

I. Introduction and Background

The Master Plan for O'Hare International Airport (hereafter referred to as "O'Hare" or "the Airport") provides a guide for facility development to serve future aviation needs. The Master Plan addresses airfield, terminal, support/ancillary, ground access, and people mover facilities and facility improvements to enhance the overall operating efficiency of the Airport. This document summarizes the background and planning analyses that led to the preferred development concept.

It is important to note that the existing airfield and terminal core at O'Hare have been analyzed in detail over the past several years. Whether through previous Airport Layout Plan updates, planning studies, Delay Task Force analyses, or other efforts, details on the performance of the existing Airport and its limitations are well documented. This Master Plan builds on these previous efforts.

The Chicago Department of Aviation (DOA) retained a team of consultants led by Ricondo & Associates, Inc. to prepare a Master Plan. The team included the following firms who provided specialized expertise for this effort:

<u>Firm</u>	<u>Area of Specialized Expertise</u>
Carolyn Grisko & Associates	Media Relations and Public Outreach
Consoer Townsend Envirodyne	Stormwater, Utilities, and Infrastructure Development and Evaluation
Kimley-Horn and Associates, Inc.	Ground Transportation Concept Development and Evaluation
Lea+Elliott, Inc.	Airport People Mover Concept Development and Evaluation
URS Corporation	Ground Transportation Concept Development and Evaluation

In addition to the firms listed above, other firms providing services to the DOA have also contributed to this effort by providing specific, specialized analysis.

Section I of the Master Plan provides background on the master planning process, the historical context of this process, the methodology and approach, and a summary of the preferred development concept.

1.1 Purpose and Goals

The purpose of this master planning effort is to guide long-term facility development at the Airport by providing a framework for decision-making given changing conditions in the local and national air transportation industry and community concerns regarding Airport growth. The goal of a master plan is to satisfy aviation demand in a financially feasible manner, while at the same time considering the aviation, environmental, and socioeconomic issues affecting an airport.

The Master Plan includes the following elements to assist in identifying a guide for future facility development:

- Inventory of Existing Conditions
- Aviation Activity Projections
- Aviation Demand/Capacity Analysis and Facility Requirements
- Alternatives Analysis

- Preferred Development Plan
- Implementation Plan
- Airport Layout Plan

1.2 Background

Airfield delays at O'Hare peaked in 1990 and subsided slightly for the majority of the decade as recommendations from the 1991 Delay Task Force were implemented and other actions were taken. However, in the late 1990s and the early part of the new decade, delays rose substantially as the result of the changes in the use of Land and Hold Short Operations (LAHSO) and increased use of regional jet aircraft that impacted capacity, as well as growth in activity. Due to weather and other issues, the summer of 2000 was a particularly delay-prone period at O'Hare and throughout the national airport system and resulted in national attention on airport delay issues.

In response to the system-wide increases in delay experienced in the summers of 1999 and 2000 in spite of Federal Aviation Administration (FAA) initiatives to mitigate those delays, the U.S. Congress requested the FAA undertake the task of developing capacity benchmarks for the busiest airports in the nation. The following are excerpts from the FAA's *Airport Capacity Benchmark Report 2001* relative to O'Hare:

- The current capacity benchmark at O'Hare is 200-202 flights per hour in good weather.
- Current capacity decreases to 157-160 flights (or fewer) per hour in adverse weather conditions, which may include poor visibility, unfavorable winds, or heavy precipitation.
- In 2000, O'Hare was ranked the third most delayed airport in the country. Overall, slightly more than six percent of all flights were delayed (i.e., more than 15 minutes).
- On good weather days, scheduled traffic is at or above the capacity benchmark for 3-½ hours of the day and about two percent of the flights are delayed significantly.
- In adverse weather, capacity is lower and scheduled traffic exceeds capacity for eight hours of the day. The number of significantly delayed flights jumps to 12 percent.
- Technology and procedural improvements are expected to increase O'Hare's capacity benchmark in good weather by six percent (i.e., 211-213 flights per hour) over the next 10 years.
- The adverse weather capacity benchmark will increase by a total of 12 percent (i.e., 176-179 flights per hour) compared to today, (given expected technology and procedural improvements).
- Demand at O'Hare is projected to grow by 18 percent over the next decade. This imbalance between capacity and demand growth is expected to significantly increase delays at O'Hare.

Subsequent to the *Airport Capacity Benchmark Report 2001*, the FAA ranked O'Hare as the most delayed airport in the U.S. for calendar year 2002.¹

The intensity of flight delays is exacerbated during peak traffic periods and during periods of poor weather and/or wet runway conditions. These delay periods impact the Airport's ability to provide a consistent level of air service to the traveling public and other Airport users. In addition, as aviation

¹ FAA's OPSNET database, <http://www.apo.data.faa.gov/faaopsnetall.HTM>.

demand increases over time, flight delays will continue to worsen, thus further deteriorating the Airport's operational reliability.

1.3 Approach and Methodology

The Master Plan presents the analysis undertaken in the development and refinement of a preferred airport plan and the subsequent official submittal, the Draft Future Airport Layout Plan (ALP), to the FAA in December 2002, hereafter referred to as the December 2002 Draft Future ALP. Unless otherwise noted, all details noted in the Master Plan refer to the December 2002 Draft Future ALP. Subsequent to the draft ALP submittal in December 2002, the City submitted a final ALP to the FAA in October 2003 that included revisions that were based on comments received from the FAA in the summer of 2003.

Future activity projections were established for the 20-year planning horizon starting in 2002 and ending in 2022. The aviation demand analysis for the Master Plan comprised the utilization of forecasts previously developed by FAA to establish derivative aviation activity profiles and future design day schedules for the Airport. These activity profiles and design day schedules were then used in simulation analyses and to evaluate and refine a general airfield concept as well as to establish future facility requirements for terminal, support/ancillary, and ground access facilities at the Airport. It should be noted that the design day schedules were based on specific years of analysis, including 2007, 2009, 2013, and 2018. These years of analysis were chosen based on the planned implementation schedule for the Master Plan. Therefore, the technical analysis performed based on these design day schedules, and discussed in this document, were based on these analysis years. These facility requirements also included the use of planning factors prescribed in Advisory Circular (AC) 150/5300-13, *Airport Design* and AC 150/5360-13, *Planning and Design Guidelines for Airport Terminal Facilities*.

The facility requirements for the various components of the Airport (i.e., airfield, terminal, support/ancillary, and ground access facilities) were used to identify Airport development alternatives. The alternatives for each Airport component were evaluated, and the preferred alternative for each component was integrated into the preferred development plan.

As discussed above, the planning work discussed in this document produced an ALP that was submitted to the FAA in December 2002. Thus, such technical analysis was performed prior to December 2002.

1.4 Preferred Plan

The preferred development plan for O'Hare is depicted in the Future ALP. This plan includes an airfield layout that optimizes arrival and departure capability during both good and poor weather conditions and supports the forecasts of future levels of activity. The physical characteristics of the plan include the reconfiguration of the airfield from sets of parallel runways in three main directional orientations (northeast/southwest, east/west, and northwest/southeast) to six parallel runways in the east/west direction and two runways in the northeast/southwest direction. This reconfiguration involves the construction of one new runway, the relocation of three existing runways, and the extension of two existing runways, while maintaining the use of two existing unmodified runways. The plan also allows for the expansion of terminal facilities to the west and ultimate development of a western access road to the Airport as well as terminal development proposed as the World Gateway Program (WGP).

From an airfield capacity standpoint, the concept provides for triple independent simultaneous approaches in both the east and west directions during IFR conditions and quadruple independent simultaneous approaches during VFR conditions, in both the east and west directions, above 5,500 feet of ceiling and 10 miles visibility based on current FAA criteria (it is noted that more extensive use of quadruple independent approaches may be possible in the future pending FAA review). Additionally, the Airport will be able to accommodate New Large Aircraft, classified by the FAA as Aircraft Design Group (ADG) VI (i.e., aircraft with wingspans exceeding 214 feet). The major benefits expected from the development of the plan are:

- *Delay Reduction:* The plan will significantly reduce delay relative to the existing airfield (as further discussed in Section V). The proposed runway layout will ultimately provide balanced arrival and departure capabilities to address delay issues during all weather conditions and peak periods.
- *Capacity Increase:* The capacity increases achieved through the plan are expected to meet aviation demand, as forecast by the FAA, through the planning horizon and beyond.

In addition to airfield modifications, the preferred plan will enhance other areas of the Airport, as well. Terminal and access facilities will be expanded. Both railways and buildings will be relocated to accommodate the reconfigured runways. New Navigational Aid Systems (NAVAIDS) will be added and existing NAVAIDS will be upgraded. New north and south airport traffic control towers (ATCT) will be constructed in order to ensure full air traffic control coverage of the expanded airfield. Public and employee parking facilities will be expanded to meet demand and a new secure automated people mover (APM) will link future west terminal development to the existing terminal areas.

It is significant to note that, for programming and implementation purposes, the Airport has incorporated elements of the preferred plan into the O'Hare Modernization Program (OMP), the WGP, and/or the Airport's ongoing Capital Improvement Program (CIP). While the WGP and the CIP are programs resulting from previous planning efforts, some elements of those programs have been further refined and/or modified as a result of this planning process.

1.5 Benefits to the National Airspace System

The plan will benefit the National Airspace System (NAS) by reducing delays nationwide and by increasing airfield capacity at a key airport in the system. The lack of airfield capacity at high-activity airports in the U.S. is a frequent cause of "bottlenecks" in the nation's aviation system. O'Hare was the most delay-prone airport in the U.S. in 2001, 2002, and 2003.² The airfield improvements contained in the plan are a major part of the development of needed capacity for the NAS. Several industry leaders, including the Administrator of the FAA, have stated that delays at O'Hare affect the entire nation.³ Further, the FAA Administrator recently stated that current delay situation at O'Hare is unacceptable.⁴

² FAA's OPSNET database, <http://www.apo.data.faa.gov/faaopsnetall.HTM>.

³ Garvey, Jane F., "Airport Capacity in the Chicago Area." The Committee on Commerce, Science, and Transportation, Chicago. June 15, 2001.

⁴ Federal Aviation Administration. "U.S. Transportation Secretary Mineta Announces Congestion Relief for Chicago's O'Hare International." 21 January 2004.

A recent National Aeronautics and Space Administration (NASA) study indicates that additional runways, providing independent IFR capability, are one of the most promising strategies for improving capacity in the NAS.⁵ The airfield improvements in the plan will provide many benefits to the NAS, including but not limited to:

- *Fewer Flow Control Delays Accumulated by Aircraft Bound for O'Hare:* Adverse weather conditions affect the airport arrival rate (AAR), which is the number of aircraft the runway system can handle in a one-hour period. The O'Hare ATCT sets the AAR based on numerous factors, with meteorological conditions being a primary consideration. When weather dictates that the AAR drop below a specific level, flow control programs are implemented, slowing the arrival rate of aircraft into the Chicago area. Providing triple independent instrument approach capability will allow the Airport to maintain a higher AAR for longer periods during reduced visibility or inclement weather, reducing the number and severity of flow control delays into O'Hare. The implementation of triple independent instrument approaches will greatly reduce the need for flow control programs into O'Hare. Improvements to delay levels at O'Hare benefit the NAS by reducing congestion at origin airports (due to aircraft holding at the origin airport while waiting for clearance to depart for O'Hare).
- *Holding Patterns Emptied More Quickly:* When the arrival demand exceeds the AAR, air traffic controllers implement a number of strategies. Putting aircraft in a holding pattern is one typical strategy. When controllers are ready to accept aircraft at a higher rate, the holding pattern is emptied. However, emptying the pattern and sequencing aircraft to two final approaches from four fixes (holding pattern locations) requires more time than would be needed to sequence aircraft to three final approaches from four fixes. The ability to empty aircraft from holding patterns more efficiently means fewer disruptions to airport and airline operations. The benefits would be reduced delay, reduced fuel consumption, and relieved stress for air traffic controllers.
- *Cost Savings:* All of O'Hare's users, including commercial carriers, their passengers and cargo customers, private operators, and even operations throughout the entire NAS, would realize the benefits of a higher capacity airfield. The reduced delay in all weather and operating conditions would contribute to a more reliable schedule with higher on-time performance. All aircraft operators at the Airport would benefit from the lower operating costs resulting from reduced delays. As the United States Secretary of Transportation stated in January 2004 when discussing delays at O'Hare, "Delays cost time and money."⁶
- *Encourage Airline Competition:* O'Hare (pre-September 11, 2001) had the highest total delay of any airport in the U.S. Airlines using O'Hare as a hub would have an increasingly large operational disadvantage compared to airlines that hub at other airports, since O'Hare airlines would have a much higher probability of schedule disruption. The plan will reduce delays at

⁵ *Aviation System Capacity Improvements Through Technology*, National Aeronautics and Space Administration, March 1995.

⁶ Federal Aviation Administration. "U.S. Transportation Secretary Mineta Announces Congestion Relief for Chicago's O'Hare International." 21 January 2004.

O'Hare, which would be a benefit to the national air transportation system because of the improved competitive balance among airlines that serve the U.S. from competing hub airports. In addition, capacity increase at O'Hare would provide opportunity for increases in service by incumbent and new entrant carriers, thus promoting competition.