	1,721(1)
T2-T6	110	12,347	6,124	3,471
TOTALS	220	26,130	12,014	8,061(2)

(1) This number was reported as 1,727 in Table 6 of the 9/17/03 CCT Memo on western access. The difference is attributed to rounding.
(2) This number was reported as 8,042 in Table 6 of the 9/17/03 CCT Memo on western access.

Source: Peak Hour Flights, Passengers, and O&D Passengers – FAA 2001 TAF, Ricondo & Associates, Inc.; Peak Hour Vehicles – Kimley-Horn and Associates.
Prepared by: Ricondo & Associates, Inc.

Table 2
2018 with Project PMAD Schedule Based on the 2002 TAF

Terminal	Peak Hour Flights	Peak Hour Passengers	Peak Hour O&D Passengers	Peak Hour Vehicles
T1	60	6,998	2,450	2,208
TW	42	3,773	1,660	1,390(1)
T2-T6	109	13,423	8,245	5,134
TOTALS	211	24,194	12,355	8,732(2)

(1) This number was reported as 1,395 in Table 1 of the 3/22/03 CCT Memo on western access.
(2) This number was reported as 8,733 in Table 1 of the 3/22/03 CCT Memo on western access.

Source: Peak Hour Flights, Passengers, and O&D Passengers – FAA 2002 TAF, FAA TPC (Leigh Fisher Associates); Peak Hour Vehicles – Kimley-Horn and Associates.
Prepared by: Ricondo & Associates, Inc.

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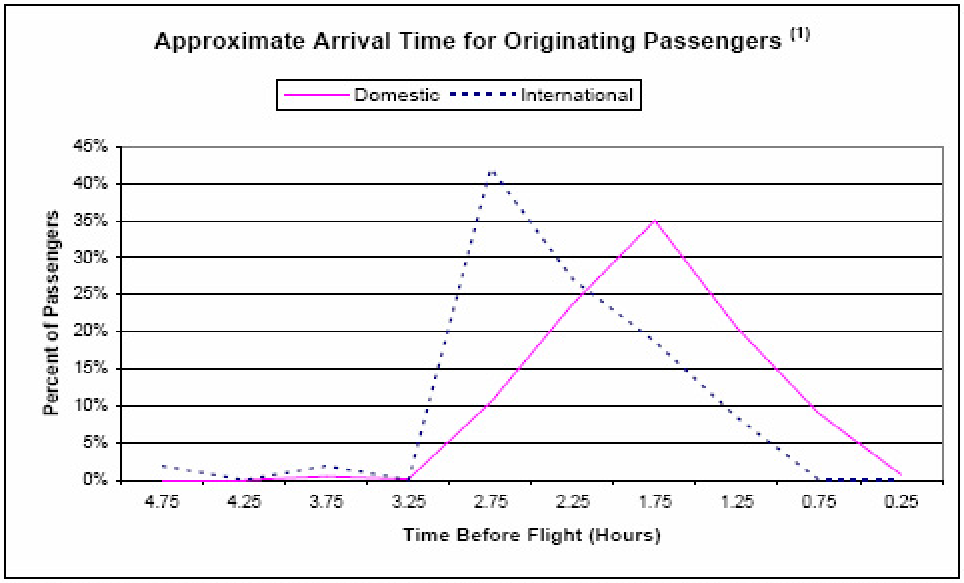
Exhibit 1
Departing Passenger Time Distribution Curves



(1) These data points represent the midpoint of the half hour time period of the interval they represent.

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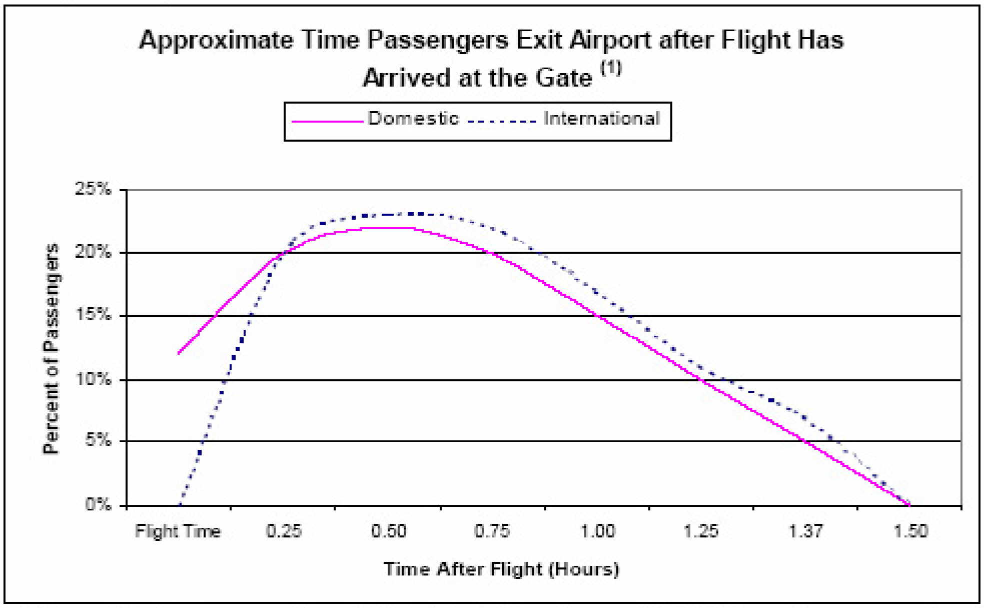
Exhibit 2

Arriving Passenger Time Distribution Curves



(1) These data points represent the midpoint of the half hour time period of the interval they represent.

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OMP Surface Transportation Analysis
West Access Assumptions - Supplemental Table 1 -- DRAFT

2018 with Project PMAD Schedules based on the 2001 TAF

Peak Hour Flights by 1-Hour Bins

Flights: Departures-International			
Terminal	T1	TW	T2-6
3:30-4:30 pm			
4:30-5:30 pm	-	11	13
5:30-6:30 pm	4	8	8
6:30-7:30 pm	-	7	11
7:30-8:30 pm	3	7	4
TOTAL	7	33	36

Flights: Departures-Domestic			
Terminal	T1	TW	T2-6
3:30-4:30 pm			
4:30-5:30 pm	33	16	56
5:30-6:30 pm	32	14	31
6:30-7:30 pm	16	5	63
7:30-8:30 pm	31	22	39
TOTAL	112	57	189

Flights: Arrivals-International			
Terminal	T1	TW	T2-6
3:30-4:30 pm	-	13	8
4:30-5:30 pm	-	8	13
5:30-6:30 pm			
6:30-7:30 pm			
7:30-8:30 pm			
TOTAL	-	21	21

Flights: Arrivals-Domestic			
Terminal	T1	TW	T2-6
3:30-4:30 pm	33	14	65
4:30-5:30 pm	28	14	28
5:30-6:30 pm			
6:30-7:30 pm			
7:30-8:30 pm			
TOTAL	61	28	93

Flights: Peak Hour Total			
Terminal	T1	TW	T2-6
4:30-5:30 pm	61	49	110
TOTAL All Terminals:			220

Peak Hour Total Passengers by 1-Hour Bins

Total Passengers: Departures-International			
Terminal	T1	TW	T2-6
3:30-4:30 pm			
4:30-5:30 pm	-	2,028	2,145
5:30-6:30 pm	815	1,627	1,376
6:30-7:30 pm	-	1,356	1,550
7:30-8:30 pm	560	1,303	750
TOTAL	1,375	6,314	5,821

Total Passengers: Departures-Domestic			
Terminal	T1	TW	T2-6
3:30-4:30 pm			
4:30-5:30 pm	4,189	1,173	5,498
5:30-6:30 pm	4,021	1,090	2,844
6:30-7:30 pm	2,087	287	6,240
7:30-8:30 pm	3,364	1,585	3,112
TOTAL	13,661	4,135	17,694

Total Passengers: Arrivals-International			
Terminal	T1	TW	T2-6
3:30-4:30 pm	-	2,531	1,490
4:30-5:30 pm	-	1,705	2,269
5:30-6:30 pm			
6:30-7:30 pm			
7:30-8:30 pm			
TOTAL	-	4,236	3,759

Total Passengers: Arrivals-Domestic			
Terminal	T1	TW	T2-6
3:30-4:30 pm	4,453	735	6,719
4:30-5:30 pm	3,656	1,032	2,435
5:30-6:30 pm			
6:30-7:30 pm			
7:30-8:30 pm			
TOTAL	8,109	1,767	9,154

Total Passengers: Peak Hour Total			
Terminal	T1	TW	T2-6
4:30-5:30 pm	7,845	5,938	12,347
TOTAL All Terminals:			26,130

Peak Hour O&D Passengers by 1-Hour Bins

O&D Passengers: Departures-International			
Terminal	T1	TW	T2-6
3:30-4:30 pm			
4:30-5:30 pm	-	902	832
5:30-6:30 pm	280	628	585
6:30-7:30 pm	-	617	596
7:30-8:30 pm	193	524	333
TOTAL	473	2,671	2,346

O&D Passengers: Departures-Domestic			
Terminal	T1	TW	T2-6
3:30-4:30 pm			
4:30-5:30 pm	1,835	472	2,776
5:30-6:30 pm	1,761	439	1,793
6:30-7:30 pm	914	110	3,238
7:30-8:30 pm	1,474	642	1,806
TOTAL	5,984	1,663	9,613

O&D Passengers: Arrivals-International			
Terminal	T1	TW	T2-6
3:30-4:30 pm	-	987	584
4:30-5:30 pm	-	666	849
5:30-6:30 pm			
6:30-7:30 pm			
7:30-8:30 pm			
TOTAL	-	1,653	1,433

O&D Passengers: Arrivals-Domestic			
Terminal	T1	TW	T2-6
3:30-4:30 pm	1,950	280	3,338
4:30-5:30 pm	1,601	414	1,667
5:30-6:30 pm			
6:30-7:30 pm			
7:30-8:30 pm			
TOTAL	3,551	694	5,005

O&D Passengers: Peak Hour Total			
Terminal	T1	TW	T2-6
4:30-5:30 pm	3,436	2,454	6,124
TOTAL All Terminals:			12,014

Peak Hour O&D Passengers by 1-Hour Bins with Time Distribution Curves Applied

Peak Hour O&D w/Time Dist Curves - International Departures			
Terminal	T1	TW	T2-6
3:30-4:30 pm			
4:30-5:30 pm	143	554	472
5:30-6:30 pm			
6:30-7:30 pm			
7:30-8:30 pm			
TOTAL	143	554	472

Peak Hour O&D w/Time Dist Curves - Domestic Departures			
Terminal	T1	TW	T2-6
3:30-4:30 pm			
4:30-5:30 pm	1,459	346	2,557
5:30-6:30 pm			
6:30-7:30 pm			
7:30-8:30 pm			
TOTAL	1,459	346	2,557

Peak Hour O&D w/Time Dist Curves - International Arrivals			
Terminal	T1	TW	T2-6
3:30-4:30 pm			
4:30-5:30 pm	-	970	599
5:30-6:30 pm			
6:30-7:30 pm			
7:30-8:30 pm			
TOTAL	-	970	599

Peak Hour O&D w/Time Dist Curves - Domestic Arrivals			
Terminal	T1	TW	T2-6
3:30-4:30 pm			
4:30-5:30 pm	1,661	276	2,507
5:30-6:30 pm			
6:30-7:30 pm			
7:30-8:30 pm			
TOTAL	1,661	276	2,507

Peak Hour O&D Pax w/Time Dist Curves			
Terminal	T1	TW	T2-6
4:30-5:30 pm	3,263	2,146	6,135
TOTAL All Terminals:			11,544

Peak Hour Vehicle Trips by 1-Hour Bins

Peak Hour Vehicle Trips - Total			
Terminal	T1	TW	T2-6
3:30-4:30 pm			
4:30-5:30 pm	2,869	1,721 (1)	3,471
5:30-6:30 pm			
6:30-7:30 pm			
7:30-8:30 pm			
TOTAL	2,869	1,721	3,471
TOTAL All Terminals:			8,061 (2)

(1) This number was reported as 1,727 in Table 6 of the 9/17/03 CCT Memo on western access. The difference is attributed to rounding.

(2) This number was reported as 8,042 in Table 6 of the 9/17/03 CCT Memo on western access.

OMP Surface Transportation Analysis
West Access Assumptions - Supplemental Table 2 -- DRAFT

2018 with Project PMAD Schedules based on the 2002 TAF

Peak Hour Flights by 1-Hour Bins

Flights: Departures-International			
Terminal	T1	TW	T2-6
3:30-4:30 pm			
4:30-5:30 pm	1	4	12
5:30-6:30 pm	-	4	9
6:30-7:30 pm	-	1	7
7:30-8:30 pm	-	2	11
TOTAL	1	11	39

Flights: Departures-Domestic			
Terminal	T1	TW	T2-6
3:30-4:30 pm			
4:30-5:30 pm	24	16	39
5:30-6:30 pm	36	25	55
6:30-7:30 pm	17	10	64
7:30-8:30 pm	29	25	53
TOTAL	106	76	211

Flights: Arrivals-International			
Terminal	T1	TW	T2-6
3:30-4:30 pm	-	3	9
4:30-5:30 pm	1	2	9
5:30-6:30 pm			
6:30-7:30 pm			
7:30-8:30 pm			
TOTAL	1	5	18

Flights: Arrivals-Domestic			
Terminal	T1	TW	T2-6
3:30-4:30 pm	25	22	46
4:30-5:30 pm	34	20	49
5:30-6:30 pm			
6:30-7:30 pm			
7:30-8:30 pm			
TOTAL	59	42	95

Flights: Peak Hour Total			
Terminal	T1	TW	T2-6
4:30-5:30 pm	60	42	109
TOTAL All Terminals:			211

Peak Hour Total Passengers by 1-Hour Bins

Total Passengers: Departures-International			
Terminal	T1	TW	T2-6
3:30-4:30 pm			
4:30-5:30 pm	120	785	2,858
5:30-6:30 pm	-	565	1,931
6:30-7:30 pm	-	147	1,081
7:30-8:30 pm	-	184	2,374
TOTAL	120	1,681	8,244

Total Passengers: Departures-Domestic			
Terminal	T1	TW	T2-6
3:30-4:30 pm			
4:30-5:30 pm	2,621	1,279	3,662
5:30-6:30 pm	3,860	1,564	5,132
6:30-7:30 pm	1,671	589	5,557
7:30-8:30 pm	2,656	1,416	3,938
TOTAL	10,808	4,848	18,289

Total Passengers: Arrivals-International			
Terminal	T1	TW	T2-6
3:30-4:30 pm	-	330	2,106
4:30-5:30 pm	160	435	1,880
5:30-6:30 pm			
6:30-7:30 pm			
7:30-8:30 pm			
TOTAL	160	765	3,986

Total Passengers: Arrivals-Domestic			
Terminal	T1	TW	T2-6
3:30-4:30 pm	3,027	1,373	4,743
4:30-5:30 pm	4,097	1,274	5,023
5:30-6:30 pm			
6:30-7:30 pm			
7:30-8:30 pm			
TOTAL	7,124	2,647	9,766

Total Passengers: Peak Hour Total			
Terminal	T1	TW	T2-6
4:30-5:30 pm	6,998	3,773	13,423
TOTAL All Terminals:			24,194

Peak Hour O&D Passengers by 1-Hour Bins

O&D Passengers: Departures-International			
Terminal	T1	TW	T2-6
3:30-4:30 pm			
4:30-5:30 pm	42	635	2,532
5:30-6:30 pm	-	225	1,354
6:30-7:30 pm	-	76	504
7:30-8:30 pm	-	92	1,809
TOTAL	42	1,028	6,199

O&D Passengers: Departures-Domestic			
Terminal	T1	TW	T2-6
3:30-4:30 pm			
4:30-5:30 pm	918	409	1,886
5:30-6:30 pm	1,351	614	2,772
6:30-7:30 pm	585	244	2,854
7:30-8:30 pm	930	482	1,788
TOTAL	3,784	1,749	9,300

O&D Passengers: Arrivals-International			
Terminal	T1	TW	T2-6
3:30-4:30 pm	-	143	1,591
4:30-5:30 pm	56	152	1,053
5:30-6:30 pm			
6:30-7:30 pm			
7:30-8:30 pm			
TOTAL	56	295	2,644

O&D Passengers: Arrivals-Domestic			
Terminal	T1	TW	T2-6
3:30-4:30 pm	1,060	471	2,207
4:30-5:30 pm	1,434	464	2,774
5:30-6:30 pm			
6:30-7:30 pm			
7:30-8:30 pm			
TOTAL	2,494	935	4,981

O&D Passengers: Peak Hour Total			
Terminal	T1	TW	T2-6
4:30-5:30 pm	2,450	1,660	8,245
TOTAL All Terminals:			12,355

Peak Hour O&D Passengers by 1-Hour Bins
with Time Distribution Curves Applied

Peak Hour O&D w/Time Dist Curves - International Departures			
Terminal	T1	TW	T2-6
3:30-4:30 pm			
4:30-5:30 pm	-	97	1,198
5:30-6:30 pm			
6:30-7:30 pm			
7:30-8:30 pm			
TOTAL	-	97	1,198

Peak Hour O&D w/Time Dist Curves - Domestic Departures			
Terminal	T1	TW	T2-6
3:30-4:30 pm			
4:30-5:30 pm	920	422	2,661
5:30-6:30 pm			
6:30-7:30 pm			
7:30-8:30 pm			
TOTAL	920	422	2,661

Peak Hour O&D w/Time Dist Curves - International Arrivals			
Terminal	T1	TW	T2-6
3:30-4:30 pm			
4:30-5:30 pm	29	195	1,210
5:30-6:30 pm			
6:30-7:30 pm			
7:30-8:30 pm			
TOTAL	29	195	1,210

Peak Hour O&D w/Time Dist Curves - Domestic Arrivals			
Terminal	T1	TW	T2-6
3:30-4:30 pm			
4:30-5:30 pm	1,156	453	2,397
5:30-6:30 pm			
6:30-7:30 pm			
7:30-8:30 pm			
TOTAL	1,156	453	2,397

Peak Hour O&D Pax w/Time Dist Curves			
Terminal	T1	TW	T2-6
4:30-5:30 pm	2,105	1,167	7,466
TOTAL All Terminals:			10,738

Peak Hour Vehicle Trips by 1-Hour Bins

Peak Hour Vehicle Trips - Total			
Terminal	T1	TW	T2-6
3:30-4:30 pm			
4:30-5:30 pm	2,208	1,390(1)	5,134
5:30-6:30 pm			
6:30-7:30 pm			
7:30-8:30 pm			
TOTAL	2,208	1,390	5,134
TOTAL All Terminals:			8,732(2)

(1) This number was reported as 1,395 in Table 1 of the 3/22/03 CCT Memo on western access.

(2) This number was reported as 8,733 in Table 1 of the 3/22/03 CCT Memo on western access.

ATTACHMENT G-5

MEMORANDUM FROM KIMLEY-HORN AND ASSOCIATES TO RICONDO & ASSOCIATES REGARDING DELAYED CONSTRUCTION ANALYSIS

(12/03/04)

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Kimley-Horn and Associates, Inc.

Preliminary Draft
For Discussion Purposes Only

Memorandum

To: Lisa Reznar
Ricondo & Associates

From: Jennifer Bihl
Foster de la Houssaye
Adam Novak

Date: December 3, 2004

Subject: Delayed Construction Analysis

Kimley-Horn was asked by the FAA/TPC team to perform some surface transportation analysis for "delayed construction" scenarios. In these scenarios, construction would be delayed by 14 months. The analysis we were requested to perform was to examine the changes in level of service and delay for the top ten intersections for each scenario. This memo presents the difference in the level of service and delay for the top ten intersections between the 2007, 2009, 2013 and 2018 With Project alternatives and the level of service and delay at those intersections for a 2008, 2010, 2014 and 2019 analysis. Since the objective was to perform a sensitivity analysis on the significance of this shift, the intersection volumes in the With Project alternatives were factored up to provide the basis for the analysis.

2007/2008 analysis

Table 1 shows the results of the intersection analysis for the top ten intersections in 2007 and 2008. As shown by the rankings, most of the intersections retain their rankings or shift slightly but remain within the top ten. However, in 2008, the intersection of Bessie Coleman Drive and Higgins Road drops to number 11 in intersection ranking and the intersection of Devon Avenue and Arlington Heights Road rises to number 10 in intersection rankings.

Overall, we feel that there are no significant detrimental changes in level of service and delay at these intersections in 2008 as compared to 2007.

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Table 1: Intersection Volume & Delay Rankings for 14-Month Delayed Construction Scenario 2007 & 2008

Reference ID[1]	Intersection		2007			2008		
			Rank	Level of Service	Average Delay per Vehicle (seconds)	Rank	Level of Service	Average Delay per Vehicle (seconds)
1	Touhy Avenue	& Elmhurst Road	8	E	64.6	8	E	68.2
2	Touhy Avenue	& Mount Prospect Road	10	D	52.1	9	D	53.6
3	Touhy Avenue	& Wolf Road	6	F	87.3	6	F	82.7
6	Bessie Coleman Drive	& Higgins Road	9	D	54.4	11	D	48.8
7	Mannheim Road	& Higgins Road	1	F	212.7	1	F	199.0
10	Mannheim Road	& Zemke Road	4	F	115.2	4	F	113.7
17	Mannheim Road	& Lawrence Avenue	3	F	112.4	3	F	113.2
20	Mannheim Road	& Irving Park Road	5	E	76.9	5	E	76.7
22	York Road	& Irving Park Road	2	F	176.2	2	F	201.3
29	Thorndale Avenue	& Arlington Heights Road	7	F	108.4	7	F	111.0
33	Devon Avenue	& Arlington Heights Road	11	E	66.5	10	E	73.9

<u>2009/2010 analysis</u>

Table 2 shows the results of the intersection analysis for the top ten intersections in 2009 and 2010. As shown by the rankings, most of the intersections retain their rankings or shift slightly but remain within the top ten However, in 2010, the intersection of Devon Avenue and Arlington Heights Road drops to number 11 in intersection ranking and the intersection of York Road and Irving Park Road ramp rises to number 9 in intersection rankings.

Overall, we feel that there are no significant detrimental changes in level of service and delay at these intersections in 2010 as compared to 2009.

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Table 2: Intersection Volume & Delay Rankings for 14-Month Delayed Construction Scenario 2009 & 2010								
			2009			2010		
Reference ID[1]	Intersection		Rank	Level of Service	Average Delay per Vehicle (seconds)	Rank	Level of Service	Average Delay per Vehicle (seconds)
1	Touhy Avenue	& Elmhurst Road	6	E	71.3	7	E	75.9
2	Touhy Avenue	& Mount Prospect Road	8	E	56.1	10	E	60.6
3	Touhy Avenue	& Wolf Road	5	E	79.3	5	F	86.9
7	Mannheim Road	& Higgins Road	1	F	184.5	1	F	197.4
10	Mannheim Road	& Zemke Road	4	F	109.1	4	F	120.5
17	Mannheim Road	& Lawrence Avenue	2	F	114.1	2	F	126.3
20	Mannheim Road	& Irving Park Road	3	E	76.3	3	F	85.0
29	Thorndale Avenue	& Arlington Heights Road	7	F	116.3	6	F	134.2
33	Devon Avenue	& Arlington Heights Road	9	E	79.6	11	F	87.7
37	York Road	& Irving Park Road Ramp	11	F	80.2	9	F	103.2
38	Irving Park Road	& York Road Ramp	10	E	77.3	8	F	96.5

2013/2014 analysis

Table 3 shows the results of the intersection analysis for the top ten intersections in 2013 and 2014. As shown by the rankings, all of the intersections retain their rankings or shift slightly but remain within the top ten

Overall, we feel that there are no significant detrimental changes in level of service and delay at these intersections in 2014 as compared to 2013.

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Table 3: Intersection Volume & Delay Rankings for 14-Month Delayed Construction Scenario 2013 & 2014								
Reference ID[1]	Intersection		2013			2014		
			Rank	Level of Service	Average Delay per Vehicle (seconds)	Rank	Level of Service	Average Delay per Vehicle (seconds)
3	Touhy Avenue	& Wolf Road	10	F	106.9	9	F	105.0
6	Bessie Coleman Drive	& Higgins Road	5	F	119.1	7	F	119.3
7	Mannheim Road	& Higgins Road	1	F	236.7	1	F	230.3
10	Mannheim Road	& Zemke Road	4	F	165.3	4	F	162.4
16	Balmoral Avenue	& Des Plaines River Road	9	F	146.1	10	F	140.2
17	Mannheim Road	& Lawrence Avenue	2	F	176.1	2	F	184.3
20	Mannheim Road	& Irving Park Road	3	F	132.9	3	F	134.5
29	Thorndale Avenue	& Arlington Heights Road	7	F	180.6	6	F	191.5
37	York Road	& Irving Park Road Ramp	8	F	179.8	8	F	187.1
38	Irving Park Road	& York Road Ramp	6	F	159.9	5	F	164.4

<u>2018/2019 analysis</u>

Table 4 shows the results of the intersection analysis for the top ten intersections in 2018 and 2019. As shown by the rankings, all of the intersections retain their rankings or shift slightly but remain within the top ten.

Overall, we feel that there are no significant detrimental changes in level of service and delay at these intersections in 2019 as compared to 2018.

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Table 4: Intersection Volume & Delay Rankings for 14-Month Delayed Construction Scenario 2018 & 2019

Reference ID[(1)]	Intersection		2018			2019		
			Rank	Level of Service	Average Delay per Vehicle (seconds)	Rank	Level of Service	Average Delay per Vehicle (seconds)
1	Touhy Avenue	& Elmhurst Road	9	F	106.5	8	F	111.4
3	Touhy Avenue	& Wolf Road	8	F	114.1	9	F	112.4
6	Bessie Coleman Drive	& Higgins Road	10	F	107.6	10	F	109.6
7	Mannheim Road	& Higgins Road	2	F	213.4	2	F	205.0
10	Mannheim Road	& Zemke Road	4	F	172.9	5	F	176.5
17	Mannheim Road	& Lawrence Avenue	1	F	217.3	1	F	227.3
20	Mannheim Road	& Irving Park Road	3	F	143.1	3	F	145.2
29	Thorndale Avenue	& Arlington Heights Road	5	F	229.2	4	F	240.2
37	York Road	& Irving Park Road Ramp	7	F	201.8	7	F	204.5
38	Irving Park Road	& York Road Ramp	6	F	181.3	6	F	186.5

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