U.S. Department
of Transportation
**Federal Aviation
Administration**

Great Lakes Region
2300 East Devon Avenue
Des Plaines, IL 60018

OCT 29 2018

Dear Mayor Juracek:

Thank you for your letter dated September 25, 2018 regarding Metroplex and the airspace redesign portion of the O'Hare Modernization Program (OMP).

While not classified as a Metroplex, many of the elements of the Metroplex program have already been implemented in Chicago. In the future, the Federal Aviation Administration (FAA) may reevaluate the current design to take advantage of emerging technology and make any other warranted refinements. The FAA anticipates that it will take at least a few years after full build out of the airfield to make such a decision.

We are hopeful that the answers below provide more clarity to your inquiry.

What is the definition of Metroplex?

The FAA uses the term "Metroplex" to define metropolitan areas with multiple airports and complex air traffic flows. The FAA's goal with the Metroplex program is to improve airport access and make flight routes more efficient.

Through the Metroplex program, the FAA collaborates with aviation stakeholders to improve regional traffic movement by optimizing airspace and procedures based on precise satellite-based navigation. Each Metroplex includes one or more commercial airports with shared airspace that serves at least one major city.

Information on the FAA's Metroplex program can be found at:
https://www.faa.gov/nextgen/snapshots/metroplexes/

What is it designed to do? (i.e., does it reassign flights to other airports or does it better manage the system of airports/airspace within the Metroplex region)

The Metroplex program is designed to improve regional traffic movement by optimizing airspace, procedures, and efficiency based on precise satellite-based navigation. It is not designed to reassign flights to other airports. The FAA does not have the legal authority to distribute air traffic among multiple airports in a metropolitan area nor to direct where carriers provide service. Air carriers determine where they will provide service, the time of day of the flight, and the type of aircraft.

There are 11 active Metroplexes, why is there not a Chicago Metroplex?

As noted above, many of the elements of the Metroplex program have already been implemented in Chicago. As you know, the OMP started in the early 2000's. In addition to the construction of new runways in the OMP, the Environmental Impact Statement that approved the OMP included a comprehensive redesign of the Chicago metropolitan area's airspace. That redesign was called the Chicago Airspace Project (CAP). Through the CAP the FAA developed airspace procedures that would best utilize the proposed airfield and take advantage of newer technologies. When the FAA worked on the airspace redesign, the agency had not yet developed its vision for the Metroplex program. However, the concepts incorporated in the CAP are similar to those incorporated at Metroplex project locations across the country, including satellite based procedures and Optimized Profile Descent (OPD). The FAA implemented the CAP in three phases. In March 2007, the FAA began implementing the airspace by adding eastbound departure routes for O'Hare. The second phase provided the airspace structure that allows for three simultaneous approaches in west flow and reconfigured southbound departure routes for both O'Hare and Midway. These were implemented in November 2008 in conjunction with the commissioning of Runway 9L/27R. The final stage of the project provided improvements for west-bound departures at both O'Hare and Midway and three simultaneous approaches for east flow at O'Hare. These were implemented in October 2013, in conjunction with the commissioning of Runway 10C/28C.

As part of the CAP, the large majority of Standard Arrival Routes (STARs) into the Chicago area were designed as Performance Based Navigation (PBN), which are satellite-based routes. While some ground-based navigation arrival procedures still exist at O'Hare and Midway, they are only used for aircraft that are not equipped to navigate PBN routes. The Standard Instrument Departure Routes (SIDs) in the Chicago area rely on waypoints[1] established by satellite navigation points in space rather than ground-based navigation systems. Due to the overall congestion of the airspace and the proximity of many general aviation airports to O'Hare, the FAA has not designed or implemented full PBN departure routes at O'Hare or Midway. In addition to improving the efficiency of the Chicago airspace and addressing potential conflicts between many O'Hare/Midway operations (i.e., "deconfliction"), the CAP redesign provided the structure for other Chicago area airports to use while arriving or departing from the metropolitan area. The FAA also updated procedures for other Chicago area airports, including airports as far away as Milwaukee, WI and South Bend, IN.

Do any of these tools apply at O'Hare:

1. **Wake Recategorization?**

Yes. The recategorization of wake turbulence standards allows aircraft to safely take-off and land closer to each other, leading to increased capacity and flight efficiency at many airports

[1] A waypoint is a predetermined geographical position that is defined in terms of latitude/longitude coordinates.

across the country, including O'Hare. Wake turbulence forms behind an aircraft as it passes through the air. The bigger the aircraft the bigger the wake. The FAA studied this issue with other government agencies and industry and learned that the separation between aircraft can safely be decreased. At O'Hare, Wake Recategorization procedures were implemented in 2016. These changes now allow air traffic to reduce the separation of aircraft behind wide-body aircraft like the Boeing 747-800 and reduce the separation behind Boeing 757s and all other aircraft. For example, before Wake Recategorization, an Embraer ERJ -145 (regional jet) required a 4-mile separation behind a Boeing 757. Based on the evaluation and changes learned through Wake Recategorization, the required airborne separation between these two aircraft is now 3 miles, as opposed to 4.

2. Optimized Profile Descents?

Yes, but only partially. Due to the complexity of Chicago airspace, OPDs to the ground are currently not feasible for any approaches and are rarely used for approaches from the east. However, as part of the CAP, O'Hare arrival procedures incorporated OPD segments, which occur between approximately 33,000 feet and 11,000 feet altitude.

OPDs are a specific type of PBN procedure designed to help reduce fuel consumption, emissions and noise by keeping arrival aircraft at their cruise altitude as long as possible before beginning a descent. Once the descent has begun, the procedure differs from the historical pattern of step-by-step clearances (i.e. descend, level off, descend, etc.), by enabling an uninterrupted descent for portions of the arrival route. Ideally, the OPD facilitates clearance of the aircraft for an uninterrupted descent from cruising altitude to final approach. This enables the aircraft to use the most economical power setting, at or near idle, and minimize or eliminate the need to level-off for which greater power must be applied.

For OPD segments to be effective and capture the intended gains, the particular route has to be able to absorb an amount of variability driven by various factors, including but not limited to types of aircraft, different flight crew techniques, and winds. The need to absorb this variability drives compression between the flights, which creates the need for additional spacing on the particular routes to maintain a safe distance between flights. The airspace constraints as well as traffic complexity to the east of ORD, limit the degree of how often OPDs can be issued, as there is less opportunity to absorb the aforementioned variability. The OPDs on the arrival routes from the west see more frequent use as the airspace has fewer constraints and complexities, which in turn allows a greater ability to absorb some of the variability associated with procedure.

3. Lower visibility procedures?

Yes. Expanded Low-Visibility Operations Using Lower Runway Visual Range Minima is available at O'Hare. Improved Approaches and Low-Visibility Operations include capabilities designed to increase airport approach and arrival access and flexibility. This is accomplished through a combination of procedural changes, improved aircraft capabilities, and improved precision approach guidance. An instrument landing system (ILS) enables pilots to conduct an instrument approach to landing if they are unable to establish visual contact with the runway. ILSs provide precision guidance to increasing degrees of precision (from Category I to Category

III. Currently O'Hare has nine Category II/III approaches. When the OMP is complete O'Hare will have 12 approaches with Category II/III capabilities, which allow for arrivals in all types of low visibility ratings. In addition to O'Hare's Cat II/III ILS capabilities, national changes and improvements such as Enhanced Flight Vision System (EFVS) for approach and takeoff and reduced Runway Visual Range (RVR) are available.

Are there documents we can point to that specify/define the analysis for O'Hare?

The O' Hare Modernization Environmental Impact Statement (EIS) defines the analysis for O'Hare. The document can be found at:
https://www.faa.gov/airports/airport_development/omp/eis/feis/

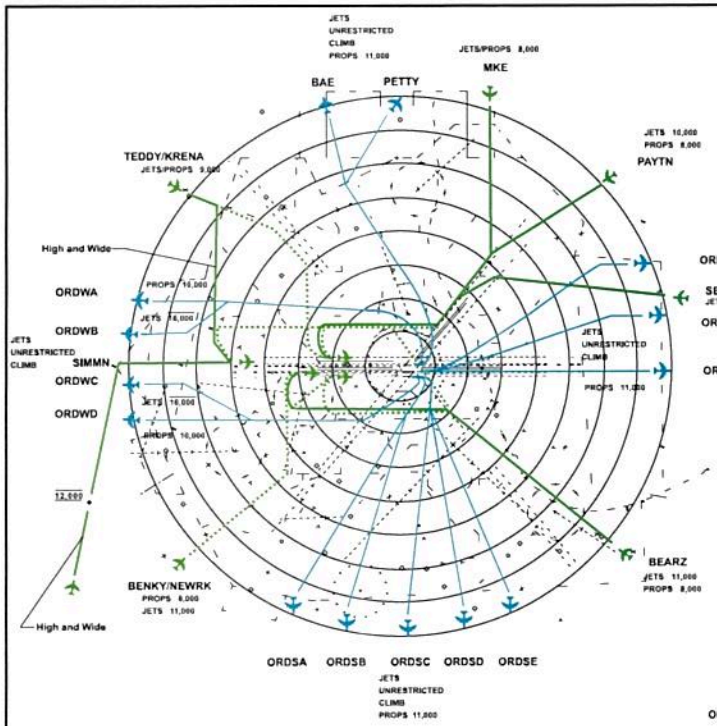
We have also attached a document and airspace routes highlighting excerpts from the EIS that addressed airspace changes. At the time OMP and CAP were designed and evaluated, the FAA used the terms National Airspace Redesign (NAR) and Operational Evolution Plan, or OEP, to describe the precursors to the Metroplex program.

We hope that this response proves helpful in addressing your concern.

Sincerely,

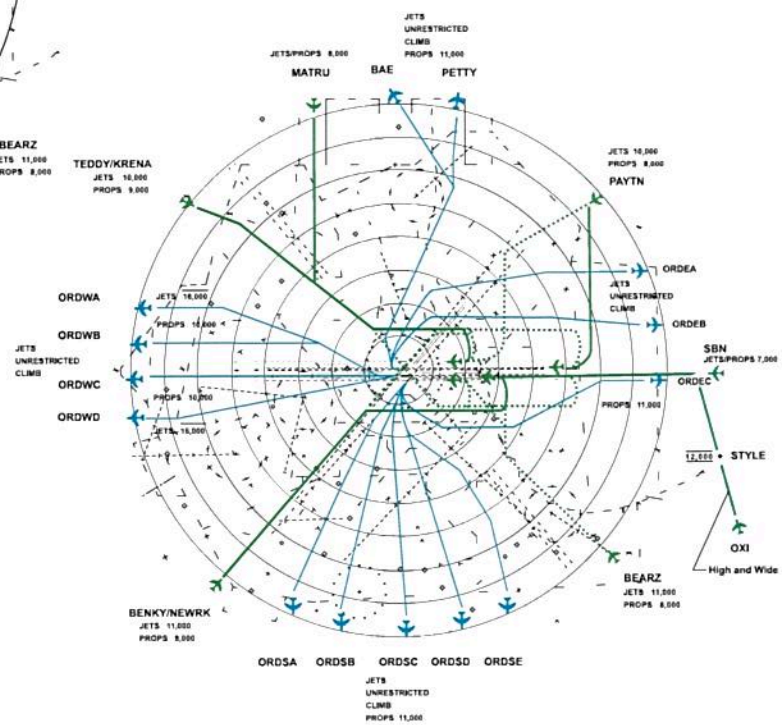
Rebecca B. MacPherson
Regional Administrator
Great Lakes Region

Attachments (4)
Selected excerpts from the 2005 Environmental Impact Statement for the O'Hare Modernization pertaining to airspace redesign
Proposed Airspace Routes for Alternatives C, D, and G (Build Alternatives), Exhibit E-11
Airspace Routes for Alternative A vs. Build Alternatives West Flow, Exhibit E-12
Airspace Routes for Alternative A vs. Build Alternatives East Flow, Exhibit E-13



East Flow

West Flow



Chicago O'Hare International Airport

O'Hare Modernization Environmental Impact Statement

Primary Arrival Route
Secondary Arrival Route
Departure Route

Note: Range Rings are 5 nautical miles apart.

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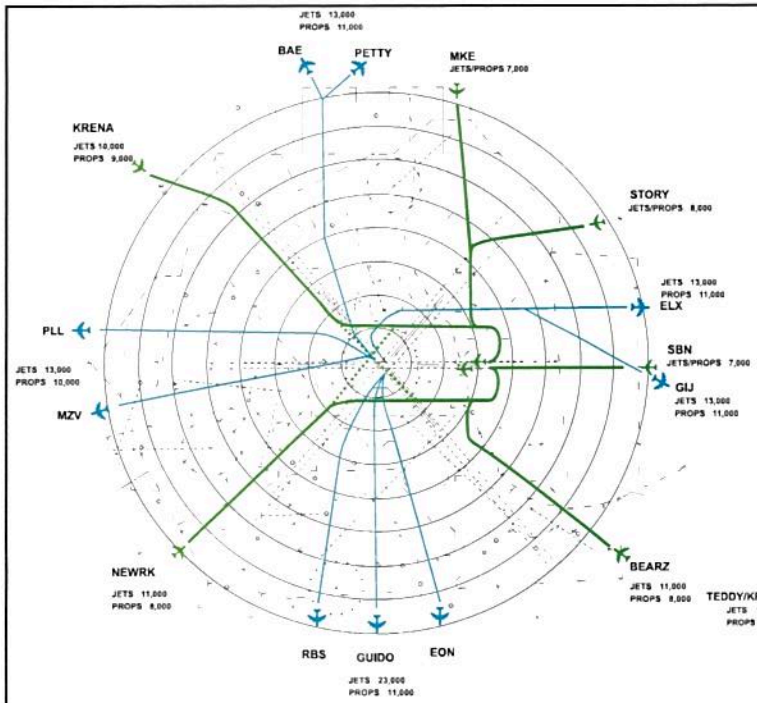
Proposed Airspace Routes for Alternatives C, D, and G (Build Alternatives)

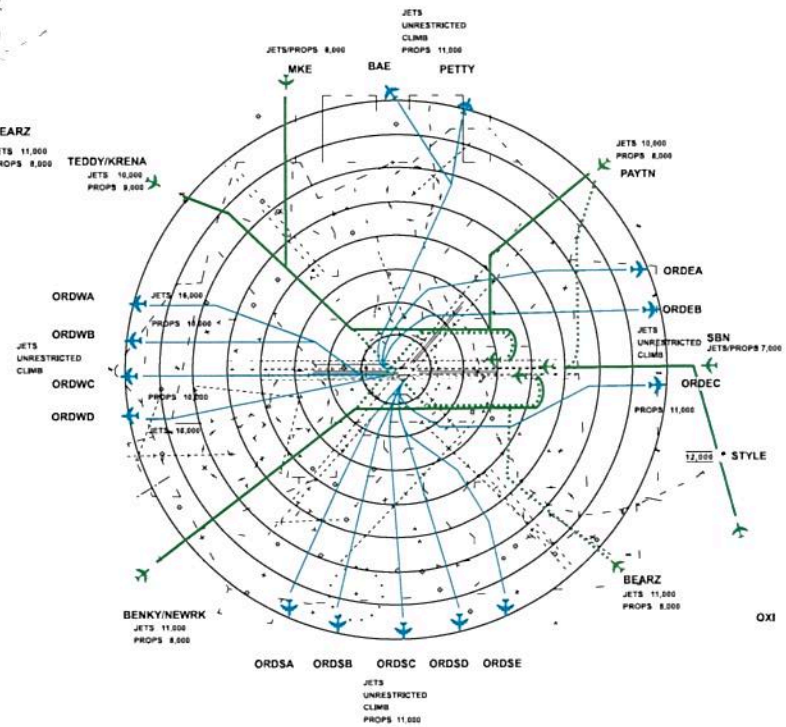
► **Exhibit E-11**

Comparisson of the airspace structure of Alternative A with that shown for Alternative C indicates the airspace changes that are proposed for the Build Alternatives.



Alternative A
No-Action
Preferred West Flow

Alternative C
Preferred West Flow



Note: Alternative A is equivalent to the existing airspace structure that serves O'Hare.

Chicago O'Hare International Airport

O'Hare Modernization Environmental Impact Statement

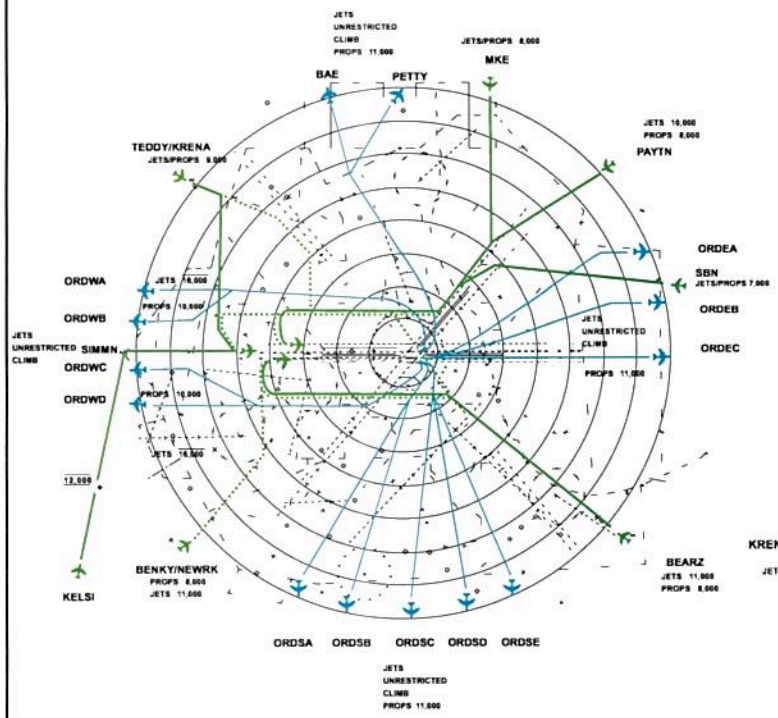
Primary Arrival Route
Secondary Arrival Route
Departure Route

Note: Range Rings are 5 nautical miles apart.

Airspace Routes for Alternative A vs. Build Alternatives West Flow

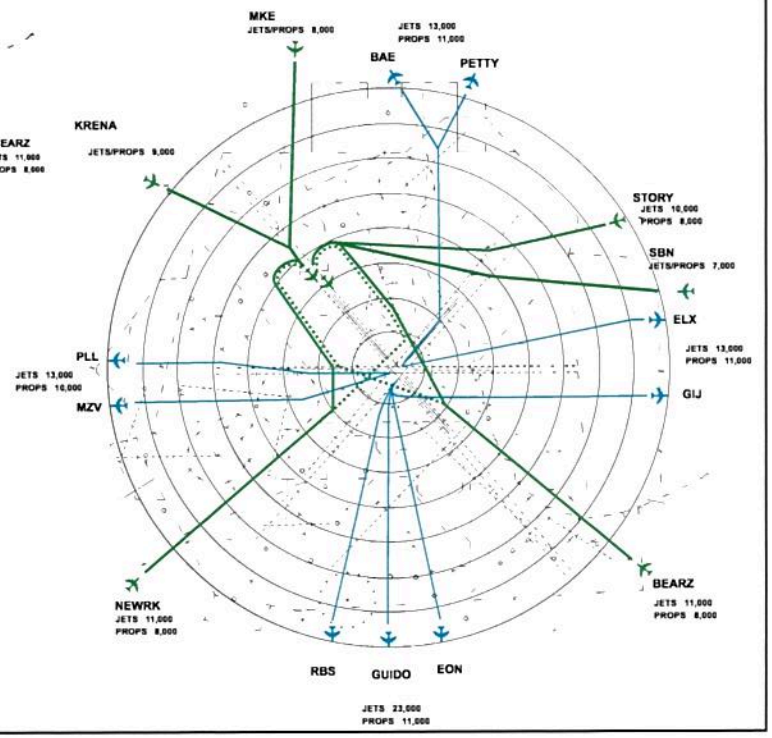
► **Exhibit E-12**

Comparisson of the airspace structure of Alternative A with that shown for Alternative C indicates the airspace changes that are proposed for the Build Alternatives.



Alternative C
Preferred Action
East Flow

Alternative A
No-Action East Flow



Note: Alternative A is equivalent to the existing airspace structure that serves O'Hare.

Chicago O'Hare International Airport

O'Hare Modernization Environmental Impact Statement

Primary Arrival Route
Secondary Arrival Route
Departure Route

Note: Range Rings are 5 nautical miles apart.

Airspace Routes for Alternative A vs. Build Alternatives East Flow

► **Exhibit E-13**

Selected excerpts from the 2005 Environmental Impact Statement for the O'Hare Modernization pertaining to airspace redesign:

Chapter 2, Section 2.2.2 – National Airspace Redesign

NAR is a multi-year FAA initiative to review, redesign, and restructure the nation's airspace to meet the rapidly changing and increasing operational demands on the NAS. The National Airspace Redesign is considering improvements in technology, aircraft equipment, infrastructure and procedures. NAR, a major element of the FAA's OEP, is designed to respond to increasing inefficiencies and delays in the NAS.

Focused on redesign of the airspace at high altitudes (initially at 39,000 feet and above), the NAR exploits new navigational technologies to allow suitably equipped aircraft to fly point-to point instead of following the current system of routes based on ground-based navigational aids. The NAR also redesigns and optimizes local airspace to increase efficiency and reduce delays for flights in and out of terminal airspace. While it is a national effort, most NAR resources are being applied to geographic areas where the need is greatest such as Boston, New York Airports (LaGuardia, Kennedy and Newark), Philadelphia, Atlanta, Chicago, San Francisco, and Los Angeles.

Benefits of the NAR will include increased en route airspace access, increased throughput at major airports, and reduced airspace complexity. Airfield constraints at individual airports are frequently more limiting than the airspace serving those same airports. Unless these airfield constraints can be eliminated, the bottlenecks in the NAS will continue.

Chapter 2, Section 2.2.3 – Operational Evolution Plan

The FAA's Operational Evolution Plan (OEP) is an ongoing ten-year plan developed by the FAA to increase the capacity and efficiency of the NAS, while at the same time enhancing safety and security. The OEP, a system-wide strategy for the advancement of the NAS, includes both optimization of the airspace and the introduction of new concepts, technologies, and procedures. The plan is organized in the following core areas: Arrival/Departure Rates, En Route Congestion, Airport Weather Conditions, and En Route Severe Weather.

To implement the OEP, the FAA has developed the Flight Plan 2005-2009 (Flight Plan). One of the goals of the Flight Plan is to "work with local government and airspace users to provide capacity in the United States airspace system that meets projected demand in an environmentally sound manner."28 Specific objectives associated with this goal include:

- Increase airport capacity to meet projected demand.
- Increase or improve aviation capacity in the eight major metropolitan areas (including Chicago) and corridors that most affect total system delay.
- Increase on-time performance of scheduled carriers.
- Address environmental issues associated with capacity enhancements.

Chapter 3, Section 3.1.2.5 – Airspace Improvements

Modifications to the airspace and/or air traffic control procedures were evaluated to determine if they might achieve the stated needs without physical development at the Airport. As discussed in Chapter 2, Purpose and Need a number of airspace improvements have been under study in and around the Chicago region. As part of the ongoing National Airspace Redesign (NAR) effort, a number of airspace and air traffic control improvements have been identified to increase the efficiency of air traffic control in and around the Chicago region.

Chapter 3, Section 3.2.2.2 – Initial Screening of Non-Airfield Alternatives

Airspace-Only Improvement Alternative

The Airspace-Only Improvement Alternative is Alternative A (No Action Alternative) combined with airspace modifications to enhance the flow of traffic to and from O'Hare. Implementing such improvements (e.g. new arrival routes) in the O'Hare airspace could reduce or eliminate the need for physical improvements to the airfield only if the capacity of the current runway system was greater than the capacity of the corresponding adjacent airspace. Today, the current runway system is the constraint on operations at O'Hare. In other words, improving the airspace at O'Hare without also making improvements in the runway capacity would be akin to adding new entrance ramps on a highway without adding new lanes. Therefore, the Airspace-Only Improvement Alternative would not, by itself, meet purpose and need. The comparison of airspace and airfield capacities is presented in greater detail in Appendix E, Section E.1.2.4, Airspace-Only Improvement.

Appendix E, Section E.5.1 Airspace Changes Included as a part of Alternative A

There are no changes to the existing airspace reflected in the No Action Alternative (Alternative A).

Appendix E, E.5.2 Airspace Changes Included as a part of Alternatives C, D and G

In conjunction with the airfield improvements proposed in the Alternatives C, D and G, the airspace surrounding O'Hare International Airport (the Airport) would be restructured to facilitate effective use of the airfield improvements. This section summarizes airspace changes that would be part of Alternatives C, D and G.

Appendix E, E.5.3 O'Hare Arrival Route Changes

Three new arrival routes would be provided. These arrival routes—called "high and wide" arrival routes—would provide three independent arrival streams to the Airport in both east flow and west flow conditions. The new arrival routes would originate to the southeast (over the OXI VORTAC), southwest (near BENKY/NEWRK), and northwest (from TEDDY/KRENA) of the Airport. Exhibit E-11 shows the approximate locations of these new arrival routes. As shown in Exhibit E-11, the high and wide arrival route from the

southeast would be used in west flow conditions (i.e., when the Runway 27 and Runway 28 systems are in use) whereas the high and wide arrival routes from the southwest and northwest would be used in east flow conditions (i.e., when the Runway 9 and Runway 10 systems are in use). These arrival routes would provide air traffic controllers with the ability to feed Runway 27C in west flow and Runway 9C in east flow independently of the arrival flows to the Airport's other runways.

Provision of the high and wide arrival routes will involve redesign of airspace areas managed by the Chicago O'Hare Terminal Radar Approach Control Facility (TRACON) and Chicago Air Route Traffic Control Center (ARTCC). In addition, the arrival routes that currently serve the Airport's other runways will be adjusted slightly to allow for adequate horizontal separation of these routes from proposed departure routes. Exhibits E-12 and E-13 show comparisons of the existing airspace route structures with the proposed route structures for east flow and west flow configurations, respectively.

Appendix E, E.5.4 O'Hare Departure Route Changes

With the Build Alternatives, additional departure routes would be provided to accommodate the increased departure flows that the runway system would be able to accommodate. The airspace to the east of the Airport would be restructured to increase the number of eastbound departure routes from the Airport from two—ELX and GIJ—to three—ORDEA, ORDEB, and ORDEC. A fourth eastbound route, primarily for use by Midway Airport departures would also be provided south of ORDEC. The airspace to the south would be similarly restructured, increasing the number of southbound departure routes from three—EON, RBS, and GUIDO— to five—ORDSA, ORDSB, ORDSC, ORDSD, and ORDSE. Finally, the airspace west of the airport would be restructured, increasing the number of westbound departure routes from two—PLL and MZV—to four—ORDWA, ORDWB, ORDWC, and ORDWD. Exhibits E-12 and E-13 show these changes.

Appendix E, E.5.5 Other Airspace Changes

Implementation of the changes to O'Hare arrival and departure routes described above would require limited modifications to flight procedures for nearby airports in the airspace surrounding O'Hare. These modifications are described in Appendix F, Noise.