MSP Airport
2040 Long-Term Plan

Metropolitan Council Determination - March 2024

Final MAC Adoption - May 2024

Volume 2 of 2 - Appendices A-H

List of Appendices (Volume 2)

Appendix A: MSP 2030 Long-Term Comprehensive Plan Update

Minneapolis – St. Paul International Airport (MSP)

2030 Long Term Comprehensive Plan Update

July 26, 2010

Minneapolis-St. Paul International Airport Long Term Comprehensive Plan Update

July 26, 2010

Prepared by the Metropolitan Airports Commission
with assistance from HNTB Corporation

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Note

Minneapolis-St. Paul International Airport (MSP) is the only major airport in the United States to have two terminals – the Lindbergh and the Humphrey – located on entirely separate roadway systems. Highway signs and other way-finding aids related to MSP will be updated in 2010 in order to assist travelers in locating the terminals. Numeric designations will be added to the existing terminal names: Terminal 1-Lindbergh and Terminal 2-Humphrey. For the purposes of this document, however, the terminals are referred to by their original names.

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

E.1 PURPOSE

The Metropolitan Council adopted guidelines to integrate information pertinent to planning, developing, and operating the region's airports in a manner compatible with their surrounding environs. The process to ensure this orderly development is documented in a Long Term Comprehensive Plan (LTCP) for each airport. In recognition of the dynamic nature of the aviation industry, the plans are to be updated regularly. The previous LTCP for the Minneapolis-St. Paul International Airport (MSP) was completed in 1996. The 2009 update will be the first revision to that LTCP and reflects substantial changes for MSP and the aviation industry over the past 13 years.

E.2 NEED

The aviation industry has changed since the previous LTCP for MSP was published in 1996. Airline consolidation, shifts in the aircraft fleet, new technologies, and evolving security protocols stemming from the September 11, 2001 terrorist attacks have resulted in many changes to operations that require new approaches to airport planning. These changes have affected airline service patterns, passenger processing and behavior, and have resulted in some development at MSP that was not part of the 1996 LTCP.

Airports work best when the capacities of their various elements are balanced and work in harmony to provide a safe, efficient system of facilities with a high level of customer service. Over time, some of MSP's facilities have become less efficient and some have not been improved to meet the dynamic needs of today's travelers.

While MSP's airfield was dramatically improved with the addition of a fourth runway in 2005, portions of the terminal and landside facilities have become outdated and need improvement. MSP's two-terminal system could be utilized more efficiently to provide better service to airlines and passengers alike. Terminal facilities, including the international arrivals hall, bag-claim hall, passenger security screening, and some concourses, need improvement. Access roads, parking, and terminal curb areas are also in need of enhancements to serve increasing passenger levels into the future. Finally, even with the new runway, MSP's airfield may require additional taxiways to improve aircraft circulation, especially around the terminal areas. These issues are the primary focuses of this updated LTCP.

The LTCP is a 20-year plan for MSP focused on developing facilities to accommodate forecast growth in a safe and efficient manner with a high level of customer service. Proposed improvements are phased to reflect the gradual growth of demand at MSP and to reflect lead time required for detailed planning, environmental analysis, design, and implementation. The LTCP will be updated every five years, consistent with Metropolitan Council guidelines, to ensure planning activities address changes in the aviation industry, demand and local and national economic conditions.

E.3 PROCESS AND CONTENT

The LTCP consists of five primary tasks:

1. Assessing the condition and capacity of existing facilities
2. Forecasting long-range aviation demand
3. Determining future facility requirements

4. Identifying and evaluating various development options
5. Selecting a preferred comprehensive plan

The LTCP Update identifies the type and location of facility improvements needed to safely and efficiently accommodate aviation demand through the year 2030. The LTCP Update also provides guidance for phasing airport improvements during the development period. Noise contours were also generated for 2030 and are included in the full report.

The goals of this LTCP Update were established at the outset of the planning process and are listed here:

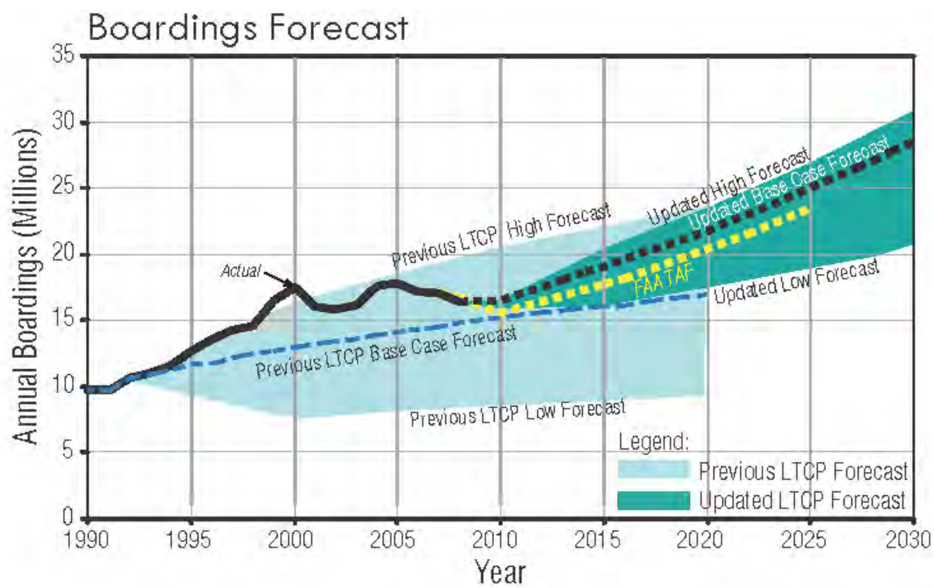
1. Provide sufficient, environmentally-friendly facilities to serve existing and future demand;
2. Provide improved energy efficiencies;
3. Encourage increased use of public transportation;
4. Minimize confusion associated with having two terminals and multiple access points;
5. Allow for flexibility in growth;
6. Utilize and maintain existing facilities to the fullest extent possible; and
7. Enhance aircraft operational safety and efficiency.

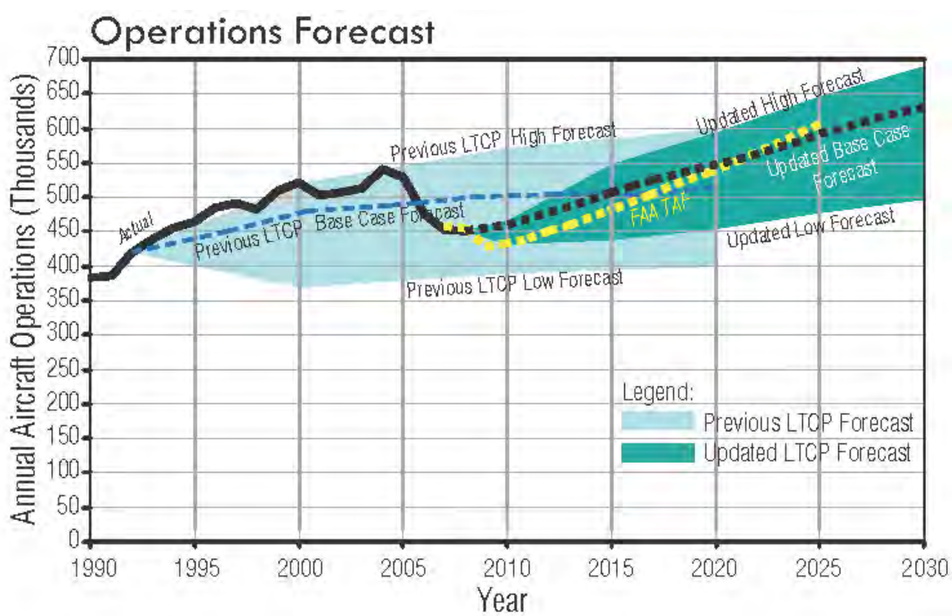
E.4 INVENTORY

Existing facilities at MSP were inventoried and their conditions and capacities assessed. The inventory shows that future plans for MSP will require consideration of balancing airfield capacity, terminal capacity, and landside capacity. In addition to properly balancing the capacities of these three functional elements of the airport, more efficient balance and utilization of the airport’s two terminal complexes required consideration.

E.5 FORECAST

Forecasts of annual passenger boardings and aircraft operations (takeoffs and landings) were completed in June 2009. They show that passenger boardings are expected to increase by more than 73% by 2030, growing from 16.4 million to 28.4 million. Total aircraft operations at MSP are expected to grow by about 40% from 450,000 to 630,000 by 2030. While the current economic recession has resulted in declines in both boardings and operations at MSP since 2005, passenger boardings are expected to return to previous levels in 2013, and operations are expected to return to previous levels in 2019. Additionally, the MAC will initiate a capacity study two years in advance of when MSP is expected to have 540,000 annual operations and will incorporate the results into a future LTCP Update.


Boardings Forecast
Annual Boardings (Millions)
Year
Actual
Previous LTCP High Forecast
Previous LTCP Base Case Forecast
Previous LTCP Low Forecast
Updated High Forecast
Updated Base Case Forecast
FAA TAF
Updated Low Forecast
Legend:
Previous LTCP Forecast
Updated LTCP Forecast


Operations Forecast
Annual Aircraft Operations (Thousands)
Year
Actual
Previous LTCP High Forecast
Previous LTCP Base Case Forecast
Previous LTCP Low Forecast
Updated High Forecast
Updated Base Case Forecast
FAA TAF
Updated Low Forecast
Legend:
Previous LTCP Forecast
Updated LTCP Forecast

E.6 FACILITY REQUIREMENTS

Growth in the number of passengers and aircraft operations will require airport facilities to be improved in order to continue operating in a safe and efficient manner.

The inventory of airport facilities and existing capacity evaluation identified 15 key focus areas for the LTCP Update to evaluate. Each of these focus areas identified existing facilities that are operating inefficiently today or that are expected to operate inefficiently with moderate increases in passenger numbers. The 15 focus areas are:

1. Balancing passenger demand between the two terminals
2. Reallocation of airlines between the two terminals
3. Arrival curbside capacity (Lindbergh Terminal)
4. Public parking (Both Terminals)
5. Way-finding / Signage for the airport roadways
6. Baggage claim facilities (Lindbergh Terminal)
7. Security Screening Check Points (Lindbergh Terminal)
8. International arrivals (Customs and Border Protection) facilities (Lindbergh Terminal)
9. Regional carrier aircraft gates (Lindbergh Terminal)
10. Refurbishing Concourses E and F (Lindbergh Terminal)
11. Rental car facilities (Both Terminals)
12. Airfield capacity and taxiways
13. The United States Post Office facility (Lindbergh Terminal)
14. Potential development of an airport hotel
15. Air Traffic Control Tower (ATCT) improvements

The analysis concluded that the existing passenger terminal complexes and their landside facilities are not able to accommodate planned forecast growth without expansion. Growth in passenger boardings will prompt additional aircraft gates, parking, roadway improvements and terminal space to allow passengers to enjoy a safe and comfortable airport environment. Balancing passenger demand between the Lindbergh and Humphrey Terminals will result in improved efficiency and customer service of both facilities. This balance can best be achieved by utilizing the Lindbergh Terminal to accommodate Delta Air Lines and its partner airlines while relocating all other airlines to the Humphrey Terminal. The aviation activity forecast suggests that this move should occur by 2015.

Though aircraft operations will be growing as well, the existing four-runway airfield is expected to be able to continue operating in a safe and efficient manner without the need for additional runways. Some improvements to taxiways are recommended to help aircraft move around the airfield as they taxi between the runways and the terminal complexes.

E.7 CONCEPTS

Though it is typical for an airport LTCP effort to provide a series of broad organizational concepts for airport development, the nature of this study was to focus on key facilities and develop concepts that would resolve existing and forecast facility deficiencies. A more detailed description, by subject area, is included in the full report and a summary of the recommendations is provided below and shown on **Figure E-1** located at the end of this Executive Summary.

Lindbergh Terminal

- *ADDITIONAL GATES* - Extending Concourse G would provide new gates capable of accommodating domestic or international flights.

- *EXPANDED INTERNATIONAL ARRIVALS (CBP) FACILITY* - New, larger facilities will be provided as part of the Concourse G expansion to accommodate forecasted growth in demand for international flights to MSP.

- *SECURITY SCREENING* - Reconfiguration of security screening areas would improve efficiency and reduce wait times.

- *BAGGAGE CLAIM* - The existing baggage claim hall would be reconfigured with larger, modern baggage claim systems.

- *PARKING* - Additional parking garages would be constructed adjacent to the existing garages to accommodate existing and future parking demand.

- *ARRIVALS CURB* - Enhancements to the curb area would improve capacity and efficiency for arriving passengers to reach shuttles, taxis, and private vehicles.

- *HOTEL* - A site has been identified that would be appropriate for hotel development.

Humphrey Terminal

- *ADDITIONAL GATES* - New gates would be added by extending the passenger concourses to the north and south accommodating up to 26 additional gates.

- *PASSENGER PROCESSING* - Ticketing and baggage claim facilities would be expanded to accommodate additional airlines and passengers.

- *PARKING* - Existing garages would be expanded to accommodate future parking demand.

- *RENTAL CAR FACILITIES* - Accommodations for rental cars would be provided by developing facilities in expanded existing parking garages.

- *ACCESS ROADS* - Post Road and 34th Avenue would be improved and signed to accommodate increasing traffic volumes and simplify circulation.

E.8 FACILITY IMPLEMENTATION SCHEDULE AND COSTS

Improvements must be phased and constructed in response to demand and with consideration for the Capital Improvement Program budget. A preliminary phasing plan prepared for the LTCP Update includes four 5-year phases along with very preliminary cost estimates. These costs are for new development only and do not include normal rehabilitation and maintenance efforts that will be required during this period. The costs are based upon planning concepts for the airport. Preliminary design has not been accomplished for any of these projects. The costs, therefore, represent the general order of magnitude of costs that could be expected for the proposed development. They are expressed in 2009 dollars, with no allowance for inflation.

- Phase I (2010-2015): Expand Humphrey Terminal and relocate airlines.
  Cost Range - $380 Million - $445 Million

- Phase II (2015-2020): Modernize and expand Lindbergh Terminal, including a new international arrivals facility.
  Cost Range - $810 Million - $960 Million

- Phase III (2020-2025): Complete expansion of Humphrey Terminal, balancing passenger loads between the two terminals.
  Cost Range - $665 Million - $783 Million

- Phase IV (2025-2030): Construct crossover taxiways and access road improvements at Lindbergh Terminal.
  Cost Range - $190 Million - $225 Million

This phasing plan allows improvements to be implemented over a 20-year period in response to gradual increases in demand. It also allows implementation of improvements to occur with minimal disruption to the day-to-day operation of the airport.

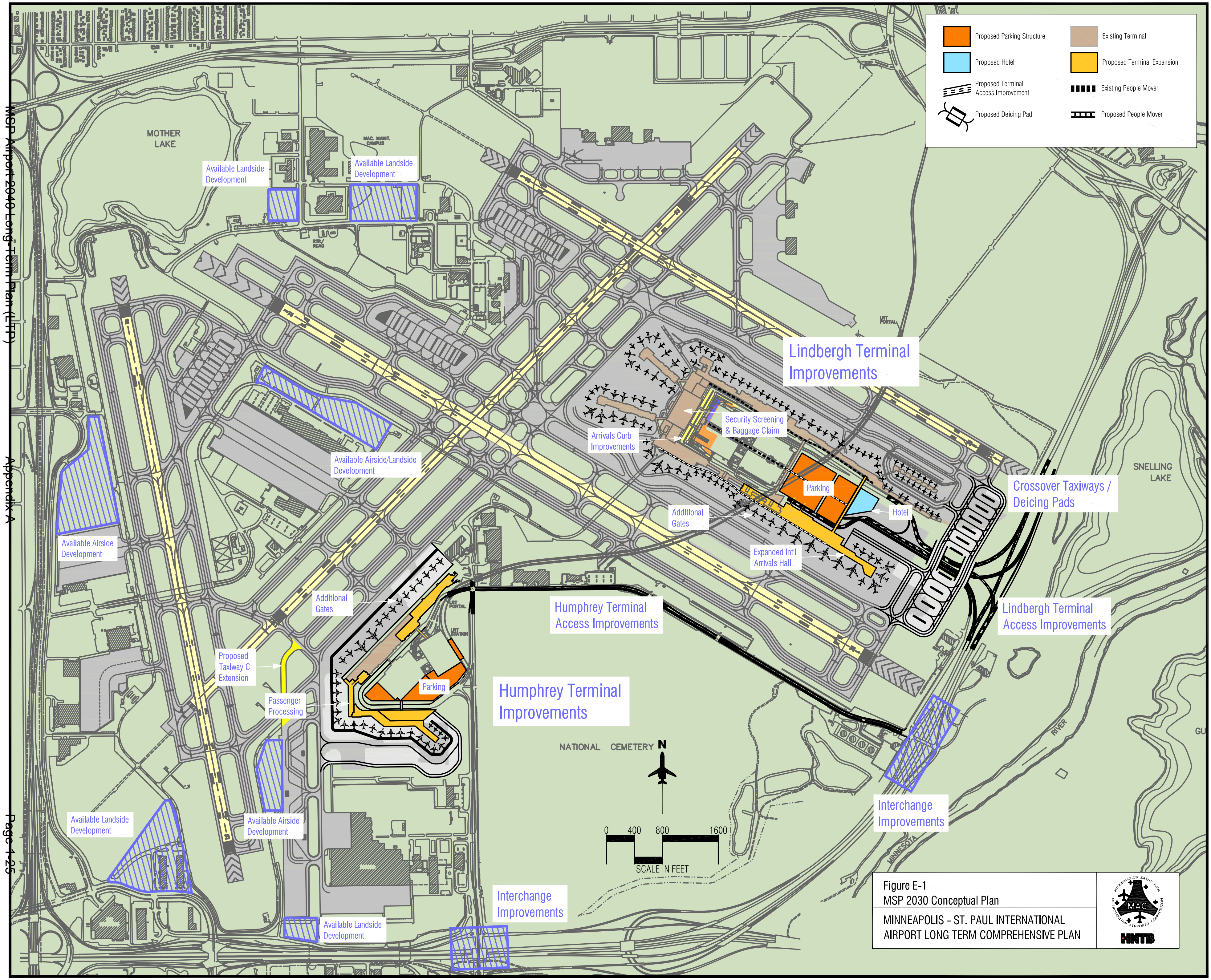


Figure E-1
MSP 2030 Conceptual Plan
MINNEAPOLIS - ST. PAUL INTERNATIONAL AIRPORT LONG TERM COMPREHENSIVE PLAN

CHAPTER 1: INVENTORY

CHAPTER 1: INVENTORY

1.1 INTRODUCTION

Minneapolis-St. Paul International Airport (MSP) is a commercial service airport located approximately seven miles south of downtown Minneapolis, Minnesota and seven miles southwest of downtown St. Paul. It is owned and operated by the Metropolitan Airports Commission (MAC) which was formed by the State Legislature in 1943 as a public corporation to provide and promote aviation services for the Minneapolis-St. Paul metropolitan area. In addition to MSP, the MAC operates six other airports in the Twin Cities region: Airlake, Anoka County-Blaine, Crystal, Flying Cloud, Lake Elmo, and St. Paul Downtown. **Figure 1-1** shows the location of MSP and the other airports in the MAC system.

In 2008, MSP ranked as the 16th busiest airport in the U.S. in terms of passengers, with 17 million enplanements (passenger boardings). MSP also handled about 234,000 metric tons of air cargo. That same year, about 450,000 aircraft operations (takeoffs or landings) occurred at the airport. The airport covers approximately 3,400 acres.

The Long Term Comprehensive Plan (LTCP) for MSP serves as a guide for the long-range facility development needed to meet the Twin Cities' forecast growth in commercial aviation demand safely and efficiently, and with minimal environmental consequences.

The MAC initiated an update to the LTCP in 2008. In the first phase, a general inventory of existing airport facilities was conducted and some initial concepts for expanding airport facilities were developed. In addition, activity forecasts were updated. This inventory chapter provides an overview of existing airport facilities. Chapter 2 documents the activity forecast update. Phase 2 of the study consisted of determining the capacity of the existing airport facilities, calculating long-range (Year 2030) facility requirements, identifying and evaluating alternative development concepts, selecting a preferred comprehensive plan, and providing a general approach for phasing the expansion.

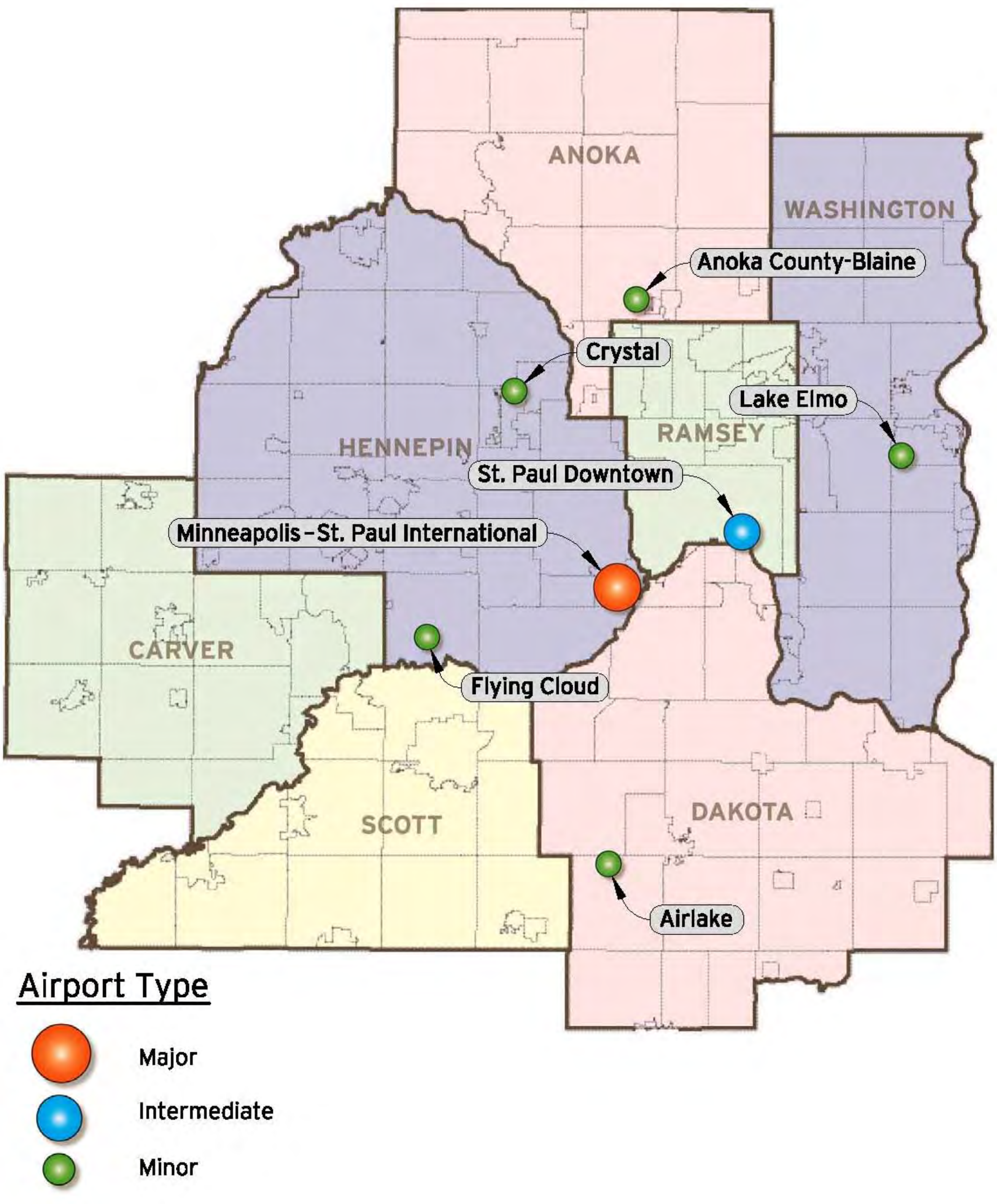
1.2 NEED FOR LTCP UPDATE

The Metropolitan Council adopted guidelines for the MAC to integrate information pertinent to planning, developing, and operating the region's airports in a manner compatible with their surrounding environs. In recognition of the dynamic nature of the aviation industry, the plans are to be updated regularly.

The aviation industry has changed significantly since the last LTCP was published in 1996. These changes include airline consolidation (including the recent merger of Delta Air Lines and Northwest Airlines), shifts in the aircraft fleet, new technologies, and evolving security protocols stemming from the September 11, 2001 terrorist attacks and other threats since that time. Combined, these changes have affected airline service patterns and passenger processing and behavior, and have resulted in some development at MSP that is different from the current LTCP.

The changes listed above, as well as variations in growth rates for different aviation activities, have resulted in some imbalances and deficiencies among various airport elements. In the terminal area, these near-term issues include bag claim facilities, public parking, the international arrivals hall, passenger security screening capacity, and a need for refurbishing

FIGURE 1-1: MAC AIRPORTS IN THE SEVEN COUNTY METROPOLITAN AREA



some concourses. On the airfield, consideration will be given to new taxiways to improve aircraft circulation. These near-term issues will be the primary focus of the LTCP Update.

The LTCP must examine not just immediate needs, but the long-range vision for MSP must be considered as well, especially given the long lead time for planning, environmental review, design, and actual construction. Key long-range issues include balancing airline activity between the Lindbergh and Humphrey terminals and enhancing the airport's ultimate capacity. To ensure the LTCP activities address changes in the aviation industry, demand and local and national economic conditions, the MAC will budget and update the LTCP every five years, consistent with Metropolitan Council guidelines. Based on this schedule, the next update will be completed in 2015.

1.3 AIRPORT HISTORY

Wold-Chamberlain Field flying activities date back to the formation of the Aero Club of Minneapolis, which leased land at an old concrete race track on the present MSP site in 1920. Government mail service began in 1921 but lasted only three months. In 1923, the airfield was named after two pilots killed in World War I, Ernest Groves Wold and Cyrus Foss Chamberlain. Air mail service was reinitiated by Northwest Airways in 1926, with service under government contract between Chicago and the Twin Cities.

In 1928, the airport was taken over by the Minneapolis Park Board and named Minneapolis Municipal Airport. Passenger service began in 1929 with Northwest Airways flying Ford Tri-motors to Chicago.

Airport facilities and service continued to expand through the 1930s, and in 1943, the Minnesota Legislature created the Minneapolis-St. Paul Metropolitan Airports Commission. The airport was designated Minneapolis-St. Paul International Airport—Wold-Chamberlain Field on August 23, 1948.

The Charles Lindbergh Terminal was built in 1962, and the original Hubert Humphrey Terminal opened in 1977, initially to accommodate international fights. It is now used by charter flights and a few scheduled airlines.

In 1989, the Minnesota Legislature adopted the Metropolitan Airport Planning Act. This legislation required the MAC and the Metropolitan Council (Met Council) to complete a comprehensive and coordinated program to plan for major airport development in the Twin Cities. The planning activities were designed to compare the option of future expansion of Minneapolis-St. Paul International Airport (MSP) with the option of building a new airport.

The analysis was completed in 1996, and the MAC and the Met Council formally submitted their recommendations to the Legislature on March 18, 1996. On April 2, 1996, legislation was passed by both the House and Senate, and subsequently signed by Governor Arne Carlson, stopping further study of a new airport and directing the MAC to implement the MSP 2010 Long Term Comprehensive Plan. This plan led to an over $3 billion expansion program including gate and automobile parking expansion and rental car facility consolidation and expansion, culminating in 2005 with the opening of the new Runway 17-35.

1.4 INVENTORY OF EXISTING FACILITIES

1.4.1 OVERVIEW

This section summarizes the major functional elements of the airport, including the airfield, passenger terminal, roadways and parking, cargo facilities, general aviation (GA) facilities, and support functions. **Table 1.1** found on the following page summarizes the major airport components.

1.4.2 AIRFIELD

MSP's airfield consists of four runways, a network of taxiways, and deicing pads.

Runways

Figure 1-2 shows the general airport layout for MSP. The airfield consists of two parallel runways, one north-south runway and one crosswind runway. Runway 4-22 is 11,006 feet long (with environmental approvals for an extension to 12,000 feet); Runway 12R-30L is 10,000 feet long; Runway 12L-30R is 8,200 feet long; and Runway 17-35 is 8,000 feet long.

Taxiways

Each runway is served by at least one full-length parallel taxiway. In addition, a network of taxiways connects each runway with the terminal areas (described in the next section) and other airport facilities.

Deicing Pads

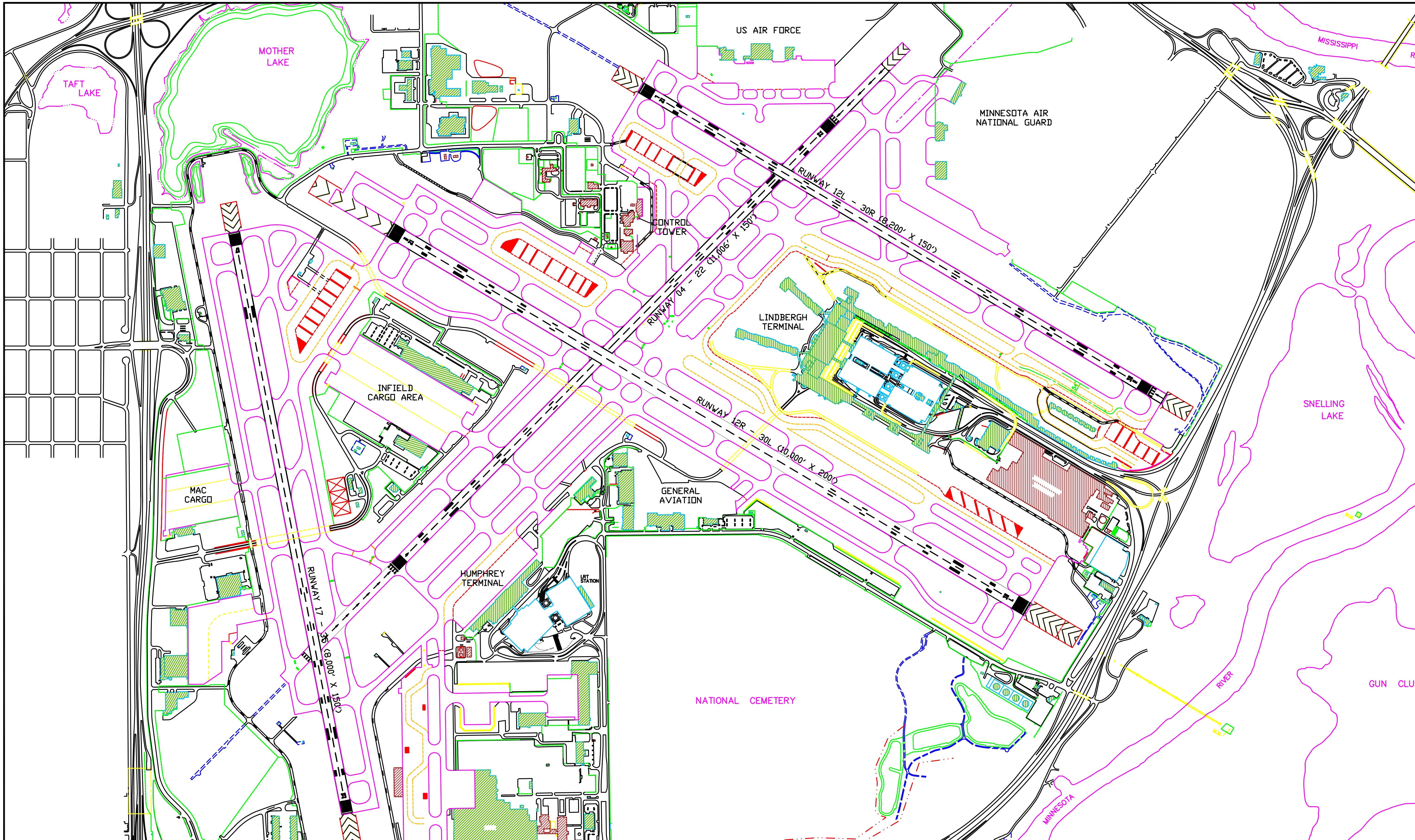
The parallel runways have deicing pads at each end sized to maintain runway departure rates during deicing conditions. Runway 17-35 has a 7-position deicing pad at the north end only because current operating restrictions normally preclude departures to the north over Minneapolis. All the deicing pads have adjacent facilities to recharge the deicing trucks and rest the deicing crews. A combined deicing operations and maintenance facility adjacent to the 12L deicing pad provides the capability to coordinate deicing operations on all pads.

TABLE 1.1: EXISTING AIRPORT FACILITIES

Airport Facility		Quantity
Runways		
East-West Parallel (12L-30R)		8,200 x 150 linear ft.
East-West Parallel (12R-30L)		10,000 x 200 linear ft.
North-South (17-35)		8,000 x 150 linear ft.
Crosswind (4-22)[1]		11,006 x 150 linear ft.
Terminals		
Lindbergh Terminal		2.8 sq. ft. (millions)
Humphrey Terminal		0.4 sq. ft. (millions)
	Total	3.2 sq. ft. (millions)
Gates		
Lindbergh Terminal		117 gates
Humphrey Terminal		10 gates
	Total	127 gates
Auto Parking Spaces (Public)		
Lindbergh Terminal		14,400 spaces
Humphrey Terminal		9,200 spaces
	Total	23,600 spaces
Cargo		
Warehouse/Office Space		480,000 sq. ft.
Aircraft Apron		229,000 sq. yds.
General Aviation Facility		18,500 sq. ft.

Notes: (1) Runway 4-22 has environmental approval to be extended to 12,000 feet.

Source: 2008 Legislative Report and MAC Analysis



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Note: Scale sized for 22x34 print. If printed on 11x17 double scale factor.

0' 600' 1200'

SCALE: 1" = 1200'

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SOURCE:
BASE MAPPING - TKDA

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SUITE 200
ARLINGTON, VIRGINIA 22206
PH (703) 824-5100
FAX (703) 671-6210

EXISTING AIRPORT LAYOUT

MINNEAPOLIS - ST. PAUL
MINNEAPOLIS, MN

DATE:
Jan 20, 2010

FIGURE
1-2

1.4.3 TERMINAL FACILITIES

Two terminals serve MSP: the Lindbergh Terminal and the Humphrey Terminal. Together, they provide a total of 2.4 million square feet of terminal facilities and 127 aircraft gate positions.

Lindbergh Terminal

The Lindbergh Terminal is located between the two parallel runways, east of the crosswind runway. As shown in **Figures 1-3 through 1-5**, the terminal is laid out with single-loaded and double-loaded concourses that provide 117 gate positions. The gates are distributed among seven concourses labeled A through G. Ten gates can support international arrivals into the International Arrival Facility. A concourse tram and moving sidewalks assist passenger travel along Concourse C. Moving sidewalks also facilitate passenger movement on Concourses A, B, G and through the connector bridge between Concourses C and G. Domestic bag claim functions are located on the lower level where there are 12 sloped-plate carousels, of which 10 are the older circular-shaped devices that have the capacity of 1.2 bags per linear foot. The size of each of these units is 90 linear feet, or a total capacity of 108 bags each. The remaining two sloped-plate units are similar to the carousels that are in the Humphrey Terminal, with a capacity of 1.5 bags per linear foot. The claim frontage of these units in the Lindbergh Terminal is 218 and 306 linear feet, or a total capacity of 327 and 459 bags respectively.

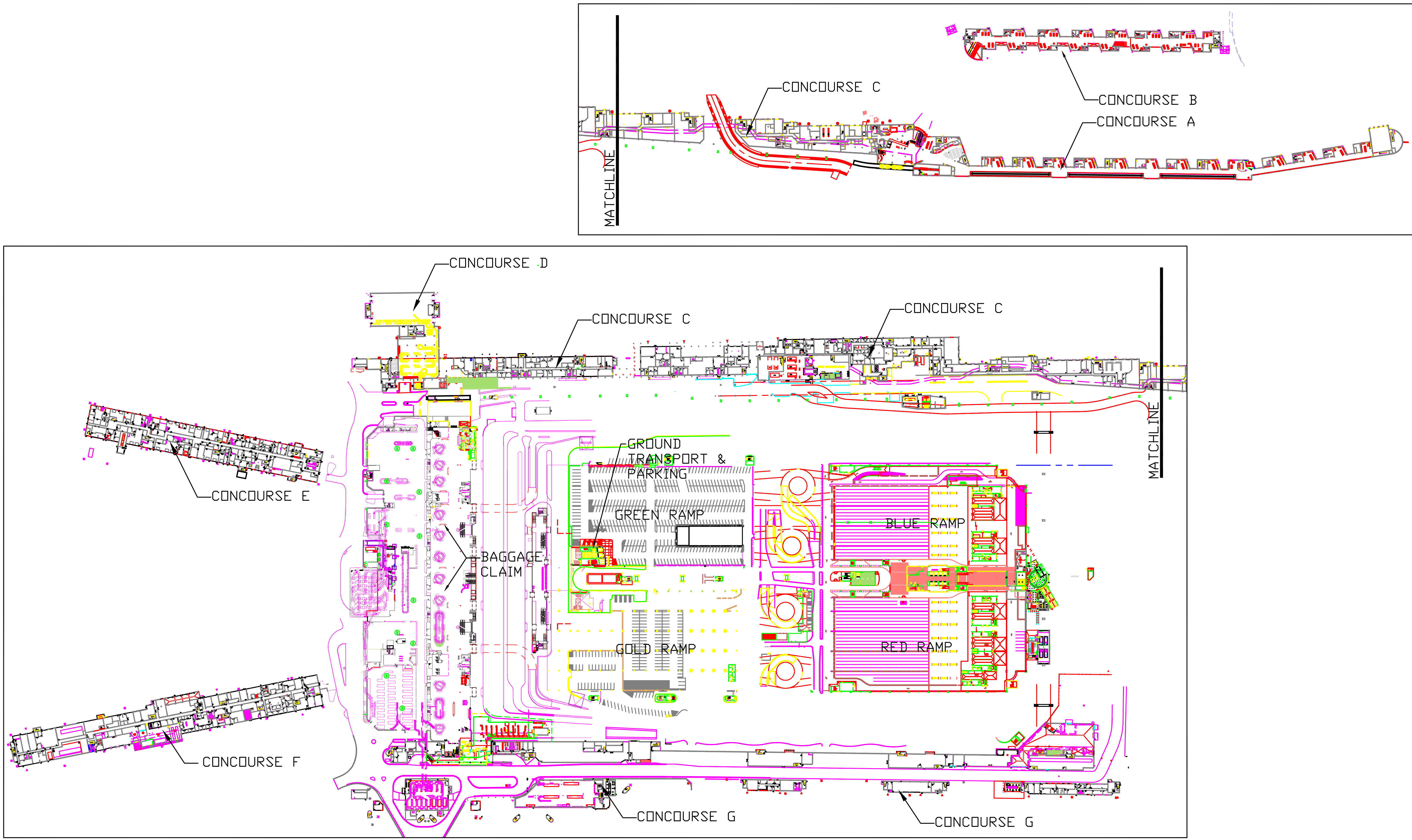
Ticketing/check-in, passenger security screening, gate hold rooms, and a wide array of concessions are located on the second level. A ground transportation center, located directly across from the terminal and accessed by a tunnel and skyway, serves as a focal point for multi-modal access. The MAC also has office space and a conference center on the Mezzanine Level of the Lindbergh Terminal.

At the time of this writing, the following airlines are currently located at the Lindbergh Terminal: Air Canada, Alaska Airlines, American Airlines, Continental Airlines, Delta Air Lines, Frontier Airlines, KLM Royal Dutch Airlines, United Airlines, and US Airways.

Humphrey Terminal

The Humphrey Terminal, shown in **Figures 1-6 through 1-8**, provides 10 gates (with four of those serving the International Arrivals Facility) used by Air Tran Airways, Iceland Air, Midwest Airlines, Southwest Airlines, Sun Country Airlines, and several charter airlines. The lower level features the ticketing/check-in area, international arrivals processing, and the bag claim area which has four sloped-plate carousels that are oval-shaped, and have the capacity of 1.5 bags per linear foot. The overall size of each of these units is 145 linear feet, or a total capacity of 218 bags per device.

The second floor of the terminal includes the security screening checkpoint and gate hold rooms. The Humphrey Terminal also features a ground transportation center for commercial vehicle service. The Humphrey Terminal is served by a single-level curb facility serving both departing and arriving passenger functions.



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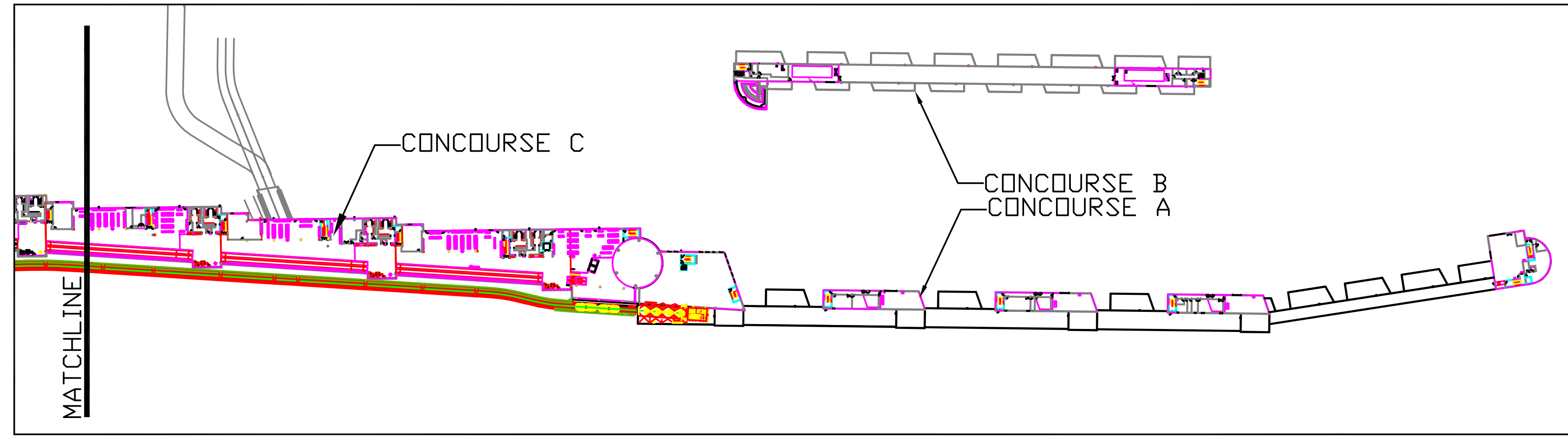
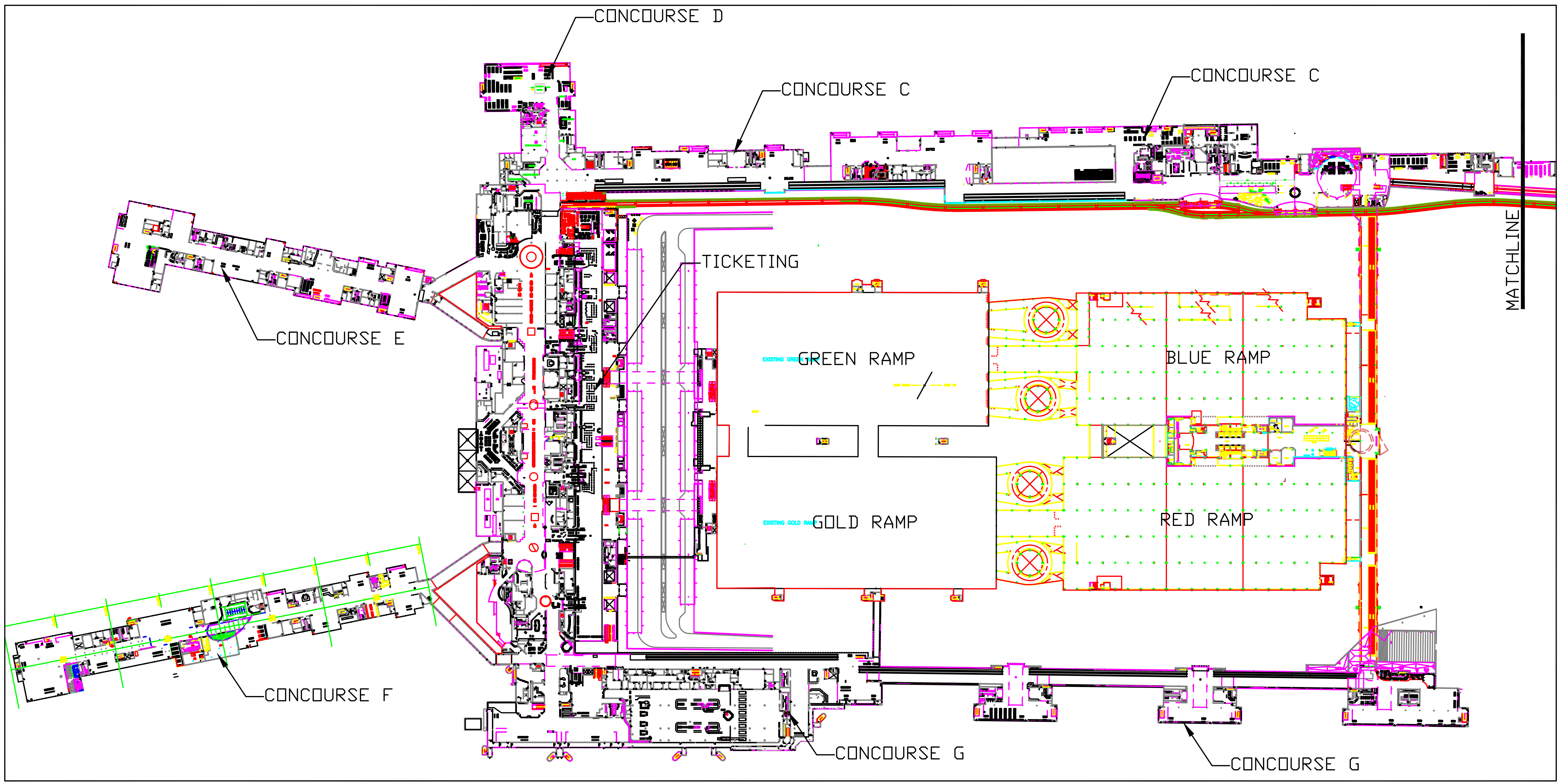
LINDBERGH TERMINAL - LEVEL 1

MINNEAPOLIS - ST. PAUL
MINNEAPOLIS, MN

DATE: Jan 20, 2010

FIGURE 1-3





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LINDBERGH TERMINAL - LEVEL 2

MINNEAPOLIS - ST. PAUL
MINNEAPOLIS, MN

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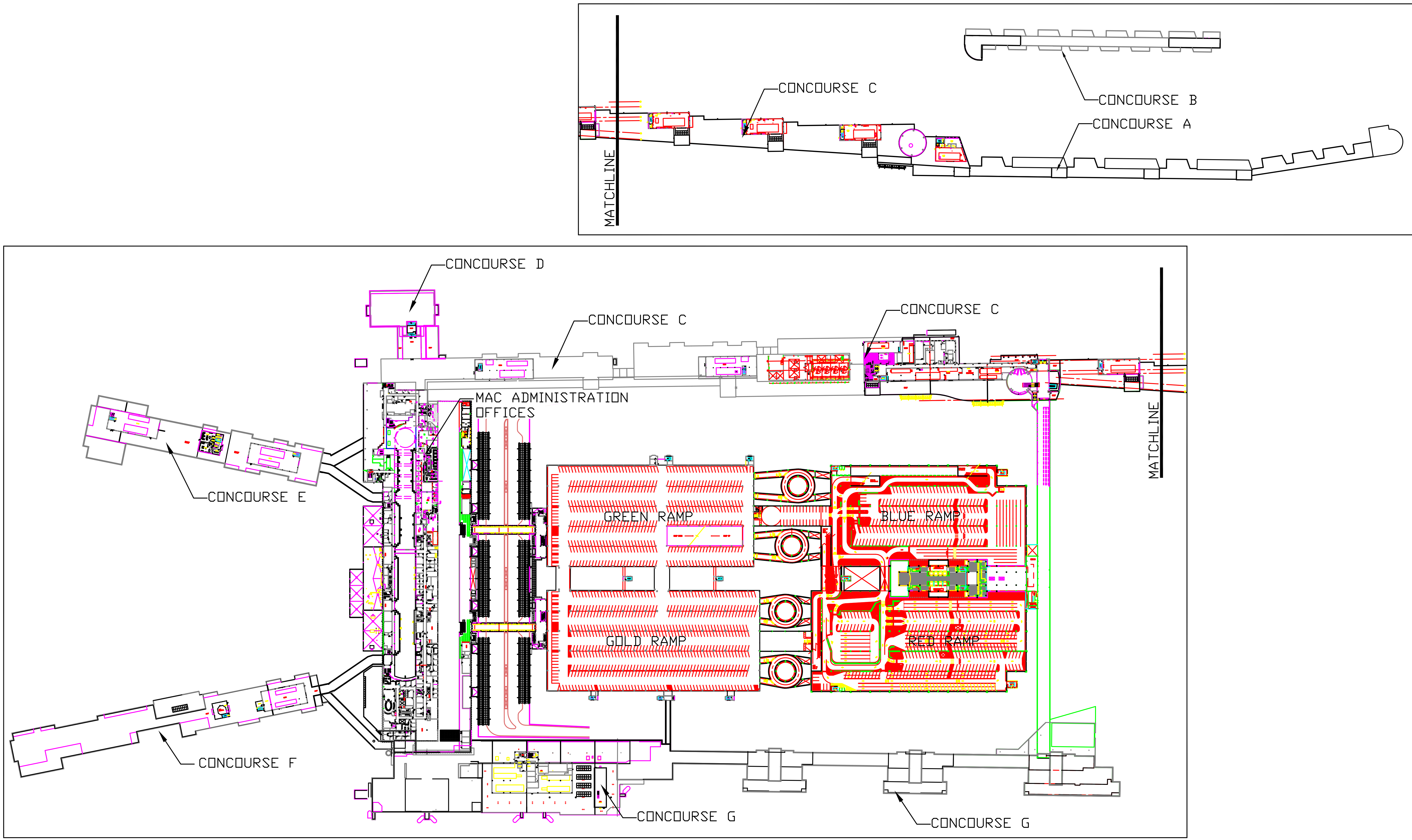
Jan 20, 2010

FIGURE
1-4



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LINDBERGH TERMINAL - LEVEL 3

MINNEAPOLIS - ST. PAUL
MINNEAPOLIS, MN

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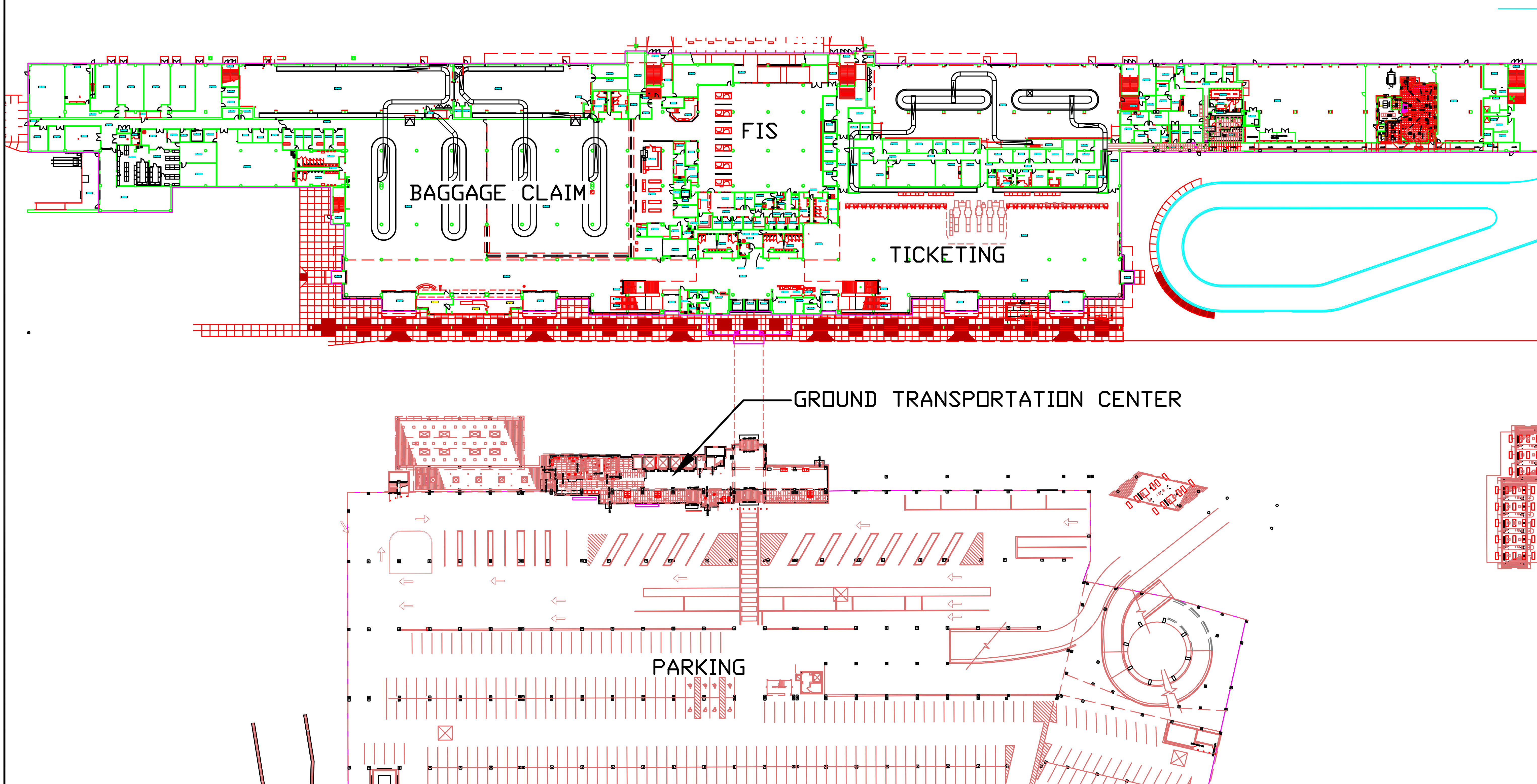
FIGURE 1-5



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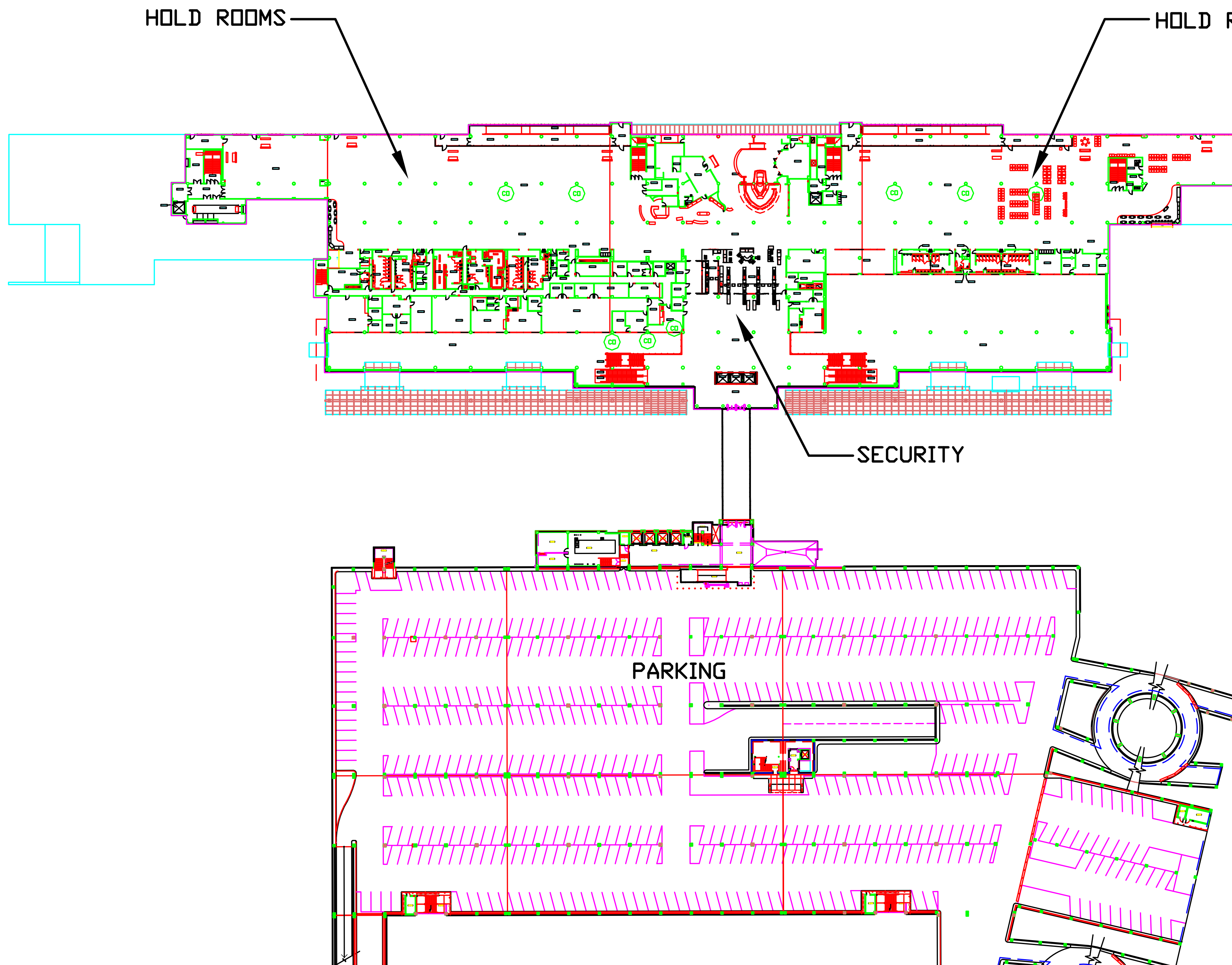
FAX (703) 671-6210

HUMPHREY TERMINAL - LEVEL 1

MINNEAPOLIS - ST. PAUL
MINNEAPOLIS, MN

DATE:
Jan 20, 2010

FIGURE
1-6



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HUMPHREY TERMINAL - LEVEL 2

MINNEAPOLIS - ST. PAUL
MINNEAPOLIS, MN

DATE: Jan 20, 2010

FIGURE 1-7

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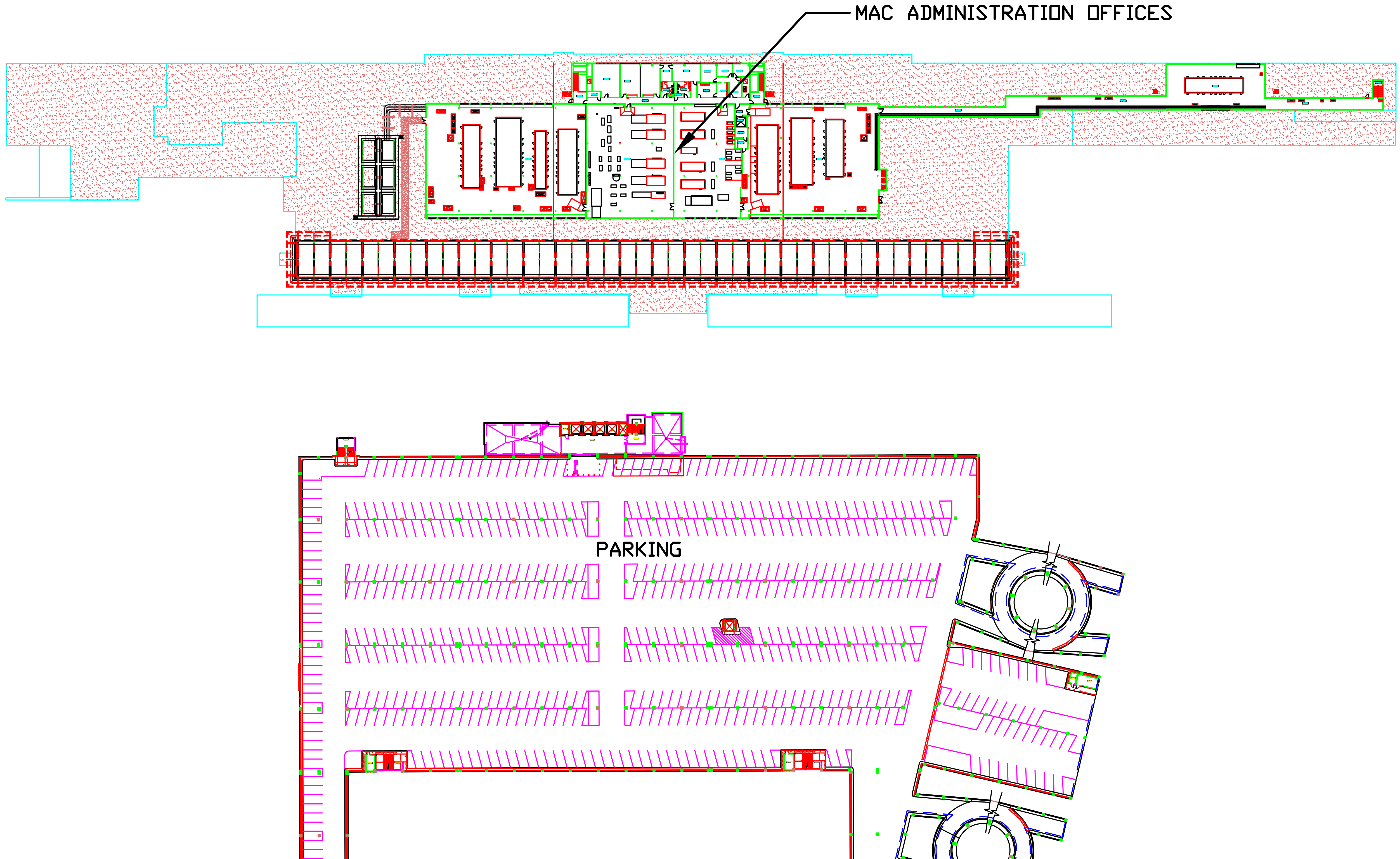

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ARLINGTON, VIRGINIA 22206
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HUMPHREY TERMINAL - LEVEL 3

MINNEAPOLIS - ST. PAUL
MINNEAPOLIS, MN

DATE:
Jan 20, 2010

FIGURE
1-8

J:\Jobs\44692 MAC Planning Consultant\PL 024 - MSP LTCP Phase 2 (2009)\2-Production\C-Work\0-Combined Report 1 11 10\Figures\3- HUMPHREY LAYOUT.dwg Level 3 Jan 18, 2010 - 1:34pm

1.4.4 GROUND ACCESS AND PARKING

Highway Access

Minneapolis-St Paul International Airport (MSP) is surrounded by a comprehensive highway network. The Crosstown Highway (State Highway 62) is located directly north of MSP, while Interstate 494 lies directly south of the airport; both run in an east-west direction. State Trunk Highways 55 and 77 are located directly east and west of the airport, respectively, and run in a north-south direction. The Lindbergh Terminal is accessed directly off of Highway 5 via Glumack Drive. The Humphrey Terminal is accessed directly off of 34th Avenue from I-494, Highway 5, or Post Road (East 70th Street), via Humphrey Drive/East 72nd Street. The airport has a network of internal roads providing access to general aviation, cargo and other facilities.

MSP is the only major airport in the United States to have two terminals – the Lindbergh and the Humphrey – located on entirely separate roadway systems. Highway signs and other way-finding aids related to MSP will be updated in 2010 in order to assist travelers in locating the terminals. Numeric designations will be added to the existing terminal names: Terminal 1-Lindbergh and Terminal 2-Humphrey.

Transit

MSP has direct access to downtown Minneapolis and the Mall of America via the region’s light rail transit (LRT). Currently, two stations serve the airport; the first is located directly east of the Humphrey Terminal and the second is below ground in the tunnel at the southeast end of the Lindbergh Terminal parking garage. Trains run every seven or eight minutes during peak hours and every 10 to 15 minutes off-peak. Metro Transit provides public bus service to the airport. The bus station is located in the Lindbergh Terminal’s Transit Center.

Parking

There are approximately 23,600 public parking spaces at MSP, split between the Lindbergh and Humphrey parking ramps. At the Lindbergh Terminal, four parking ramps designated Green, Gold, Red and Blue provide short-term and general parking for passengers and space for rental cars. Short-term parking is located on Level 1 and the Mezzanine Level of the Green Ramp and rental car parking is provided on Levels 2 and 3 of the Red and Blue Ramps. Valet parking is also available in the lower level of the Lindbergh Terminal. There are a total of 14,400 public parking spaces in the areas described above. A tram assists passenger movements to the Red and Blue parking ramps that are located furthest from the Lindbergh Terminal.

There are two parking ramps – designated the Orange and Purple ramps – at the Humphrey Terminal that provide a total of 9,200 public parking spaces. The LRT provides access to the Lindbergh Terminal from the Humphrey parking ramps.

There is also a cell phone lot located off of Post Road between the two terminals.

1.4.5 CARGO FACILITIES

Cargo activity occurs at three locations at MSP. FedEx and UPS operate in a 100-acre “infield” area which provides 269,000 square feet of warehouse/office space and 154,000 square yards of apron space, including the center taxiway.

Second, there is a 30-acre “west” cargo area, west of Runway 17-35, that provides a 26,000 square foot cargo building and a 75,000 square yard apron (including the center taxi lane).

Lastly, on the southwest side of the airfield, there are two 40,000 square-foot cargo buildings (for a total of about 80,000 square feet). This site, known as the “air cargo center” does not provide direct aircraft access.

1.4.6 GENERAL AVIATION FACILITIES

General aviation (GA) facilities are located on a 37-acre site off East 70th Street. Fixed Base Operator (FBO) services are provided by Signature Flight Support. In 2002, Signature built a new GA facility, which now provides 18,500 square feet of facilities featuring a lobby, office space, conference rooms, private phone suites, pilot lounge, showers, lockers, a game room and a quiet room. A 3,700 square-foot garage provides indoor storage for ground equipment. There are also about 185 public automobile parking spaces. The site includes about 267,000 square feet of hangar/storage/shop space and 88,000 square yards of apron. The FBO also provides aircraft maintenance.

1.4.7 SUPPORT FACILITIES

Support facilities (which include airline maintenance, airport maintenance, Aircraft Rescue & Fire Fighting (ARFF) facilities), Federal Aviation Administration facilities, and miscellaneous facilities are in various locations of the airport.

Delta Air Lines (which acquired Northwest Airlines) occupies two maintenance complexes and a cargo facility on the south side of the airport. Most of the old Northwest Building B maintenance facility (adjacent to the Lindbergh Terminal inbound/outbound roadway) has been demolished. Two hangars, an engine test cell and associated facilities that remain (approximately 751,000 sq. ft.), are used by Delta for aircraft maintenance, shops and repairs.

Three additional airline maintenance hangars are sited on the western edge of the airfield and provide a total of approximately 247,000 square feet of floor space for hangars, shops, and offices.

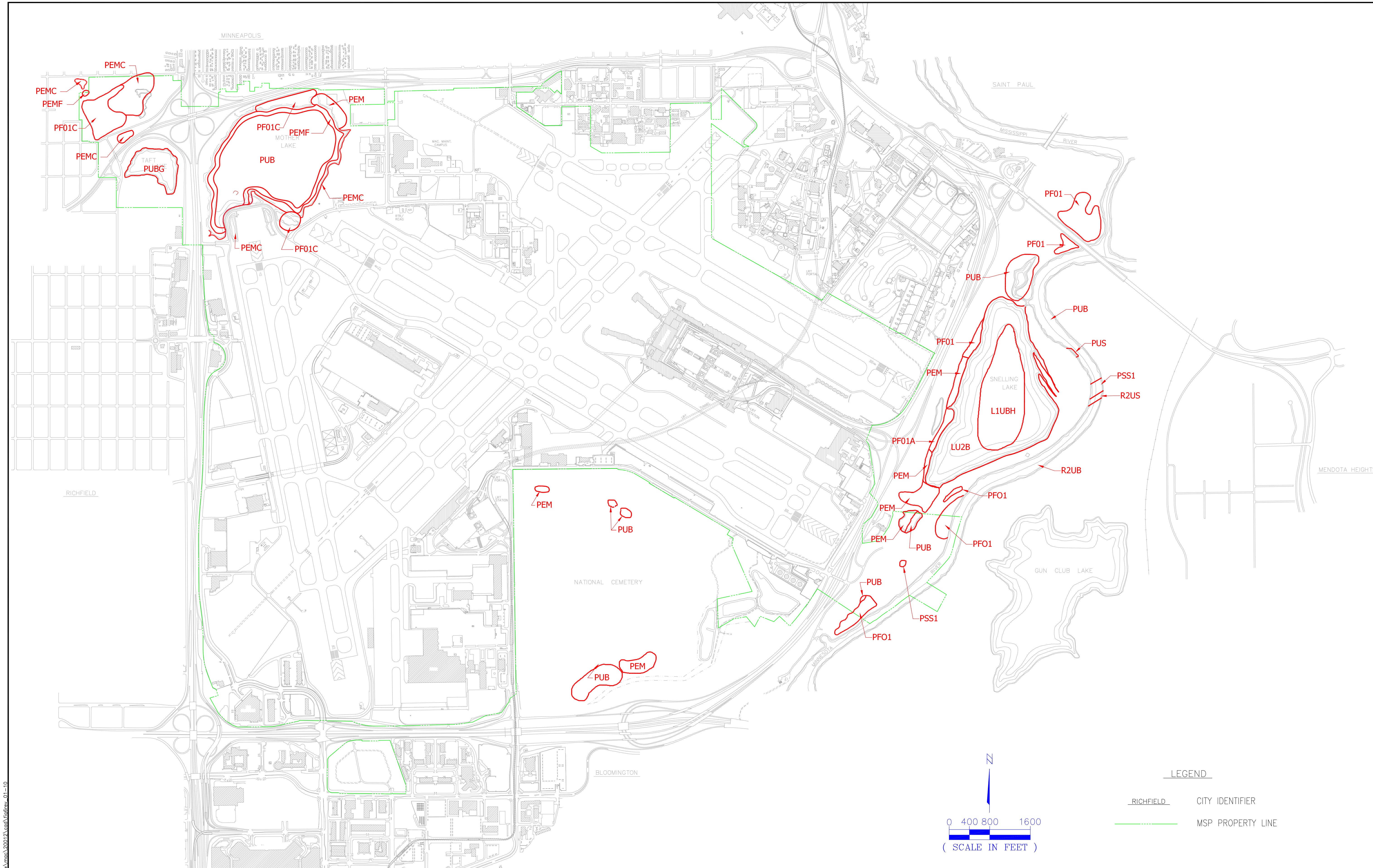
The main Aircraft Rescue & Fire Fighting (ARFF) facility is located near the center of the airfield on the south side of the runways; a satellite ARFF facility is located on the north side of the airfield between the parallel runways.

1.5 AIRPORT ENVIRONMENT

1.5.1 WETLANDS

In the now completed MSP 2010 Airport Expansion Program, impacted wetlands were mitigated through various means in conjunction with the appropriate regulatory agencies. Only a couple of minor remnant wetlands, at the north end of Runway 17, adjacent to the Mother Lake area, are still in existence on the airfield.

The wetlands were mitigated through permits granted by the US Army Corps of Engineers and the Minnesota Department of Natural Resources and in accordance with federal and state laws. The MAC serves as its own local government unit for any Wetland Conservation Act (WCA) jurisdictional wetlands. The Department of Natural Resources would have jurisdiction over any remnants that qualify under its authority. **Figure 1-9** depicts the National Wetlands Inventory within the airport property.



MINNEAPOLIS – ST. PAUL INTERNATIONAL AIRPORT
MSP WATERSHED MANAGEMENT PLAN

NATIONAL WETLANDS INVENTORY

Figure 1–9

1.5.2 WATER QUALITY AND DRAINAGE

Water Quality

Issues of concern at MSP that have the potential for environmental impact on water resources and that are associated with the airport facility and operations are biochemical oxygen demand (glycol products used for aircraft de/anti-icing operations); total suspended solids in storm water runoff; and oil and grease associated with aviation fueling facilities and operations.

The MAC has a National Pollutant Discharge Elimination System (NPDES) permit from the Minnesota Pollution Control Agency (MPCA) for storm water discharges from MSP. The MAC also maintains a construction NPDES permit from the MPCA and a Special Discharge permit from the Metropolitan Council Environmental Services (MCES) for construction dewatering activities.

Deicing activities at airports have the potential to effect receiving bodies of water. The MSP Glycol Management Program - a combination of capital improvements and Best Management Practices (BMP) implemented by both the airport and airlines - has been and may continue to be the most effective means to minimize the five-day carbonaceous biochemical oxygen demand ($CBOD_5$) discharges to the Minnesota River.

The basic objective of the Program is to control the runoff of Aircraft Deicing Fluid (ADF) so that glycol (and therefore $CBOD_5$) discharges to the river are minimized. The source control program seeks to minimize ADF application consistent with safety mandates, and to maximize glycol capture at the location of ADF application. Contained glycol-impacted storm water (GISW) with significant enough glycol content is recycled. Contained GISW with glycol content insufficient for recycling is routed to MCES for treatment.

The key components of the MSP Glycol Management Program are five dedicated deicing pads, a plug and pump network adjacent to both terminals, enhanced or new storm water ponds, snow melters, glycol recovery vehicles, runway/pavement BMPs and sophisticated equipment for ADF application.

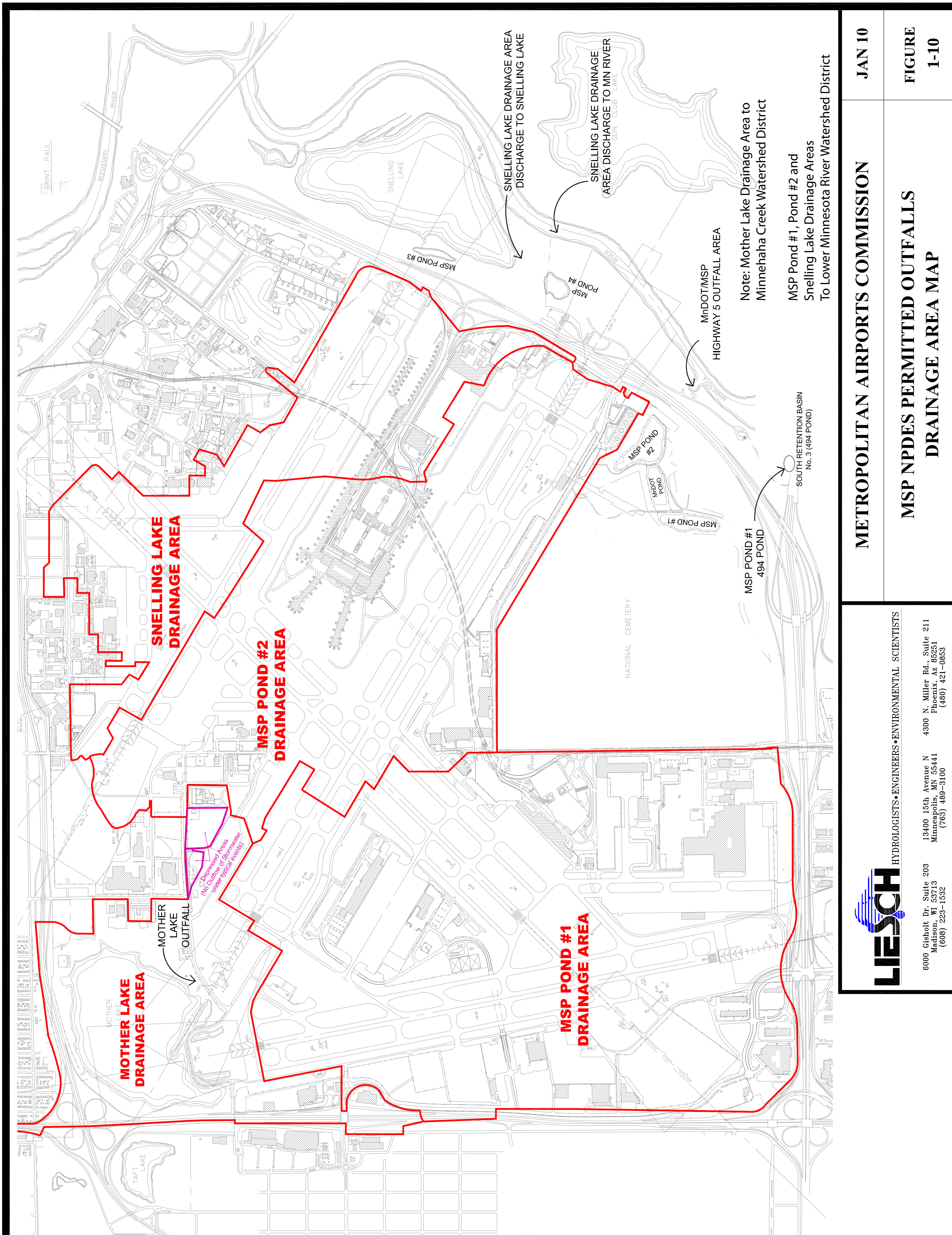
MSP tenant airlines support this program by using sophisticated equipment for ADF application, Glycol Recovery Vehicles (GRVs) to collect spent glycol and/or glycol-impacted storm water (GISW) for recycling and off-site treatment by local Publicly Owned Treatment Works (POTW) through an industrial discharge permit.

MAC implemented runway/pavement BMPs including prohibiting use of urea; use of mechanical runway snow removal procedures to reduce chemical pavement deicing and sand usage; advanced weather forecasting to facilitate preventative anti-icing practices; and extensive personnel training on efficient application techniques to minimize pavement deicer usage.

Drainage

The goal of the airport's water management plan is to effectively protect and manage water resources while ensuring safe and efficient operation of the airport facility.

There are two receiving waters for surface water runoff from MSP—Mother Lake and the Minnesota River. MSP has four drainage areas; one of the four MSP drainage areas discharges to Mother Lake and the remaining three discharge to the Minnesota River. The drainage areas are shown in **Figure 1-10.**


METROPOLITAN AIRPORTS COMMISSION
MSP NPDES PERMITTED OUTFALLS
DRAINAGE AREA MAP
JAN 10
FIGURE 1-10
LIESCH HYDROLOGISTS•ENGINEERS•ENVIRONMENTAL SCIENTISTS
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Madison, WI 53713
(608) 223-1532
13400 15th Avenue N
Minneapolis, MN 55441
(763) 489-3100
4300 N. Miller Rd., Suite 211
Phoenix, Az 85251
(480) 421-0853
Note: Mother Lake Drainage Area to
Minnehaha Creek Watershed District
MSP Pond #1, Pond #2 and
Snelling Lake Drainage Areas
To Lower Minnesota River Watershed District
SNELLING LAKE DRAINAGE AREA
DISCHARGE TO SNELLING LAKE
SNELLING LAKE DRAINAGE
AREA DISCHARGE TO MN RIVER
MnDOT/MSP
HIGHWAY 5 OUTFALL AREA
SOUTH RETENTION BASIN
No. 3 (494 POND)
MSP POND #1
494 POND
MSP POND #3
MSP POND #4
MSP POND #2
MnDOT POND
MSP POND #1
SNELLING LAKE
DRAINAGE AREA
MSP POND #2
DRAINAGE AREA
MSP POND #1
DRAINAGE AREA
MOTHER LAKE
DRAINAGE AREA
MOTHER LAKE OUTFALL
Depressed Areas
(No Outflow of Stormwater
under typical events)
SNELLING LAKE
GUN CLUB LAKE
MOTHER LAKE
TAFT LAKE
NATIONAL CEMETERY
MISSISSIPPI RIVER
SAINT PAUL

Mother Lake Drainage Area

The Mother Lake drainage area from MSP is comprised of approximately 300 acres, of which an estimated 51 acres are hard-surfaced. A large percentage of the surface area is grassland and Mother Lake. Service roadways, and the outward half of taxiways associated with the end of Runways 12R and 17 are the only significant hard-surfaced areas in the Mother Lake drainage area from the airport. Other facilities also discharge to the Mother Lake Drainage Area such as the Richfield maintenance facility, Mn/DOT materials storage and maintenance facility, as well as adjacent portions of Cedar Avenue and Highway 62 roadways.

Figure 1-10 identifies two areas as depressed that will not convey storm water flow during typical precipitation events. Storm water conveyed from these two locations flow into the Mother Lake Drainage Area or the MSP Pond #2 Drainage Area.

The only significant airport operations within the Mother Lake drainage area are vehicular traffic and aircraft movement on the limited portions of the taxiway.

Storm water drainage from the MAC General Office, Field Maintenance and Trades building area flows into the City of Minneapolis storm sewer system, with the exception of the drainage directed into two infiltration basins located east of the Field Maintenance and Trades buildings. There is no access for aircraft within the area directed to the Minneapolis system; therefore, there is no aircraft maintenance, deicing or fueling conducted in this storm water discharge area.

Minnesota River North Drainage Area

The Minnesota River North drainage area – also defined as the MSP Pond #2 Drainage Area – is the second largest and most intensely developed drainage area on MSP. It is comprised of approximately 797 acres, of which 307 acres are hard-surfaced. This watershed includes a majority of Terminal 1 (Lindbergh), parts of Runways 12L-30R, 12R-30L and 4-22 and associated taxiways, parking and the Fuel Farm.

Included in this drainage area are the majority of all fueling activities, aircraft deicing/anti-icing activities, runway sanding and general snow/ice control activities, and other associated airport operations.

Snelling Lake Drainage Area

The Snelling Lake drainage area has an approximate area of 427 acres, of which an estimated 226 acres are hard-surfaced. This watershed includes the portion of the Lindbergh Terminal servicing regional aircraft, Runways 12L-30R and 4-22 and associated taxiways, inbound and outbound roadways, the US Post Office and Air Force Reserve and Air National Guard Airside Operations.

Minnesota River South Drainage Area

The Minnesota River South drainage area – also defined as the MSP Pond #1 Drainage Area - is comprised of approximately 1,191 acres, of which 596 acres are hard-surfaced. This watershed includes the Humphrey Terminal and associated parking facilities, Delta Building C, FedEx and UPS Cargo Operations, Metropolitan Transit Commission bus storage facility and the Glycol Recovery Facility.

The MAC has an extensive monitoring program to measure the quality and quantity of the MSP discharge to the Minnesota River. In addition, the MAC constructed detention ponds to reduce the potential loading of pollutants into the Minnesota River. Construction of Pond 1 was completed in 2001 and Pond 2 was completed in 2004. The storm water ponds that receive flow from the airport's network of storm sewer piping are visually checked daily for signs of petroleum impacts.

Pond 1 receives storm water discharges from the Minnesota River South Drainage area, which encompasses virtually all airport activity on the west side of MSP, including the Humphrey Terminal and Runway 17-35. Pond 2 receives storm water from the Minnesota River North Drainage area, which encompasses the majority of airport activity at MSP, including most of the Lindbergh Terminal. Ponds 3 and 4 receive storm water from the Snelling Lake Drainage area, which includes the inbound/outbound roadways, the US Post Office and a portion of the Lindbergh Terminal.

MSP Ponds 1 and 2 were designed as an MSP storm sewer upgrade to control discharge of total suspended solids (TSS) to the Minnesota River. These ponds, along with the Mn/DOT pond, discharge through one spillway with three pipes under Highway 5 at the same location.

MSP Ponds 1 and 2 each include a forebay area where influent is received. The forebays are the primary TSS separation areas and have an underflow design to protect against floating debris and provide sheen management. The forebays are followed by a large main body that storm water travels through prior to exiting through discharge structures. The discharge structures are equipped with an underflow baffle to prevent floating debris and sheens from discharging. Booms have been deployed across the forebay areas and around the discharge structures to enhance the capability of capturing floating debris and sheens. The ponds also have remotely-actuated valve controls on the discharge structures to supplement the manual controls. Ponds 3 and 4 have a storm water collection system that is comprised of a detention storm water basin followed by a retention storm water basin in series.

1.6 SANITARY SEWER, WATER AND SOLID WASTE

1.6.1 SANITARY SEWER

Wastewater discharges from MSP are conveyed to the MCES Metro Plant on Childs Road. This plant has a design capacity of 250 million gallons per day.

Wastewater is discharged to the Metro Plant through MCES' sewer interceptor system. Discharges from MSP are conveyed to the interceptor system through the sewer systems of three different jurisdictions. The majority is discharged from the airport to a tunnel near the Mississippi River that discharges into the interceptor system. A small volume of wastewater is discharged into the City of Minneapolis sewer system prior to reaching the MCES interceptors. Wastewater from the southwest portion of MSP is discharged through the City of Richfield sewer system prior to reaching the MCES interceptors.

1.6.2 WATER SUPPLY

All of the potable water used on the MSP campus is provided by the City of Minneapolis via three trunk main connections located along the northern boundary of the airport. Water usage is generated at the terminal buildings due to passenger amenities such as restrooms and concessions, cleaning requirements, and tenant facilities. Other airfield water uses include irrigation, rental car wash facilities, tenant hangar areas and cargo uses. The average daily water use reached 989,000 gallons per day in 2007, and declined slightly to 916,000 gallons per day in 2008. Peak flow requirements are largely dependent on fire flow demand. The peak fire flow demand is 4,500 gallons per minute for four hours at either the Lindbergh or the Humphrey Terminal, which is met by the existing system.

1.6.3 SOLID WASTE

MSP is located in Hennepin County, whose solid waste management plan provides for an integrated waste management system of transfer stations, waste processing, combustion facilities, recycling programs and facilities, yard waste composting and land-filling.

Using a centralized solid waste management system, the MAC contracts with a single vendor for all solid waste hauling at the Lindbergh and Humphrey Terminals. Trash is moved from the point of generation to six locations and from there is moved off-site by the airport's vendor. Compactors are used in all terminal locations to reduce waste volume which reduces the number of loads that must be transported off-site.

The airport provides the traveling public with a "dual stream" offering of receptacles in the terminal public areas. Newspapers/magazines and plastic/glass bottles/cans are collected separately. Recycling containers are located throughout the terminals but concentrated in gate areas where most recyclable materials are discarded.

The MAC's contracted vendor is required to deliver all municipal solid waste directly to the Hennepin Energy Recovery Center (HERC), a waste-to-energy facility. Part of an overall regional solid waste management plan, the HERC facility is owned by Hennepin County and burns trash for energy recovery.

1.7 METEOROLOGICAL DATA

In general terms, MSP enjoys good weather to accommodate the high level of operations associated with a major hub airport.

Table 1.2 below shows the historical percentages of different weather categories at MSP. VFR 1 is the best weather for flight operations. All aircraft can make what are called visual approaches to the airport in VFR 1 conditions. Departures can also use initial visual separation. The airport has the highest airfield capacity in VFR 1 conditions.

TABLE 1.2: AIRFIELD WEATHER

	Ceiling/Visibility	Occurrence (%)
VFR 1	3,200 feet and above/8 statute mile (sm) and above	70.7
VFR 2	1,000 to 3,200 feet/3 to 8 sm	20.9
IFR 1	200 to 1,000 feet/0.5 to 3 sm	8.2
IFR 2	Below 200 feet/below 0.5 sm	0.2
		Total: 100.0

Source: Minneapolis-Saint Paul International Airport Capacity Enhancement Plan, December 1993, Figure 10.

VFR 2 is almost as good as VFR 1 from an airfield capacity standpoint. In VFR 2 conditions, approaches typically need to be put on an instrument approach for the first part of the final approach phase. This increases aircraft separation slightly. Approaches to all three runways in the "north flow" condition (converging between Runway 35 and Runway 30L and 30R) can still be conducted in most VFR 2 conditions. Departures cannot use initial visual separation, so separations between departing aircraft also need to be increased slightly.

In IFR 1 conditions, all aircraft need to be on an instrument approach for the entire phase of the approach. Aircraft separation needs to be increased slightly beyond the separation used in VFR

2 conditions. Approaches to Runway 35 cannot be conducted at the same time approaches are occurring on Runways 30L and 30R, which causes an additional decrease in arrival capacity.

In IFR 2 conditions, operations can be significantly limited, depending on the direction of the wind. Aircraft need special equipment and pilots need special training to land during IFR 2 conditions. In addition, runways need to be specially-equipped for operations during IFR 2 conditions. Runways 12R and 12L are both equipped to accommodate operations in IFR 2 weather, and they can be used simultaneously, as long as aircraft maintain a staggered separation between adjacent runways. For north winds, Runway 30L is equipped for limited operation during IFR 2 conditions, and Runway 35 is fully equipped for IFR 2 conditions. However, the runways converge and cannot be used simultaneously for arrivals. Fortunately, the occurrence of IFR 2 conditions is very low, and the winds tend to be calm or are from a southerly direction a majority of the time in this condition.

1.8 LAND USE, AIRSPACE AND ZONING

Chapter 6 provides an analysis of land use, airspace and zoning considerations in the context of existing and planned airport facilities.

CHAPTER 2: FORECASTS

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2.1 INTRODUCTION AND PURPOSE

The Metropolitan Airports Commission (MAC) is updating the Long Term Comprehensive Plan (LTCP) for Minneapolis-St. Paul International Airport (MSP). A critical element of this plan is to balance the long-term airfield, terminal, and landside facilities serving the airport. A re-appraisal of the forecasts is especially timely, given the acquisition of Northwest Airlines by Delta Air Lines and the impacts of recent fuel price increases and the current economic recession.

This forecast analysis contains the annual and derivative activity forecasts for the airport. Except where noted, the forecasts contained herein are unconstrained; they assume landside and airfield capacity will be available to accommodate the anticipated demand. Forecasts are presented for 2010, 2015, 2020, 2025, and 2030. Separate annual forecasts were developed for scheduled domestic and international passenger, non-scheduled passenger, air cargo, general aviation, and military activity.

This analysis first discusses historical and anticipated socioeconomic activity in the Twin Cities area, followed by a discussion of historical aviation activity and ongoing trends at MSP. Critical assumptions are then presented followed by the forecasts of domestic and international passengers, along with forecasts of non-scheduled passengers and peak activity. Forecasts of air cargo tonnage and operations, and general aviation and military activity are then discussed. The technical report concludes with a summary of forecast annual activity, estimated gate requirements, and a discussion of alternative forecast scenarios.

The assumptions in the following forecasts are based on input from airline and airport officials, previous MSP studies, relevant literature, and professional experience. Forecasting, however, is not an exact science. Departures from forecast levels in the local and national economy and in the airline business environment may have a significant effect on the projections presented herein. These uncertainties increase toward the end of the forecast period, when new technologies and business strategies and changes in work and recreational practices may have an unpredictable impact on aviation activity. For these reasons, the forecasts should be periodically compared with actual airport activity levels, and airport plans and policies adjusted accordingly. Tables 2.1 through 2.18 are included in this chapter, the rest of the tables, denoted with letters, can be found in Appendix A of this report.

2.2 ECONOMIC TRENDS

Passenger demand is determined by the strength of the economy and the cost of available services. Consequently, the development of an aviation activity forecast requires a clear understanding of local economic forecasts and trends.

The service area definition corresponds to the seven counties that comprise the Metropolitan Council (Met Council). This core area includes Anoka, Carver, Dakota, Hennepin, Ramsey, Scott, and Washington Counties. Larger service area definitions that encompass additional counties have been tested in previous MSP forecast efforts, but in those studies, passengers proved to be most sensitive to trends in the 7-county Met Council area.

Table 2.1 presents historical and projected population, employment, income and per capita income for each county of the Met Council area. The tables in the Appendix provide more detailed information by county and also show data for the United States for comparison purposes. Two sets of forecasts are presented in the Appendix, one from the Met Council and the other from Woods & Poole Economics.

Both the Met Council and Woods & Poole socioeconomic forecasts have their strengths and weaknesses. The Met Council forecasts are prepared locally and reflect a detailed knowledge of the existing and projected growth trends within the Minneapolis-St. Paul metropolitan area. However, they do not include projections of income or projections of national activity. Income is important because an analysis of historical registered aircraft data by county indicated that registered aircraft were more closely correlated with income than with population or employment. Also, much of the analysis will be based on Federal Aviation Administration projections of national general aviation activity. For this analysis to be valid, the local and national socioeconomic projections need to be based on a consistent set of assumptions.

The Woods & Poole forecasts are more recent than the Met Council forecasts. They also include personal income and prepare metropolitan and national forecasts using a common set of assumptions. However, the Woods & Poole forecasts do not incorporate a detailed knowledge of local growth trends and development constraints.

A hybrid forecast that incorporates the strengths and minimizes the weaknesses of the two data sources was prepared for use in this study. For each county, Met Council forecast growth rates were applied to the latest base year data. These forecasts were then adjusted, on a prorated basis, to sum to the Woods & Poole forecasts for the 7-county Met Council metropolitan area.

2.2.1 POPULATION

Table A.1 of Appendix A shows historical population in the Twin Cities, Minnesota, and the United States. The historical population information was obtained from the Bureau of Economic Analysis in the US Department of Commerce. The Twin Cities have grown at a more rapid pace than the United States. The suburban areas are also growing slightly more quickly than the urban core (Hennepin and Ramsey Counties).

Table A.2 of Appendix A presents two alternative forecasts of population for Minneapolis-St. Paul. The first forecast was obtained from the Met Council's revised Regional Development Framework 2030 Forecasts and is available only for the 7-county Met Council area. The second forecast was obtained from Woods & Poole Economics, which provides forecasts for all counties and metropolitan areas in the United States. As shown, the two sources provide very similar forecasts for the 7-county area, both projecting an average annual growth rate slightly above 1.0% through 2030. The forecasts project the metropolitan area to continue to grow faster than the state, and the outer suburbs to grow faster than the inner suburbs.

TABLE 2.1: SUMMARY OF SOCIOECONOMIC DATA AND FORECASTS SEVEN-COUNTY METROPOLITAN COUNCIL AREA

Year	Population	Employment	Income (thousands of 2007 $)	Per Capita Income (2007 $)
1990	2,298,418	1,603,044	76,546,647	33,304
1991	2,332,897	1,605,181	76,567,544	32,821
1992	2,368,710	1,628,288	79,552,668	33,585
1993	2,406,000	1,662,568	80,492,172	33,455
1994	2,441,014	1,713,409	84,046,939	34,431
1995	2,474,926	1,766,851	88,005,525	35,559
1996	2,508,406	1,802,255	91,965,878	36,663
1997	2,540,725	1,834,525	96,874,609	38,129
1998	2,575,454	1,884,161	104,644,525	40,631
1999	2,613,594	1,927,990	109,008,820	41,708
2000	2,652,116	1,972,269	115,532,307	43,562
2001	2,684,454	1,982,015	116,168,728	43,275
2002	2,701,403	1,964,849	116,954,718	43,294
2003	2,714,033	1,971,415	118,465,846	43,649
2004	2,730,546	2,004,534	123,102,449	45,083
2005	2,745,769	2,045,068	124,827,612	45,462
2006	2,767,734	2,082,727	127,735,714	46,152
2010	2,924,557	2,233,505	129,480,127	47,023
2015	3,118,761	2,421,649	146,564,763	49,913
2020	3,318,224	2,609,428	165,854,464	53,087
2025	3,524,942	2,796,788	187,853,049	56,602
2030	3,744,009	2,983,675	212,841,334	60,379
		Average Annual Growth Rate		
1990-2006	1.2%	1.6%	3.3%	2.1%
2006-2030	1.3%	1.5%	2.2%	1.1%

Sources: Tables A.1 through A.8 and HNTB analysis.

2.2.2 EMPLOYMENT

Table A.3 in Appendix A presents historical employment for each of the seven Met Council counties, the service area, and the United States. The table shows the economic cycles that have occurred over the past two decades, including the boom times of the mid- to late-1980s and mid- to late-1990s, punctuated by the slowdowns and declines of the early 1980s, early 1990s, and 2001-2003. Overall, the metropolitan area has grown slightly more rapidly than the U.S. and again the outer suburbs have grown slightly faster than the inner suburbs.

Employment forecasts from the Met Council and Woods & Poole are presented in **Table A.4**. in Appendix A The Met Council uses a stricter definition of employment than is used by the US Bureau of Economic Analysis (USBEA) or Woods & Poole and therefore its historical and projected employment numbers are lower.[1] Consequently, to facilitate comparison an adjusted set of Met Council projections was developed by applying Met Council growth rates to base year USBEA numbers. The Met Council projections (0.9% per year) are more conservative than the Woods & Poole projections (1.5% per year).

2.2.3 INCOME AND PER CAPITA INCOME

Table A.5 in Appendix A shows historical income in the service area and the United States from 1980 through 2006. All numbers are provided in thousands of 2007 dollars. Total income in the metropolitan area grew at 3.3% annually through 2006, a higher rate than in the remainder of the State or the United States (2.9%). As was the case with employment, income has alternated between periods of rapid growth and periods of stagnation. No income data specific to the 7-county area are available for a more recent year than 2006. However, since the 2008-2009 recession has already had an impact on air travel demand, an effort was made to estimate income for more recent years based on State and national data. Those estimates are also presented in **Table A.5.**

Table A.6 in Appendix A shows historical per capita income in 2007 dollars. Per capita income in the Twin Cities is higher than in the rest of the State or than in the United States. Over the past 20 years, Minnesota per capita income has grown at roughly the same pace inside and outside the metropolitan area but more quickly than in the United States.

Projected per capita income is shown in **Table A.7** in Appendix A. No Met Council forecasts are presented because the Met Council does not publish income or per capita income forecasts. Woods & Poole projects per capita income to continue to grow but at a more moderate rate than it has in the past. This, in part, reflects an expectation that the growth in the economy will slow down as more members of the Baby Boom generation enter retirement. Per capita income is projected to grow at roughly 1% per annum in the Twin Cities metropolitan area, and in the United States.

Table A.8 in Appendix A presents two sets of income projections. The unadjusted Woods & Poole forecasts project real income to grow 2.4% per year in the metropolitan area. A second set of projections combines the Met Council population forecasts with the Woods & Poole per capita income forecasts to generate a hybrid income forecast for the 7-county service area. The resulting forecast was also adjusted downward to reflect lost economic growth in 2008 and

[1] The Bureau of Economic Analysis employment statistics, upon which Woods & Poole projections are based, include the self-employed in addition to wage and salary workers.

anticipated in 2009. The adjusted forecast projects income to increase at 2.2% rate over the forecast period.

2.3 HISTORICAL AVIATION ACTIVITY AND CURRENT TRENDS

This section provides a brief overview of historical passenger, cargo (freight and mail), general aviation and military activity at MSP.

2.3.1 PASSENGER ACTIVITY

Table 2.2 shows historical domestic and international originations and **Table 2.3** shows historical passenger enplanements at MSP from 1980 through 2008. In general, passenger growth has tracked economic growth. There were periods of slow growth in the early 1990s, and 2000-2003 and periods of more rapid growth in the mid- to late-1990s, as well as 2004 and 2005. Enplanements began to decline after 2005 and originations declined between 2007 and 2008. Key trends and factors at MSP over the past 24 years include:

- the reduction in traffic growth after 1987 following the Northwest/Republic merger and the economic slowdown;
- two rapid periods of regional carrier growth, first in the 1980s with the advent of code-sharing and then in the late-1990s with the widespread proliferation of regional jets;
- significant international passenger growth through the period as Northwest introduced non-stop service to Europe and Asia and the Canadian markets became liberalized;
- an extended period of passenger growth corresponding with the economic boom of the mid- and late-1990s;
- a brief slow-down in the growth in 1998 as a result of the Northwest work stoppage;
- another spurt in growth in 1999-2000 corresponding to Sun Country's introduction of scheduled service and Northwest's competitive reaction;
- a major downturn beginning in 2001 as a result of the September 11th terrorist attacks and associated security restrictions and passenger apprehensions coupled with an economic slowdown;
- rapid growth in 2004 resulting from an improving economy and relentless fare competition; and
- a decline after 2005 resulting from Northwest's Chapter 11 filing, followed by a rapid increase in jet fuel costs, and followed in turn by the financial crisis of 2008 and subsequent economic recession.

Total domestic originations have grown at a 3.0% average annual rate over the period. Total enplanements have grown at a 4.7% average annual rate over the same period indicating that international passengers and connecting enplanements have grown more rapidly than originating enplanements. International enplanements and regional carrier enplanements have grown most rapidly. Conversely, non-scheduled enplanements have grown the slowest and declined in recent years, although this is largely due to Sun Country's change in emphasis from charter to scheduled operations.

TABLE 2.2: HISTORICAL ORIGINATING PASSENGERS

Year	Domestic Originations (a)	Combined International (b)	Total Originations
1990	4,284,240	n/a	n/a
1991	4,288,090	n/a	n/a
1992	4,414,590	n/a	n/a
1993	4,511,050	n/a	n/a
1994	4,598,270	n/a	n/a
1995	5,021,830	n/a	n/a
1996	5,411,820	n/a	n/a
1997	5,750,780	n/a	n/a
1998	5,736,650	n/a	n/a
1999	6,365,610	n/a	n/a
2000	7,225,020	n/a	n/a
2001	6,603,320	709,489	7,312,809
2002	6,207,930	680,392	6,888,322
2003	6,390,140	675,401	7,065,541
2004	7,074,980	780,332	7,855,312
2005	7,609,360	840,887	8,450,247
2006	7,643,820	888,697	8,532,517
2007	7,857,050	951,196	8,808,246
2008	7,291,815 (c)	963,631 (c)	8,255,446
Average Annual Growth Rate			
1990-2008	3.0%	n/a	n/a
2001-2008	1.4%	4.5%	1.7%

(a) USDOT, Origin-Destination Survey as compiled by DataBase Products, Inc.
(b) USDOT, Origin-Destination Survey for U.S. Flag Carriers. Originations for Foreign-Flag Carriers estimated.
(c) Extrapolated from first three quarters.

Sources: As noted and HNTB analysis.

TABLE 2.3: HISTORIC PASSENGER ORIGINATIONS AND REVENUE ENPLANEMENTS

Year	Domestic Air Carrier Enplanements	International Air Carrier Enplanements (b)	Regional Enplanements	Non-Scheduled Enplanements	TOTAL Enplanements (c)
1980	4,285,217	28,731	159,727	113,793	4,587,468
1981	4,391,802	57,871	129,497	85,869	4,665,039
1982	5,071,395	50,574	178,590	82,278	5,382,837
1983	5,702,094	49,638	256,615	149,486	6,157,833
1984	5,986,288	73,014	287,762	187,076	6,534,140
1985	7,114,367	83,533	349,281	312,186	7,859,367
1986	7,845,494	81,700	481,188	238,972	8,647,354
1987	8,171,206	85,023	509,246	205,700	8,971,175
1988	8,023,121	65,265	516,083	266,344	8,870,813
1989	8,349,920	78,910	415,910	343,418	9,188,158
1990	8,609,638	102,673	495,439	387,320	9,595,070
1991	8,683,232	124,125	492,075	353,590	9,653,022
1992	9,550,986	144,255	566,186	419,060	10,680,487
1993	9,851,910	170,544	649,104	350,918	11,022,476
1994	10,261,328	166,114	646,788	457,715	11,531,945
1995	11,288,317	256,669	617,477	501,792	12,664,255
1996	12,142,783	276,575	720,749	481,532	13,621,639
1997	12,578,587	419,048	872,377	465,628	14,335,640
1998	12,645,248	519,395	820,709	635,290	14,620,642
1999	14,020,304	575,079	1,211,306	650,350	16,457,039
2000	15,278,927	644,096	1,204,681	399,683	17,527,387
2001	14,379,588	558,276	809,019	280,609	16,027,492
2002	13,794,354	551,203	1,054,192	365,023	15,764,772
2003	14,045,747	572,691	1,250,064	233,692	16,102,194
2004	14,901,675	677,318	1,778,396	240,250	17,597,639
2005	14,849,344	790,806	2,138,186	205,975	17,984,311
2006	14,143,459	692,757	2,190,679	151,412	17,178,307
2007	13,496,662	980,460	2,406,447	85,515	16,969,084
2008	11,750,665	1,264,507	3,336,724	32,376	16,384,272
			Average Annual Growth		
1980-1990	7.2%	13.6%	12.0%	13.0%	7.7%
1990-2001	4.8%	16.6%	4.6%	-2.9%	4.8%
2001-2008	-2.8%	12.4%	22.4%	-26.5%	0.3%
1980-2008	3.7%	14.5%	11.5%	-4.4%	4.7%

Sources: MAC activity statistics and HNTB analysis.

2.3.2 AIRCRAFT OPERATIONS

Table 2.4 presents historical aircraft operations at MSP. Each aircraft takeoff and each aircraft landing counts as an operation. Total aircraft operations have grown at an average annual rate of 1.7% over the 28-year period. The fastest growing categories have been international and regional passenger carriers. Conversely, general aviation and military operations have been declining.

2.4 GENERAL BASE FORECAST ASSUMPTIONS

This section describes the general forecast assumptions that were applied in this forecast. More detailed assumptions specific to a particular activity category are described in the sections pertaining to those categories. These general assumptions also apply to the forecast scenarios except where noted (see section 2.12). The major assumptions are as described below.

2.4.1 UNCONSTRAINED FORECASTS

The revised unconstrained forecasts contained herein are physically unconstrained. For the purposes of this study, “physically unconstrained” means that there are sufficient airport airfield, terminal, and landside facilities at the airport to accommodate all commercial aviation activity dictated by demand. Although no airfield limits are assumed for general aviation (GA), it is anticipated that the development of on-airport GA facilities will follow current trends. Therefore, it is assumed that limited on-airport GA facilities will continue to divert GA to reliever airports.

It is assumed that destination airports will be developed sufficiently to accommodate demand from the Twin Cities. However, it is recognized that airfield capacity constraints at some airports, such as London Heathrow and Tokyo Narita, will force an increase in aircraft size that would not occur in a truly unconstrained case.

2.4.2 REGULATORY ASSUMPTIONS

No return to airline regulation, as occurred prior to 1979, is assumed. This means that airlines will increase service and change fares as market conditions dictate. Also, except for the demand management scenarios, the forecasts in this report assume no slot control systems for MSP or destination airports other than those already in place.

2.4.3 ECONOMIC ASSUMPTIONS

The forecasts assume no major economic downturn, such as occurred during the depression of the 1930s. The local and national economies will periodically increase and decrease the pace of growth in accordance with business cycles. However, it is assumed that, over the forecast term, the high-growth and low-growth periods will offset each other so that the economic forecasts described in Section 2.2 will be realized. As noted in Section 2.2, the socioeconomic projections used for these forecasts have been adjusted for the current economic recession.

TABLE 2.4: HISTORICAL AIRCRAFT OPERATIONS (a)

Year	Domestic Air Carrier	Regional	International Air Carrier (b)	Non-Scheduled	All-Cargo	General Aviation	Military	Total
1980	146,524	12,128	350	1,976	1,214	114,260	6,604	283,056
1981	146,338	9,904	472	2,568	1,446	97,278	5,606	263,612
1982	150,450	22,838	390	2,478	2,556	82,303	5,359	266,374
1983	170,108	33,924	388	3,752	3,192	83,548	5,100	300,012
1984	189,830	35,938	506	2,234	5,966	93,367	7,721	335,562
1985	220,190	31,460	628	3,346	5,338	106,715	14,020	381,697
1986	231,760	50,520	680	2,426	12,360	71,406	6,869	376,021
1987	213,540	56,410	644	3,002	15,434	70,050	8,676	367,756
1988	211,562	58,896	544	2,836	17,958	68,634	6,698	367,128
1989	218,168	59,338	718	3,310	17,194	71,669	4,347	374,744
1990	223,884	74,446	860	4,538	18,526	58,864	2,804	383,922
1991	225,390	75,856	1,078	5,046	20,280	55,702	2,534	385,886
1992	242,670	85,926	1,222	5,824	18,900	60,929	3,003	418,474
1993	258,374	108,237	1,285	4,855	15,198	49,216	2,825	439,990
1994	264,519	115,164	1,478	6,103	14,110	50,898	2,451	454,723
1995	281,334	106,763	1,832	6,832	15,909	49,769	2,915	465,354
1996	295,776	105,926	2,256	8,750	20,362	49,786	2,624	485,480
1997	294,220	102,038	3,821	8,350	15,011	64,209	3,624	491,273
1998	278,828	90,421	5,109	11,531	15,323	79,757	2,044	483,013
1999	314,883	109,017	6,036	10,600	17,271	49,256	3,358	510,421
2000	341,980	89,105	7,224	5,959	18,395	58,076	2,473	523,212
2001	342,122	81,661	7,449	4,090	17,077	45,943	3,180	501,522
2002	338,744	95,248	7,048	4,833	14,974	44,279	2,543	507,669
2003	336,516	104,931	8,461	4,732	16,579	39,513	1,856	512,588
2004	334,452	135,785	9,360	3,793	16,709	39,018	1,976	541,093
2005	314,833	144,293	13,351	3,879	17,182	36,472	2,230	532,240
2006	277,525	128,156	10,900	3,233	16,355	37,459	2,040	475,668
2007	253,338	135,170	14,889	1,432	15,292	30,562	2,289	452,972
2008	212,167	166,106	24,074	536	14,361	30,685	2,115	450,044
				Average Annual Growth				
1980-1990	4.3%	19.9%	9.4%	8.7%	31.3%	-6.4%	-8.2%	3.1%
1990-2001	3.9%	0.8%	21.7%	-0.9%	-0.7%	-2.2%	1.2%	2.5%
2001-2008	-6.6%	10.7%	18.2%	-25.2%	-2.4%	-5.6%	-5.7%	-1.5%
1980-2008	1.3%	9.8%	16.3%	-4.6%	9.2%	-4.6%	-4.0%	1.7%

(a) MSP Airport data as reported on the MAC website.
(b) Does not include some Canadian traffic on Northwest Airlines. Canadian traffic included in domestic numbers.

Sources: As noted, MAC Activity Statistics, and HNTB analysis.

2.4.4 INTERNATIONAL POLITICAL ENVIRONMENT

No major international conflicts that would disrupt aviation at MSP are assumed. Likewise, no major trade wars or embargoes that would restrict the international flow of commerce and travel are assumed.

2.4.5 SECURITY ENVIRONMENT

Post-September 11th security requirements are still evolving. They affect passenger demand by increasing the cost of travel, delays, and inconvenience. For the purpose of this study it is assumed that the Transportation Security Agency will meet an objective of limiting security-related delays.

2.4.6 FUEL ASSUMPTIONS

In accordance with Department of Energy forecasts, the real cost of fuel is assumed to increase from 2009 levels. However, no major disruptions, as occurred in the mid- and late-1970s, are assumed. Also, no major increases in fuel taxes are assumed. If this assumption does not hold, and fuel prices continue to remain high, airlines would have to raise air fares to remain in operation, and the higher air fares would reduce demand. The effect of fuel prices on fares is discussed in more detail in Section 2.5. Also, the sensitivity of airport activity to fuel prices is explored further in Section 2.12.

2.4.7 ENVIRONMENTAL FACTORS

No major changes in the physical environment are assumed. It is assumed that global climate changes will not be sufficient enough to force restrictions on the burning of hydrocarbons or major fuel tax increases. A strict cap and trade system for carbon dioxide would have a similar impact as an increase in fuel prices, and that is explored in Section 2.12.

2.4.8 NATIONAL AIRSPACE SYSTEM

It is assumed that the Federal Aviation Administration will successfully implement any required changes and improvements for the national airspace system to accommodate the unconstrained forecast of aviation demand.

2.4.9 AIRLINE CONSOLIDATION

It is assumed that factors, such as government regulations and labor union resistance, will prevent any major airline consolidation beyond the Delta/Northwest merger. Although some minor airline consolidation could continue to occur, no attempt is made to predict the individual airlines that would be affected. It is also assumed that major airlines that are currently in Chapter 11 will successfully re-emerge from bankruptcy.

2.4.10 NEW ENTRANTS

As they expand their national route networks, established airlines that currently do not serve MSP, such as JetBlue, are assumed to introduce service by 2015. Southwest Airlines is assumed to expand service at MSP as it has at other major connecting hubs. New airlines may attempt to become established during the forecast period; however, it is not possible to predict the names and characteristics of these airlines.

2.4.11 AIRLINE ALLIANCES

The SkyTeam alliance is assumed to continue with its current membership through the future. Current members include Delta Air Lines, Air France, KLM Royal Dutch Airlines, Alitalia Airlines, Korean Air, Aeromexico, Aeroflot, China Southern Airlines, Air Europa, Copa Airlines, Kenya Airways and CSA Czech Airlines.

2.4.12 AIRLINE STRATEGY

Delta Air Lines is assumed to continue to operate as a hub carrier at MSP. It is not assumed to either add or delete major hubs elsewhere in the United States, and therefore the connecting percentage is assumed to remain at levels similar to those from 1992-2008.

2.5 DOMESTIC PASSENGER FORECASTS

This section describes the domestic passenger forecast for MSP. This section includes a discussion of assumptions and data sources, the methodology for the passenger originations forecast, and the assumptions used to determine potential new markets. This section also includes a discussion of the projections of enplanements and connections, load factor, and seat departures. The methodology and assumptions used to estimate the type of air service that would accommodate the projected passenger are also described. This section concludes with a forecast of domestic passenger carrier aircraft operations.

2.5.1 METHODOLOGY, ASSUMPTIONS AND DATA SOURCES

Following is a summary of the methodology used in the domestic passenger forecast:

1. Determine drivers of passenger activity in the Twin Cities area
2. Project future domestic passenger originations at MSP using regression analysis
3. Adjust originations for impact of Southwest Airlines
4. Project future domestic passenger enplanements
5. Allocate MSP passengers by market
6. Determine future non-stop markets based on airline revenue thresholds for existing non-stop markets
7. Project outbound revenue passengers for each destination market as a ratio of origination and destination (O&D) traffic
8. Project load factor for each market
9. Project seat departures for each market using the outbound revenue passenger and load factor forecasts
10. Estimate the most likely way that airlines would accommodate the seat departure forecast in terms of aircraft type and frequency of service
11. Convert the outbound passenger forecast to enplanements using MSP enplanement data
12. Convert the scheduled aircraft departure forecast to actual departures using historical departure completion data

The methodology will be described in greater detail below.

The following data sources were used in the analysis:

- Historical and projected information on population, employment, and real income were obtained from the Regional Economic Information System developed by the Bureau of Economic Analysis in the U.S. Department of Commerce (see Section 2.2).

- The US Department of Transportation OD1A domestic O&D database was used to obtain yield (airline revenue per passenger mile) and distance and historical originating traffic and on a market-by-market basis.

- The USDOT T-100 database was used to obtain outbound passengers on a market-by-market basis.

- Official Airline Guide (OAG) information on scheduled operations was used to determine existing scheduled service and historical non-stop service.

- The OAG, JP Fleet Airline-Fleets International, and individual airline websites were used to determine aircraft seat configurations for each airline.

- JP Fleet Airline-Fleets International and other industry publications were used to identify information on airline fleet orders.

2.5.2 YIELD AND FARE PROJECTIONS

Since passenger originations are local, they are sensitive to local economic factors such as population, employment, and income, and also to airline factors such as air carrier service and fares. Therefore, the critical assumptions for this analysis include the use of the growth rates in Section 2.2 for socioeconomic data and assumptions regarding future yield (revenue per passenger mile) and fare levels. The detailed yield and fare analysis is presented in the Appendix.

Table B.1 in Appendix A presents historical fares and yields at MSP. Since the price to the passenger includes taxes and fees, in addition to the base fare reported by the airlines, these taxes and fees were added to the historical data. As shown in the table, there has been a long-term decline in the real cost of air travel at MSP, with the rate of decline accelerating after the September 11, 2001 terrorist attacks.

Table B.2 in Appendix A provides the Federal Aviation Administration (FAA) forecasts of yield. An estimate of FAA fares was derived by multiplying the FAA forecasts of average yield and average trip distance. Since the FAA provides separate forecasts for mainline and regional carriers, these were weighted by FAA forecasted enplanements to generate combined mainline-regional carrier fare projections. As shown in the Table, the FAA projects yield to continue to decline but, because of increasing trip distance, national fares are projected to increase slightly.

The FAA forecasts in **Table B.2** were prepared prior to the major spike in fuel prices that occurred in 2008. The airlines need to cover the cost of fuel in their fare structure if they are to remain financially viable; therefore there was a concern that the more recent expectations about the price of fuel were not adequately reflected in the FAA projections. To compensate for this, an adjustment was made to the FAA yield forecast to incorporate the more recent US Department of Energy (DOE) forecasts of jet fuel. In effect, the additional increase in fuel cost estimated by the DOE was allocated by revenue passenger mile and then allocated to the FAA's original yield estimate. **Table B.3** in Appendix A shows the calculations.

Real yields and fares (constant 2007 dollars) at MSP were assumed to change at the adjusted FAA national-projected rate (see **Table B.4** Appendix A). **Table B.5** in Appendix A shows projected MSP fares and yields including estimated taxes and fees.[2] Although real fares are anticipated to dip slightly between 2008 and 2010, as a result of a weak economy and reduced fuel prices, they are expected to increase thereafter.

2.5.3 PASSENGER ORIGINATION FORECAST

This section presents the forecast of domestic passenger originations. It includes a discussion of the projection of domestic MSP originations, adjustments for the introduction of Southwest Airlines service, and the market-by-market distribution of projected originations.

Base Domestic Originations

Base domestic passenger originations were projected using regression analysis. Additional originations resulting from the introduction of air service by Southwest Airlines are discussed later in this section. Regression analysis is a statistical method of generating an equation (or model) which best explains the historical relationship among selected variables, such as origination and destination (O&D) passenger data and real income. If it is assumed that the model that best explains historical activity will continue to hold into the future, this equation can be used as a forecasting equation. Using historical (1980-2006) data, several passenger origination forecasting models were tested. The potential driving factors tested included socioeconomic variables, aviation industry variables, and instrument variables (also called dummy variables). The socioeconomic variables included population, employment, income, and per capita income for the service area (see Section 2.2). The aviation industry variables included MSP fares and yields. Instrument variables representing the first Gulf War, the 1998 Northwest Airlines work stoppage, and the September 11th attacks and ensuing industry recovery were also tested. The model was tested in both linear and logarithmic formulations. The variables that were tested are shown in **Tables C.1** and **C.2** in Appendix A.

Several of the equations that were calculated showed strong correlations with passenger originations. The model that produced the best results, from both a theoretical and statistical standpoint, was a logarithmic formulation that specified MSP originations as a function of local income and average fares (including taxes and fees) as independent variables. The regression equation is presented in **Table 2.5**.

The model's projections for 2008 were compared with preliminary numbers for 2008 and the results suggested a further downward adjustment over and above that explained by the economic variables. Based on the difference between the forecast results and actual numbers, the value of this imputed dummy variable is $10^{-.0211}$. This negative impact, along with that of the post-September 11th dummy variables, was carried through the forecast period.

The metropolitan area income and employment variables represent the size of the market, and the fare variable represents the cost of the service. Since the forecasting model has a

[2] It was assumed that taxes and fees, as a proportion (%) of total fare, would remain at their 2008 levels over the forecast period.

logarithmic formulation, each of the exponents associated with the input variables is defined as an elasticity. With small changes in the input variables, the forecasting model can be interpreted as indicating that every 1.0% increase in metropolitan area income will increase originations by approximately 1.14% and that every 1.0% decrease in MSP fares will increase originations by approximately 0.34%. Therefore, the forecast equation says that domestic originations have an income elasticity of 1.14 and a fare elasticity of -0.34.

Projections of the input variables are necessary to use the forecasting equation. Specifically, income projections were obtained from **Table A.8** and fare and yield projections from **Table B.5**. Both tables are found in Appendix A of this report.

Table 2.5 shows the base forecast of scheduled domestic passenger originations prepared using the equation presented above. As shown, base domestic MSP originations are projected to rise from 7.3 million in 2008 to 12.3 million in 2030, an average annual increase of 2.4%. This growth rate is lower than that experienced since 1990 (3.0%). The reduced future growth rate is anticipated to result from slower-than-historical rates of real income growth and from a slight increase in real fares.

There are several assumptions implicit in the base passenger origination forecasts:

- The historical relationship between originations, income, and fares will continue throughout the forecast period. Forces that could disrupt this relationship, such as a return to regulation, severe congestion at destination airports, or the wide-scale use of teleconferencing as a travel alternative, could alter this relationship.

- In accordance with US Department of Energy forecasts, fuel prices will increase over the forecast period, causing fares to increase rather than continue to decline.

- Real income in the extended service area will grow at the rate projected in **Table A.8** in Appendix A.

- The population's distribution of income through the forecast period will be similar to what it is today.

- As a percentage of income, taxes and medical expenses, which are the principal budget items over which households have little control, will not increase sufficiently to affect household or business budgets devoted to air travel.

Originations Resulting from Southwest Airlines Service

Southwest Airlines began to serve MSP directly in March 2009. Many in the aviation industry have noted a phenomenon termed the "Southwest effect" in which the introduction of air service to an airport by Southwest Airlines has resulted in a substantial increase in passenger activity. The principal cause of the increase is the reduction in fares resulting from increased competition. The effect, however, often exceeds the amount that would be expected from the reduction in fares, possibly because of Southwest's high frequency of service, price transparency, and consistent level of service, and because of increases in the size of the catchment area.

TABLE 2.5: BASE FORECAST OF ANNUAL DOMESTIC ORIGINATIONS

Year	Income (thousands of 2007 dollars) (a)	Fare (b)	Originations (c)	Southwest Adjustment Factor (d)	Originations Including Southwest Factor (e)
2006	127,735,714	197.36	7,643,820	-	7,643,820
2007	131,147,791	190.64	7,857,050	-	7,857,050
2008	131,859,584	215.40	7,291,815	-	7,291,815
2009	128,299,375				
2010	129,480,127	188.98	7,468,129	1.03	7,692,173
2015	146,564,763	218.20	8,191,488	1.15	9,420,211
2020	165,854,464	221.79	9,381,527	1.15	10,788,756
2025	187,853,049	224.85	10,765,239	1.15	12,380,025
2030	212,841,334	229.12	12,336,341	1.15	14,186,792
			Average Annual Growth Rate		
2008-2030	2.2%	0.3%	2.4%	n/a	3.1%

(a) Table A.8.
(b) Table B.5.
(c) Projected using following equation:

ORIG = (10^-1.5452)*(INCOME^1.14219)*(FARE^-.34159)*(STRIKE)*(D2001)*(D2002)*(D2004)*(A2008)

where: ORIG = domestic originations
INCOME = 7-county metropolitan income in thousands of 2007 dollars)
FARE = average fare in 2007 dollars, including taxes and fees
STRIKE = instrument variable equal to (10^-.0266) in 1998 during NWA pilot job action, and equal to 1 in all other years.
D2001 = instrument variable equal to 1 prior to 2001, and to (10^-.04316) thereafter
D2002 = instrument variable equal to 1 prior to 2002, and to (10^-.02858) thereafter
D2004 = instrument variable equal to 1 prior to 2004, and to (10^.02318) thereafter
A2008 = adjustment factor of .95257, representing difference between actual 2008 originations and originations projected by the equation.

R-squared = .991
F-statistic = 307.52
Durbin-Watson = 1.93
Degrees of Freedom = 10
T-statistics
intercept = -1.73
INCOME = 16.82
FARE = -2.01
STRIKE = -2.50
D2001 = -3.82
D2002 = -2.81
D2004 = 2.13

(d) Adjustment for Southwest stimulation. Please see text for details.
(e) Originations multiplied by Southwest factor.

Sources: As noted and HNTB analysis.

Table D.1 in Appendix A shows the historical impact of Southwest service on originations at large United States airports. The airports listed include large and medium hub airports where Southwest initiated service after 1990. Detroit is included for comparison, although Southwest began serving the market in the 1980s. Originations in the table are expressed as a share of national originations to net out the impact of changes in the general economy and industry trends. To facilitate comparison, the shares are indexed so that in the two years prior to the introduction of Southwest service, the relative share is set equal to 1.00. In each case, the data series begins the first full year after the introduction of Southwest service. Therefore, all other things being equal, the relative share of United States originations would remain at 1.00 if Southwest service had no impact on originations. The relative share would be greater than 1.00 if Southwest had a positive impact and less than 1.00 if Southwest had a negative impact.

In all cases, the addition of Southwest service caused an airport's share of national originations to increase. In one instance – Cleveland Hopkins International Airport – the relative share eventually dipped below 1.00 again, most likely because of Cleveland's poor record of economic growth relative to the remainder of the country. The increase in share was exceptional in the case of Baltimore Washington International Airport and Fort Lauderdale/Hollywood International Airport, mainly because Southwest was able to capture traffic from other markets – Washington and Miami.

To better evaluate the potential effect on MSP, the analysis was refined to include only airports similar to MSP, i.e., airports that host major connecting operations and whose catchment areas do not substantially overlap that of another major airport. Three airports met those criteria – Denver, Philadelphia, and Cleveland. **Table D.2** in Appendix A shows the results of the analysis, indicating that for the airports most similar to MSP, the average impact of Southwest service was to increase originations by 15% over what they would otherwise have been.

The domestic originations forecasts in **Table 2.5** were adjusted to reflect the anticipated impact of Southwest Airlines service. It was assumed that the effects would be fully realized by 2015. As shown, with the effect of Southwest Airlines included, originations are projected to increase from 7.3 million in 2008 to 14.2 million by 2030, an average annual increase of 3.1%.

2.5.4 DOMESTIC ENPLANEMENT FORECASTS

The forecast of domestic passenger enplanements is a function of the originating passenger forecast and the ratio of enplanements to originations (hubbing ratio). When queried, Delta Air Lines indicated that it did not anticipate a significant change in the ratio between enplanements and connections for its operation at MSP in the short-term. In the longer term, there are a number of national industry factors that are affecting the relationship between enplanements and originations. These include:

- The loss of service at small communities, where the vast majority of passengers connect to their final destination;
- The increase in regional jets, which facilitate point-to-point service for market pairs that had previously been too small to justify non-stop service;
- The proliferation of low-cost carriers that typically provide more point-to-point service than legacy carriers; and
- Faster economic growth in communities served by large and medium hub airports as opposed to small hub airports.

In combination, these forces have caused connections to grow at a slightly lower rate than originations nationally, as shown in **Table E.1** in Appendix A. If this trend is carried forward, the ratio of enplanements to originations will continue to decline, albeit at a slow rate. **Table E.2** in Appendix A shows the projected future hubbing ratio at MSP, assuming that it will decline at the same rate as the national hubbing ratio.

Table 2.6 provides the forecast of domestic enplanements at MSP. The hubbing ratio in **Table E.2** was applied to base originations rather than total originations, since it is not anticipated that the additional originations stimulated by Southwest will lead to additional connecting passengers. As shown in **Table 2.6**, total domestic enplanements at MSP are projected to increase from 15.1 million in 2008 to 25.6 million in 2030, an average annual increase of 2.4%.

2.5.5 DOMESTIC PROJECTIONS BY MARKET

Since one of the end products of this forecast is a detailed fleet mix for use in gate requirements analyses and noise simulation, domestic passenger forecasts were disaggregated by individual market.

Originations by Market

MSP originations in each market were projected to increase from 2007 at the same rate as total domestic MSP originations, adjusted by the relative difference in income growth in the destination markets. As seen in the forecasting equation, there is a strong relationship between income and originations. Therefore, it is reasonable to assume that the relative growth rate in each region's originations to the Twin Cities area will vary in relation to each region's growth in personal income relative to the United States. Woods & Poole Economics was used as the source of income forecasts by market. The individual market originations forecasts were proportionately adjusted as necessary so that they would sum to the forecast of total domestic originations.

The detailed calculations of the market-by-market originations forecast are presented in **Table E.3** in Appendix A**.**

Forecast Of Outbound Passengers by Market

Data for outbound passengers on a market-by-market basis were obtained from the US Department of Transportation's T-100 database, which provides data on total revenue passengers (enplaned plus on-board) for each segment. Outbound passengers include both originating and connecting passengers. This section first discusses assumptions regarding new non-stop markets, and then discusses the methodology for estimating future non-stop outbound passengers.

TABLE 2.6: BASE CASE FORECAST OF DOMESTIC ENPLANEMENTS

Year	Base Originations (a)	Hubbing Ratio (b)	Base Enplanements w/o Southwest (c)	Total Originations (d)	Total Enplanements including Southwest (e)
2006	7,643,820	2.137	16,334,138	7,643,820	16,334,138
2007	7,857,050	2.024	15,903,109	7,857,050	15,903,109
2008	7,291,815	2.069	15,087,389	7,291,815	15,087,389
2010	7,468,129	2.021	15,092,264	7,692,173	15,316,308
2015	8,191,488	1.999	16,377,788	9,420,211	17,606,511
2020	9,381,527	1.978	18,555,194	10,788,756	19,962,423
2025	10,765,239	1.956	21,060,262	12,380,025	22,675,048
2030	12,336,341	1.924	23,729,505	14,186,792	25,579,956
			Average Annual Growth Rate		
2008-2030	2.4%	-0.3%	2.1%	3.1%	2.4%

(a) Table 5. Originations without Southwest Factor.
(b) Table E.2.
(c) Base originations multiplied by Southwest factor.
(d) Table 5. Total originations including Southwest factor.
(e) Base enplanements plus originations resulting from Southwest factor.

Sources: As noted and HNTB analysis.

A critical element of the forecasts is the determination of new non-stop markets. The number of new non-stop markets will affect the number of enplaned passengers and aircraft operations.

Candidate markets for non-stop domestic air carrier service were determined by identifying the current thresholds of total revenue (passengers multiplied by average fare) that justified non-stop service to MSP. A market's total revenue includes revenue from both originating and potential connecting passengers and is therefore a better measure of the market's value to the airline than just originating revenue to MSP. These thresholds are presented in **Table E.4** in Appendix A. Thresholds are lower for nearby markets than for more distant markets because service can be offered with smaller aircraft and because there is less competition from connecting hubs between the two markets. Thresholds of revenue necessary to justify non-stop service were estimated using the average of revenue in the smallest market with non-stop service and the largest market without non-stop service in each mileage band (0-300 miles, 301-500 miles, 501-700 miles, etc.). These thresholds are in large part determined by aircraft capabilities. For example, there is a big jump in the threshold above 1300 miles because that is beyond the capability of most regional jets. Therefore, these more distant markets would need to be large enough to justify mainline aircraft.

In markets to the west of MSP, specifically the rest of Minnesota, the Dakotas, and Montana, MSP is the most realistic connecting hub to most destinations. Since these are essentially "captive" markets, the ratio of connections to originations tends to be very high and the revenue threshold required for non-stop service tends to be lower. This is reflected in **Table E.4** which shows lower thresholds for markets to the west of MSP.

It was assumed that revenue in each market would increase at the same rate as the forecast of MSP originating passengers in that market. New markets that are projected to grow sufficiently to justify non-stop service to MSP are shown in **Table E.4**.

No service stimulation was assumed for originations at new non-stop markets. Experience at other airports indicates that the stimulation effect is less than 10% and often less than 5%. In addition, the historical growth in Twin Cities area originations has been caused, in part, by new non-stop service. Therefore, the forecasting equation implicitly includes the effect of new service stimulation. Including additional service stimulation would result in double counting.

Markets that were most likely to attract non-stop service by Southwest Airlines were identified based on the experience of other Midwest airports with Southwest service. The additional originations resulting from the Southwest effect were distributed proportionately to these markets. These are also identified in **Table E.3** in Appendix A.

The forecasts of outbound domestic passengers by market area are presented in **Table E.3**. Outbound passengers in most markets were estimated by assuming that the ratio of outbound passengers to originating passengers declines at the same rate as the hubbing ratio. Data for outbound passengers were adjusted proportionately where necessary so that the resulting sum of enplanements would equal the total in **Table 2.6**.

The ratio of outbound passengers to originating passengers in new non-stop markets (markets that have had non-stop service for fewer than two years or are projected to obtain non-stop service in the future) was assumed to be the same as in the most similar existing non-hub originating market in the same mileage band.

Load Factor and Seat Departure Forecast

This section discusses the assumptions used to estimate load factor in each market and the calculation of projected annual and daily seat departures in each market.

Over the past several years, the airline industry has experienced a significant increase in the average boarding load factor on both domestic and international flights. The load factor average has increased dramatically, from an average in the mid- to upper-50% range in the early 1980s to close to 80% nationally in 2007. This growth was fueled by a strong economy, coupled with strong travel demand and actions by the airlines to remove capacity from their systems and to use sophisticated yield management procedures. Since national load factors have recently been at historically high levels, the Federal Aviation Administration (FAA) does not project them to go significantly higher.

In existing non-stop markets, load factors were assumed to increase at the projected FAA rate for domestic operations. Load factors in new non-stop markets were assumed to be same as in the most similar existing market in the same mileage band.

Annual scheduled seat departures in each market were estimated by dividing the projections of outbound passengers by the load factor projections. Average annual day (AAD) seat departures were estimated by dividing annual seat departures by 365 days. Detailed calculations of annual and AAD seat departures by market are presented in **Table E.3** in Appendix A.

2.5.6 AIR SERVICE PROJECTIONS

The AAD seat departure projections were translated into projections of scheduled aircraft flights for each market using a set of assumptions regarding airline strategies and available equipment. The service projections are guided by the general assumptions outlined in Section 2.4. Based on previous surveys and discussions with the major airlines operating at MSP, industry publications, and professional experience, additional, more-detailed air service assumptions were developed, as listed below:

- No radical changes in airline strategy for how to serve and compete in markets are assumed.
- The current pattern of airline dominance at other airport hubs and non-hubs is assumed to remain substantially in place.
- Delta Air Lines (including its SkyTeam partners) is assumed to continue to maintain a constant share of the MSP market, after allowance for the expansion of Southwest Airlines.
- As projected by the FAA and Boeing, airlines will continue to emphasize frequency when adding service to meet demand. This means that domestic service will be provided principally by narrow-body air carrier aircraft and regional jets.
- Relaxation of legacy carrier scope clauses will allow their code-sharing regional partners to add regional jets, as necessary, to meet demand.

- Carriers that do not currently provide service to MSP, such as Jet Blue, are assumed to gradually introduce service from their main focus cities.

- Delta Air Lines is assumed to continue Northwest's current directional connecting bank structure.

- The existing relationship between aircraft size and frequency for each distance category was assumed to remain stable through the forecast period unless the frequency exceeded the number of connecting banks.

- The existing connecting bank structure limits the number of Delta Air Lines daily frequencies to medium- and long-haul markets to six, or seven at most. It is assumed that once the frequency limit is reached, Delta will accommodate increases in demand with larger aircraft rather than with increases in frequency.

- Full integration of the Delta and Northwest fleets is assumed by 2015.

- Delta Air Lines is assumed to continue to gradually remove the hush-kitted DC9 aircraft from its fleet, and completely remove them by 2015.

- It is assumed that Delta will phase-out the 757 and MD80 aircraft by 2025.

- It is assumed that the Saab 340 aircraft will be phased out by 2030.

- In the short-term, major growth is expected to occur in the 76-seat CRJ-900 and EMB 175 aircraft fleet.

- Next generation replacement aircraft for the 757 and 737/320 categories are assumed to be available by 2025.

- It is assumed that 50-seat turboprop aircraft will replace the Saab 340 in small short-haul markets.

- Southwest Airlines is assumed to fly Boeing 737-700 aircraft through the forecast period.

- Future schedule information provided by Sun Country was reviewed in estimating future Sun Country markets. Sun Country is assumed to continue to fly Boeing 737-800 aircraft.

- United Airlines is expected to replace its older Boeing 737 aircraft with Airbus 319s and 320s.

- American Airlines is expected to gradually replace its MD-80 aircraft with newer Boeing aircraft, specifically the 737-800.

- Continental is anticipated to replace its older Boeing 737 aircraft with next generation Boeing 737 aircraft.

- Future fleet additions beyond those presently announced by the airlines are assumed to be consistent with current announced fleet expansion plans and existing acquisitions.

- No supersonic, hypersonic, or tilt-rotor aircraft are projected because of poor operating economies and potential noise impacts.

Using the above assumptions for guidance, air service scenarios were developed for each market in each forecast year. The scenarios were developed so that the selected aircraft types and frequencies in combination matched the average annual day (AAD) seat departure projections for that market. Factors considered in each market included historical service patterns, current dominant carriers, aircraft in place and on order, length of haul, and announced plans of current carriers and new entrants. Individual market scenarios are presented in **Table E.5** in Appendix A.

2.5.7 DOMESTIC PASSENGET FORECAST SUMMARY

Table 2.7 summarizes the forecast of domestic passenger enplanements and aircraft operations for MSP. It should be noted that some of the domestic enplanements are international originations departing through another gateway and therefore do not appear as originations in this table.

Table 2.7 also shows the forecast of scheduled domestic aircraft operations. Completed aircraft departures are slightly less than the scheduled aircraft departures identified in **Table E.5**, because, typically, approximately 2-3% of scheduled flights are cancelled for weather, mechanical, or miscellaneous other reasons. As shown, scheduled domestic passenger aircraft departures are projected to increase at 1.5% per year through 2030. **Table E.6** in Appendix A presents the forecast of AAD scheduled aircraft departures by aircraft type.

2.6 INTERNATIONAL PASSENGER FORECASTS

This section discusses the international passenger forecasts, including assumptions, methodologies, and results.

2.6.1 METHODDOLGY, ASSUMPTIONS, AND DATA SOURCES

The methodology used to develop the international passenger forecasts was essentially a top-down approach. The type of bottom-up approach that was used to estimate domestic passenger traffic was not suitable for the international passenger forecast for several reasons. First, origination and destination (O&D) data for passengers flying their entire itinerary on foreign-flag carriers are not available; therefore, the historical record is incomplete. Second, many of the international markets are still being developed, so insufficient historical data exist from which to establish trends. Finally, past international service has been constrained by physical factors, such as distance, and political factors, such as bilateral agreements. These constraints tend to obscure the relationship between traditional drivers of demand, such as income and yield, and international passenger traffic.

TABLE 2.7: FORECAST OF DOMESTIC SCHEDULED PASSENGER AIRCRAFT OPERATIONS AND SEAT DEPARTURES

	2007	2008	2010	2015	2020	2025	2030
Scheduled Aircraft Departures							
Daily (a)	533.3	536.0	547.5	604.4	652.8	706.8	749.8
Annual (b)	194,662	195,655	199,819	220,591	238,272	257,982	273,688
Completed Aircraft Departures							
Annual (c)	194,254	189,304	193,333	213,431	230,538	249,608	264,804
Ratio (Completed to Scheduled) (d)	0.998	0.968	0.968	0.968	0.968	0.968	0.968
Completed Aircraft Operations (e)	388,508	378,273	386,666	426,862	461,076	499,216	529,608
Scheduled Aircraft Seat Departures							
Daily (a)	56,442	54,204	54,901	62,677	70,595	79,356	89,061
Annual (b)	20,601,474	19,784,490	20,038,792	22,877,112	25,767,073	28,964,772	32,507,126
Seats per Departure (f)	105.8	101.1	100.3	103.7	108.1	112.3	118.8
Enplanements (g)	15,903,109	15,087,389	15,316,308	17,606,511	19,962,423	22,675,048	25,579,956
Enplanements per Departure (h)	81.9	79.7	79.2	82.5	86.6	90.8	96.6

(a)Table E.6
(b) Daily activity multiplied by 365 days.

(c) Existing departures from MSP Monthly Summary Reports. Future completed departures estimated by multiplying scheduled departures by completion ratio.
(d) Assumed to remain constant at 2008 levels.
(e) Completed aircraft departures multiplied by 2.
(f) Scheduled seat departures divided by scheduled aircraft departures.
(g) Table 6.
(h) Enplanements divided by completed aircraft departures.

Sources: As noted and HNTB analysis.

A top-down approach provides an opportunity to exploit the research and analysis into international travel conducted by the Federal Aviation Administration (FAA), and major aircraft manufacturers, such as Boeing and Airbus. These organizations have resources available to investigate the factors driving international demand, and are able to incorporate the findings into their forecasts. The selected top-down approach can be summarized as follows:

1. Develop forecasts of United States international passenger traffic by major region.
2. Estimate future Twin Cities share of United States international passenger originations in each region.
3. Estimate future Twin Cities international passenger enplanements from originations forecast.
4. Disaggregate regional forecasts into individual markets.
5. Identify potential new non-stop markets.
6. Develop passenger forecasts by market.
7. Estimate future load factor.
8. Project future seat departures by market using the passenger and load factor forecasts.
9. Estimate the most probable way that airlines would accommodate the seat departure forecast in terms of aircraft type and scheduled frequency.
10. Convert the passenger forecast to enplanements using local airport enplanement data.
11. Convert the scheduled aircraft departure forecast to actual departures using historical departure completion data.

The methodology will be described in greater detail in subsequent sections of this report.

The following data sources were used in the analysis:

- FAA, Boeing, and Airbus international projections.
- US Department of Transportation (USDOT) International Schedule T-100 database.
- USDOT International O&D Survey.
- OAG information on scheduled operations, which was used to determine current scheduled service.
- The Official Airline Guide (OAG), and JP Airline-Fleets International guide, which were used to determine aircraft seat configurations for each airline.
- JP Airline-Fleets International and other industry publications, which were used to gather information on airline fleet orders.

2.6.2 FORECASTS BY INTERNATIONAL REGION

Table F.1 in Appendix A presents a comparison of international forecast growth rates developed by the FAA, Boeing, and Airbus. The projections show agreement in some areas, such as Europe, but vary in other regions. For example, Airbus is more optimistic about Middle East travel than Boeing, while Boeing is more optimistic about South America and Oceania.

A consensus forecast was developed for each region using the average of the forecast indexes from the three organizations. Based on the consensus forecast, Oceania and the Middle East are expected to grow most rapidly, followed by Asia, South America, and Africa. More mature markets, such as Europe, Canada and Mexico and Central America, are expected to grow more slowly.

2.6.3 MSP FORECASTS BY REGION

The estimated existing breakout of international originations from MSP by world region is provided in **Table F.2** in Appendix A. The estimate is complicated by two factors. First, foreign-flag carriers are not required to submit originating data to the USDOT. Secondly, international originating data submitted by the United States-flag carriers are restricted, and cannot be published publicly. The estimates in **Table F.2** were prepared by adding estimated foreign-flag originations (based on a percentage of enplanements) to the USDOT originating passenger numbers. The two largest international markets are Europe and Mexico and Central America, followed by Asia, Canada, and the Caribbean.

Table F.3 in Appendix A shows projected MSP international originations. The basis for the projections is the regional growth rates from **Table F.1** with two adjustments. First, the 2009 projections were adjusted downward to reflect Delta Air Lines' planned international capacity reductions in response to the recession. Secondly, the growth rates in **Table F.1** were adjusted to reflect the difference in estimated Twin Cities income growth and United States income growth. As shown, total international originations at MSP are projected to rise from slightly less than 1.0 million in 2008 to 2.4 million by 2030.

2.6.4 MSP INTERNATIONAL ENPLANEMENT FORECASTS

Similar to the domestic forecast approach, future international passenger enplanements were estimated by applying a hubbing ratio to the forecast of international originations. The international hubbing ratio has been increasing in recent years. However, there is a question as to whether this increase can be sustained given Delta's acquisition of Northwest, because of its heavy investment in international facilities at Atlanta and New York JFK. In addition, international enplanements are heavily dependent on domestic connecting passengers and will be sensitive to trends in that segment. For these reasons, it was assumed that the future international hubbing ratio would change at the same rate as the domestic hubbing ratio, and therefore decline slightly in the future. **Table E.4** of Appendix A shows the estimated future international ratio of enplanements to originations and **Table 2.8** shows the future forecast of international enplanements at MSP. Total international enplanements are projected to increase from about 1.3 million in 2008 to 2.8 million in 2030, an average annual increase of 3.7%.

TABLE 2.8: FORECAST OF INTERNATIONAL ENPLANEMENTS BASE CASE

Year	International Originations (a)	International Hubbing Ratio (b)	International Enplanements (c)
2006	888,697	0.780	692,757
2007	951,196	1.031	980,460
2008	963,631	1.312	1,264,507
2010	959,808	1.230	1,180,400
2015	1,210,171	1.217	1,472,452
2020	1,525,839	1.204	1,836,550
2025	1,923,847	1.191	2,290,408
2030	2,425,675	1.171	2,839,469
	Average Annual Growth Rate		
2008-2030	4.3%	-0.5%	3.7%

(a) Table F.3.
(b) Table F.4.
(c) Originations multiplied by international hubbing ratio.

Sources: As noted and HNTB analysis.

2.6.5 INTERNATIONAL PASSENGER PROJECTIONS BY MARKET

This section discusses the forecasts of MSP international passengers, first in markets with existing non-stop service, then in potential new markets.

Existing Markets

International originations in existing and potential non-stop markets were projected to increase at the same rate as the consensus growth indexes for each region developed in **Table F.1**. Details of the calculations are presented in **Table F.5**. Both of these tables are found in Appendix A of this report.

New Markets

Similar to the methodology used for domestic markets, passenger thresholds were used to identify potential new international non-stop markets. The process was more difficult because international originating passenger data are not available for foreign-flag carriers. Therefore, several threshold criteria were used to estimate new markets. The methodology involved the following steps:

1. *Identify originating passenger thresholds for non-stop service in each region*. Thresholds will vary by region because: a) shorter-haul markets require smaller aircraft and thus reduce the required threshold; and b) the direction of the market will determine how much connecting traffic can logically be funneled through the MSP gateway, thereby reducing the required originating passenger percentage. For example, most East Coast United States passengers can fly to Asia or western Canada via MSP with relatively little increase in circuity. However, those same passengers would incur much greater circuity if they were to use MSP as a gateway to Europe. Originations in each potential market were assumed to grow at the rates in **Table F.3** to determine if and when they would exceed the threshold.

2. *Identify seat departure thresholds for non-stop service to each region*. As a crosscheck on the passenger data, seat departures from all United States gateways to international markets were identified. Similar to Step 1, the threshold for new service in each region was assumed to be the average of the smallest market (measured in terms of seat departures) with non-stop MSP service and the largest market without non-stop MSP service. Scheduled seat departures in each potential market were assumed to grow at the rates in **Table F.3** to determine if and when they would exceed the threshold. **Table F.6** in Appendix A shows the seat departure thresholds by region.

3. *Identify thresholds for regions with no existing service.* Some regions, such as Africa or China, have insufficient service history from which to identify originating passenger thresholds. In these instances, thresholds were adopted from other regions based on similar distance and circuity characteristics. For example, European thresholds were used for Africa.

4. *Estimate new non-stop markets*. Information from the two sets of threshold criteria was integrated to estimate new non-stop markets. In general, any market that satisfied both threshold criteria was assumed to gain new non-stop service in the year in which those criteria were reached.

The new non-stop markets that were estimated using the above approach are listed in **Table F.5**. These projections are the best estimate of new market potential given available information. It is acknowledged that additional factors such as local economic trends, political circumstances, airline strategies, and market development initiatives may serve to either accelerate or delay the introduction of non-stop service to the markets listed in the Appendix.

Load Factor and Seat Departure Forecast

The load factor projections vary by market. Load factors in each region were projected to increase at the same rate as the Federal Aviation Administration forecast load factor for that region. Projected seat departures in each market were estimated by dividing the passenger projections by the load factor. Annual scheduled international seat departures at MSP are presented in **Table F.5**. As shown, total scheduled international seat departures are projected to increase from 1.65 million in 2008 to 3.75 million by 2030. Average annual day (AAD) seat departures were estimated by dividing by 365 days.

2.6.6 AIR SERVICE PROJECTIONS

The procedure used to allocate international passenger activity to airlines and aircraft equipment was similar to that used for the domestic air service projections. The following assumptions were used to guide the process:

- Annual aircraft departures and aircraft types were projected to be consistent with the AAD seat departure forecast for each market, as presented in **Table F.5**.
- The trend toward more Open Skies agreements is assumed to continue.
- No radical changes in airline strategy for how to serve and compete in markets is assumed.
- The current pattern of airline dominance at other airport hubs and gateways is assumed to remain in place.
- The current airline alliance structure is assumed to remain intact. Thus, SkyTeam members and code-sharing partners are expected to be more likely to provide service at MSP than other foreign-flag carriers.
- Except where noted, sufficient airport expansion in Europe and the Far East is anticipated to accommodate market demand.
- Delta Air Lines is assumed to serve its overseas international markets with A-330s, Boeing 777s and Boeing 787s.
- Next generation replacement aircraft for the 757 and 737/320 categories are assumed to be available by 2025.
- Future fleet additions beyond those presently announced by the airlines are assumed to be consistent with current announced fleet expansion plans and existing acquisitions.

- No supersonic, hypersonic, or tilt-rotor aircraft are projected because of poor operating economies and potential noise impacts.

The air service projections for each international market are outlined in detail in **Table F.7** in Appendix A. Projecting individual flights over an 11-year forecast horizon is an ambitious undertaking. The air service scenarios presented in **Table F.7** are considered reasonable and plausible, given the available information. However, it is acknowledged that actual service patterns may deviate from those projected, and that these deviations could be material.

2.6.7 SUMMARY

Table 2.9 summarizes the unconstrained international scheduled passenger and aircraft operation forecasts. Total international enplanements are projected to increase from 1.3 million in 2008 to 2.8 million in 2030. Completed international aircraft operations are projected to increase from 24,074 in 2008 to 47,074 in 2030, an average annual increase of 3.1%.

Table F.8 in Appendix A shows the scheduled international passenger fleet mix forecast. Although an increase in wide-body operations is anticipated, narrow-body aircraft operations to Canadian, Mexican and Caribbean markets are projected to account for the majority of the total.

2.7 CHARTER ENPLANEMENTS AND AIRCRAFT OPERATIONS

The forecast of charter (non-scheduled) passenger enplanements and aircraft operations is discussed in this section.

2.7.1 CHARTER PASSENGERS

Good historical data on charter activity are difficult to obtain and, therefore, it is not possible to develop a forecast using regression analysis or trend analysis. The Federal Aviation Administration does not publish forecasts of national charter activity so a share analysis is not possible either. Typically, charter operators cater to tour groups traveling to leisure destinations or to sports teams traveling to road games. Airport counts of charter passengers have declined significantly in recent years at MSP. This can be attributed to several factors:

- Sun Country, which has accounted for the majority of past charter operations at MSP, has placed more of an emphasis on scheduled operations, although in many instances to the same markets where it offered charter service.
- Some major charter operators, such as Champion, have ceased operations.
- Northwest's (now Delta) Amigo flights to Mexico have cut into traditional charter markets. These are assumed to continue under Delta in the future.
- Continued price reductions by legacy carriers have diminished the price advantage that charter carriers can offer.

There is little indication that any of the above factors will be reversed. The entry of low-fare service by Southwest Airlines will place additional pressure on charter operators. For these reasons, the historical decline in charter passengers is projected to continue. The rate of decline is assumed to be moderate, however, given that the effect of most of the above factors has been realized already.

TABLE 2.9: FORECAST OF INTERNATIONAL SCHEDULED PASSENGER AIRCRAFT OPERATIONS AND SEAT DEPARTURES

	2008	2010	2015	2020	2025	2030
Scheduled Aircraft Departures						
Daily (a)	34.1	33.5	40.6	45.9	56.3	66.5
Annual (b)	12,429	12,224	14,826	16,764	20,531	24,265
Completed Aircraft Departures						
Annual (c)	12,056	11,857	14,381	16,261	19,915	23,537
Ratio (Completed to Scheduled) (d)	0.970	0.970	0.970	0.970	0.970	0.970
Completed Aircraft Operations (e)	24,074	23,714	28,762	32,522	39,830	47,074
Scheduled Aircraft Seat Departures						
Daily (a)	4,530	4,398	5,403	6,738	8,384	10,248
Annual (b)	1,653,480	1,605,168	1,971,971	2,459,202	3,059,985	3,740,418
Seats per Departure (f)	133.0	131.3	133.0	146.7	149.0	154.1
Enplanements (g)	1,264,507	1,180,400	1,472,452	1,836,550	2,290,408	2,839,469
Enplanements per Departure (h)	104.9	99.6	102.4	112.9	115.0	120.6

(a) Table F.8.
(b) Daily activity multiplied by 365 days.
(c) Existing departures from MSP Monthly Summary Reports. Future completed departures estimated by multiplying scheduled departures by completion ratio.
(d) Assumed to remain constant at 2008 levels.
(e) Completed aircraft departures multiplied by 2.
(f) Scheduled seat departures divided by scheduled aircraft departures.
(g) Table 8.
(h) Enplanements divided by completed aircraft departures.

Sources: As noted and HNTB analysis.

Table G.1 in Appendix A shows the forecast of charter enplanements. The forecast assumes that Sun Country continues operating principally as a scheduled carrier. Total charter enplanements are projected to decline from about 32,000 in 2008 to about 12,000 in 2030. The current split between domestic and international passengers is projected to continue.

2.7.2 CHARTER AIRCRAFT OPERATIONS

Tables G.2 and **G.3** in Appendix A show the derivations of domestic and international charter aircraft operations from the passenger forecast. The tables also show the forecast fleet mix. Passenger aircraft departures for charter carriers were estimated as follows:

1. Assume constant load factors since they are already at very high levels.
2. Project total charter seat departures by dividing forecast enplanements by the projected load factor.
3. Estimate future fleet mix based on existing carrier fleets and available information on aircraft acquisition plans.
4. Calculate average seats per aircraft from the future fleet mix.
5. Divide forecast seat departures by projected seats per aircraft to generate projected charter aircraft departures and operations.

No attempt was made to forecast charter activity by market. **Table G.4** in Appendix A summarizes the forecast of charter aircraft operations. As shown, total passenger charter aircraft operations are projected to decline from 536 in 2008 to 218 in 2030. Narrow-body aircraft are forecast to continue to account for the vast majority of charter operations.

2.8 SUMMARY OF PASSENGER FORECASTS

Table 2.10 summarizes the scheduled and non-scheduled domestic and international passenger enplanement forecasts. Total enplanements at MSP are projected to increase from 16.4 million in 2008 to 28.4 million in 2030, an average annual increase of 2.5%.

Many facility requirements are dependent on peak hour activity. **Tables H.1** through **H.6** in Appendix A provide domestic and international peak month, average weekday peak month, and peak hour estimates of enplaning, deplaning, originating and terminating passengers. These estimates were organized by SkyTeam, Southwest, and other airline categories.

The distribution of passengers by airline was in accordance with the distribution of scheduled seat departures that resulted from the market projections in **Tables E.5** and **F.7**. The peak month shares of passengers in the domestic and international categories were assumed to remain constant. However, since the categories are projected to grow at different rates, the combined peak month percentage changes slightly. Because international activity, which peaks in March, is expected to grow more quickly than domestic activity, which peaks in July, the peak month for overall airport activity is expected to eventually shift from July to March.

Because the connecting bank structure for Delta Air Lines is expected to remain the same, the percent of daily passenger activity occurring during the peak hour was assumed to remain

TABLE 2.10: FORECAST OF ANNUAL DOMESTIC AND INTERNATIONAL DEPARTURES

Year	Domestic (a)	International (b)	Charter (c)	Total
2006	16,334,138	692,757	151,412	17,178,307
2007	15,903,109	980,460	85,515	16,969,084
2008	15,087,389	1,264,507	32,376	16,384,272
2010	15,316,308	1,180,400	29,677	16,526,385
2015	17,606,511	1,472,452	23,872	19,102,835
2020	19,962,423	1,836,550	19,203	21,818,176
2025	22,675,048	2,290,408	15,447	24,980,903
2030	25,579,956	2,839,469	12,425	28,431,850
		Average Annual Growth Rate		
2008-2030	2.4%	3.7%	-4.3%	2.5%

(a) Table 6.
(b) Table 8.
(c) Table G.1.

Sources: As noted and HNTB analysis.

constant for the SkyTeam airlines. As of this writing, Southwest Airlines is just beginning its operation at MSP, so there are no historical data upon which to base peak hour percentage. A 10% peak percentage was assumed for Southwest, suggesting an operation that is fairly evenly spread throughout the day, which is typical of the way Southwest operates at most airports. The peak hour percentage for other airlines was also assumed to remain constant. However, in the case of non-SkyTeam international passengers, the seasonal distribution of activity was assumed to become more evenly distributed than is currently the case. It is not expected that other new entry international carriers will have the same pronounced spike of activity in March that Sun Country currently experiences.

2.9 AIR CARGO TONNAGE AND AIRCRAFT OPERATIONS

The forecasts of air cargo tonnage and related all-cargo aircraft operations are discussed in this section.

Table I.1 in Appendix A shows historical enplaned air cargo, including both freight and mail, at MSP from 1990 through 2008. In the early part of the decade FedEx won a major postal service contract to carry mail and includes mail with cargo when reporting statistics. Hence, the apparent recent downturn in air mail at MSP is mostly an artifact of changes in reporting practices. Air cargo tonnage at MSP grew rapidly in the 1980s and then at a slower rate through 1997. It has since declined, in part because of the stricter security restrictions imposed after the September 11, 2001 terrorist attacks. The stricter security restrictions have led to an especially sharp downturn in air cargo carried on passenger carriers. Cargo carried on all-cargo carriers continued to increase through 2004 but has since declined.

2.9.1 AIR CARGO TONNAGE

As noted earlier, some carriers have ceased distinguishing between air mail and air freight when reporting their statistics. Consequently, the forecast contained herein combines freight and mail into a single air cargo category. All statistics are presented in short tons (2000 pounds per ton).

Table I.1 shows the forecasts of air cargo at MSP. There are two main categories of air cargo tonnage: 1) cargo carried on passenger aircraft (belly cargo); and 2) cargo carried on dedicated all-cargo aircraft. Separate approaches were developed to forecast each category.

Forecasts of belly cargo activity are based in part on Federal Aviation Administration (FAA) forecasts of revenue ton miles (RTMs) of air cargo traveling on domestic passenger carriers. An index was developed which related the FAA forecast of RTMs on domestic passenger carriers to the forecast of Available Seat Miles (ASM) for domestic air carriers. This ratio provided the expected future relationship of cargo to available seats. This index was then applied to the forecasts of scheduled seat departures prepared in Sections 2.5 and 2.6 to produce a belly cargo forecast for MSP.

As shown in **Table I.1**, enplaned belly cargo is projected to increase from 24,179 tons in 2008 to 35,701 tons in 2030, an average annual increase of 1.8%. Although this represents an increase from base year levels, it is still well below the belly cargo tonnages experienced in the 1990s. Increased security restrictions and strong competition from the dedicated all-cargo carriers will make it difficult for passenger carriers to recapture market share.

All-cargo carrier air cargo tonnage was estimated as a share of the FAA forecast of domestic all-cargo RTMs. All-cargo carrier tonnage at MSP roughly paralleled United States all-cargo carrier RTMs in the 1990s but has declined since 2003. The MSP share was assumed to continue to decline but at half the rate of the recent past, reflecting a combination of long-term and short-term historical rates. Enplaned all-cargo tonnage is forecast to increase from 102,508 tons in 2008 to 143,943 tons in 2030, an average annual increase of 1.6%.

Table 2.11 summarizes the cargo tonnage forecast. The ratio of deplaned to enplaned cargo tonnage was assumed to equal the 2007-2008 average in the future. Combined belly and all-cargo carrier enplaned tonnage is forecast to increase at an average annual rate of 1.6% from 126,687 tons in 2008 to 179,643 tons in 2030.

2.9.2 ALL-CARGO AIRCRAFT OPERATIONS

Table I.2 in Appendix A presents the forecast of all-cargo aircraft operations and fleet mix.

The future all-cargo carrier fleet mix was estimated based on available information on future aircraft acquisition plans by the carriers serving MSP. The average lift capacity per aircraft operation was estimated from the projected fleet mix and future all-cargo carrier aircraft departures were estimated by dividing total all-cargo carrier lift capacity by the capacity per aircraft. No attempt was made to forecast cargo activity by market.

Total all-cargo aircraft operations are projected to rise from 14,361 in 2008 to 18,834 in 2030, an average annual rate of 1.2%.

2.10 GENERAL AVIATION AND MILITARY OPERATIONS

This section discusses the forecast of general aviation and military operations.

2.10.1 GENERAL AVIATION

In contrast to commercial activity at MSP, general aviation (GA) activity has been declining in the long-term. This mirrors the experience at many other major airports, where many GA operators have relocated to reliever airports to avoid the congestion generated by scheduled commercial operations.

The Minneapolis-St. Paul Reliever Airports: Activity Forecasts – Technical Report for the MAC Reliever Airport System provides much of the basis of the GA forecast for MSP. The report was selected because it was performed on a system basis, and therefore takes into account the interactions resulting from the differing growth rates among the Twin Cities counties and the differing capabilities and capacities of the airports in the system.

Table 2.12 shows the based aircraft forecast for MSP, which comes from the Reliever Airport forecasts. Based on available hangar facilities, the maximum capacity was estimated at 30. Based aircraft in each category were projected to grow at national trends, adjusted for local factors, until the capacity limit was achieved. As shown, all based aircraft are anticipated to be jets, as is the case currently.

TABLE 2.11: ENPLANED AND DEPLANED AIR CARGO (SHORT TONS)

	Passenger Carrier (a)			Cargo Carrier (a)			Total		
Year	Enplaned	Deplaned	Total	Enplaned	Deplaned	Total	Enplaned	Deplaned	Total
2007	25,124	28,745	53,870	116,058	113,849	229,908	141,182	142,595	283,777
2008	24,179	27,412	51,591	102,508	103,018	205,526	126,687	130,430	257,116
2010	23,298	26,537	49,834	108,379	107,537	215,915	131,677	134,073	265,750
2015	25,603	29,162	54,765	118,759	117,836	236,595	144,362	146,998	291,360
2020	31,627	36,023	67,650	127,749	126,756	254,506	159,376	162,780	322,156
2025	43,274	49,290	92,565	135,617	134,563	270,180	178,891	183,853	362,745
2030	66,129	75,322	141,451	143,943	142,824	286,767	210,071	218,146	428,217
Average Annual Growth Rate									
	4.7%	4.7%	4.7%	1.6%	1.5%	1.5%	2.3%	2.4%	2.3%

(a) Table I.1 and MSP Monthly Summary Reports. Deplaned cargo assumed to increase at same rate as enplaned cargo.

Sources: As noted and HNTB analysis.

TABLE 2.12: SUMMARY OF BASED AIRCRAFT FORECAST

Year	Single Engine Piston	Multi-Engine Piston	Turboprop	Microjets	Other Jets	Helicopter	Other (b)	Total
2008	0	0	0	0	24	0	0	24
2010	0	0	0	1	26	0	0	27
2015	0	0	0	1	29	0	0	30
2020	0	0	0	1	29	0	0	30
2025	0	0	0	1	29	0	0	30
2030	0	0	0	1	29	0	0	30
Average Annual Growth Rate								
2008-2030	-	-	-	-	0.9%	-	-	1.0%

Source: Table G.6 in Minneapolis-St. Paul Reliever Airports: Activity Forecasts - Technical Report.

Table J.1 in Appendix A shows the MSP forecast of GA operations based on the methodology in the Reliever Airport forecast. As shown, even with the constraint on based aircraft, the anticipated increase in jet aircraft utilization results in growing forecast of GA aircraft operations. The Reliever Airport methodology addresses hangar capacity but does not address airfield capacity and delay.

Table 2.13 shows the recent history of GA operations at MSP and compares it to the FAA count of itinerant GA operations in the United States. As shown, MSP GA activity, as a share of the United States, has been consistently declining. GA activity in the United States rose in the late 1990s but then declined as a result of the recession and the September 11th attacks. Since 2001, United States GA activity (itinerant operations) has been relatively constant. The FAA predicts that GA will begin to grow again in the near future based on the following assumptions:

- Moderate sustained economic growth;
- No dramatic changes in the GA regulatory environment; and
- Increased growth in the fractional ownership market, which brings new owners and operators into business aviation.

Table 2.13 shows the MSP GA forecast if the airport share of United States GA activity accounted for by the airport is assumed to continue to decline at historical rates.

As shown, under this assumption, GA operations would decline at a -1.7% annual rate to slightly over 21,000 by 2030.

The Reliever Airport methodology accounts for the anticipated stimulation resulting from the higher utilization of jet aircraft while the United States share methodology captures the ongoing trend of GA operators diverting their aircraft from MSP to one of the regional reliever airports. The recommended forecast incorporates both trends by taking the average of the two methodologies. As shown in **Table 2.13**, based on the average, total GA operations are projected to increase slightly from 30,685 in 2008 to 32,988 in 2030, an average annual increase of 0.3% per year.

Forecast operations by aircraft type are shown in **Table J.1**. Based on current practices at MSP, all these operations are projected to be itinerant operations. Operations in each GA aircraft category were assumed to grow at the same rate as the FAA's forecast of hours flown in that category. The results were then adjusted on a prorated basis to sum to the original forecast of GA aircraft operations. The result, as shown in the table, is a slight increase in jet operations through 2030, while turboprop and piston operations decrease.

2.10.2 MILITARY

Military operations are related to national and international political and institutional factors rather than local economic conditions. The number of military operations at MSP decreased during most of the 1980s and early 1990s and then leveled off after a spike in activity in 2001. Due to the uncertainties enumerated above and consistent with the principal trend occurring since 1990, military operations are assumed to remain constant at 2008 levels throughout the forecast period. This assumption is consistent with FAA forecasts of national military activity. However, future national defense actions could increase or decrease future military operations.

TABLE 2.13: FORECAST OF ANNUAL GENERAL AVIATION OPERATIONS

Year	FAA Itinerant GA Ops (000's) (a)	Ratio of MSP Operations to US Operations (b)	MSP Operations from Ratio Method (c)	MSP Operations from Reliever LTCP	Average (e)
1995	20,860	2.39	49,769		
1996	20,823	2.39	49,786		
1997	21,669	2.96	64,209		
1998	22,086	3.61	79,757		
1999	23,019	2.14	49,256		
2000	22,844	2.54	58,076		
2001	21,433	2.14	45,943		
2002	21,451	2.06	44,279		
2003	20,231	1.95	39,513		
2004	20,007	1.95	39,018		
2005	19,315	1.89	36,472		
2006	18,741	2.00	37,459		
2007	18,577	1.65	30,562		
2008	18,637	1.65	30,685	30,685	30,685
2010	19,298	1.57	30,291	32,793	31,542
2015	20,928	1.32	27,569	39,140	33,354
2020	22,839	1.11	25,250	41,413	33,331
2025	24,951	0.93	23,150	43,289	33,220
2030	27,063	0.78	21,073	44,903	32,988
			Average Annual Growth Rate		
2008-2030	1.7%	-3.3%	-1.7%	1.7%	0.3%

(a) FAA Aerospace Forecasts: Fiscal Years 2008-2025.

(b) Ratio of MSP GA operations to thousands of US operations. Assumed to change at historical rate in the future.

(c) Historical from Table 4. Future estimated by multiplying FAA forecast by ratio of MSP operations to US operations.
(d) Unconstrained GA forecasts estimated using methodology in Minneapolis-St. Paul Reliever Airports: Activity Forecasts - Technical Report.
(e) Average of Ratio and LTCP methods.

Sources: As noted and HNTB analysis.

Table 2.14 shows the forecast of military operations. As shown, annual operations are projected to remain constant at 2,115.

2.11 SUMMARY OF ANNUAL FORECASTS

This section summarizes the passenger and aircraft operation forecasts.

Table 2.15 provides a summary of the passenger forecasts. Total revenue enplanements are forecast to increase from 16.4 million in 2008 to 28.4 million in 2030, an average annual increase of 2.5%. Originating passengers are projected to increase from 8.3 million to 16.6 million over the same period. As a percentage of enplanements, originations are projected to increase, but with the majority of the increase occurring in the early part of the period as a result of Southwest's entry into the market. The percentage of enplanements accounted for by originations is expected to increase from 51% in 2008 to 58% by 2030.

Table 2.16 summarizes the unconstrained forecast of aircraft operations at MSP. Total aircraft operations are estimated to increase from 450,044 in 2008 to 630,837 in 2030, an average annual increase of 1.5%. The scheduled passenger operation categories are projected to grow the most rapidly, and air cargo, general aviation, and military aircraft operations are projected to grow slowly.

2.12 FORECAST SCENARIOS

The assumptions used in developing the forecasts are likely to vary over the forecast period, and the variations could be material. One way to explore the impact of these variations is to develop alternative scenarios in which the impact on the forecast of a variation in a critical assumption is evaluated. The base case forecast provides the basis for determining what additional facilities will be required at the airport through 2030. The airport must be able to respond to a range of contingencies that could occur, taking into account political and economic changes, technological changes, and changes in individual airline policies. The recommended development program must be flexible enough to accommodate these contingencies.

To address these potential changes, four alternative forecast scenarios were selected with the assistance of airport staff. Much of the background information used to develop the scenarios is provided in previous chapters; except where noted, the assumptions are the same as those presented in section 2.4. The four scenarios are:

Scenario 1 – High Fuel Cost. This scenario assumes that jet fuel costs to the airlines increase significantly, either as a result of increased demand/supply imbalances, or stringent environmental restrictions, such as a cap and trade program or a carbon tax. The cost of jet fuel is assumed to increase to $4.50 per gallon after the recession ends and then continue to increase at 2% per year thereafter. This would cause air fares to rise and passenger demand to fall. As detailed in **Table K.2**, in Appendix A, total enplanements would rise slowly to 21.4 million by 2030, an average annual increase of 1.2%. Total operations would increase to 514,042 in 2030, an average annual rate of 0.6% per year. Because of the low growth, it is assumed that under this scenario Delta Air Lines would consolidate its connecting activity among fewer hubs and, therefore, the connecting percentage at MSP would decline more than in the base case.

TABLE 2.14: FORECAST OF ANNUAL MILITARY AIRCRAFT

Year	Total (a)
1990	2,804
1991	2,534
1992	3,003
1993	2,825
1994	2,451
1995	2,915
1996	2,624
1997	3,624
1998	2,044
1999	3,358
2000	2,473
2001	3,180
2002	2,543
2003	1,856
2004	1,976
2005	2,230
2006	2,040
2007	2,289
2008	2,115
2010	2,115
2015	2,115
2020	2,115
2025	2,115
2030	2,115
Average Annual Growth Rate	
2008-2030	0.0%

(a) Table 4 for historical data. Assumed to remain constant in future.

Sources: As noted and HNTB analysis.

TABLE 2.15: SUMMARY OF BASE CASE PASSENGER FORECAST

	2007	2008	2010	2015	2020	2025	2030	Average Annual Growth Rate
Enplanements								
Domestic Scheduled Air Carrier (a)	15,903,109	15,087,389	15,316,308	17,606,511	19,962,423	22,675,048	25,579,956	2.4%
International Scheduled Air Carrier (b)	980,460	1,264,507	1,180,400	1,472,452	1,836,550	2,290,408	2,839,469	3.7%
Subtotal Scheduled	16,883,569	16,351,896	16,496,708	19,078,963	21,798,973	24,965,456	28,419,425	2.5%
Domestic Charter (c)	41,874	16,990	15,574	12,527	10,077	8,106	6,520	-4.3%
International Charter(c)	43,641	15,386	14,103	11,345	9,126	7,341	5,905	-4.3%
Subtotal charter	85,515	32,376	29,677	23,872	19,203	15,447	12,425	-4.3%
Total	16,969,084	16,384,272	16,526,385	19,102,835	21,818,176	24,980,903	28,431,850	2.5%
Originations								
Domestic Scheduled Air Carrier (a)	7,857,050	7,291,815	7,692,173	9,420,211	10,788,756	12,380,025	14,186,792	3.1%
International Scheduled Air Carrier (b)	951,196	963,631	959,808	1,210,171	1,525,839	1,923,847	2,425,675	4.3%
Subtotal Scheduled	8,808,246	8,255,446	8,651,981	10,630,382	12,314,594	14,303,872	16,612,467	3.2%
Domestic Charter (d)	41,874	16,990	15,574	12,527	10,077	8,106	6,520	-4.3%
International Charter(d)	43,641	15,386	14,103	11,345	9,126	7,341	5,905	-4.3%
Subtotal charter	85,515	32,376	29,677	23,872	19,203	15,447	12,425	-4.3%
Total	8,893,761	8,287,822	8,681,658	10,654,254	12,333,797	14,319,319	16,624,892	3.2%

(a) Table 6.
(b) Table 8.
(c) Table G.1.
(d) Assumed to be the same as enplanements.

Sources: As noted and HNTB analysis.

TABLE 2.16: SUMMARY OF FORECAST AIRCRAFT OPERATIONS

	2007	2008	2010	2015	2020	2025	2030	Average Annual Growth Rate
Domestic Scheduled Air Carrier (a)	388,508	378,273	386,666	426,862	461,076	499,216	529,608	1.5%
International Scheduled Air Carrier (b)	14,889	24,074	23,714	28,762	32,522	39,830	47,074	3.1%
Charter (c)	1,432	536	542	440	352	276	218	-4.0%
All-Cargo Carrier (d)	15,292	14,361	14,902	16,136	17,540	18,192	18,834	1.2%
General Aviation and Air Taxi (e)	30,562	30,685	31,542	33,354	33,331	33,220	32,988	0.3%
Military (f)	2,289	2,115	2,115	2,115	2,115	2,115	2,115	0.0%
Total	452,972	450,044	459,481	507,669	546,936	592,849	630,837	1.5%

(a) Table 7.
(b) Table 9.
(c) Table G.4.
(d) Table I.2.
(e) Table 13.
(f) Table 14.

Sources: As noted and HNTB analysis.

Scenario 2 – Low Fuel Cost. This scenario assumes that jet fuel costs to the airlines decrease in real terms, either as a result of increased supply or the accelerated availability of alternative fuels such as biofuels. The real cost of jet fuel is assumed to decrease by 2% per year from early 2009 levels. This would cause air fares to fall and passenger demand to increase. As detailed in **Table K.3**, in Appendix A, total enplanements would rise slowly to 31.1 million by 2030, an average annual increase of 3.0%. Total operations would increase more slowly to 697,815 in 2030, an average annual rate of 2.0% per year.

***Scenario 3 – High Economic Growth*.** This scenario assumes a full recovery from the current economic recession, to the extent that post-recession growth is sufficient to offset the losses of the recession and restore income levels to where they would be absent the recession. **Table K.4** in Appendix A shows that in this scenario, passenger enplanement would increase to 30.7 million by 2030, an average annual increase of 2.9%. Total operations are projected to increase 2.0% per year to 688,431 by 2030.

Scenario 4 – Declining Connecting Ratio. This scenario assumes the same originating passenger forecast as the base case, but also assumes that Delta Air Lines reduces the size of the MSP connecting operation. The connecting ratio is assumed to decline at the average rate of the last five years. Under this scenario, the percentage of enplanements accounted for by originations is expected to rise from 51% in 2008 to 70% in 2030. As shown in **Table K.5**, in Appendix A, total enplanements are projected to increase at an average annual rate of 1.6% to 23.7 million by 2030 and total operations are projected to increase at an annual 1.1% rate to 571,934 by 2030.

Table 2.17 summarizes the alternative scenarios and provides a comparison with the base case.

2.13 GATE REQUIREMENTS

Table 2.18 summarizes the estimated gate requirements resulting from the above forecasts and **Tables L.1** through **L.3** in Appendix A provide more detailed information organized by the SkyTeam Alliance members (Delta Air Lines and its partners), Southwest, and all other carriers.

Gate requirements are a function of passenger aircraft operations and average gate utilization. Base year gate requirements were calculated using the summer 2008 schedule from the Official Airline Guide (OAG) and assuming a 20-minute buffer between a departing aircraft and the next arriving aircraft at any given gate. Note that the existing number of gates that are required, based on schedule, is less than the available number of gates, indicating that there is excess gate capacity at this time. Since airlines cannot always operate according to their schedules, additional spare gate capacity was included to allow for off-schedule flights. This additional spare gate capacity was assumed to be 8% of the requirements calculated based solely on schedule.

Future average gate utilization was assumed to remain at existing levels for Delta Air Lines and the SkyTeam Alliance based on input provided by Delta Air Lines. Southwest Airlines is typically able to use its gates more intensively than other carriers. Southwest was assumed to average 8.5 departures per gate based on its experience at other airports. Average gate utilization for other carriers (non-SkyTeam and non-Southwest) was assumed to remain at existing levels, approximately 4.7 turns per gate.

TABLE 2.17: SCENARIO SUMMARY

	2007	2008	2010	2015	2020	2025	2030
Total Originations							
Base Case	8,893,761	8,287,822	8,681,658	10,654,254	12,333,797	14,319,319	16,624,892
Scenario 1: High Fuel Cost	8,893,761	8,287,822	8,662,834	9,904,026	11,280,808	12,867,215	14,707,543
Scenario 2: Low Fuel Cost	8,893,761	8,287,822	8,696,250	11,114,205	13,054,856	15,402,032	18,256,782
Scenario 3: High Economic Growth	8,893,761	8,287,822	8,693,849	11,377,997	13,217,186	15,408,919	17,979,093
Scenario 4: Low Connecting Ratio	8,893,761	8,287,822	8,681,658	10,654,254	12,333,797	14,319,319	16,624,892
Total Enplanements							
Base Case	16,969,084	16,384,272	16,526,385	19,102,835	21,818,176	24,980,903	28,431,850
Scenario 1: High Fuel Cost	16,969,084	16,384,272	16,039,649	16,651,548	18,068,039	19,643,363	21,401,089
Scenario 2: Low Fuel Cost	16,969,084	16,384,272	16,544,330	19,921,290	23,063,023	26,803,327	31,111,241
Scenario 3: High Economic Growth	16,969,084	16,384,272	16,541,378	20,421,185	23,378,479	26,843,490	30,656,311
Scenario 4: Low Connecting Ratio	16,969,084	16,384,272	16,074,766	17,868,992	19,601,262	21,559,813	23,708,077
Total Air Cargo Tonnage							
Base Case	283,777	257,116	265,750	291,360	322,156	362,745	428,217
Scenario 1: High Fuel Cost	283,777	257,116	265,172	270,798	294,609	325,919	378,794
Scenario 2: Low Fuel Cost	283,777	257,116	266,198	303,967	341,019	390,202	470,282
Scenario 3: High Economic Growth	283,777	257,116	266,124	311,197	345,266	390,377	463,124
Scenario 4: Low Connecting Ratio	283,777	257,116	265,750	291,360	322,156	362,745	428,217
Total Operations							
Base Case	452,972	450,044	459,481	507,669	546,936	592,849	630,837
Scenario 1: High Fuel Cost	452,972	450,044	443,941	449,443	469,455	492,352	514,042
Scenario 2: Low Fuel Cost	452,972	450,044	463,938	534,013	583,925	643,175	697,815
Scenario 3: High Economic Growth	452,972	450,044	463,875	546,593	591,594	644,305	688,431
Scenario 4: Low Connecting Ratio	452,972	450,044	448,018	484,668	512,041	542,975	571,934

Sources: Tables K.1 through K.5.

TABLE 2.18: SUMMARY OF FORECAST GATE REQUIREMENTS - TOTAL

	2008		2010	2015	2020	2025	2030
Daily Departures	569.4		580.2	644.3	698.0	762.4	815.6
			Gate Requirements				
Total	w/o Spares	w/ Spares					
Widebody (a)	3	5	5	7	11	13	15
757 Class (b)	10	11	9	6	4	9	16
Narrow Body (c)	42	45	45	48	54	56	57
Large Regional (d)	13	15	18	26	29	33	36
Medium Regional (e)	22	23	24	25	25	26	31
Small Regional (f)	12	12	11	11	10	8	-
Subtotal	102	111	112	123	133	145	155
International							
Widebody (a)	3	5	5	6	7	9	11
757 Class (b)	1	1	1	1	1	-	1
Narrow Body (c)	6	6	5	7	9	12	12
Large Regional (d)	-	-	-	-	-	-	-
Medium Regional (e)	-	-	1	1	1	1	1
Small Regional (f)	-	-	-	-	-	-	-
Subtotal	10	12	12	15	18	22	25
Domestic							
Widebody (a)	-	-	-	1	4	4	4
757 Class (b)	9	10	8	5	3	9	15
Narrow Body (c)	36	39	40	41	45	44	45
Large Regional (d)	13	15	18	26	29	33	36
Medium Regional (e)	22	23	23	24	24	25	30
Small Regional (f)	12	12	11	11	10	8	-
Subtotal	92	99	100	108	115	123	130
Average Utilization (g)		5.1	5.2	5.2	5.2	5.3	5.3

(a) Includes all multiple aisle aircraft.
(b) Includes 757-200, 757-300 and anticipated replacement aircraft.
(c) Includes all mainline narrow-body aircraft except for 757 class.
(d) Includes Embraer 175 and Canadair 900 aircraft.
(e) Includes all regional aircraft between 44 and 70 seats.
(f) Includes all regional aircraft less than 44 seats.
(g) Total aircraft operations divided by gate requirements.

Sources: As noted, Tables L.1, L.2, and L.3, and HNTB analysis.

Gate requirements in each category (wide-body, 757-class, etc.) were assumed to increase at the same rate as aircraft departures in that category. For the purpose of calculating gate requirements, however, it was assumed that aircraft would be able to use any gate sized to accommodate aircraft larger than their class. Therefore, a new 757-class gate requirement was not assumed if there was available wide-body gate capacity.

As shown in **Table 2.18**, a requirement of 155 total contact gates is anticipated by 2030, of which 25 would need to be capable of accommodating non-pre-cleared international flights. SkyTeam would account for 119 of the required gates (see **Table L.1**). Factors that could change future gate requirements at MSP include the following:

- Changes in forecast activity
- Adjustments in the spare gate percentage
- Increased future gate utilization among the carriers
- Changes from preferential use to common-use gate lease arrangements
- Use of hardstands
- Shuttling of international arrival passengers from domestic gates to Customs and Border Protection facilities. (This would not reduce the total number of gates but would reduce the number of international gates.)

CHAPTER 3: FACILITY REQUIREMENTS

CHAPTER 3: FACILITY REQUIREMENTS

3.1 INTRODUCTION

Facility requirements identify the scale and type of improvements the various airport facilities will need to safely and comfortably accommodate forecast growth in passengers and operations in future years. Facility requirements are developed through a 3-step process.

1. Facilities are inventoried to determine their existing condition and capacity.
2. Forecasts of aviation activity are prepared to determine future passenger and operations levels expected at the airport.
3. Requirements are determined for those facilities with inadequate capacity to accommodate future levels of passengers and operations.

Facility requirements are intended to be objective and to identify how much additional capacity should be provided. Facility requirements do not, however, evaluate how or where additional capacity should be provided. The details of how future requirements are met are addressed during the development of concepts.

For the purposes of the Minneapolis-St. Paul International Airport (MSP) Long Term Comprehensive Plan Update (LTCP), the airport's existing facilities were broadly described in Chapter 1. The facility requirements analysis presented in this chapter includes a more detailed evaluation of the conditions of the existing facilities including their current capacity.

The forecast of aviation activity presented in Chapter 2 estimates future operations and passenger levels. The airfield facilities will be impacted by the total number of operations at MSP while the terminal and landside facilities will be impacted by the number of passengers. Most airport support facilities can be evaluated based on the total number of operations.

Fifteen key focus areas were identified for the LTCP Update to evaluate. Each of these focus issues recognized existing facilities that are operating inefficiently today or are expected to operate efficiently with moderate increases in passenger numbers. The 15 focus areas are:

1. Balancing passenger demand between the two terminals
2. Reallocation of airlines between the two terminals
3. Arrival curbside capacity (Lindbergh Terminal)
4. Public parking (Both Terminals)
5. Way-finding / Signage for the airport roadways
6. Baggage claim facilities (Lindbergh Terminal)
7. Security Screening Check Points (Lindbergh Terminal)
8. International arrivals (Customs and Border Protection) facilities (Lindbergh Terminal)
9. Regional carrier aircraft gates (Lindbergh Terminal)
10. Refurbishing Concourses E and F (Lindbergh Terminal)
11. Rental car facilities (Both Terminals)
12. Airfield capacity and taxiways
13. The United States Post Office facility (Lindbergh Terminal)
14. Potential development of an airport hotel
15. Air Traffic Control Tower (ATCT) improvements

Though the LTCP will focus on these facility issues, an evaluation of all facilities has been included in the study to identify any other potential facility issues.

3.1.1 GATE ALLOCATION AND THE TWO-TERMINAL SYSTEM

As described in Chapter 1, MSP has two terminals: the Lindbergh Terminal and the Humphrey Terminal. Today, the Lindbergh Terminal is substantially larger than the Humphrey Terminal and accommodates the majority of passenger activity at MSP. However, even today, the terminal landside facilities, notably the arrivals curb and parking facilities are congested at the Lindbergh Terminal. Future expansion of terminal facilities is probably more feasible at the Humphrey Terminal where there is more available land and the supporting landside facilities have available capacity to serve more passengers. This theme – the expansion of the Humphrey Terminal – is a central element of the LTCP Update and is critical to the evaluation of facility requirements within the LTCP Update.

Each airline that serves MSP utilizes one or more gates on a consistent basis. Passengers can expect to find Delta Air Lines operating from the Lindbergh Terminal and Sun Country Airlines operating from the Humphrey Terminal. However, as passenger boardings increase at MSP, both terminals will require improvements and expansion. Further, Delta Air Lines operates a major hub at MSP. This is an important fact because approximately 60% of Delta Air Lines' passengers at MSP do not begin or end their trips at MSP, they simply fly through on their way between two other airports. These connecting passengers do not rely on MSP's bag claim facilities, ticketing facilities, roadways, or parking. However, most passengers on other airlines are beginning and ending their trips at MSP and do rely on the ticketing, bag-claim, roadways and parking facilities.

Today, in addition to Delta Air Lines, the Lindbergh Terminal accommodates eight other airlines: American Airlines, United Airlines, US Airways, Alaska Airlines, Midwest Airlines, Continental Airlines, Air Canada, and Frontier Airlines. The forecast of aviation activity identifies that the 117 gates at the Lindbergh Terminal will not be able to accommodate the forecast growth of these carriers at MSP beyond 2015. More critically, the landside facilities at the Lindbergh Terminal, including the curbs and parking areas, are unable to accommodate the arriving and departing passengers. The Humphrey Terminal, however, has expansion capability sufficient to expand passenger processing and landside facilities to accommodate passenger growth and additional boarding gates.

The existing capacities and constraints of the terminal and landside facilities will be discussed in greater detail within this chapter. However, it is essential to note that for the purposes of the LTCP Update facility requirements analysis, it was assumed that by 2015 all non-SkyTeam airlines (all airlines except Delta Air Lines and its alliance partners) will relocate to an expanded Humphrey Terminal.

Reallocating airline passengers between the two terminals by 2015 will relieve some capacity constraints at the Lindbergh Terminal. However, improvements and expansion of the Humphrey Terminal will be required to accommodate these airlines. The details of required improvements are presented in this chapter of the LTCP Update report.

After the initial reallocation of airlines between the two terminals, ongoing expansions and improvements will be required at both facilities throughout the 20-year LTCP Update planning period.

The aviation activity forecast presented in Chapter 2 includes a forecast of required aircraft gates. Delta and its SkyTeam partners are forecasted to require 119 gates by 2030 while all non-SkyTeam airlines combined are forecasted to require 36 gates by 2030. In addition to the increased number of gates, the types of aircraft that each gate can accommodate will also change as the fleet of aircraft evolves with more modern planes. This will impact the size and layout of each required gate.

The reallocation of airlines between the two terminals will impact terminal and landside facility requirements. This reallocation was an assumption utilized in developing all facility requirements for the terminal and landside facilities at MSP as part of the LTCP Update.

The reallocation of airlines between the Lindbergh Terminal and Humphrey Terminal accomplishes three key goals:

1. Each terminal will accommodate originating (i.e., passengers beginning or ending their trips at MSP) passenger volumes commensurate with its capacity.
2. Passengers will be able to find their way to the appropriate terminal relatively easily because the Lindbergh Terminal would exclusively serve Delta and its SkyTeam partners while the Humphrey Terminal would serve all other airlines. This would organize all MSP airlines into two distinct and easily identified groups.
3. Expansion of the Humphrey Terminal is more easily accomplished in the near term and will allow the airport to continue a program of carefully phased improvements to both terminal facilities.

The facility requirements for the LTCP Update required that the reallocation of airlines between the two terminals be considered and evaluated early in the process. Therefore, each of the terminal and landside facility requirements discussions addresses the impacts the airline reallocation will have on the respective facilities at each terminal.

3.2 AIRFIELD CAPACITY ANALYSES

3.2.1 AIRFIELD CAPACITY AND DELAY

For the purposes of the LTCP Update, annual airfield capacity was evaluated to determine whether the runway system at MSP could likely accommodate the forecast annual number of takeoffs and landings.

There have been three capacity analyses completed for MSP in recent years that were reviewed to establish an approximate annual airfield capacity:

- The Dual-Track Airport Planning process completed in the mid 1990s
- The Draft Environmental Assessment for the 2015 terminal expansion
- The SIMMOD computer analysis of the proposed cross-field taxiway

As presented in Chapter 2, MSP is projected to have approximately 630,000 annual operations (takeoffs and landings) by 2030. Based on a review of the previous airfield capacity studies for MSP, at 630,000 annual operations MSP is expected to experience average annual delay of approximately ten minutes per operation. Some flights would experience no delays while others, during poor weather in most cases, would experience longer delays. This level of average annual delay compares to other busy hub airports in the United States and is considered acceptable for airports of this size and number of operations.

The topic of capacity and delay is multi-faceted and can, at times, be heavily impacted by the interaction of other airports within the National Airspace System (NAS) The FAA conducts systematic evaluations of the major airports within the NAS and attempts to identify how impacts at one facility affects other facilities. To better understand MSP facilities and infrastructure, the MAC will initiate a capacity study two years in advance of when MSP is expected to reach 540,000 annual operations and incorporate the results of this study into the following LTCP Update.

3.3 AIRSIDE REQUIREMENTS

3.3.1 RUNWAYS

The LTCP Update does not recommend the development of any additional runways at MSP. The existing runways are expected to accommodate the forecast growth at MSP through 2030, the duration of the planning period.

3.3.2 TAXIWAYS AND CIRCULATION

The taxiway system allows aircraft to move between the runways and other airport facilities (e.g., terminals) in an efficient and safe manner. As the airfield becomes increasingly congested, improvements may be required to help reduce taxi time and delays. The existing MSP taxiway system works efficiently and does not require any immediate significant improvements. However, as the number of operations grows, improvements to the taxiway system will need to be evaluated.

A pair of crossover taxiways located east of the Lindbergh Terminal complex that would connect the approach ends of runways 30L and 30R were recommended in the previous master plan, which was prepared for the airport as part of the Dual-Track Airport Planning process conducted in the 1990s. A crossover taxiway in the same location was also considered in the 2020 Vision Plan proposed by Northwest Airlines in 2004.

The LTCP Update recommends further study of the crossover taxiways at this location and will make a preliminary recommendation that they be accommodated in all facility planning at MSP.

The taxiways will be planned to airplane design Group IV (wingspan less than 171 feet) criteria. Air Traffic Control Tower (ATCT) line-of-sight, though restricted, is not considered to be a constraint to implementing the crossover taxiways. It is assumed that ASDE-X (enhanced ground control RADAR), local area control by the airport, or other means will be used to compensate for limited line of sight from the existing ATCT.

An extension of Taxiway C on the south side of the airport is recommended to alleviate localized congestion in and out of the Humphrey remote apron.

3.4 GATE REQUIREMENTS

The forecast of aviation activity, presented in Chapter 2, includes a forecast of required gates for all airlines for the forecast period through 2030. MSP is characterized by an exclusive use agreement whereby most airlines lease gates for their exclusive use and do not share their facilities with other airlines. Calculating the number of required airline gates in future years requires consideration of several factors including:

- How frequently a given airline uses its gates
- What size aircraft a given airline flies (larger aircraft require larger gates)
- Access to international passenger processing facilities

MSP airlines were split into three broad categories for calculation of future gate requirements:

- Delta Air Lines and its SkyTeam alliance partners
- Southwest Airlines
- All other passenger airlines

Delta Air Lines and its SkyTeam alliance partners were segregated because of the large hub operation Delta has at MSP. The characteristics of a hub airline differ from those of other airlines operating at MSP. Southwest Airlines was segregated because the airline has a history of significantly higher gate utilization than other airlines. For example, Delta Air Lines and its SkyTeam partners are assumed to operate, on average, 4.7 flights per day from each of their gates. However, Southwest is assumed to operate, on average, 8.5 flights per day from each of its gates. Finally, all other airlines were grouped after SkyTeam and Southwest were segregated.

Though the requirements call for 155 total gates, additional analysis has been provided to identify the characteristics of the gates. First, as presented in the introduction to this chapter, Delta and its SkyTeam partners are assumed to operate out of the Lindbergh Terminal by 2030 while all other airlines are assumed to operate out of the Humphrey Terminal, possibly as soon as 2015.

Lindbergh Terminal – Delta Air Lines/SkyTeam Airlines Requirements

- 119 total gates are required in 2030
- 13 gates must accommodate wide-body aircraft
- 63 gates must accommodate medium and large regional aircraft
- 20 gates must have access to international arrivals facilities

Though there are a total of 117 gates at the Lindbergh Terminal today, the 2030 requirements are far more demanding because, on average, aircraft in 2030 are anticipated to have larger wingspans and thus each gate position would be larger. Therefore, building two additional gates at the Lindbergh Terminal would not meet the 2030 gate requirements. Further, today only 10 gates provide access to international arrivals facilities. By 2030, 20 gate positions would require access to international arrivals facilities.

Humphrey Terminal – All non-SkyTeam Airlines Requirements

- 36 total gates are required in 2030
- 2 gates must accommodate wide-body aircraft
- 30 gates must accommodate narrow-body jet aircraft
- 5 gates must have access to international arrivals facilities

The 36 gates required at the Humphrey Terminal in 2030 will serve predominantly narrow-body aircraft operated by airlines with hubs elsewhere. Most air service to MSP on these airlines is anticipated to be operated by common narrow-body aircraft such as the Boeing 737 or Airbus A320. However, some international service is expected to be accommodated at the Humphrey Terminal and some airlines may like to operate smaller regional jets to MSP for some domestic service.

Though the timing of relocating all non-SkyTeam airlines to the Humphrey Terminal from the Lindbergh Terminal is predicated upon the increasing congestion at the curb and in the parking facilities at the Lindbergh Terminal, the need for additional gates is an essential component. In 2015, when the relocation is recommended to occur, the Humphrey Terminal would require an additional 17 gates to accommodate the associated demand of all non-SkyTeam airlines. In spite of the fact that this relocation would free all 15 gates on Concourse F in the Lindbergh Terminal, growing passenger numbers combined with the evolving fleet of aircraft at Delta Air Lines and its SkyTeam partners would require the Concourse F gates by 2020. This means that between 2015 and 2020 there is a window of approximately five years during which the Lindbergh Terminal may have excess gate capacity and some terminal improvements may be more easily phased due to the ability to relocate operations among gates.

3.5 TERMINAL REQUIREMENTS

3.5.1 OVERVIEW

The functional performance of the terminal facilities is measured by their ability to accommodate passengers during busy periods. Though it is possible to evaluate a terminal based upon annual passenger numbers, a more accurate assessment of the facility can be achieved by evaluating how it operates during peak hours of activity. Flight schedules can vary dramatically throughout the day and the airport must continue to operate efficiently and safely, even during these busy periods.

The terminal facility program was developed by quantifying the peak hour passenger numbers and analyzing the capacity of various terminal components (e.g., ticketing) at a desired level of service. A pragmatic approach to developing facility requirements will describe the desired characteristics of the terminal components in terms of passenger processing rates and spatial requirements.

- Process rates quantify the performance capability of a facility measured in terms of a unit of demand in relation to time - for example, passengers or bags per minute.

- Space templates have been developed for these facilities to illustrate the preferred arrangement of equipment and operational clearances around them as typically representing the industry's "best practices".

- Level of Service (LOS), as established by the International Air Transport Association, generally indicates the level of performance at which a facility operates under given demand levels (**Table 3.1**). It primarily uses passenger comfort (space) and convenience (time) as indicators of service quality.

Conforming to industry standard best practices for planning terminal facilities, LOS C is the preferred design day performance level as it typically represents good service quality at a reasonable cost. Level D is considered tolerable during peak periods.

TABLE 3.1: IATA SERVICE LEVELS

LOS A	Excellent level of service; condition of free flow; no delays; excellent level of comfort
LOS B	High level of service; condition of stable flow; very few delays; high level of comfort
LOS C	Good level of service; condition of stable flow; acceptable delays; good level of comfort
LOS D	Adequate level of service; condition of unstable flow; acceptable delays for short period of time; adequate level of comfort
LOS E	Inadequate level of service; condition of unstable flows; unacceptable delays; inadequate level of comfort
LOS F	Unacceptable level of service; condition of cross-flows, system breakdown and unacceptable delays; unacceptable level of comfort

Source: International Air Transport Association (IATA), Airport Development Manual.

Pragmatic requirements in themselves are not a facility program since they do not fully address other program considerations such as functional arrangement, site constraints, or quality of service goals. Instead, they provide the basis to assess needs and begin the reciprocal process of defining a comprehensive facility program.

The following terminal functional areas of the LTCP Update were developed using this process:

- Ticket Counter/Passenger Check-in Area
- Security Screening Checkpoint Area
- Baggage Claim Area
- US Customs and Border Protection Area

Please note that for the purposes of the terminal facility requirements, the Lindbergh Terminal is assumed to accommodate only Delta Air Lines and its SkyTeam Alliance partner airlines. The Humphrey Terminal is assumed to accommodate all other airlines serving MSP.

The planning level of arrivals for Lindbergh Terminal domestic passengers is forecast to be 3,958 in the peak hour by year 2030. The forecast peak hour departure by year 2030 at the Lindbergh Terminal is 3,909 passengers.

3.5.2 PASSENGER CHECK-IN AREA

Currently, there are four different check-in options for departing passengers:

1. Off-Site (Internet) Check-In
2. Self-Service Units - positions where passengers acquire boarding passes
3. Bag Drop Positions - locations where airline staff tag and accept bags after passengers complete their self-service check-in transactions
4. Full-Service (Agent) Counter Check-in – locations where an agent may assist the passengers to acquire boarding passes and accepts their check-in bags

Market penetration of each check-in method is based on various surveys conducted on passenger travel and behavior, such as whether the passenger is checking bags. It assumes that, in the future, an increasing proportion of passengers will use self-service units and Internet check-in. This reflects the growing preference of passengers — coincidentally encouraged by airline staffing practices — for moving away from traditional agent check-in towards self-serve check-in.

Based on the peak hour passenger forecast for 2030, the Lindbergh Terminal is projected to require 85 ticketing positions. The conceptual plans of the ticket counter positions are based on a modular width of 7’-0” plus a 2’-6” baggage scale unit. To provide space for circulation and queuing, the reconfigured plan depth of the ticketing area is approximately 55 ft., which is an additional depth of 10 feet within the existing terminal.

3.5.3 SECURITY SCREENING CHECKPOINT

While the Transportation Security Administration (TSA) has direct responsibility for determining the size and configuration of the passenger screening checkpoints, it is typical for the TSA to collaborate with airports on those aspects along with the checkpoint location.

The “Checkpoint Design Guide” (CDG) Revision 1 - Transportation Security Administration (TSA), February 11, 2009, has been used as the basis for planning. The Security Screening Checkpoint (SSCP) template module includes:

Minimum clearance ahead of the divestiture tables that would typically accommodate:

- Minimum depth for queuing
- Document check podiums
- Private screening
- Post document queues and internal circulation

Main Screening Area, including:

- Divestiture tables
- Metal detectors
- X-Ray equipment
- Secondary search/ examination

Compose Area, including:

- Compose benches
- Supervisor and Local Enforcement Official stations

The following operational criteria have been used to assess security checkpoint facility needs:

- Document Check Throughput Rates: 5 passengers per minute per agent
- Screening Lane Throughput: 180 passengers per hour per lane

The numbers of document checkers and screening lanes necessary to accommodate the peak hour demand has been determined using the following criteria: 95% of passengers require no more than 10 minutes to reach the screening divestiture tables.

The basis for determining the amount of space that should be allocated for passengers queuing for document check has been based on having sufficient capacity to contain the peak hour demand at the checkpoint under the following parameters and level of comfort:

- The number of passengers standing in queue should be calculated on the basis of containing a 20-minute build-up of total checkpoint throughput. This would allow capacity for any throughput changes at the checkpoint – e.g., a shift change of TSA personnel.
- Sufficient area to provide each passenger 10.8 square feet of space while in queue, which conforms to IATA LOS C recommendations for this function.

Based on the SSCP peak hour of 3,909 passengers, 22 security lanes are required at the Lindbergh Terminal in 2030. While each SSCP lane is planned at 1,200 square feet, (for a total of 26,400 square feet for all 22 lanes), the combined total area that is required for the SSCP and passenger queuing is 40,656 square feet. Due to the minimal depth and constraint of the existing terminal lobby, the passenger queuing area of the preferred SSCP conceptual plan is deficient by approximately 2,750 square feet. However, as a means of off-setting this queuing deficiency, two additional checkpoint lanes could potentially be accommodated bringing the total number of lanes to 24. The required TSA support space would be approximately 7,200 square feet, generally based on 75 square feet per agent position with each line supporting four agents. This area would be identified and planned as the LTCP Update is further developed.

It should be noted that the SSCP requirement of 22 lanes and associated queuing space is all for Lindbergh Terminal originations including both domestic and international. There are alternatives for redistributing international originations at the Lindbergh Terminal which would reduce the required facilities within the existing ticketing lobby area.

3.5.4 BAGGAGE CLAIM AREA

The inbound baggage system consists of in-feed conveyors and claim devices. Typically, bags from arriving flights are delivered via baggage carts to the terminal and manually unloaded onto a loading conveyor with a direct feed to a sloped-plate claim device. The baggage claim area in the Lindbergh Terminal currently has twelve sloped-plate claim devices with a total of 1,249 linear feet. Two of the devices are sloped-plated carousels configured as ovals with 145 and 204 linear feet of claim frontage, and the remaining 10 are configured as circles, each having a diameter of approximately 29 feet with 90 linear feet of claim frontage. Due to the size of the circular-shaped claim devices and the minimal circulation around the claim units, the passenger waiting area becomes overcrowded during peak periods resulting in a reduced level of service.

The 2030 peak hour baggage claim requirement of 1,312 linear feet of claim frontage for the Lindbergh Terminal was calculated based on the following:

Domestic Peak Hour Terminating Passengers	3,958 passengers
Assumed Passengers Claiming Bags: 65% of 3,958	2,573 passengers
Assumption: ½ of total passengers (i.e., 1,286) will spend 30 minutes in the claim area	
Requirement Metric: 10.2 square feet (sf) per passenger x 1,286 passengers	13,121 square feet
Minimum Waiting Depth of Passenger Circulation Area	10 feet
Claim Frontage Required: 13,121 sf/10 feet	1,312 linear feet

The 2030 peak hour baggage claim requirement of 27,274 square feet of claim area (excluding the claim devices) for the Lindbergh Terminal was calculated based on the International Air Transport Association (IATA) Level of Service (LOS) C which recommends 21.2 square feet per passenger.

- 1,286 passengers x 21.2 square feet per passenger = 27,274 square feet

An analysis based on the existing number of 956 peak hour passengers claiming bags (26,550 square feet / 956 passengers) yields 27.8 square feet per passenger. While the total area of 26,550 square feet is adequate under the existing peak hour passenger activity, it is the configuration of the area (inadequate frontage of the small circular claim devices that limits passenger access to retrieving their bags) that causes overcrowding circulation conditions, thereby reducing the level service.

3.5.5 US CUSTOMS AND BORDER PROTECTION FACILITIES

The existing international arrivals facility at the Lindbergh Terminal has limited throughput for processing passengers arriving from foreign countries. There are 10 gates, all located on Concourse G, which provide access to the international arrivals facility. However, not all can be used simultaneously.

Customs and Border Protection (CBP) Programming

The Lindbergh Terminal international arrivals facility requirements were developed based on the latest US Customs and Border Protection Airport Technical Design Standards for Passenger Processing Facilities, dated August 2006. Based on the CBP space program categories, the Lindbergh Terminal's forecast international gate operation falls under the Large Airport category, which is between 2,000 and 5,000 passengers per hour operation. There are four sub-categories within the Large Airport program, which are listed as 2,000 passengers per hour (PPH), 3,000 PPH, 4,000 PPH, and 5,000 PPH. Based on the 2030 forecast of 2,855 passengers, the CBP space program category of 3,000 PPH was used in developing facility requirements.

The following areas shown on **Table 3.2** are based on the CBP Design Guidelines to meet the Large Airport category projections:

TABLE 3.2: CBP DESIGN GUIDELINES FOR LARGE AIRPORTS

Description	Area (SF)
Secure Area	
Sterile Corridor System	73,565
Primary Processing and Support	44,485
International Baggage Claim Area	60,935
Secondary Processing and Support	14,028
CBP Officer/Staff Area	6,270
Restrooms	1,495
Subtotal	**200,778**
Non-secure Area	
Public	33,086
Restrooms	1,908
Concessions – Meeter/Greeter Area	3,013
Subtotal	**38,007**
Total	**238,785**

The optimum international arrivals facility primary processing and baggage claim requirements were calculated based on the following:

Primary Processing Requirement	30 Primary Booths (3000 Passenger Category; 2,855 actual peak hour forecast)
Baggage Claim Requirement	The year 2030 peak hour baggage claim requirement is 1,383 linear feet
International Peak Hour Terminating Passengers	2,855 Passengers
Passengers Claiming Bags (95% of total International Peak Hour Terminating Passengers)	2,712 Passengers
Assumption: ¾ of total passengers (i.e., 2,034) will spend 45 minutes in the claim area	
Area Requirement: 10.2 square feet per passenger x 2,034 passengers	20,747 square feet
Minimum Waiting Depth of Passenger Area	15 feet
20,747 square feet/15 feet	1,383 linear feet of Claim Device
Total Passenger Claim area required (excluding claim devices): 41,252 square feet /2,034	20.28 square feet per passenger for IATA LOS C

The 238,785 square feet listed above is the total required international arrivals facility area for the Lindbergh Terminal in 2030. The existing international arrivals facility has a total area of 79,300 square feet.

3.6 LANDSIDE REQUIREMENTS

3.6.1 OVERVIEW

This section documents the existing landside conditions and traffic volumes on Glumack Drive at MSP's Lindbergh Terminal. Based on the forecasts of passenger activity, this section also documents the facility requirements for the following landside functions: terminal curb roadways, public parking, rental car ready and return spaces, and commercial vehicle spaces.

3.6.2 ROADWAY ACCESS AND CURB REQUIREMENTS

Traffic Volumes on Glumack Drive

Average Daily Traffic (ADT) and peak hour volumes on Glumack Drive were calculated based on counts available for Glumack Drive from the *Ground Transportation Vehicle Classification Study* performed in 2004. The 2008 and 2030 volumes were calculated by factoring the 2004 volumes in proportion to the growth of originating passengers to 2008 and 2030. **Table 3.3** summarizes the peak hour and ADT volumes on Glumack Drive.

TABLE 3.3: TRAFFIC VOLUMES ON GLUMACK DRIVE

Type of Traffic Volumes	Glumack Drive Volumes Approaching the Lindbergh Terminal	
	Existing (2008)	Future (2030)
Peak Hour	5,900	8,000
Average Daily Traffic	82,000	112,000

Terminal Curb Roadways

At the Lindbergh Terminal there is a two-level curb roadway system, with multiple parallel curbs on both the ticketing (departures) and baggage claim (arrivals) levels. At the Humphrey Terminal, there is a single-level terminal curb roadway which serves in sequence drop-off for departures and pick-up of arrivals.

Lindbergh Terminal Departures Curb Roadway

The departures curb roadway is designated for drop-offs of all departing passengers. The inner departures curb is the primary curb for drop-offs. It is 815 feet long with four striped lanes of traffic. The outer departures curb is currently used as a "backup" curb for peak periods and for public transit. It is 40 feet wide with two full (12-foot wide) lanes and three 16-foot wide left lane curb pockets, totaling 630 feet of curbside. This configuration allows two through lanes of traffic with opposite-side unloading in the curb pockets.

The inner (terminal-side) departures curb roadway provides access to six doorways, which are signed according to the associated airline ticket counters. Patrons using the outer (garage-side) curbs must use vertical circulation to either cross over or under the roadways before entering the terminal. The outer curb is designated for certain classes of commercial ground transportation. Patrons are not permitted to cross roadways at grade on either level.

Lindbergh Terminal Arrivals Curb Roadway

The arrivals roadway is designated for pick-ups of all arriving passengers. It is 60 feet wide and has five striped lanes of traffic. This roadway is generally operated with at least two through lanes of traffic, while the remaining three are used either for loading, standing, or through traffic, depending on the airport's level of activity.

The outer arrivals curb roadway is designated for use only by commercial vehicles. The outer curb is segregated by a barrier that prevents pedestrians from crossing. The outer roadway is on the west side of the Lindbergh Terminal Ground Transportation Center (GTC). The curb on the west side of the GTC has approximately 45 pull-through spaces for taxicabs and hotel shuttle services. The climate-controlled GTC also has pull-through stalls located on the east side which serve special taxis, limousines, scheduled shuttles, and off-airport parking shuttles.

Humphrey Terminal Curb Roadway

The Humphrey Terminal curb is a 670-foot long, single-level roadway, half of which is utilized for passenger drop-off at ticketing/check-in, and half of which is used for passenger pick up at baggage claim. The curb roadway is four lanes wide. The left lane is signed to bring rental car return traffic to the rental car area located in the Purple Ramp located on the other side of the curb roadway from the terminal.

Analysis of Curb Roadways and Estimate of Future Requirements

The capacity of a curb roadway is a balance between its ability to move vehicles (through capacity) and its ability to load and unload passengers (service capacity). The through capacity and service capacity depend upon the number of lanes in the roadway and how those lanes are utilized: for loading/unloading, through movement, or a combination of the two. Service capacity is also a function of the effective curb length and the characteristics of the vehicles using the curb, e.g., how long they dwell (dwell time) and their length. There is a point at which increasing the length of a curb (to add service capacity) is pointless unless an additional lane is added (adding through capacity), as the length cannot be utilized if there are not enough lanes to bring the traffic to or take the traffic away from the new length of curb.

The measure of effectiveness of a curb is its volume/capacity (v/c) ratio. The v/c ratio reflects the level of congestion on the curb, and gives an indication of the unused or spare capacity of the curb roadways. A curb would be at capacity when the volume using the curb equals the equilibrium capacity of the curb, i.e., when v/c = 1. This would represent a highly congested condition. Congestion on a curb roadway increases disproportionately at v/c ratios above approximately 0.70, and curb conditions deteriorate very quickly under such circumstances. Thus, for planning purposes, the target v/c = 0.70 is desirable for the typical peak hour condition (the peak hour of the average day of the peak month). This implies that for the several hundred additional hours of the year when heavier curb traffic volume is present, conditions will be worse, but the investment in the curb roadway will not be so great as to overbuild its capacity.

Future requirements for curb length were calculated based on standard planning factors for the airport to achieve a v/c ratio of 0.70. These assumptions included average dwell times and average vehicle length. Additional assumptions were made regarding future number of lanes, which were set to balance against the curb length requirement. The 2030 forecast for passenger activity was used to generate a growth rate in landside activity, which was used to factor existing curb traffic volume counts. The number of vehicles by class on each of the curbs was obtained from the *Ground Transportation Vehicle Classification Study* performed in 2004 by URS Corporation. **Table 3.4** summarizes the estimates of curb requirements at both the Lindbergh and Humphrey Terminals for 2030.

TABLE 3.4: CURRENT CURB CONDITIONS AND FUTURE REQUIREMENTS

Curb Summary	**Lindbergh Terminal**		**Humphrey Terminal**	
	Existing Conditions and v/c	**2030 Conditions at v/c=0.7**	**Existing Conditions and v/c**	**2030 Conditions at v/c=0.7**
Departures Curb (feet)	4 lanes @ 815 feet (inner curb) v/c = 0.74	4 Lanes @ 1,600 feet (inner curb)	4 lanes @ 335 feet v/c = 0.33	4 lanes @ 760 feet or 5 lanes @ 460 feet
	3 Lanes @ 815 feet (outer curb) v/c = 0.13	3 Lanes @ 815 feet (outer curb)	No outer curb	No outer curb
Arrivals Curb (Feet)	5 lanes @ 815 feet v/c = 0.98	5 lanes @ 2,000 feet	4 lanes @ 335 feet v/c = 0.37	4 lanes @ 1,000 feet or 5 lanes @ 620 feet
Departures Curb Peak Hour Volumes	914 (inner curb)	1,114 (inner curb)	228	807
	75 (outer curb)	417 (outer curb includes some POV)	228	807
Arrivals Curb Peak Hour Volumes	922	1,576	184	766

3.6.3 PARKING REQUIREMENTS

On-Airport Public Parking Facilities

There are currently 14,400 public parking spaces provided at the Lindbergh Terminal, chiefly in the Green, Gold, Red, and Blue parking ramps. These include short-term, general, and valet spaces (which are located in the basement of the terminal) as per the data in **Table 3.5**.

There are currently 9,200 public parking spaces provided at the Humphrey Terminal, including short-term and general spaces as per the data in **Table 3.5.** The Orange ramp includes the newest parking product, MSP Value Parking, which is intended to attract patrons who otherwise might seek parking in the busier Lindbergh Terminal ramps. During busy periods, the public parking at the Lindbergh Terminal reaches capacity, and patrons are directed to the Humphrey Terminal parking ramps, from which they can ride the public Light Rail Transit (LRT) back to the Lindbergh Terminal to board their flight. However, even with this additional demand, the Humphrey Terminal's Purple and Orange ramps do not reach capacity. Approximately 2,500 parking spaces within the Purple and Orange ramps have been reserved for employee parking on a temporary basis.

The following methodology was used in estimating the 2030 parking requirements:

- The capacity for the public parking was defined as:
    - 85% of available spaces for short-term
    - 90% of available spaces for general parking

  - o 100%of available spaces for valet parking

Note: By using these percentages, vehicles arriving in the peak periods can still find enough spaces available that they can fill efficiently without an endless search for the very last space.

- Existing demand for parking at the Lindbergh Terminal was calculated based on information obtained from Metropolitan Airports Commission (MAC) staff. The demand in 2009 was down from 2008, so 2008 data were used to define the busy “existing” condition.
- Absent better data, the existing general parking demand at the Humphrey Terminal was assumed to be 40% of existing general parking capacity; for short-term parking, the assumption was that demand was 50% of existing short-term capacity.
- With the peak demand defined, the ratio of required spaces to meet that demand was compared with the annual originating passenger volumes. The ratio was rounded off to 2,000 spaces per Million Annual Originating Passengers.
- The 2030 future requirements were calculated by multiplying this ratio by the forecast number of annual originations.
- The estimates also included consideration of the anticipated migration of some off-airport parking demand onto the airport. That methodology is described below.

Table 3.5 summarizes the findings of parking requirements at both the Lindbergh and Humphrey Terminals in 2030.

TABLE 3.5: FUTURE PARKING REQUIREMENTS

Parking Summary	**Lindbergh Terminal**				**Humphrey Terminal**			
	Existing Spaces (2009)	Capacity (2008)	Existing Demand	Future Reqts (2030)	Existing Spaces (2009)	Capacity (2008)	Existing Demand	Future Reqts (2030)
Short Term Parking Spaces	900	820	490	900	500	460	230	600
General Parking Spaces	13,110	10,100	12,000	21,200	8,700	8,140	3,300	13,000
Valet Parking Spaces	390	380	430	700	-	-	-	500
Future Off-Airport Parking	-	-	-	1,700	-	-	-	1,000
Total Parking Spaces	14,400	11,300	12,920	24,500	9,200	8,600	3,530	15,100

<u>Private Parking Facilities</u>

There are currently four off-airport parking providers near MSP. All four off-airport parking providers are located within six miles of the airport. The following methodology was used in estimating the future off-airport parking:

- In the existing conditions there are 5,200 off-airport parking spaces which are assumed to be 60% full during the Average Day Peak Month.
- In the future, the demand will grow proportionately with originations and the supply will decrease down to 3,200 spaces due to development pressures and restrictions by the City of Bloomington.
- Any surplus demand that the future off-airport parking supply cannot handle will translate into spaces required at the airport. But 25% of the surplus demand is assumed to divert to an alternative mode or behavior, e.g., passengers will get dropped off at the curb or use the LRT or taxi, etc.
- The remaining 75% of the surplus demand will be distributed between the Lindbergh and the Humphrey Terminals pro rata with originations.

Table 3.6 summarizes the findings of future off-airport parking to be accommodated at both the Lindbergh and Humphrey Terminals in 2030.

TABLE 3.6: OFF-AIRPORT PARKING

Parking Summary	Spaces
Total Existing (2008) Spaces	5,200
Existing (2008) Demand (60 % full and 90 % efficiency)	3,400
Future (2030) Demand	6,800
Future (2030) Supply at Off-Airport	3,200
Future (2030) Surplus Demand	3,600
Future (2030) Surplus Demand (Assuming 25 % will use Alternative Modes)	2,700
Future (2030) Surplus to be accommodated at Lindbergh Terminal	1,700
Future (2030) Surplus to be accommodated at Humphrey Terminal	1,000

3.6.4 RENTAL CAR REQUIREMENTS

Rental car operations exist at both the Lindbergh and Humphrey Terminals. Currently, there is a Quick-Turn Around (QTA) facility (where rental vehicles are washed and fueled before being re-rented) at the Lindbergh Terminal only. Existing rental car information on number of spaces and transaction counts was obtained from MAC staff. The following approach was used in determining the future requirement:

- Peak month for total number of transactions was determined to be August
- Based on number of transactions in peak month, average daily transactions were determined
- Peak daily transactions were then calculated as twice the number of average daily transactions
- The turnover ratio was calculated by dividing peak transactions by the total number of ready/return spaces. Turnover ratio is an index of how labor-intensive the facility is, with labor costs increasing with turnover ratio, and thereby decreasing profitability. Turnover

ratios below 3.0 indicate an under-used facility; turnover ratios higher than 4.0 indicate a very busy facility, and ratios higher than 5.0 indicate an undersized facility.

- Finally, the calculated turnover ratio of 3.8 was used to determine the number of rental spaces required in the future. This turnover ratio is desirable for future Rental Auto Companies operations as current operations at MSP are in the efficient range.

- The size of future QTAs was estimated by determining the ratio of square feet of QTA in the Red/Blue ramps to the number of ready/return spaces it serves. This ratio was then applied to the number of spaces proposed at the Humphrey Terminal to estimate the future square feet which would be required to serve the rental cars at that terminal.

Table 3.7 summarizes the total number of space requirements in the future.

TABLE 3.7: RENTAL CAR REQUIREMENTS

RAC Summary	Lindbergh Terminal		Humphrey Terminal	
	Existing Spaces (2008)	**Future Requirements (2030)**	**Existing Spaces (2008)**	**Future Requirements (2030)**
Total Spaces	3,500	2,235	274	1,385
2030 Additional Requirements	-	-	-	819
2030 QTA Requirement	549 sf	350 sf	No QTA	215 sf

3.6.5 GROUND TRANSPORTATION CENTER REQUIREMENTS

The requirements for the Ground Transportation Center were calculated based on the number of commercial vehicles arriving during the peak hour. Commercial vehicles include taxis, limousines, and shuttles (hotel/parking/courtesy). A dwell time of 3.0 minutes was used for taxis and limos, and 5.0 minutes was assumed for shuttles. The total number of spaces required was calculated based on a desirable volume/capacity (v/c) ratio of 0.55. With a lower target v/c ratio for commercial vehicle stalls, the risk of a vehicle not finding an empty stall upon arrival is minimized.

Table 3.8 summarizes the space requirement for the Ground Transportation Center.

TABLE 3.8: GROUND TRANSPORTATION CENTER (GTC) REQUIREMENTS

GTC Requirements Summary	Lindbergh Terminal		Humphrey Terminal	
	Existing Spaces (2008)	Future Requirements (2030)	Existing Spaces (2008)	Future Requirements (2030)
Total Spaces	46	63	25	32

3.7 LIGHTING AND NAVIGATION REQUIREMENTS

The LTCP Update does not recommend the addition of any runways to the MSP airfield during the 20-year planning period. Commensurate with this recommendation, no substantial improvements to navigational aids and/or lighting of the existing runway approaches is recommended.

However, it is recommended that during the planning period, emerging technologies for navigational aids be monitored and evaluated to determine the potential benefit of implementation at MSP.

3.8 SECURITY REQUIREMENTS

The Metropolitan Airports Commission (MAC) has recently completed an upgrade to the entire airport perimeter security fence. Gate improvements have also recently been completed, with new technologies being studied in some locations. The MAC will continue to evaluate the perimeter security fence and upgrade as necessary. The Transportation Security Administration may also enforce changes from time to time that the MAC will coordinate and comply with as necessary.

Aside from the security checkpoint improvements discussed in Section 3.5.3, there are no specific security requirements that need to be met at this time.

3.9 UTILITY REQUIREMENTS

The MAC continues to coordinate airport projects with the primary utility companies. The proposed projects will impact existing utilities on the field. Any necessary re-locations are completed as a part of impacting projects. If the utility companies have specific upgrades that are required to their systems, the MAC will coordinate with them to have the work completed at the utility company's cost.

3.10 OBSTRUCTION-RELATED REQUIREMENTS

Mitigation of obstructions to critical surfaces for navigation to MSP runways should be monitored and evaluated.

3.11 OTHER AIRPORT SERVICES REQUIREMENTS

The two existing Aircraft Rescue & Fire Fighting (ARFF) facilities are adequate to provide services for all proposed projects in the Long Term Comprehensive Plan Update.

The MAC maintains its own police force. The police department operates from a couple of scattered locations within the Lindbergh Terminal. Ultimately, the MAC may choose to consolidate the department in one new building location on the airfield. The department's existing areas within the terminal could then be remodeled, occupied and leased by tenants. The MAC will continue to review this option and weigh the justifications against estimated costs before making a final decision.

CHAPTER 4: ALTERNATIVES

CHAPTER 4: ALTERNATIVES

4.1 INTRODUCTION

Several alternatives were developed and evaluated based on their capability to meet the facility requirements as well as the goals for the MSP LTCP Update set forth by the Metropolitan Airport Commission. There are three components to the alternatives development and evaluation process:

1. Develop broad concepts for facility improvements
2. Evaluate and refine the concepts
3. Establish and select alternatives for development

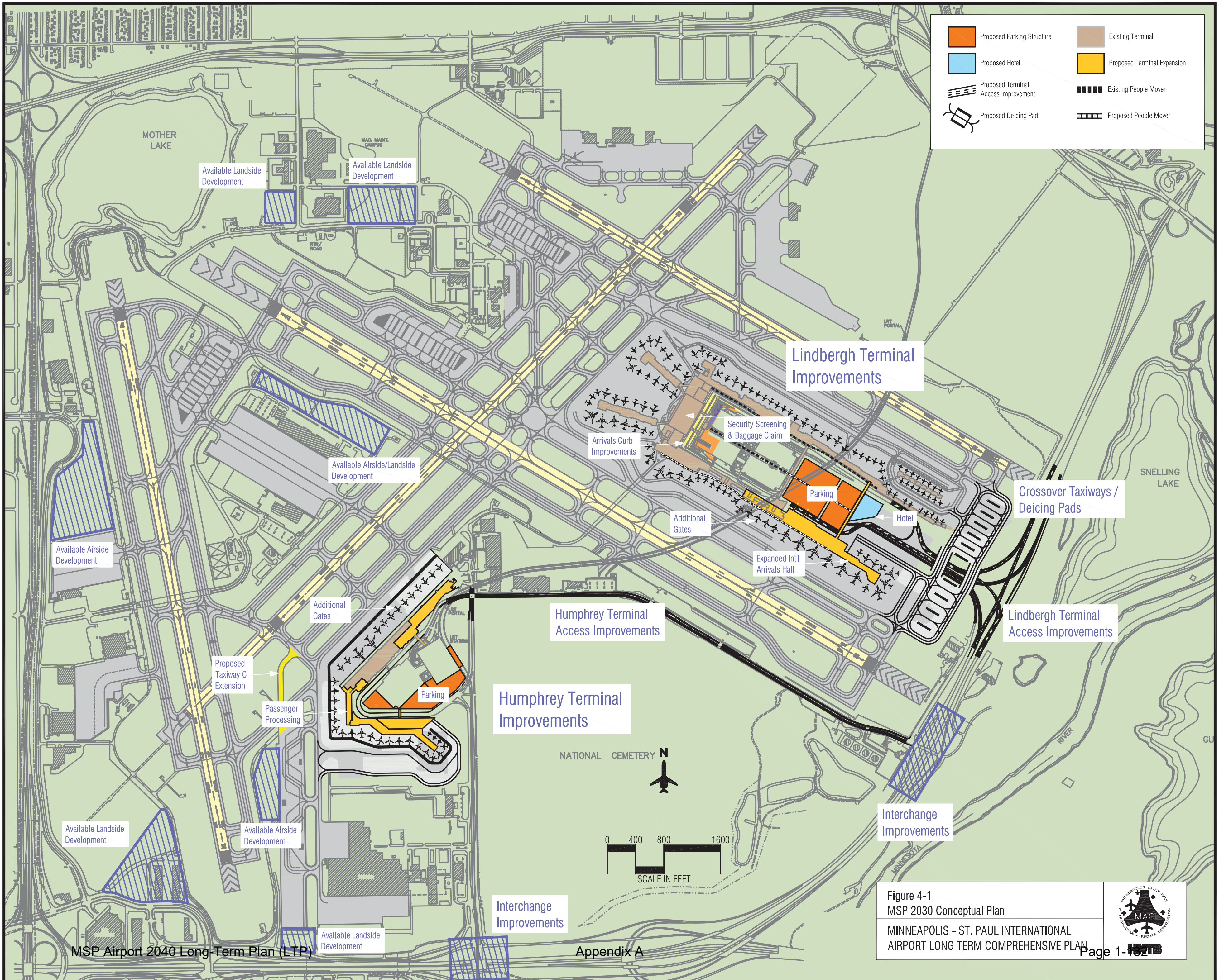
Though it is typical for an airport master plan to provide a series of broad concepts for airport development, the nature of the LTCP Update was to focus on key facilities at MSP and develop concepts that would resolve existing and forecast facility deficiencies. The specific facilities with existing deficiencies and forecast deficiencies were identified through an assessment of known issues and the facility requirements evaluation presented in Chapter 3.

Facilities were evaluated and concepts were developed by a planning team of subject matter experts in the areas of airfield facilities, terminal facilities, ground transportation facilities, and airport support facilities. The planning team worked through these challenges in concert with one another so that each concept would, ideally, complement the others and a cohesive plan for MSP could be realized. Additionally, the elements of this LTCP Update will incorporate sustainable airport development practices whenever feasible. The MAC will use its Stewards of Tomorrow's Airport Resources program to focus on developing and exploring new and innovative opportunities that will allow the airport to meet the needs of the present without compromising the ability of future generations to meet their own needs. By focusing on sustainable solutions, MSP will be able to address long-term environmental, operational, financial and social needs.

Sustainable development practices will focus on a holistic approach that will ensure the integrity of the Economic viability, Operational efficiency, Natural Resource Conservation and Social responsibility (more commonly referred to as EONS) of the airport. The EONS approach attempts to balance the four functional parts of airport management by taking into consideration the economic, ecological and social components with respect to operational efficiency. The MAC will also consider the US Green Building Council's Leadership in Energy and Environmental Design (USGBC LEED®) program for guidance in the design and construction of new or rehabilitation of existing facilities. A description of each subject area is described below and a summary of the airport-wide plan is provided at the end of this chapter.

The LTCP Update for MSP is illustrated in **Figure 4-1 - MSP 2030 Conceptual Plan**. The plan includes:

- Airfield improvements
- Expansion and improvements of Lindbergh Terminal
- Expansion and improvements of Humphrey Terminal
- Roadway access improvements
- Expanded parking capacity
- An airport hotel
- Land use designations for cargo and airport support facilities


Proposed Parking Structure
Existing Terminal
Proposed Hotel
Proposed Terminal Expansion
Proposed Terminal Access Improvement
Existing People Mover
Proposed Deicing Pad
Proposed People Mover
MOTHER LAKE
Available Landside Development
Available Landside Development
Lindbergh Terminal Improvements
Security Screening & Baggage Claim
Arrivals Curb Improvements
Available Airside/Landside Development
Parking
Hotel
Crossover Taxiways / Deicing Pads
SNELLING LAKE
Additional Gates
Expanded Int'l Arrivals Hall
Available Airside Development
Additional Gates
Humphrey Terminal Access Improvements
Lindbergh Terminal Access Improvements
Proposed Taxiway C Extension
Parking
Passenger Processing
Humphrey Terminal Improvements
NATIONAL CEMETERY
N
0 400 800 1600
SCALE IN FEET
Interchange Improvements
Available Landside Development
Available Airside Development
Interchange Improvements
Available Landside Development
RIVER
MINNESOTA
Figure 4-1
MSP 2030 Conceptual Plan
MINNEAPOLIS - ST. PAUL INTERNATIONAL AIRPORT LONG TERM COMPREHENSIVE PLAN
HNTB
MAC

4.2 AIRFIELD

Airfield facilities include the system of runways, taxiways, and aprons where aircraft land, take off, taxi, and park. Generally speaking, these are the portions of the airport where aircraft operate. In the context of long-term planning, airfield facilities must be assessed for their capabilities to efficiently accommodate forecast aircraft operations. An operation is either a takeoff or a landing. The aviation activity forecast prepared for the MSP LTCP anticipates growth from approximately 450,000 annual operations in 2008 to 630,000 annual operations in 2030. MSP currently has four runways. Runway 17-35 was opened in October 2005 and has helped to reduce delays at the airport, especially during poor weather conditions. As reported in Chapter 3, several analyses of MSP's airfield capacity (with all four runways in place) have been completed in recent years. At 630,000 annual operations, these studies anticipated average annual delay of approximately 10 minutes per operation.

Because the airfield can operate at this level of operations with a level of annual delay acceptable for a large hub airport, the LTCP Update did not evaluate alternatives for constructing additional runway capacity at MSP. The existing four-runway airfield is considered to have sufficient capacity to accommodate forecast levels of operations through the planning period.

However, the airfield also includes the taxiway system which allows aircraft to move between the runways and the terminal facilities, cargo facilities, maintenance facilities, and general aviation facilities. The taxiway system does not allow the airport to accommodate more landings or takeoffs but it does contribute to the overall efficiency of the airfield. An efficient taxiway system allows aircraft to circulate efficiently about the airfield and gives air traffic controllers the ability to route aircraft to and from runways in the most direct route.

As shown in **Figure 4-2 - Crossover Taxiway Concept**, MSP's terminal area is located between Runways 12R-30L and 12L-30R. Previous expansions of the Lindbergh Terminal have included the continued extensions of boarding concourses to the east including Concourses A, B, C, and G. Though aircraft parked at Concourses A and B are very close to the end of Runway 30R, they require a substantial taxi distance, and time, to reach the ends of other runways, including Runway 30L. In a similar fashion, the proposed expansion of Concourse G will require more taxi distance and time for aircraft to reach Runway 30R and will add to taxiway congestion.

Providing an additional taxiway connection at the east end of the airfield will help resolve this congestion and provide efficient access to Runways 30L and 30R for aircraft parked along Concourses A, B, C, and G.

Considerations in planning a crossover taxiway include maintaining existing end-of-runway deicing pads, avoiding impacts to the navigational aids for aircraft approaching Runways 30L and 30R, avoiding impacts to Concourses A and B, protecting for the potential extension of Concourse G, and bridging the airport's primary entrance road (Glumack Drive).

Three configurations for these crossover taxiways were evaluated. In all three, two taxiways were provided so that aircraft could taxi in both directions. The preferred alternative would reconfigure the deicing pads and relocate them between the proposed taxiways as shown in **Figure 4-2**. This was preferred because the deciding pads would be available to aircraft departing either Runway 30L or Runway 30R. The preferred alternative is located as far east as feasible without impacting the approach zones for Runways 30L and 30R. However, a portion

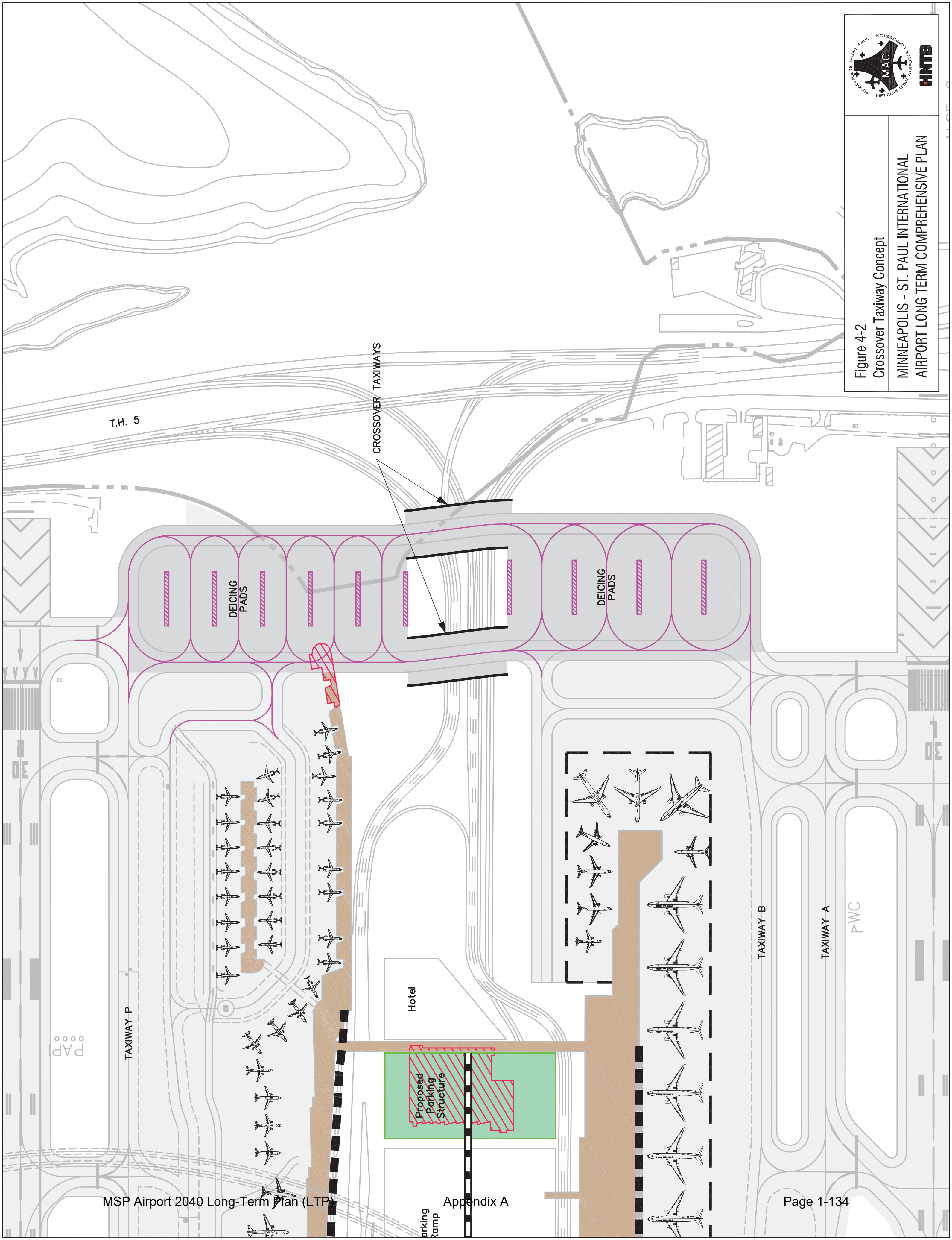


Figure 4-2
Crossover Taxiway Concept

MINNEAPOLIS - ST. PAUL INTERNATIONAL AIRPORT LONG TERM COMPREHENSIVE PLAN

of Concourse A would be impacted and approximately three commuter gates would require relocation to another portion of the terminal area. The proposed crossover taxiways would bridge Glumack Drive, which is discussed in detail in Section 4.4, Ground Transportation Alternatives.

An extension of Taxiway C on the south side of the airport is recommended to alleviate localized congestion in and out of the Humphrey remote apron. No other significant improvements to the airfield were evaluated as part of this update to the MSP LTCP.

4.3 TERMINAL

As presented in Chapter 1, MSP has two airline terminals, the Lindbergh Terminal and the Humphrey Terminal. Delta Air Lines hub operations are accommodated at the Lindbergh Terminal while MSP's other airlines are accommodated at both the Lindbergh Terminal and the Humphrey Terminal. In evaluating alternatives for terminal development at MSP, there were two primary issues to resolve:

1. Forecast growth and an assessment of gate requirements indicate that the Lindbergh Terminal would be unable to accommodate the growth of its current mix of airlines through the 20-year planning period, even with an extension of Concourse G.

2. The Lindbergh Terminal is characterized by a series of acute facility deficiencies including its international arrivals (Customs and Border Protection – CBP) facility, ticketing lobby, security screening facilities, and bag-claim facilities. These deficiencies were noted in Chapter 1 and in Chapter 3.

The facility requirements analysis presented in Chapter 3 identified a requirement for an additional 28 gates at MSP by 2030. The forecast of gate requirements by airline also indicates that Delta Air Lines and its SkyTeam alliance partners would require a total of 119 gates while all other airlines at MSP would require a total of 36 gates by 2030. Providing sufficient gates, ticketing, bag-claim, and ground transportation facilities at the Lindbergh Terminal for the existing mix of airlines is not feasible. Thus, a key task for the LTCP Update was to evaluate the potential to relocate some airlines from the Lindbergh Terminal to the Humphrey Terminal where expansion could be more readily accommodated. It was determined that relocating all airlines other than Delta and its SkyTeam partners to the Humphrey Terminal would better balance the mix of passengers beginning and ending their trips at MSP between the two facilities and would allow all airlines, including Delta and its SkyTeam partners, room to expand their facilities.

4.3.1 LINDBERGH TERMINAL

The Lindbergh Terminal requires both expansion and resolution of several facility deficiencies noted above. Each of the Lindbergh Terminal's existing passenger concourses is currently adjacent to a taxiway, except the east end of Concourse G. Concourse G currently provides the only available location for expansion without significantly impacting the airfield. This is due to Delta Air Lines' vacation of one of its maintenance hangars and the hangar's subsequent demolition by the MAC, which was located to the east of the Lindbergh Terminal. The extension of Concourse G would provide several new gates that would meet the gate requirements for the Lindbergh Terminal including access to international arrivals facilities.

The proposed improvements to the Lindbergh Terminal will result in a net increase of three gates bringing the total to 120 gates. This accounts for a loss of two Concourse A gates, reconstruction of nine Concourse G gates and will allow all of Delta's 2030 fleet to be accommodated simultaneously at peak periods. The Lindbergh Terminal will also accommodate 20 international parking positions. These are substantial improvements over today's Lindbergh Terminal gate layout, which is incapable of supporting the forecast future aircraft fleet and operations. The proposed expansion of the Lindbergh Terminal is illustrated in **Figure 4-3 – Lindbergh Terminal Concept Phase I (2015-2020), Figure 4-4, Lindbergh Terminal Concept Phase II (2020-2025)** and **Figure 4-5, Lindbergh Terminal Concept Phase II (2025-2030).**

The Lindbergh Terminal's ticketing, bag-claim, security screening, and international arrivals facilities are also in need of improvements to improve efficiency and capacity.

Ticketing

The Lindbergh Terminal ticketing lobby will be reconfigured to provide additional passenger circulation and queuing space. Currently, Delta Air Lines and its SkyTeam partners occupy approximately half of the ticketing lobby. It is anticipated that the relocation of non-Delta/SkyTeam airlines to the Humphrey Terminal could alleviate some crowding in the ticket lobby as will the continued deployment of new technologies that allow passengers to print their own boarding passes and bypass the ticketing facilities entirely. Facilities for checking bags will still be required, however, for those passengers who do not carry their luggage on-board.

Baggage Claim

The Lindbergh Terminal baggage claim facility is outdated and undersized, as discussed in Chapter 3. A reconfiguration of the baggage claim facility where the outdated round claim devices are replaced with larger carousels would help alleviate much of the congestion and lack of circulation. The proposed conceptual plan of the baggage claim area includes seven sloped-plate oval devices that will range in size from 145 to 260 linear feet, and will replace the circular-shaped smaller claim devices to provide improved passenger circulation and claim frontage within the area. The relocation of non-Delta/SkyTeam airlines to the Humphrey Terminal would also alleviate congestion within the Lindbergh Terminal bag-claim area.

Security Screening

There are currently six security screening checkpoints adjacent to the Lindbergh Terminal ticketing hall providing access to the secure area and passenger boarding areas. As described in Chapter 3, these areas lack sufficient queuing area and operate somewhat inefficiently. Two concepts were provided for consolidating the security screening facilities in the Lindbergh Terminal. In each concept, the security screening facilities would be consolidated to a large central node and a queuing area would accommodate forecast passenger demand. The final configuration of the security screening facilities would be determined during an advanced planning and design phase for Lindbergh Terminal improvements.

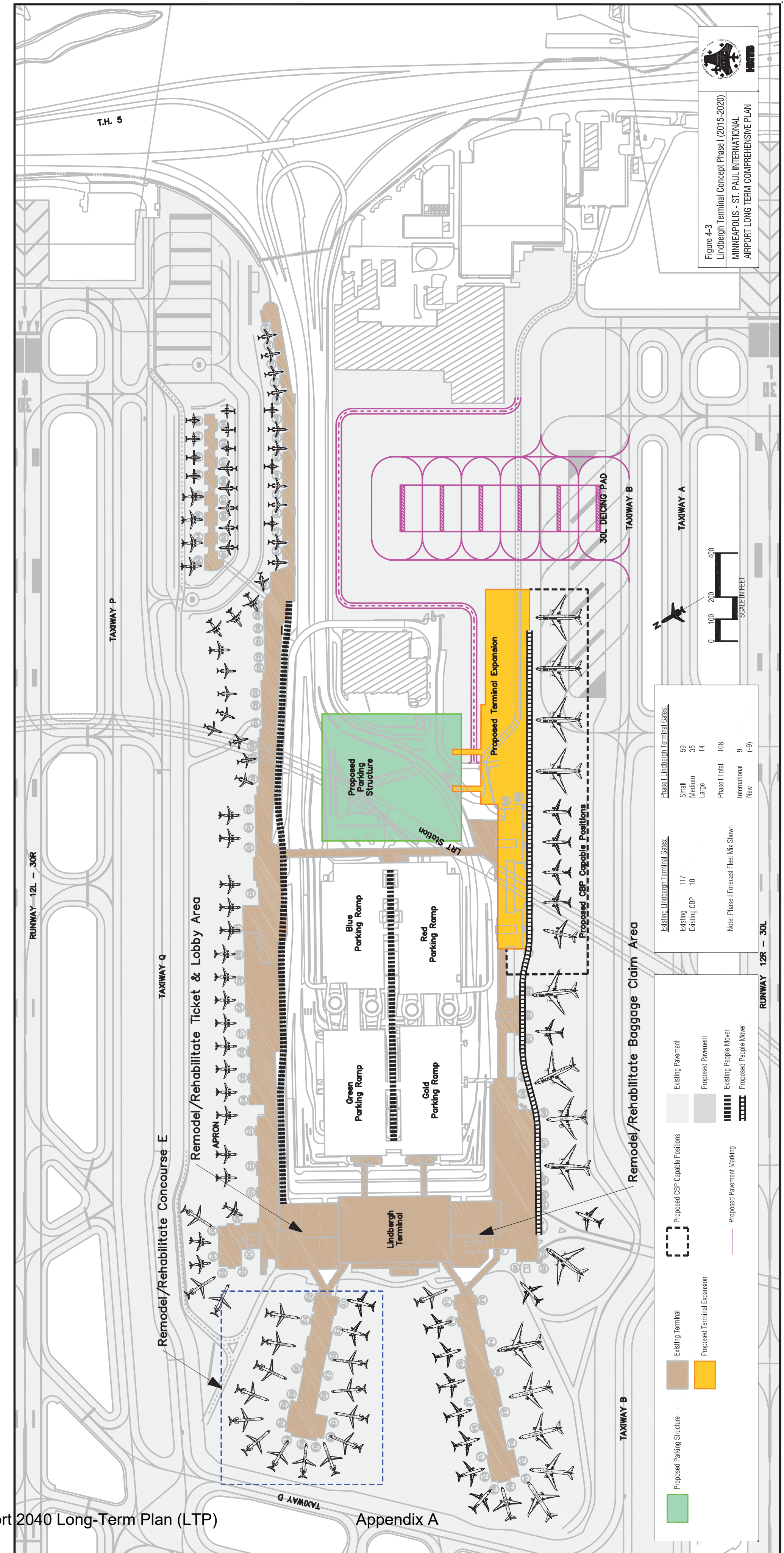


Figure 4-3
Lindbergh Terminal Concept Phase I (2015-2020)
MINNEAPOLIS - ST. PAUL INTERNATIONAL
AIRPORT LONG TERM COMPREHENSIVE PLAN
T.H. 5
TAXIWAY P
TAXIWAY Q
TAXIWAY A
TAXIWAY B
TAXIWAY D
RUNWAY 12L - 30R
RUNWAY 12R - 30L
APRON
30L DEICING PAD
Proposed Terminal Expansion
Proposed Parking Structure
LRT Station
Proposed CBP Capable Positions
Blue Parking Ramp
Red Parking Ramp
Green Parking Ramp
Gold Parking Ramp
Lindbergh Terminal
Remodel/Rehabilitate Ticket & Lobby Area
Remodel/Rehabilitate Concourse E
Remodel/Rehabilitate Baggage Claim Area
0 100 200 400
SCALE IN FEET
N
Existing Lindbergh Terminal Gates:
Existing 117
Existing CBP 10
Phase I Lindbergh Terminal Gates:
Small 59
Medium 35
Large 14
Phase I Total 108
International 9
New (-9)
Note: Phase I Forecast Fleet Mix Shown
Proposed Parking Structure
Existing Terminal
Proposed Terminal Expansion
Proposed CBP Capable Positions
Existing Pavement
Proposed Pavement
Existing People Mover
Proposed People Mover
Proposed Pavement Marking

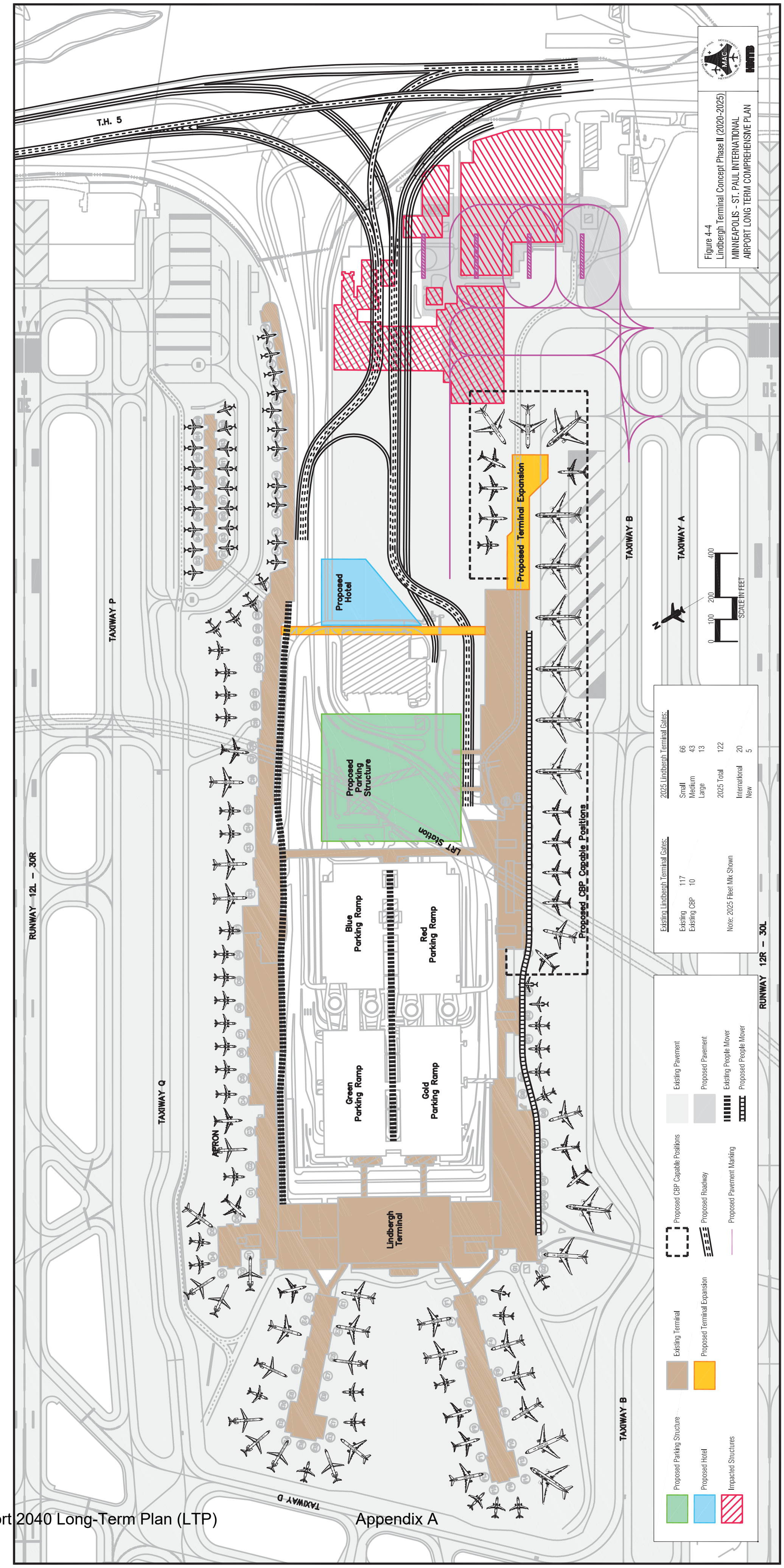


Figure 4-4
Lindbergh Terminal Concept Phase II (2020-2025)
MINNEAPOLIS - ST. PAUL INTERNATIONAL
AIRPORT LONG TERM COMPREHENSIVE PLAN
T.H. 5
Proposed Terminal Expansion
Proposed Hotel
Proposed Parking Structure
LRT Station
Proposed CBP Capable Positions
Blue Parking Ramp
Red Parking Ramp
Green Parking Ramp
Gold Parking Ramp
Lindbergh Terminal
APRON
TAXIWAY P
TAXIWAY Q
TAXIWAY B
TAXIWAY A
TAXIWAY D
RUNWAY 12L - 30R
RUNWAY 12R - 30L
SCALE IN FEET
0
100
200
400
N
Existing Lindbergh Terminal Gates:
Existing 117
Existing CBP 10
Note: 2025 Fleet Mix Shown
2025 Lindbergh Terminal Gates:
Small 66
Medium 43
Large 13
2025 Total 122
International 20
New 5
Proposed Parking Structure
Proposed Hotel
Impacted Structures
Existing Terminal
Proposed Terminal Expansion
Proposed CBP Capable Positions
Proposed Roadway
Proposed Pavement Marking
Existing Pavement
Proposed Pavement
Existing People Mover
Proposed People Mover

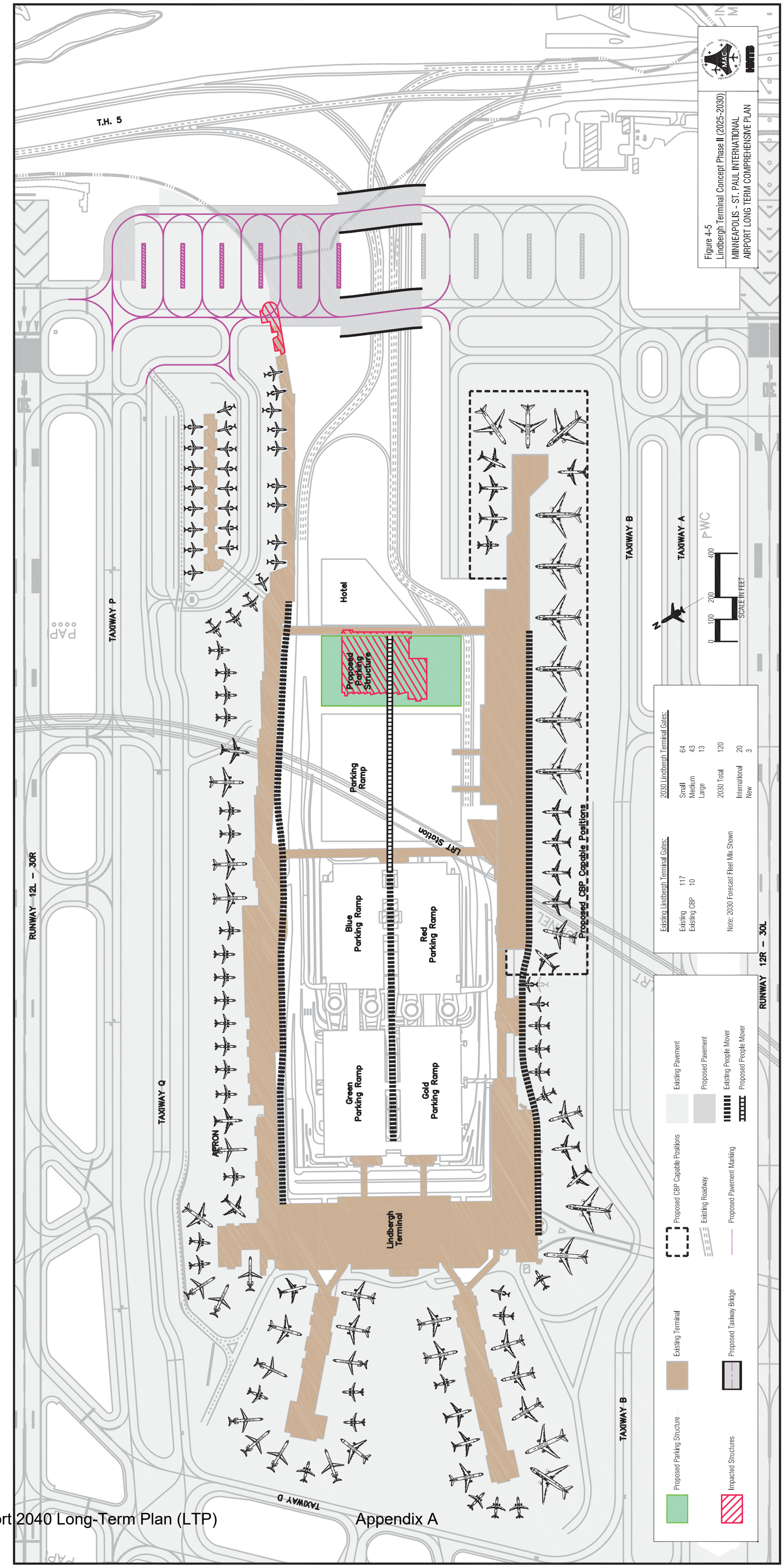


Figure 4-5
Lindbergh Terminal Concept Phase II (2025-2030)
MINNEAPOLIS - ST. PAUL INTERNATIONAL
AIRPORT LONG TERM COMPREHENSIVE PLAN
T.H. 5
TAXIWAY P
TAXIWAY Q
TAXIWAY B
TAXIWAY A
TAXIWAY D
RUNWAY 12L - 30R
RUNWAY 12R - 30L
APRON
Hotel
Proposed Parking Structure
Parking Ramp
LRT Station
Blue Parking Ramp
Red Parking Ramp
Green Parking Ramp
Gold Parking Ramp
Lindbergh Terminal
Proposed CBP Capable Positions
SCALE IN FEET
0
100
200
400
Existing Lindbergh Terminal Gates:
Existing 117
Existing CBP 10
Note: 2030 Forecast Fleet Mix Shown
2030 Lindbergh Terminal Gates:
Small 64
Medium 43
Large 13
2030 Total 120
International 20
New 3
Proposed Parking Structure
Impacted Structures
Existing Terminal
Proposed Taxiway Bridge
Proposed CBP Capable Positions
Existing Roadway
Proposed Pavement Marking
Existing Pavement
Proposed Pavement
Existing People Mover
Proposed People Mover

International Arrivals (Customs and Border Protection)

Delta Air Lines currently operates international flights to Europe, Asia, Mexico (on a seasonal basis), and Canada from MSP. The airport's existing international arrivals facility is undersized for forecast demand levels and would be unable to efficiently process forecast international passenger arrivals. Three concepts were evaluated for improving the international arrivals facility at MSP and are outlined below.

Concept 1: Vertical Expansion of Federal Inspection Services

Concept 1 would expand the existing international arrivals facilities by providing a second level for immigration processing so that the baggage claim area and customs area could be expanded into the area currently occupied by immigration. These two functions would then operate on separate levels requiring passengers to move vertically, as well as horizontally through the facility. Additional gates would need to be connected to the international arrivals facility via secure corridors. These corridors would likely be provided by extending them along the curtain wall of the concourse façade, similar to how the secure corridor is currently configured along Concourse G.

Concept 2: Reconstruct Concourse F

Concept 2 would require the closure and demolition of existing Concourse F. It would be reconstructed as a facility that could accommodate both domestic and international arrivals and departures. A new immigration and customs processing facility would be integrated into Concourse F.

Concept 3: Construct a New International Arrivals (Customs and Border Protection) Facility at Concourse G

Concept 3 would extend Concourse G and provide new gates that could accommodate both domestic and international arrivals as well as provide a new passenger processor with ticketing, bag-claim, immigration, and security screening for both domestic and international passengers.

The recommended alternative is Concept 3. Concept 3 is illustrated in four figures:

- **Figure 4-6 – New Int'l Terminal – Departures Level**
- **Figure 4-7 – New Int'l Terminal – Mezzanine Level**
- **Figure 4-8 – New Int'l Terminal – Ground Level**
- **Figure 4-9 – New Int'l Terminal – Sections**

Concept 3 provides the required additional gates and gate frontage required for larger aircraft anticipated in the future as well as an entirely new international arrivals facility. The new gates would be multi-use gates in that each could accommodate either domestic or international flights without any impact to adjacent gates. This is an improvement over the current facility which can require the closure of several adjacent gates in order to utilize the sterile corridors when an international flight arrives. The primary advantage of Concept 3 is the addition of a new passenger processing facility. The existing Lindbergh Terminal passenger processor cannot be expanded. Its ticketing lobby and baggage claim areas can be reconfigured but the overall size is constrained by its location between Concourses F and G. In Concept 3, international passengers and, potentially, some domestic passengers could utilize the supplemental passenger processing facility that would replicate the convenience of a stand-alone international terminal while still fully integrated into the Lindbergh Terminal complex.

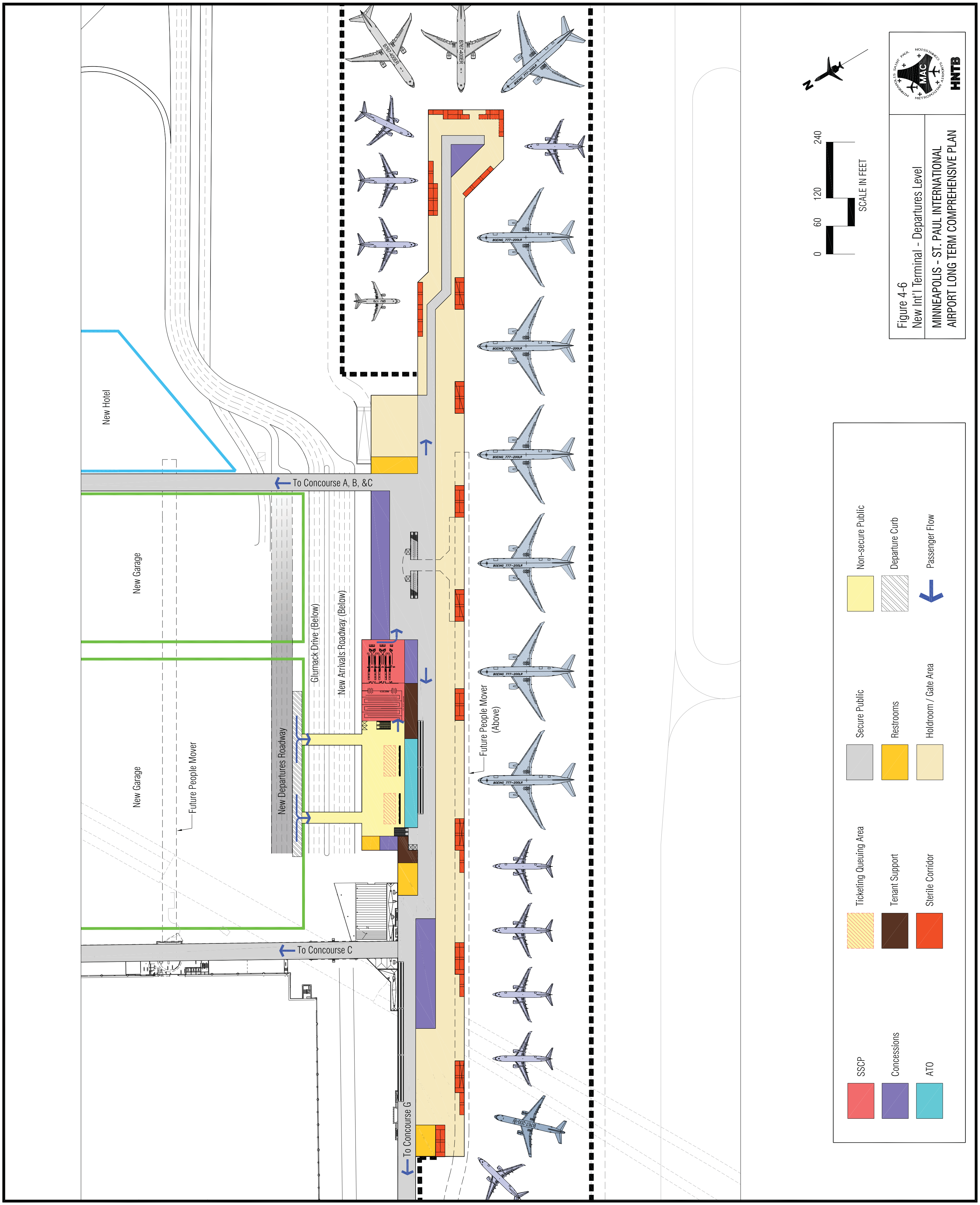
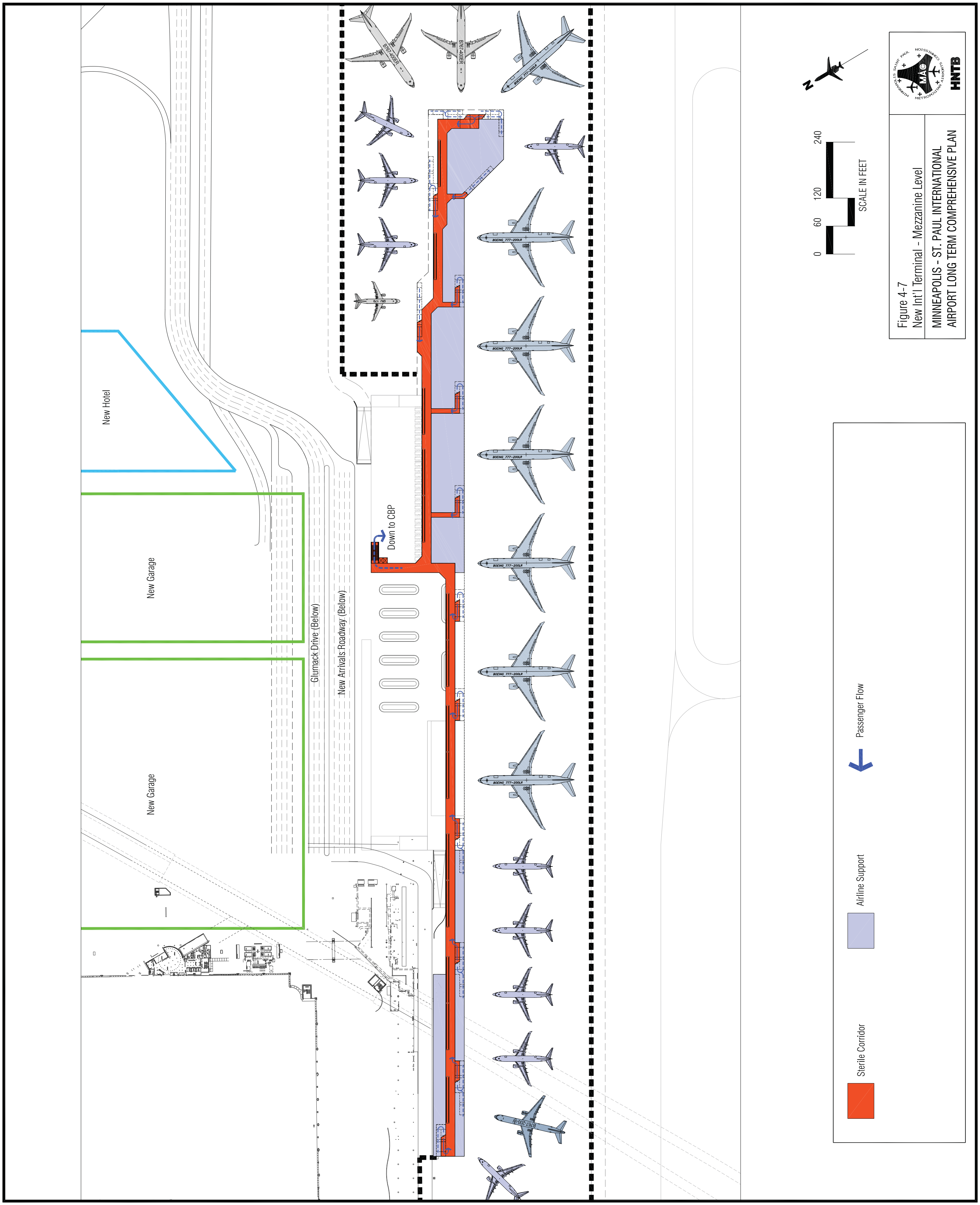
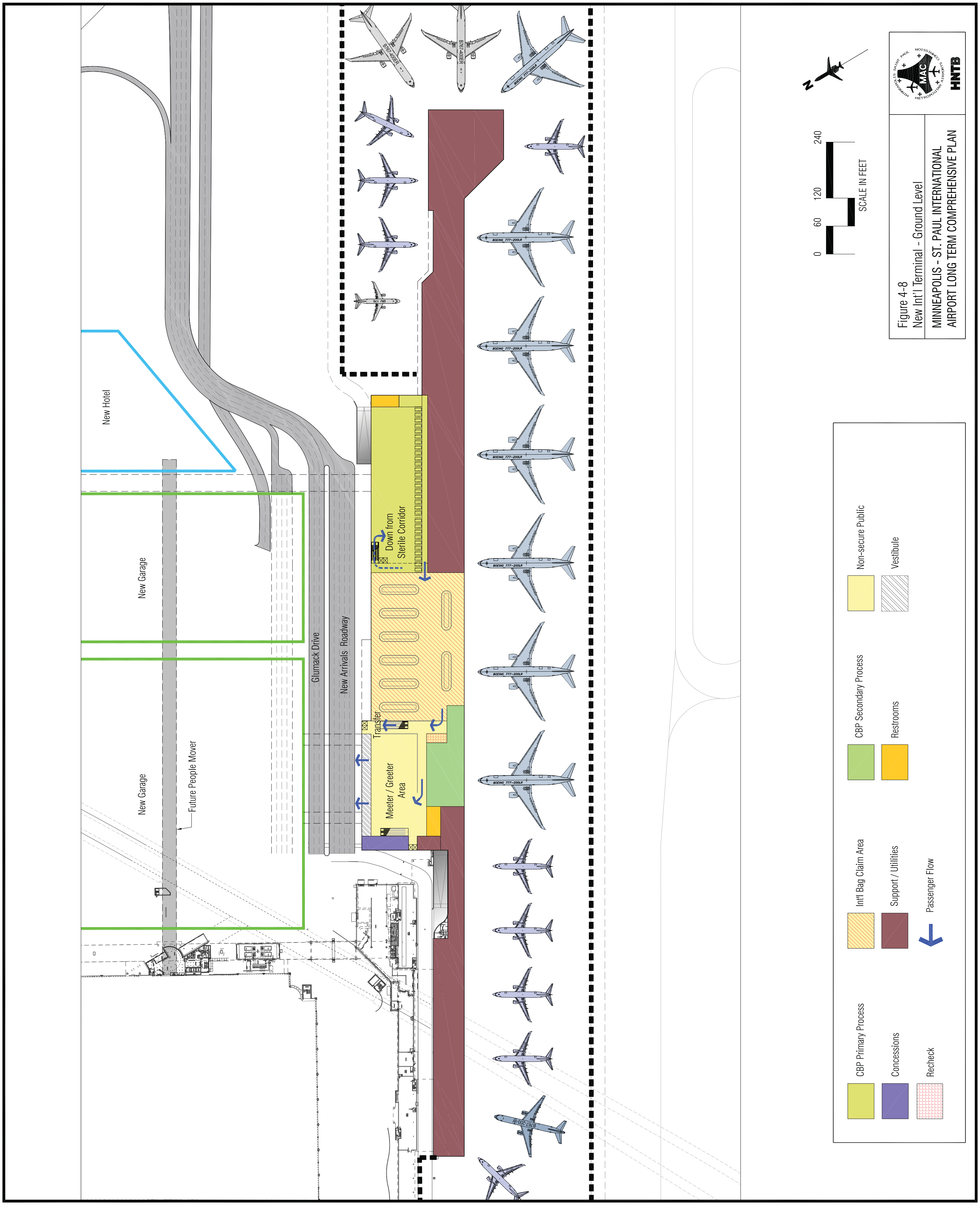


Figure 4-6
New Int'l Terminal - Departures Level



New Hotel
New Garage
New Garage
Glumack Drive (Below)
New Arrivals Roadway (Below)
Down to CBP
Sterile Corridor
Airline Support
Passenger Flow
0
60
120
240
SCALE IN FEET
N
HNTB
Figure 4-7
New Int'l Terminal - Mezzanine Level
MINNEAPOLIS - ST. PAUL INTERNATIONAL
AIRPORT LONG TERM COMPREHENSIVE PLAN


New Hotel
New Garage
New Garage
Future People Mover
Glumack Drive
New Arrivals Roadway
Down from
Sterile Corridor
Transfer
Meeter / Greeter
Area
Non-secure Public
Vestibule
CBP Secondary Process
Restrooms
Int'l Bag Claim Area
Support / Utilities
Passenger Flow
CBP Primary Process
Concessions
Recheck
0 60 120 240
SCALE IN FEET
N
Figure 4-8
New Int'l Terminal - Ground Level
MINNEAPOLIS - ST. PAUL INTERNATIONAL
AIRPORT LONG TERM COMPREHENSIVE PLAN
MAC
HNTB

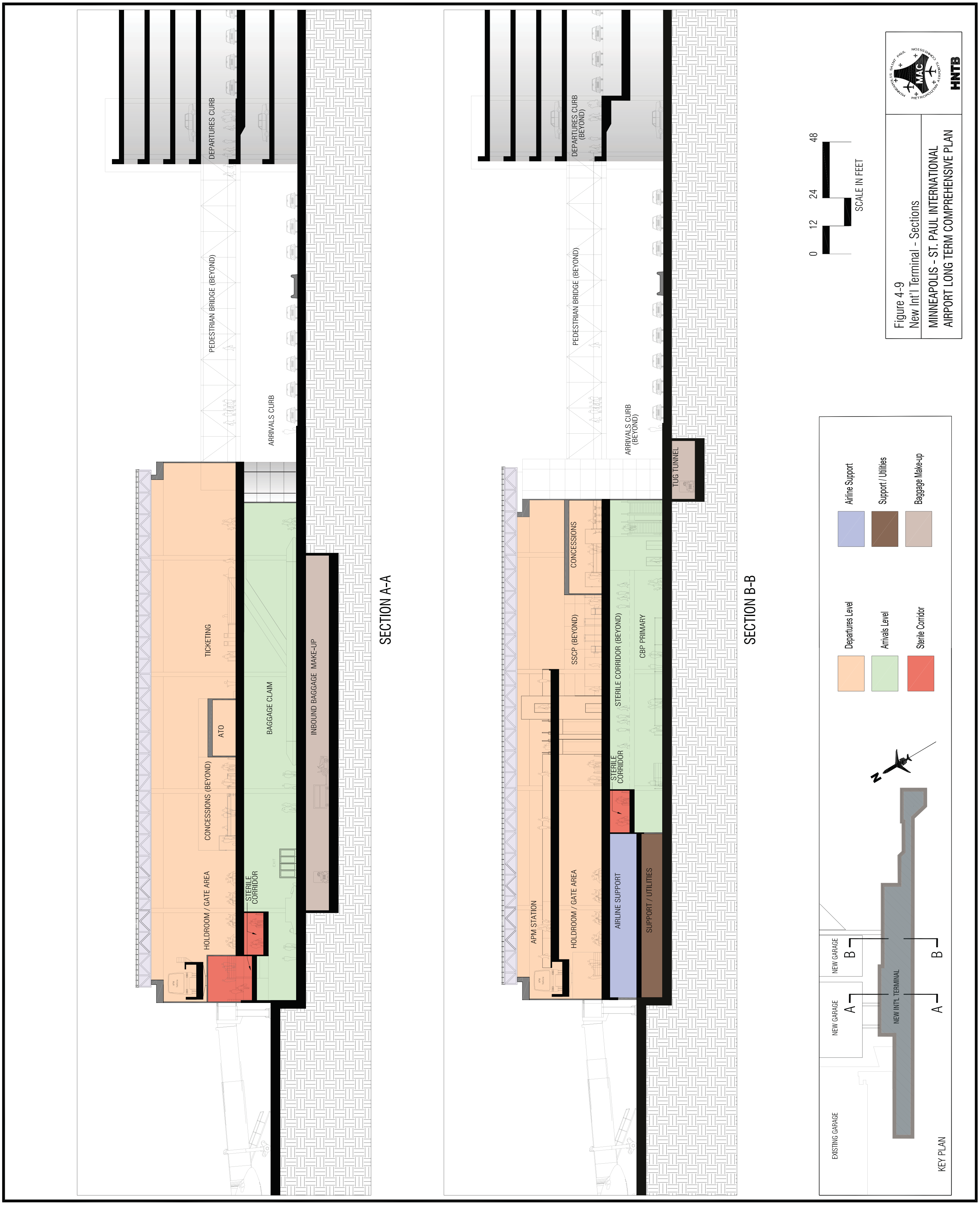


Figure 4-9
New Int'l Terminal - Sections

MINNEAPOLIS - ST. PAUL INTERNATIONAL AIRPORT LONG TERM COMPREHENSIVE PLAN

4.3.2 HUMPHREY TERMINAL

Two alternatives for expanding the Humphrey Terminal were evaluated. Both proposed the addition of six gates by extending the passenger boarding concourse to the northeast along Taxiway D and the addition of 20 gates by extending the passenger boarding concourse to the south along Taxiway S and the east along Taxilane S2. The two concepts differed only in their approach to providing passenger processing facilities such as ticketing, bag-claim and security screening. In the first concept, the existing passenger processor would be expanded to the north and south to accommodate ticketing, bag-claim, and security screening for all Humphrey Terminal passengers. In the second concept, a second passenger processing facility would be constructed to the southeast to provide more convenient access to the 20 new southeast gates. The recommended concept is to provide a second passenger processing facility to the southeast. This concept is illustrated in two figures:

- **Figure 4-10 - Humphrey Terminal Concept Phase I (2010-2015)**
- **Figure 4-11 - Humphrey Terminal Concept Phase II (2020-2025)**

The proposed supplemental passenger processing facility can be seen in **Figure 4-11** along with its proximity to the 20-gate southeast expansion of the Humphrey Terminal. The advantage of this configuration is that most Humphrey Terminal passengers are either beginning or ending their trips at MSP as opposed to connecting. Therefore, proximity of the boarding gates to ticketing, bag-claim, security check points, curbs, and parking raises the level of service for each passenger. By providing two processing facilities at the Humphrey Terminal, the 20-gate southeast expansion maintains a level of convenience on par with the existing configuration. Build-out of the secondary passenger processing facility includes dual taxiways around the facility and will impact the existing run-up enclosure facility. Additional analysis of airline maintenance needs will be considered during this phase of development to address run-up enclosure facility requirements and relocation options. Relocation would take place in the immediate vicinity of the existing facility.

4.4 LANDSIDE AND GROUND TRANSPORTATION

The landside facilities include airport terminal access roads and curb fronts, parking, and rental car facilities. The inventory and facility requirements presented in Chapters 1 and 3 outlined the key challenges with the existing facilities and what improvements would be required. The facility requirements are dependent on the mix of airlines operating at each terminal. All concepts for landside facilities were developed with the assumption that all non-Delta/SkyTeam airlines would relocate to an expanded Humphrey Terminal by 2015, when the Lindbergh Terminal would no longer meet demand for aircraft gates and processing. Concepts for landside improvements are presented independently for each terminal.

4.4.1 LINDBERGH TERMINAL

After 2015, it is assumed that the Lindbergh Terminal will service Delta Air Lines and its SkyTeam partners exclusively. Though the facility would serve only one airline and its partners, the facility requirements presented in Chapter 3 show that additional improvements to and expansion of access roadways and curb front, additional parking, and rental car facilities would be required.

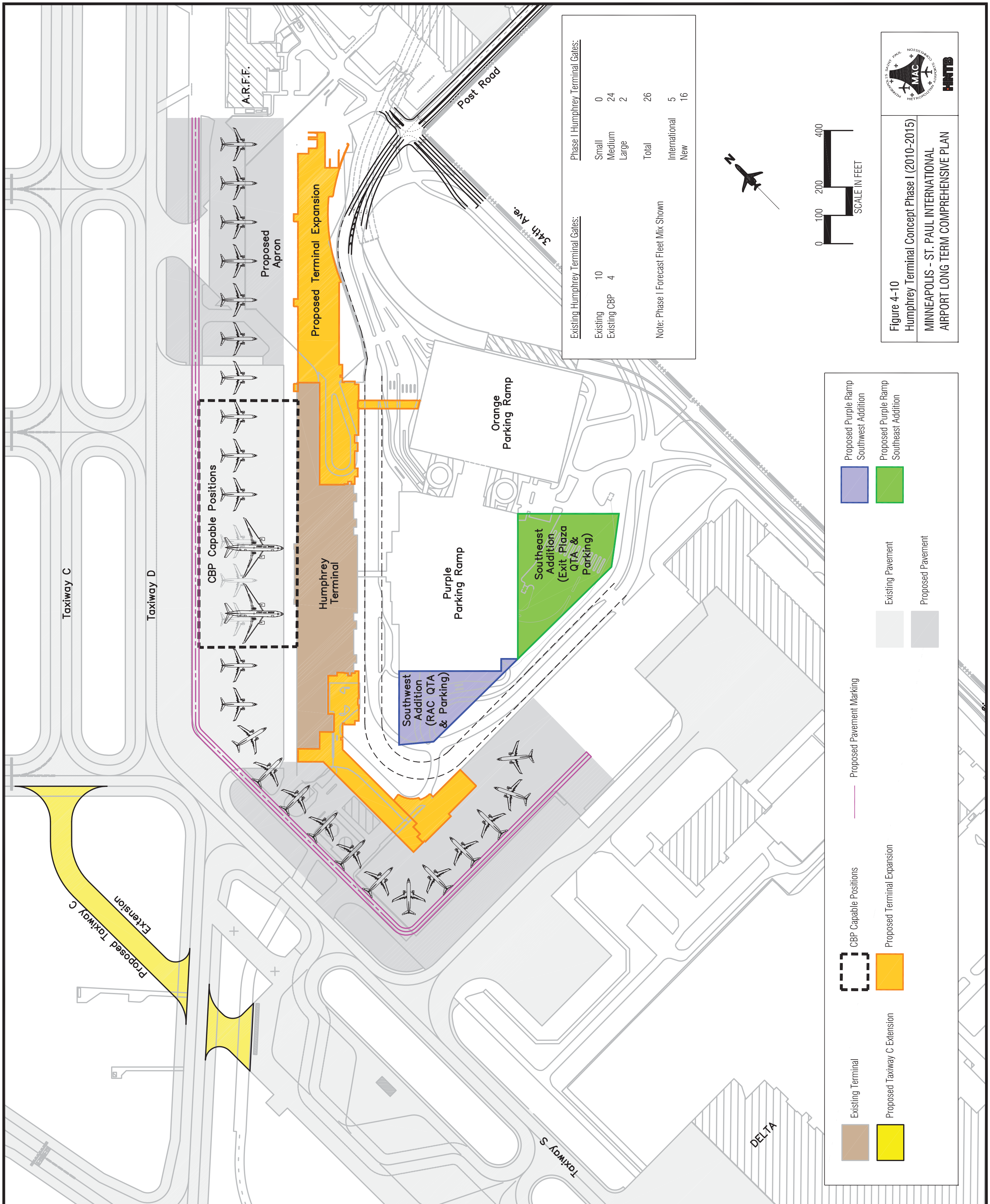


Figure 4-10
Humphrey Terminal Concept Phase I (2010-2015)

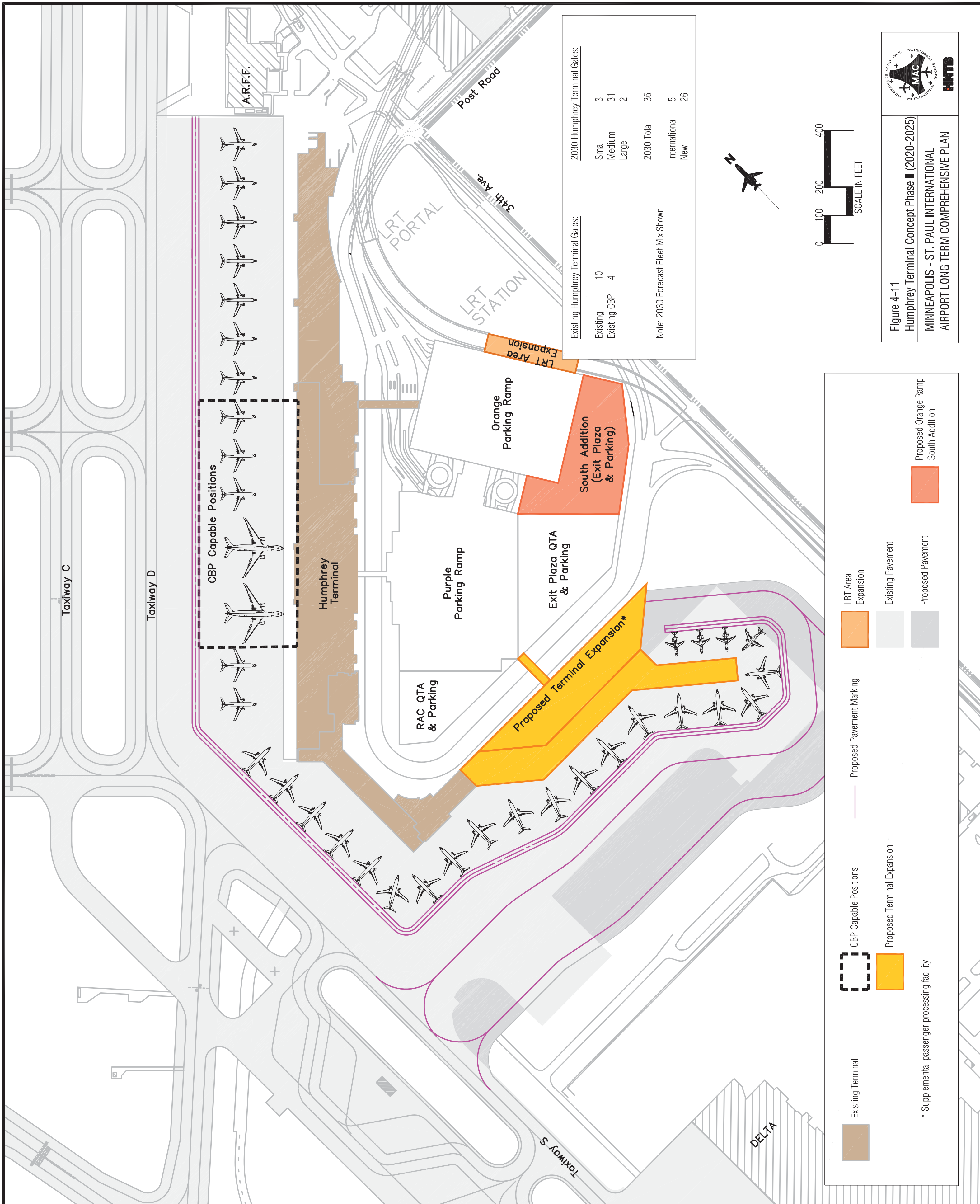


Figure 4-11
Humphrey Terminal Concept Phase II (2020-2025)
MINNEAPOLIS - ST. PAUL INTERNATIONAL
AIRPORT LONG TERM COMPREHENSIVE PLAN
Existing Humphrey Terminal Gates:
Existing 10
Existing CBP 4
Note: 2030 Forecast Fleet Mix Shown
2030 Humphrey Terminal Gates:
Small 3
Medium 31
Large 2
2030 Total 36
International 5
New 26
SCALE IN FEET
0 100 200 400
N
Existing Terminal
CBP Capable Positions
Proposed Pavement Marking
LRT Area Expansion
Existing Pavement
Proposed Pavement
Proposed Terminal Expansion
Proposed Orange Ramp South Addition
* Supplemental passenger processing facility
A.R.F.F.
Post Road
34th Ave.
LRT PORTAL
LRT STATION
LRT Area Expansion
Orange Parking Ramp
South Addition (Exit Plaza & Parking)
Purple Parking Ramp
Exit Plaza QTA & Parking
RAC QTA & Parking
Proposed Terminal Expansion*
Humphrey Terminal
CBP Capable Positions
Taxiway C
Taxiway D
Taxiway S
DELTA
HNTB
MAC

Airport Access / Curb Front

Glumack Drive provides access for all vehicles to the Lindbergh Terminal. The roadway operates with relative efficiency today but will require relocation to accommodate other airport improvements including a crossover taxiway that will bridge the road just west of Minnesota Highway 5. The redevelopment concept for Glumack Drive, illustrated in **Figure 4-12 – Realign Glumack Drive,** includes rebuilding the interchange with Highway 5 and relocating the roadway to the southwest in a more central location between the two parallel runways. The MAC will work with all appropriate agencies to implement these necessary interchange modifications, including preliminary environmental scoping and analysis, and work to include these improvements in the region's fiscally-constrained 2030 highway plan. Access would then be provided to the Lindbergh Terminal along the existing alignment while new access would be provided to the international arrivals facility and a potential airport hotel and conference center. Access would also be provided to two new parking ramps using the existing helixes.

The existing Lindbergh Terminal curb front is heavily congested at the lower level where commercial vehicles operate. A concept for improving the Lindbergh Terminal arrivals curb area is illustrated in **Figure 4-13 – Lindbergh Terminal Ground Transportation Center**. Because the curb front can't be readily lengthened due to Concourses G and C at each end, the concept for improving capacity includes providing an outer curb with pedestrian crosswalks traversing the inner curb area, potentially at grade. (Currently, the outer curb does not provide direct access to the terminal facility.) This would effectively double the available curb front but would require some passengers to traverse the inner curb.

The proposed plan would re-route commercial vehicles such as taxicabs and multi-passenger vans to a reconfigured staging area adjacent to the existing taxi staging area.

Parking

An additional 10,100 parking spaces are required at the Lindbergh Terminal by 2030. The only feasible alternative that provides parking directly at the terminal would be to construct two new garages to the southeast of the existing Lindbergh Terminal parking garages. These garages would be accessed using the existing helixes.

Rental Cars

A consolidated rental car facility was considered and rejected due to the high level of customer convenience realized by accommodating rental car ready facilities and return facilities directly within the parking facilities at each terminal. Therefore, the proposed expansion of parking garages would also accommodate the required expansion of rental car ready return facilities and allow them to continue operating within the airport garages at each terminal.

On-Site Hotel

A site has been identified that would be appropriate for hotel development.

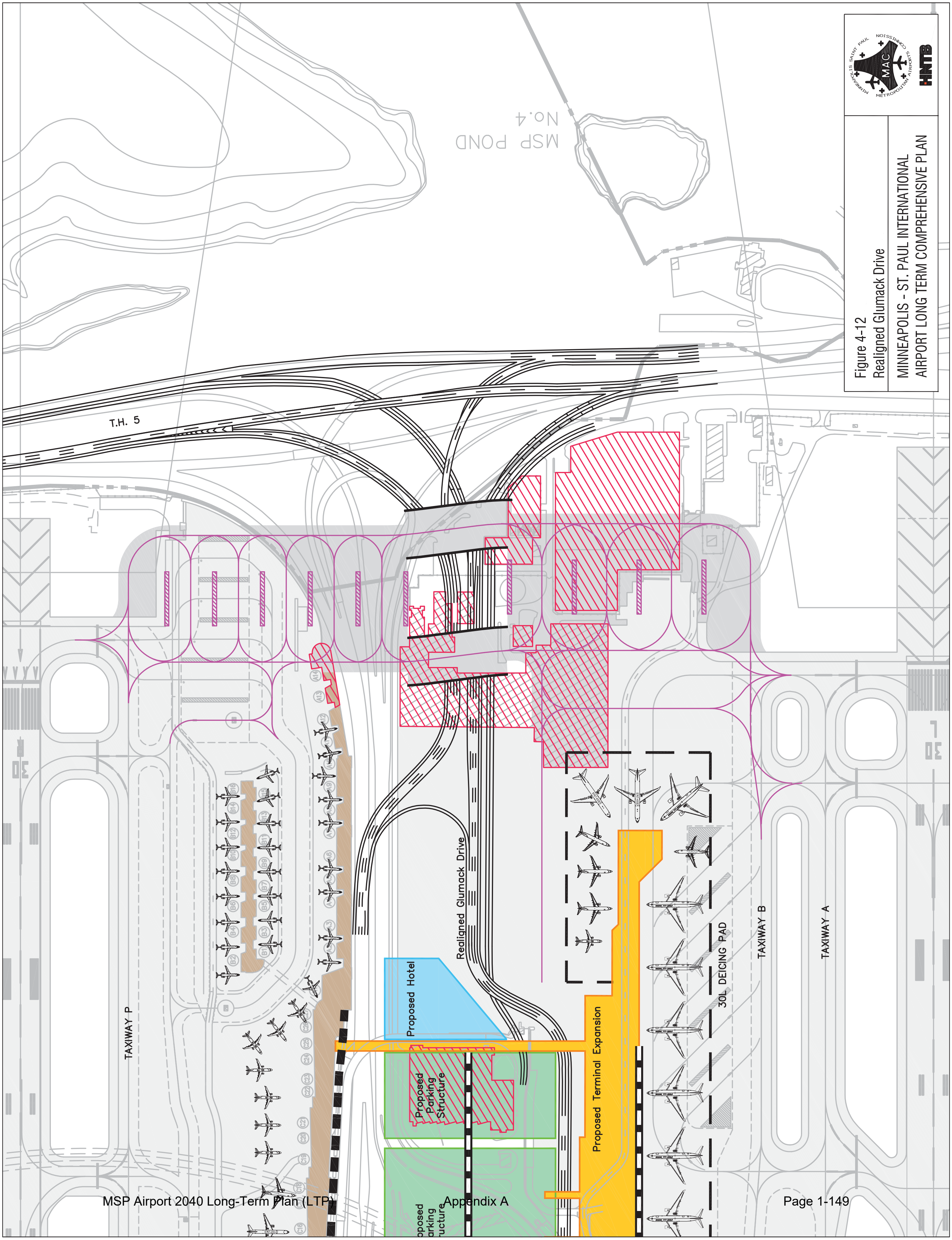


Figure 4-12
Realigned Glumack Drive
MINNEAPOLIS - ST. PAUL INTERNATIONAL
AIRPORT LONG TERM COMPREHENSIVE PLAN
METROPOLITAN AIRPORTS COMMISSION
MAC
HNTB
MSP POND
No.4
T.H. 5
Realigned Glumack Drive
Proposed Hotel
Proposed Parking Structure
Proposed Terminal Expansion
TAXIWAY P
TAXIWAY B
TAXIWAY A
30L DEICING PAD
30R
30L

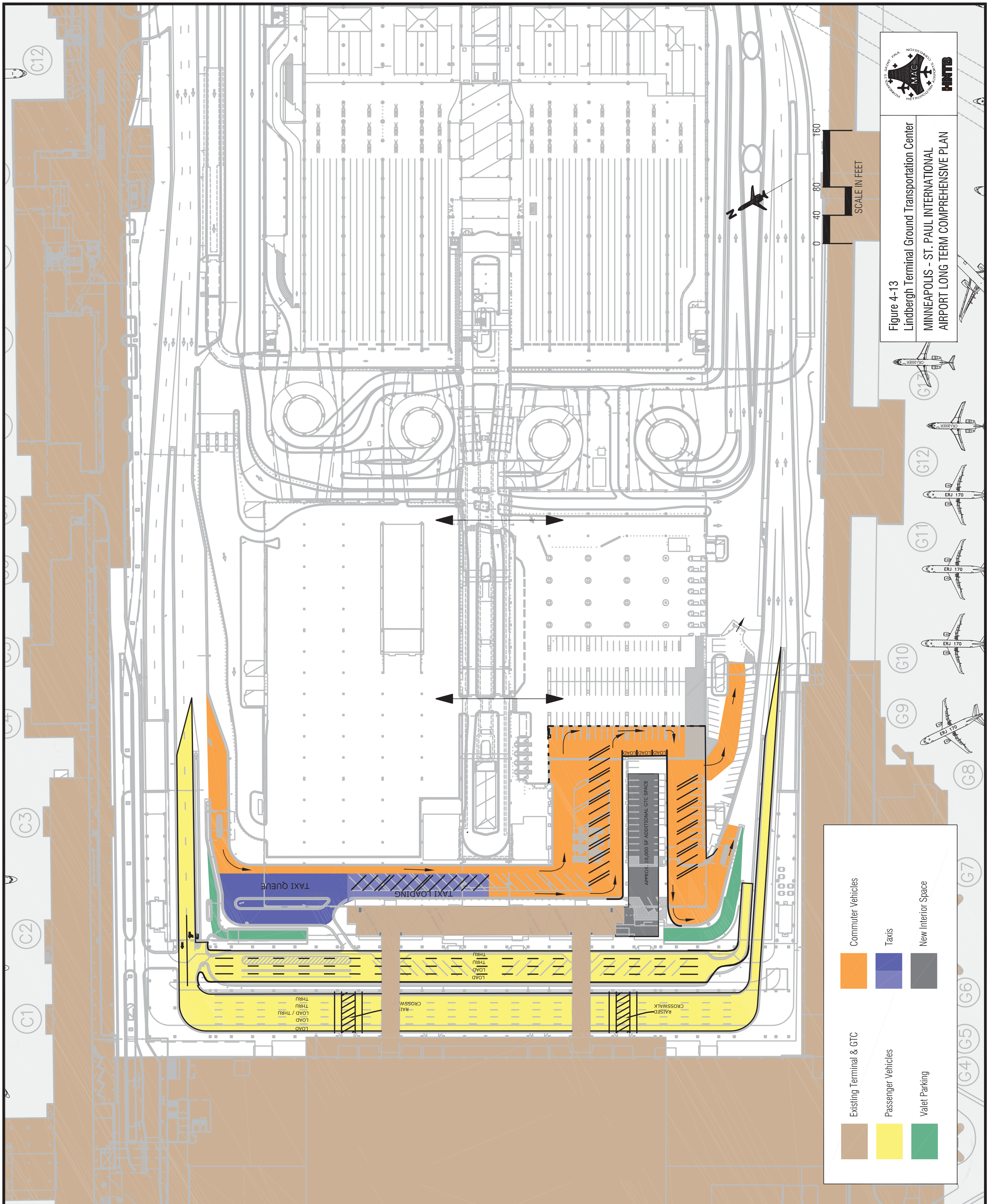


Figure 4-13
Lindbergh Terminal Ground Transportation Center

4.4.2 HUMPHREY TERMINAL

It is assumed that, after 2015, the Humphrey Terminal will accommodate all airlines except Delta Air Lines and its SkyTeam partners. The facility requirements presented in Chapter 3 show that additional improvements to and expansion of access roadways and curb front, additional parking, and rental car facilities would be required.

Airport Access Roadways / Curb Front

Access to the Humphrey Terminal is provided by both Post Road and 34th Avenue. Both existing roadways will be incapable of providing the required traffic volumes to Humphrey Terminal in future years. The concept for improving this condition, as illustrated in **Figure 4-1**, includes routing all inbound traffic for the Humphrey Terminal to Post Road and routing all outbound traffic to 34th Avenue. This concept would require several improvements, including widening Post Road. To address this issue, the MAC will work with all appropriate agencies to implement the necessary interchange modifications, including preliminary environmental scoping and analysis, and work to include these improvements in the region's fiscally-constrained 2030 highway plan.

The Humphrey Terminal curb area has sufficient capacity for existing demand levels and can be extended to accommodate an expansion of the existing passenger processor.

Parking

An additional 5,900 parking spaces will be required at the Humphrey Terminal by 2030. The existing parking garages can be expanded in place to accommodate this level of demand.

Rental Cars

As noted for the Lindbergh Terminal, a consolidated rental car facility was considered and rejected due to the high level of customer convenience realized by accommodating rental car ready facilities and return facilities directly within the parking facilities at each terminal. Therefore, the proposed expansion of parking garages would also accommodate the required expansion of rental car ready return facilities and allow them to continue operating within the airport garages at each terminal.

4.5 PREFERRED ALTERNATIVES SUMMARY

4.5.1 LINDBERGH TERMINAL

- ADDITIONAL GATES - Extending Concourse G would provide new gates capable of accommodating domestic or international flights.

- EXPANDED INTERNATIONAL ARRIVALS (CUSTOMS AND BORDER PATROTECTION) FACILITY - New, larger facilities will be provided as part of the Concourse G expansion to accommodate forecasted growth in demand for international flights to MSP.

- SECURITY SCREENING - Reconfiguration of security screening areas would improve efficiency and reduce wait times.

- BAGGAGE CLAIM - The existing baggage claim hall would be reconfigured with larger, modern baggage claim systems.

- PARKING - Additional parking garages would be constructed adjacent to the existing garages to accommodate existing and future parking demand.

- ARRIVALS CURB - Enhancements to the curb area would improve capacity and efficiency for arriving passengers to reach shuttles, taxis, and private vehicles.

- HOTEL - A site has been identified that would be appropriate for hotel development.

4.5.2 HUMPHREY TERMINAL

- ADDITIONAL GATES - New gates would be added by extending the passenger concourses to the north and south accommodating up to 26 additional gates.

- PASSENGER PROCESSING - Ticketing and baggage claim facilities would be expanded to accommodate additional airlines and passengers.

- PARKING - Existing garages would be expanded to accommodate future parking demand.

- RENTAL CAR FACILITIES - Accommodations for rental cars would be provided by developing facilities in expanded existing parking garages.

- ACCESS ROADS - Post Road and 34th Avenue would be improved and signed to accommodate increasing traffic volumes and simplify circulation.

CHAPTER 5: ENVIRONMENTAL CONSIDERATIONS

CHAPTER 5: ENVIRONMENTAL CONSIDERATONS

5.1 AIRPORT AND AIRCRAFT ENVIRONMENTAL CAPABILITY

An integral part of the airport planning process focuses on the manner in which the airport and any planned enhancements to the facility pose environmental impacts. This chapter evaluates the major environmental implications of the planned operation and development of the Minneapolis-St. Paul International Airport.

The larger tables referenced in this chapter are included in Appendix B of this report.

5.2 AIRCRAFT NOISE

5.2.1 QUANTIFYING AIRCRAFT NOISE

Basics of Sound

Sound is a physical disturbance in a medium, a pressure wave moving through air. A sound source vibrates or otherwise disturbs the air immediately surrounding the source, causing variations in pressure above and below the static (at-rest) value of atmospheric pressure. These disturbances force air to compress and expand, setting up a wavelike movement of air particles that move away from the source. Sound waves, or fluctuations in pressure, vibrate the eardrum creating audible sound.

The decibel, or dB, is a measure of sound pressure level that is compressed into a convenient range, that being the span of human sensitivity to pressure. Using a logarithmic relationship and the ratio of sensed pressure compared against a fixed reference pressure value, the dB scale accounts for the range of hearing with values from 0 to around 200. Most human sound experience falls into the 30 dB to 120 dB range.

Decibels are logarithmic and thus cannot be added directly. Two identical noise sources each producing 70 dB do not add to a total of 140 dB, but add to a total of 73 dB. Each time the number of sources is doubled, the sound pressure level is increased 3 dB.

Baseline:	70 dB
2 sources:	70 dB + 70 dB = 73 dB
4 sources:	70 dB + 70 dB + 70 dB + 70 dB = 76 dB
8 sources:	70 dB + 70 dB + 70 dB + 70 dB + 70 dB + 70 dB + 70 dB + 70 dB = 79 dB

The just-noticeable change in loudness for normal hearing adults is about 3 dB. That is, changes in sound level of 3 dB or less are difficult to notice. A doubling of loudness for the average listener of A-weighted sound is about 10 dB.[3] Measured, A-weighted sound levels changing by 10 dBA effect a subjective perception of being “twice as loud”.[4]

[3] A-weighted decibels represent noise levels that are adjusted relative to the frequencies that are most audible to the human ear.
[4] Peppin and Rodman, Community Noise, p. 47-48; additionally, Harris, Handbook, Beranek and Vér, Noise and Vibration Control Engineering, among others.

Day-Night Average Sound Level (DNL)

In 1979 the United States Congress passed the Aviation Safety and Noise Abatement Act. The Act required the Federal Aviation Administration (FAA) to develop a single methodology for measuring and determining airport noise impacts. In January 1985 the FAA formally implemented the Day-Night Average Sound Level (DNL) as the noise metric descriptor of choice for determining long-term community noise exposure in the airport noise compatibility planning provisions of 14 C.F.R. Part 150. Additionally, FAA Order 1050.1, *"Environmental Impacts: Policies and Procedures"* and FAA Order 5050.4, *"National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions,"* outlines DNL as the noise metric for measuring and analyzing aircraft noise impacts.

As detailed above, the FAA requires the DNL noise metric to determine and analyze noise exposure and aid in the determination of aircraft noise and land use compatibility issues around United States airports. Because the DNL metric correlates well with the degree of community annoyance from aircraft noise, the DNL has been formally adopted by most federal agencies dealing with noise exposure. In addition to the FAA, these agencies include the Environmental Protection Agency, Department of Defense, Department of Housing and Urban Development, and the Veterans Administration.

The DNL metric is calculated by cumulatively averaging sound levels over a 24-hour period. This average cumulative sound exposure includes the application of a 10-decibel penalty to sound exposures occurring during the nighttime hours (10:00 PM to 7:00 AM). Since the ambient, or background, noise levels usually decrease at night the night sound exposures are increased by 10 decibels because nighttime noise is more intrusive.

The FAA considers the 65 DNL contour line to be the threshold of significance for noise impact. As such, sensitive land use areas (e.g., residential) around airports that are located in the 65 or greater DNL contours are considered by the FAA as incompatible structures.

Integrated Noise Model (INM)

The FAA-established mechanism for quantifying airport DNL noise impacts is the Integrated Noise Model (INM). The FAA's Office of Environment and Energy (AEE-100) has developed the INM for evaluating aircraft noise impacts in the vicinity of airports. The INM has many analytical uses, such as assessing changes in noise impact resulting from new or extended runways or runway configurations and evaluating other operational procedures. The INM has been the FAA's standard tool since 1978 for determining the predicted noise impact in the vicinity of airports. Statutory requirements for INM use are defined in FAA Order 1050.1, *"Environmental Impacts: Policies and Procedures"* and FAA Order 5050.4, *"National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions,"* and Federal Aviation Regulations (FAR) Part 150, *"Airport Noise Compatibility Planning."*

The model utilizes flight track information, runway use information, operation time of day data, aircraft fleet mix, standard and user-defined aircraft profiles, and terrain as inputs. Quantifying aircraft-specific noise characteristics in the INM is accomplished through the use of a comprehensive noise database that has been developed under the auspices of Federal Aviation Regulations (FAR) Part 36. As part of the airworthiness certification process, aircraft manufacturers are required to subject an aircraft to a battery of noise tests. Through the use of federally adopted and endorsed algorithms, this aircraft-specific noise information is used in the generation of INM DNL contours. Justification for such an approach is rooted in national standardization of noise quantification at airports.

The INM produces DNL noise exposure contours that are used for land use compatibility maps. The INM program includes built-in tools for comparing contours and utilities that facilitate easy export to commercial Geographic Information Systems. The model also calculates predicted noise at specific sites such as hospitals, schools or other sensitive locations. For these grid points, the model reports detailed information for the analyst to determine which events contribute most significantly to the noise at that location. The model supports 16 predefined noise metrics that include cumulative sound exposure, maximum sound level and time-above metrics from both the A-Weighted, C-Weighted and the Effective Perceived Noise Level families.

The INM aircraft profile and noise calculation algorithms are based on several guidance documents published by the Society of Automotive Engineers (SAE). These include the SAE-AIR-1845 report titled *"Procedure for the Calculation of Airplane Noise in the Vicinity of Airports,"* as well as others which address atmospheric absorption and noise attenuation. The INM is an average-value-model and is designed to estimate long-term average effects using average annual input conditions. Because of this, differences between predicted and measured values can occur because certain local acoustical variables are not averaged, or because they may not be explicitly modeled in the INM. Examples of detailed local acoustical variables include temperature profiles, wind gradients, humidity effects, ground absorption, individual aircraft directivity patterns and sound diffraction, terrain, buildings, barriers, etc.

The noise contours for the 2030 Preferred Alternative were calculated using INM version 7.0b, which is the most current version released by the Federal Aviation Administration. The noise contours developed for the 2008 base case, as developed in the Metropolitan Airports Commission's 2009 Annual Noise Contour Report, were calculated using INM version 7.0a. The input data developed in the 2009 Annual Noise Contour Report were re-run in the latest version of the INM and compared. The slight differences in the contours due to changes implemented in the latest version of the model did not justify reproducing the 2008 noise contour analysis contained in the 2009 Annual Noise Contour Report. Moreover, by using the 2008 actual noise contour that was developed in the 2009 Annual Noise Contour Report, the comparative noise assessment between the base case and forecast noise contours are conservative in this document.

The 2030 noise contour, which shows potential impacts, generated considerable discussion with adjacent communities during the Metropolitan Council's LTCP approval process. To address these concerns and to fully understand the noise impacts associated with increased aircraft operations, the MAC should initiate an FAA Part 150 study update, in consultation with the MSP Noise Oversight Committee (NOC), when the forecast level of operations five years into the future exceeds the levels of mitigation in the Consent Decree (582,366 annual operations). The results of this study should be incorporated into the first subsequent LTCP Update.

5.3 MSP BASE CASE 2008 NOISE CONTOURS

5.3.1 2008 BASE CASE AIRCRAFT OPERATIONS AND FLEET MIX

The past seven years have presented many challenges to the aviation industry. From a local perspective, operational levels and the aircraft fleet mix at MSP have been subject to lingering effects from the events of September 11, 2001, high fuel prices, a flurry of bankruptcy filings by several legacy airlines including Northwest Airlines, an economic recession and overall market forces that appear to be favoring consolidation, as indicated by Delta Air Lines' acquisition of

Northwest Airlines in 2008. These developments have had profound effects on airline and airport operations. For example, the actual 2008 operational level at MSP was below the operational level documented at the airport over 13 years ago.

The total MSP operations numbers for this study were derived from Airport Noise and Operations Monitoring System (ANOMS) data. The ANOMS total operations number was 1.2% lower than the Federal Aviation Administration Air Traffic Activity Data System (ATADS) number. The slightly lower ANOMS number can be attributed to normal system data gaps that occur regularly on an annual basis. To rectify the numbers, Metropolitan Airports Commission staff adjusted the ANOMS data upward to equal the total 2008 FAA ATADS number. **Table 5.1** provides the total number of 2008 aircraft operations at MSP by operational category.

TABLE 5.1: 2008 TOTAL OPERATIONS NUMBERS

Operations Category	Number of Operations*
Scheduled Passenger Air Carrier (a)	402,347
Cargo	14,361
Charter	536
GA	29,708
Military	3,020
TOTAL	449,972

Notes:

(a) Includes both air carrier and regional carrier operations.

* Based on actual year-to-date 2008 ANOMS data adjusted to match FAA ATADS data (to account for unavailable ANOMS operations data).

The 2008 total operations number of 449,972 — in the context of historical annual operations at MSP, the 2008 operations level is the lowest annual operations at MSP since 1994.

In addition to the reduction in overall operations at MSP, the aircraft fleet mix at MSP is continuing to change. Considering the multi-faceted nature of the variables that are presently impacting the operational downturn at MSP, it is difficult to forecast long-term operational implications. All signs, however, seem to point to a fundamental change in the nature of airline operations at MSP, especially in the type of aircraft flown by all airlines. Specifically, operations by older aircraft such as the DC9 and B727 that have been “hushkitted” to meet the Stage 3 noise standard are decreasing. Following the events of September 11, 2001, the number of monthly Stage 3 hushkit operations dropped off significantly at MSP and has never returned to pre-9/11 levels. The number of monthly Stage 3 hushkit operations dropped to 9,450 in September 2001 and has continued to drop since. Stage 3 hushkit operations dropped to a low of 2,487 total monthly operations in September 2008. In January 2009 the number of monthly Stage 3 hushkitted operations dropped to an all-time low of 2,150. At the same time that older hushkit aircraft operations are declining, the use of newer and quieter manufactured Stage 3 aircraft is on the rise. The best examples at MSP of the increasing use of newer aircraft are the Airbus A320/319, Airbus 330, Canadair Regional Jets (CRJs), Boeing B757-200/300, and Boeing B737-800. These aircraft are replacing older hushkitted Stage 3 aircraft such as the DC10, DC9, and B727.

When comparing the DC9 hushkitted aircraft to the CRJ-200 regional jet (the CRJ is one of the replacement aircraft for the smaller DC9s at MSP), 43 CRJ operations would be required to generate the same noise impact as one DC9 operation. The CRJ-200 aircraft represents newer technology engine noise emission levels.

Table 5.2 provides a breakdown of the 2008 aircraft fleet mix at MSP.

TABLE 5.2: 2008 AIRCRAFT FLEET MIX AVERAGE DAILY OPERATIONS

Group	Aircraft Type	Day	Night	Total
Manufactured/	A300-622R	2.2	2.0	4.1
Re-engined	A310-304	0.3	1.0	1.2
Stage 3 Jet	A319-131	118.1	8.9	126.9
	A320-211	138.6	11.2	149.8
	A321-232	0.4	0.3	0.8
	A330	8.8	1.6	10.4
	B717-200	5.4	0.7	6.1
	B737-300	15.4	2.7	18.0
	B737-400	0.5	0.2	0.7
	B737-500	10.5	2.0	12.5
	B737-700	9.5	1.6	11.1
	B737-800	24.2	12.6	36.9
	B747-100	0.0	0.0	0.0
	B747-200	0.5	0.2	0.7
	B747-400	2.3	0.0	2.3
	B757-200	62.0	7.1	69.0
	B757-300	31.9	3.7	35.5
	B767-200	0.3	0.0	0.3
	B767-300	0.2	0.3	0.6
	B777-200	0.0	0.0	0.0
	CARJ/CL601	255.2	19.9	275.1
	CL600	2.3	0.2	2.5
	CNA500	1.4	0.1	1.5
	CNA650	3.1	0.3	3.4
	CNA750	5.1	0.5	5.6
	DC10	3.6	2.4	6.0
	DC820	0.0	0.0	0.0
	DC860	0.0	0.0	0.0
	DC870	0.6	1.0	1.6
	EMB145	31.3	3.3	34.5
	GIV	2.0	0.1	2.1
	GV	66.9	5.9	72.8
	IA1125	0.8	0.1	0.9
	L101	0.1	0.0	0.1
	LEAR35	7.0	2.8	9.8
	MD11GE	0.5	0.6	1.1
	MD81	28.0	4.9	32.9
	MD9025	0.5	0.2	0.7
	MU3001	8.5	0.6	9.1
	Total	847.8	99.0	946.8
Hushkit	727Q	1.7	2.9	4.6
Stage 3 Jet	737Q	0.1	0.0	0.1
	BAC111	0.0	0.0	0.0
	DC9Q	100.2	9.2	109.4
	Total	102.0	12.1	114.1
Stage 2	FAL20	1.1	0.1	1.1
less than	GII	1.9	0.2	2.1
75,000 lb.	GIII	0.3	0.0	0.3

MTOW	LEAR25	5.6	0.5	6.1
	Total	8.9	0.8	9.6
Propeller	1900D	4.2	0.7	4.9
	BEC58P	9.9	3.8	13.7
	C130	6.5	0.3	6.8
	CNA172	0.2	0.0	0.2
	CNA206	0.3	0.0	0.3
	CNA441	1.0	0.1	1.1
	DHC6	6.9	2.4	9.2
	DHC8	0.1	0.0	0.1
	GASEPF	1.6	1.7	3.3
	GASEPV	1.1	0.1	1.2
	HS748A	0.2	0.0	0.2
	PA28	0.1	0.0	0.1
	PA31	0.8	0.1	0.9
	SD330	0.1	0.0	0.2
	SF340	108.9	7.4	116.3
	Total	141.7	16.6	158.3
Helicopter	A109	0.0	0.0	0.0
	B206L	0.0	0.0	0.0
	B212	0.0	0.0	0.0
	B222	0.0	0.0	0.0
	S70	0.0	0.0	0.0
	Total	0.1	0.0	0.1
	C17	0.1	0.0	0.1
Military Jet	C9A	0.0	0.0	0.0
	F16GE	0.0	0.0	0.0
	F-18	0.0	0.0	0.0
	KC135	0.0	0.0	0.0
	T1	0.1	0.0	0.1
	T34	0.0	0.0	0.0
	T38	0.1	0.0	0.1
	U21	0.1	0.0	0.1
	Total	0.5	0.0	0.5
Total Ops.		1100.9	128.5	1229.4

5.3.2 2008 BASE CASE RUNWAY USE

The Federal Aviation Administration's control of runway use throughout the year for arrival and departure operations at MSP has a notable effect on the overall noise impact around the airport. The number of people and dwellings impacted by noise is a direct factor of the number of operations on a given runway and the land uses off the end of the runway.

Historically, prior to the opening of Runway 17-35, arrival and departure operations occurred on the parallel runways at MSP (12L-30R and 12R-30L) in a manner that resulted in approximately 50% of the arrival and departure operations occurring to the northwest over South Minneapolis and to the southeast over Mendota Heights and Eagan. As a result of the dense residential land uses to the northwest and the predominantly industrial/commercial land uses to the southeast of MSP, focusing arrival and departure operations to the southeast has long been the preferred configuration from a noise reduction perspective.

Since the introduction of Runway 17-35 at MSP, another opportunity exists to route aircraft over an unpopulated area – the Minnesota River Valley. With use of the Runway 17 Departure Procedure, westbound departure operations off Runway 17 are routed such that they avoid close-in residential areas southwest of the new runway. Thus, use of Runway 17 for departure operations is the second preferred operational configuration (after Runways 12L and 12R) for noise reduction purposes.

Table 5.3 provides the runway use percentages for 2008.

TABLE 5.3: 2008 RUNWAY USE

Op Type	Runway	Day	Night	Total
Arrivals	04	0.0%	0.0%	0.0%
	22	0.1%	0.0%	0.1%
	12L	22.5%	15.0%	21.7%
	30R	22.6%	21.9%	22.5%
	12R	21.1%	24.4%	21.4%
	30L	17.8%	37.2%	19.8%
	17	0.0%	0.0%	0.0%
	35	15.8%	1.5%	14.4%
	Total	100.0%	100.0%	100.0%
Departures	04	0.1%	0.1%	0.1%
	22	0.2%	0.1%	0.2%
	12L	13.2%	19.8%	14.0%
	30R	28.8%	24.9%	28.4%
	12R	6.6%	20.9%	8.2%
	30L	24.3%	20.4%	23.8%
	17	26.7%	13.8%	25.3%
	35	0.0%	0.0%	0.0%
	Total	100.0%	100.0%	100.0%
Overall	04	0.1%	0.1%	0.1%
	22	0.1%	0.0%	0.1%
	12L	17.9%	17.5%	17.9%
	30R	25.7%	23.4%	25.5%
	12R	13.9%	22.6%	14.8%
	30L	21.0%	28.5%	21.8%
	17	13.2%	7.2%	12.6%
	35	8.0%	0.7%	7.2%
	Total	100.0%	100.0%	100.0%

Note: Totals may not add up to 100% due to rounding.

Sources: MAC ANOMS data was used to calculate runway use for 2008.

5.3.3 2008 BASE CASE FLIGHT TRACKS

In large part, the 2008 Integrated Noise Model (INM) flight tracks are consistent with those used previously to develop the 2002 MSP Part 150 Update 2007 forecast mitigated noise contour, with the exception of Runways 17, 35, and 4 departure tracks. The Metropolitan Airports Commission (MAC) updated the INM departure tracks to conform to actual radar flight track data.

Figures 5-1 (a-h) provide the INM departure and arrival flight tracks that were used to develop the 2008 actual noise contour. **Table 5.4,** in Appendix B, provides the 2008 INM flight use percentages.

5.3.4 2008 BASE CASE ATMOSPHERIC CONDITIONS

The MAC gathered atmospheric data for the 2008 base case noise contour from the National Weather Service (NWS) and the Minnesota State Climatologist's Office. The MAC used the NWS's 2008 annual average temperature of 44.7 degrees Fahrenheit and 2008 average annual wind speed of 7.6 Kts. in the INM modeling process. The MAC also used a 2008 average annual pressure of 29.98 inches and a 2008 annual average relative humidity of 74%, as reported by the Minnesota State Climatologist's Office.

5.3.5 2008 MODELED VERSUS MEASURED DNL LEVELS

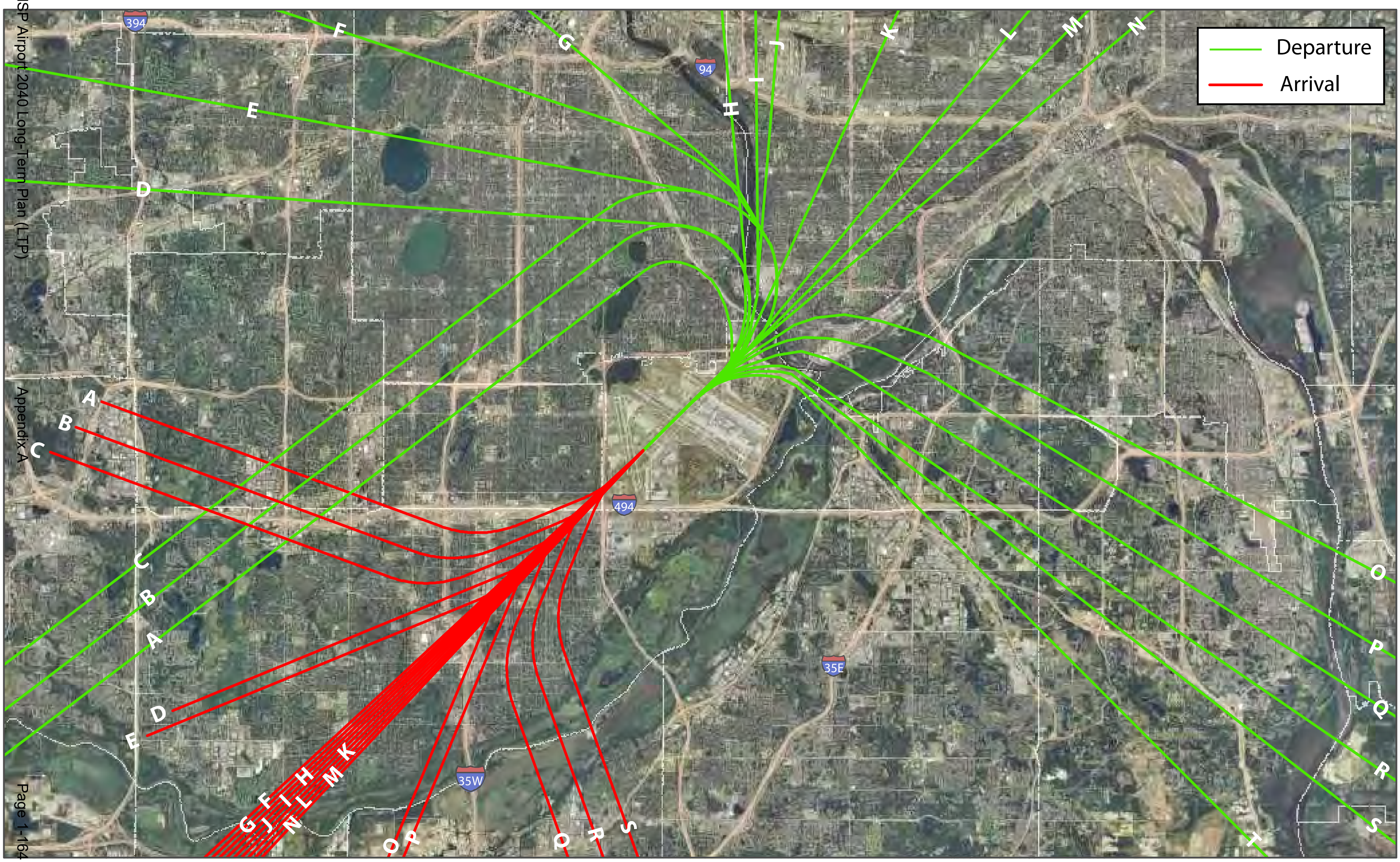
As part of the 2008 base case noise contour development process, a correlation analysis was conducted comparing the INM-developed 2008 base case DNL noise contours to actual measured aircraft noise levels at the 39 Airport Noise and Operations Monitoring System (ANOMS) Remote Noise-Monitoring Towers (RMTs) around MSP in 2008. An INM grid point analysis was conducted to determine the model's predicted 2008 DNL noise levels at each of the RMT locations (determined in INM by the latitude and longitude coordinates of each RMT).

Table 5.5 provides a comparison of the INM grid point analysis at each RMT site, based on the 2008 base case noise contour as produced with INM, and the actual ANOMS monitored aircraft DNLs at those locations in 2008.

The average absolute difference between the modeled and measured DNLs was 1.9 dB. The median difference was 1.1 dB. The ANOMS RMTs, on average, reported higher DNL levels than the INM model generated. The MAC believes that this is due in part to the inclusive approach MAC staff has taken in tuning the ANOMS noise-to-track matching parameters. This conservative approach, along with the increasing number of quieter jets operating at the airport, results in increased instances of community-driven noise events being attributed to quieter aircraft operating at further distances from the monitoring location.

INM Flight Tracks
Runway 04

Figure 5-1a

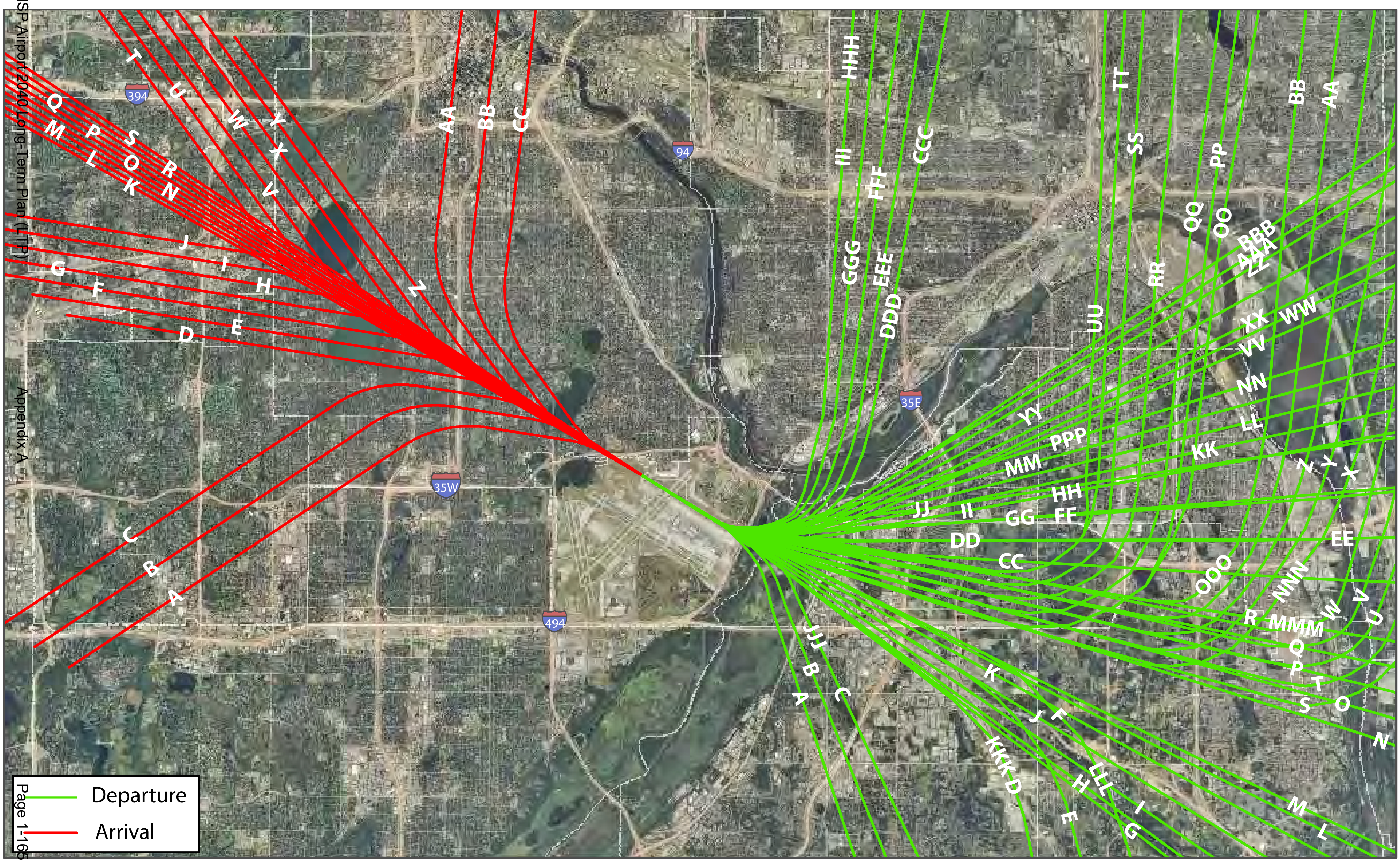


Minneapolis - St Paul International Airport (MSP)

0 2 4 Miles

INM Flight Tracks
Runway 12L

Figure 5-1b

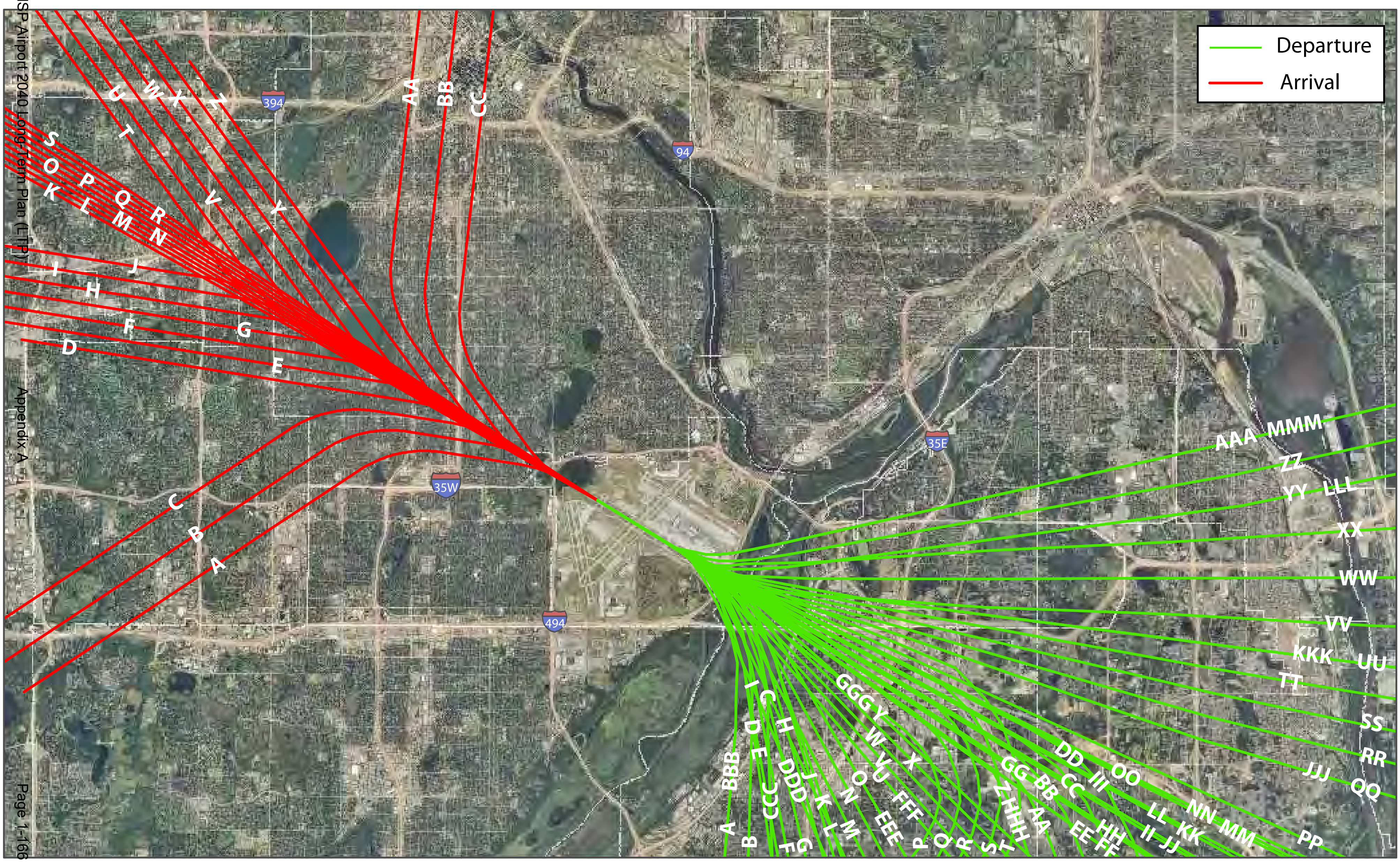


Minneapolis - St Paul International Airport (MSP)

0 3.75 7.5 Miles

INM Flight Tracks
Runway 12R

Figure 5-1c

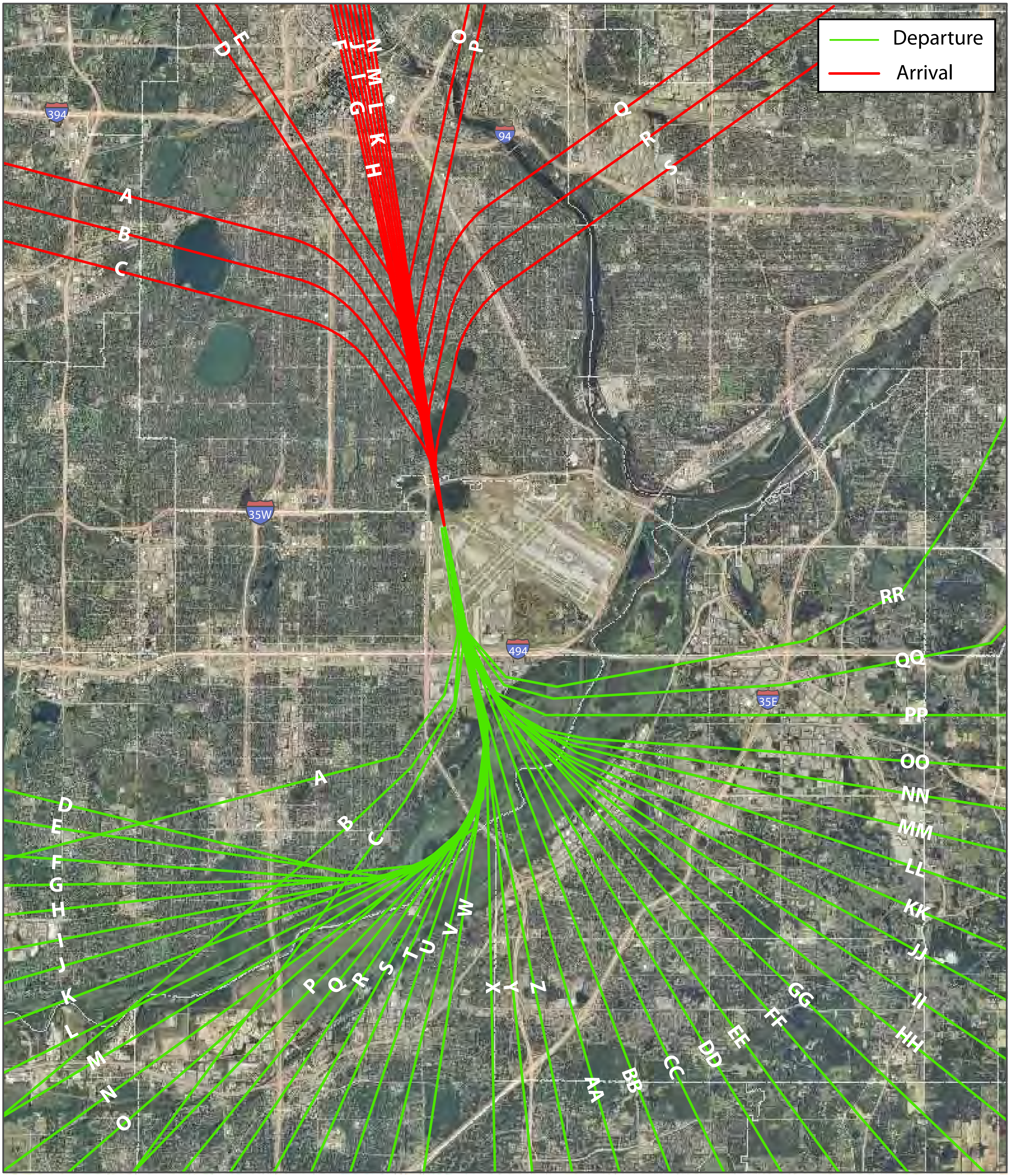


Minneapolis - St Paul International Airport (MSP)

0 3.75 7.5 Miles

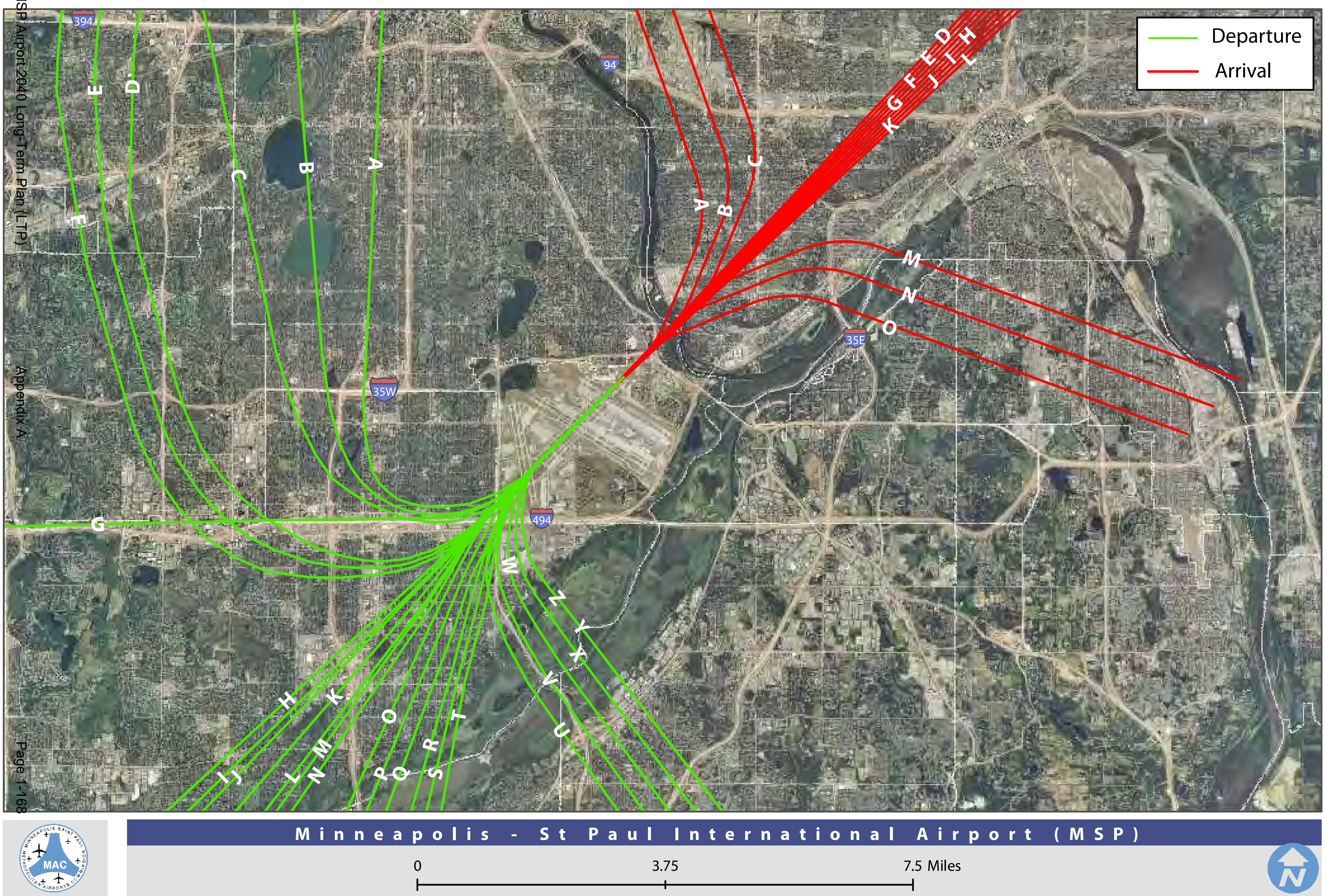
INM Flight Tracks
Runway 17

Figure 5-1d



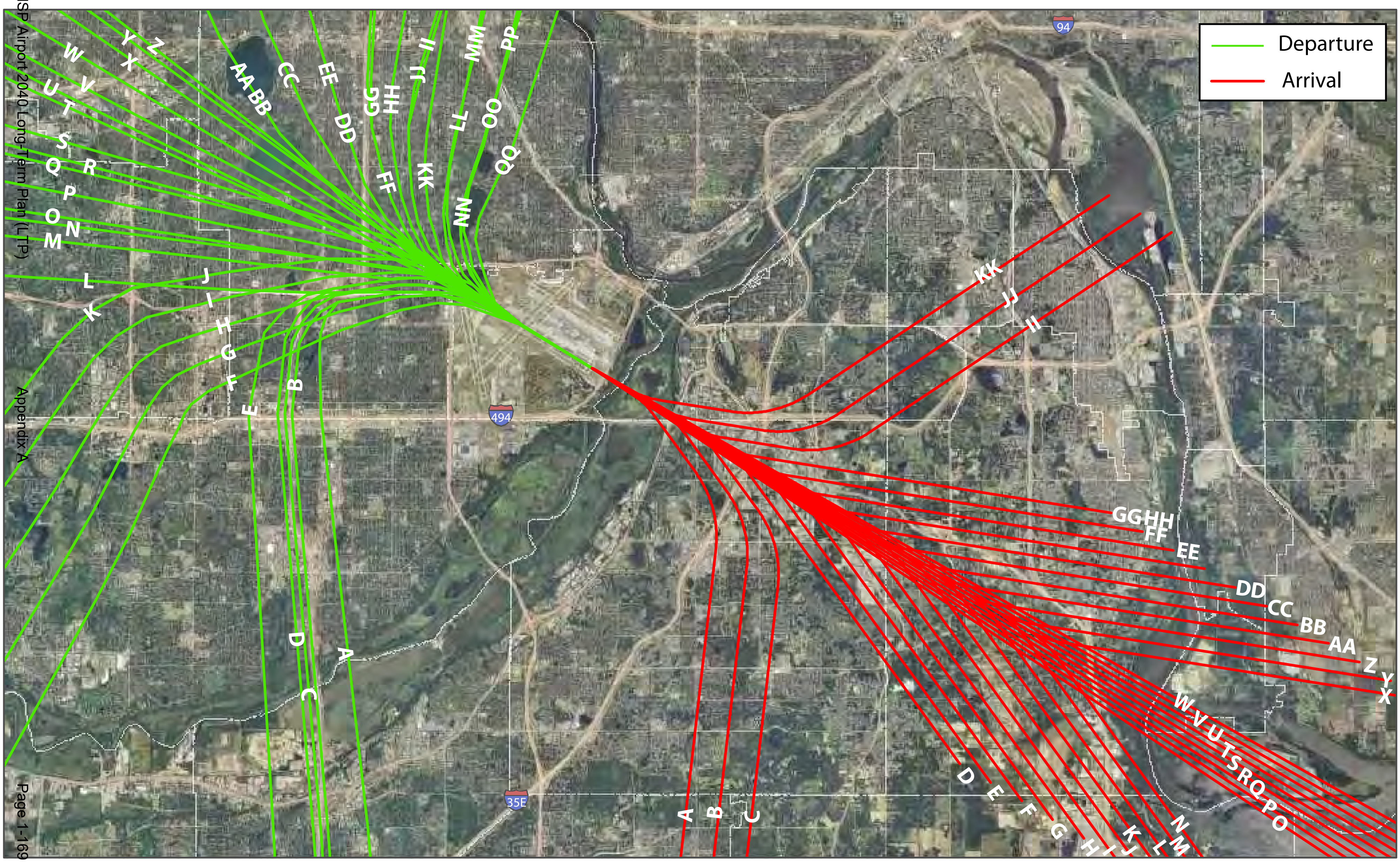
INM Flight Tracks
Runway 22

Figure 5-1e



INM Flight Tracks
Runway 30L

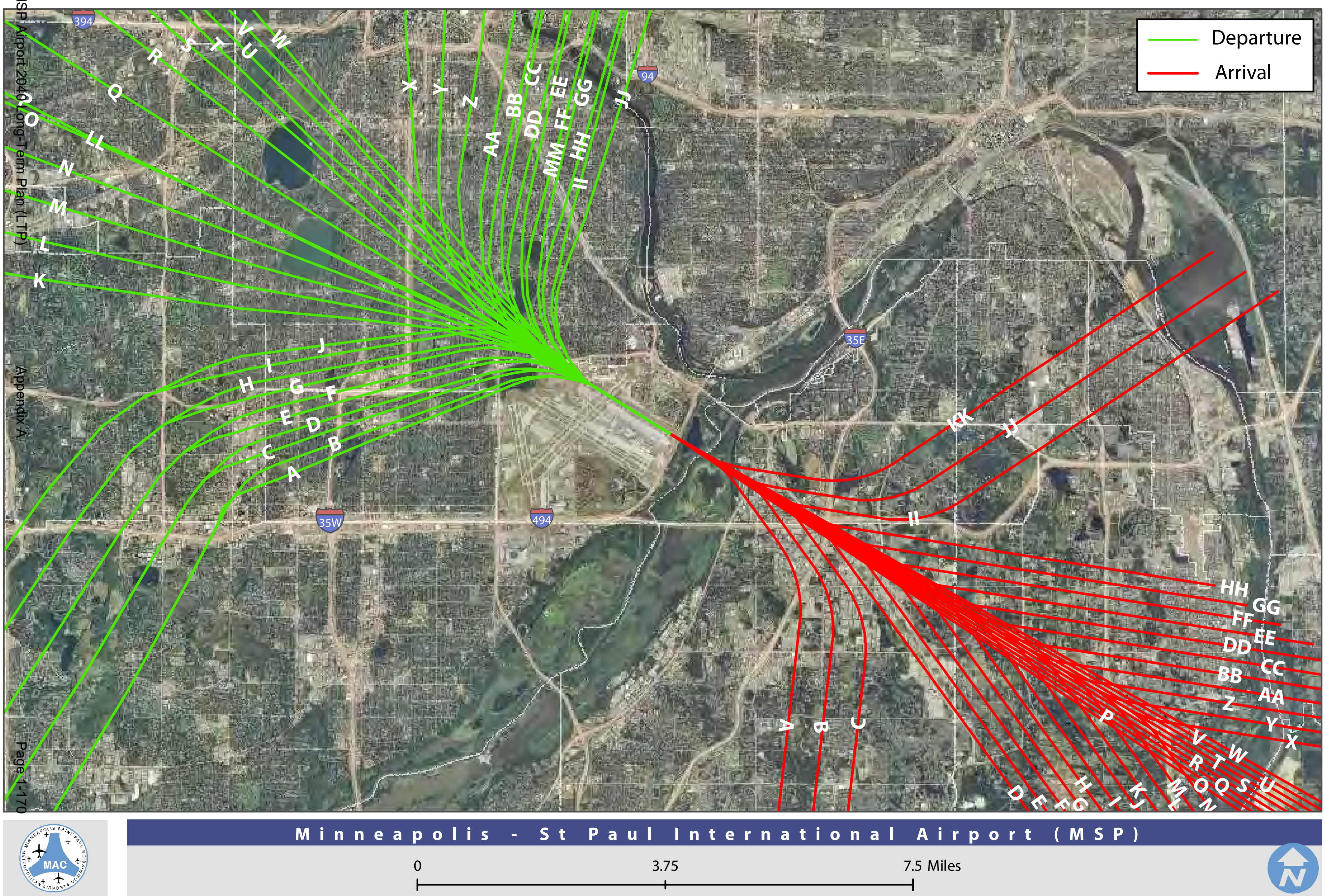
Figure 5-1f



Minneapolis - St Paul International Airport (MSP)

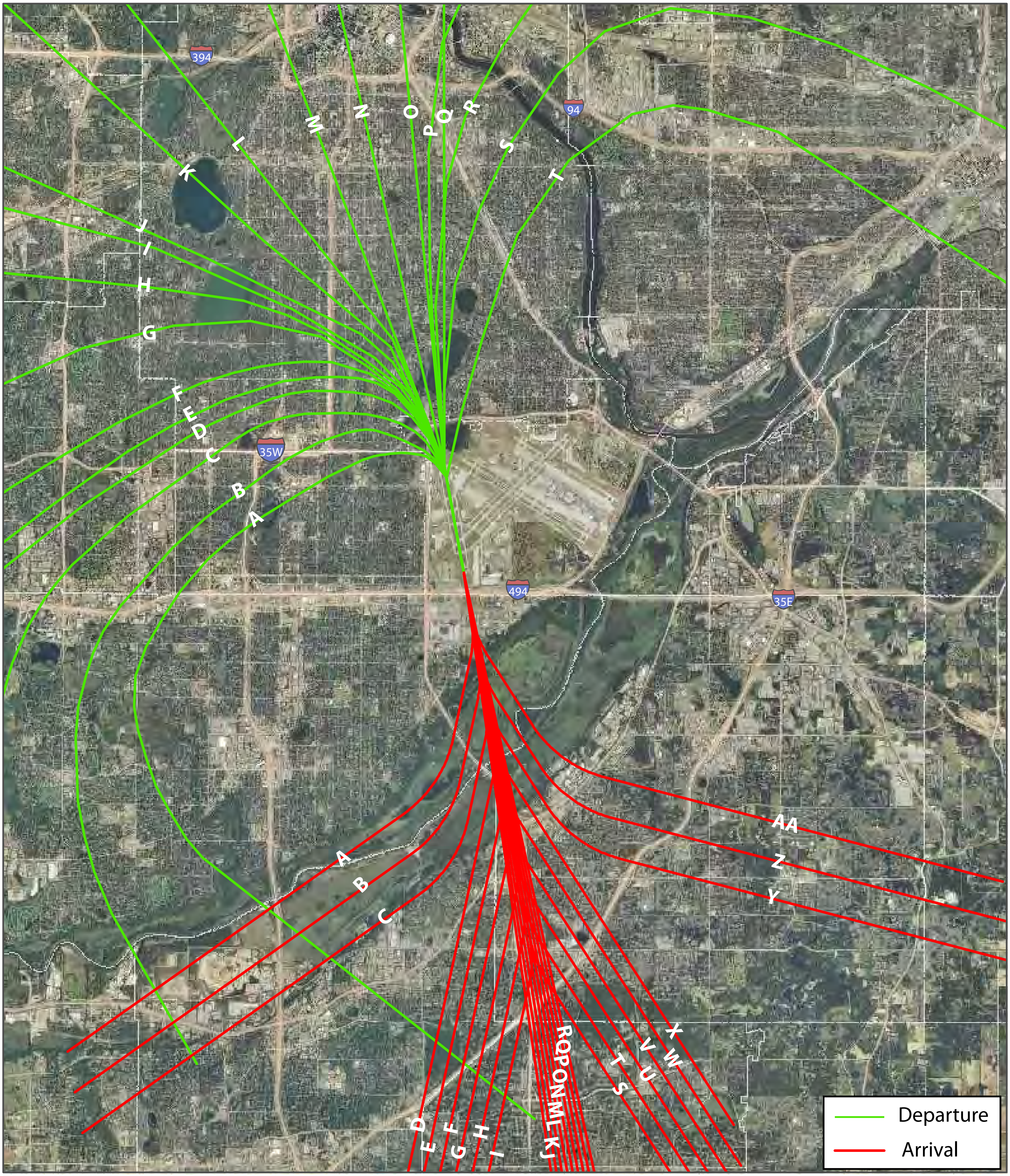
INM Flight Tracks Runway 30R

Figure 5-1g



INM Flight Tracks
Runway 35

Figure 5-1h



Minneapolis - St Paul International Airport (MSP)

The use of **Figure 5-1a** absolute values provides a perspective of total difference between the INM-modeled values and the measured DNL values provided by the ANOMS in 2008. The median is considered the most reliable indicator of correlation when considering the data variability across modeled and monitored data.

Overall, the small variation between the actual ANOMS monitored aircraft noise levels and the INM-modeled noise levels provides additional external system verification that the INM is providing an accurate assessment of the aircraft noise impacts around MSP.

TABLE 5.5: 2008 MEASURED VERSUS INM DNL VALUES AT ANOMS RMT LOCATIONS

RMT Site	2008 Annual Measured DNL (a)	2008 Modeled DNL	Difference (Modeled minus Measured)	
			Sign	Absolute
1	57.0	55.9	-1.1	1.1
2	58.9	57.1	-1.8	1.8
3	62.9	62.6	-0.3	0.3
4	61.5	61.2	-0.3	0.3
5	69.4	69.1	-0.3	0.3
6	71.3	68.9	-2.4	2.4
7	60.6	60.5	-0.1	0.1
8	59.0	58.7	-0.3	0.3
9	43.6	42.9	-0.7	0.7
10	48.6	49.5	0.9	0.9
11	44.3	45.6	1.3	1.3
12	39.3	48.1	8.8	8.8
13	54.1	55.8	1.7	1.7
14	62.0	61.4	-0.6	0.6
15	57.5	56.8	-0.7	0.7
16	65.4	63.9	-1.5	1.5
17	49.5	48.2	-1.3	1.3
18	57.9	58.8	0.9	0.9
19	53.7	54	0.3	0.3
20	48.3	50.2	1.9	1.9
21	51.1	52.1	1.0	1.0
22	56.0	56.9	0.9	0.9
23	62.9	61.6	-1.3	1.3
24	60.1	59.9	-0.2	0.2
25	51.5	56.3	4.8	4.8
26	54.8	52.6	-2.2	2.2
27	55.3	56.3	1.0	1.0
28	59.5	61.3	1.8	1.8
29	54.7	54.4	-0.3	0.3
30	62.6	61.2	-1.4	1.4
31	47.9	49.9	2.0	2.0
32	44.9	47.3	2.4	2.4
33	47.7	50.8	3.1	3.1
34	44.8	49.2	4.4	4.4
35	54.2	54.2	0.0	0.0
36	53.5	52.4	-1.1	1.1
37	47.9	49.5	1.6	1.6
38	50.4	51.5	1.1	1.1
39	51.7	53.2	1.5	1.5
Logarithmic Difference			**Average**	**1.9**
			Median	**1.1**

Notes:
All units in dB DNL
(a) computed from daily DNLs
Source: MAC RMT data

5.3.6 2008 BASE CASE NOISE CONTOUR IMPACTS

Based on the 449,972 total operations in 2008, approximately 5,716.5 acres are in the 65 DNL noise contour and approximately 12,975.5 acres are in the 60 DNL noise contour. **Table 5.6** contains the count of single-family (one unit per structure) and multi-family (greater than one unit per structure) dwelling units in the 2008 actual noise contours. The MAC based the counts on the parcel intersect methodology where all parcels that are within or touched by the noise contour are counted.

The 2008 count of residential units within the actual 60 DNL noise contour that have not received noise mitigation around MSP is 4,865. There are no unmitigated homes in the 2008 actual 65 DNL noise contour around MSP.

A depiction of the 2008 actual noise contour is provided in **Figure 5.2**.

TABLE 5.6: SUMMARY OF 2008 ACTUAL DNL NOISE CONTOUR SINGLE-FAMILY AND MULTI-FAMILY UNIT COUNTS

City	Count	Single-Family					Multi-Family				
		60-64	65-69	70-74	75+	Total	60-64	65-69	70-74	75+	Total
Bloomington	Completed	57				57	129	620			749
	Additional										
	Total	57				57	129	620			749
Eagan	Completed	269	1			270					
	Additional										
	Total	269	1			270					
Mendota Heights	Completed	45	1			46	7				7
	Additional										
	Total	45	1			46	7				7
Minneapolis	Completed	6207	2241	116		8564	1905	746	6		2657
	Additional	105				105	4				4
	Total	6312	2241	116		8669	1909	746	6		2661
Richfield	Completed	916	205			1121	284				284
	Additional										
	Total	916	205			1121	284				284
All Cities	Completed	7494	2448	116		10058	2325	1366	6		3697
	Additional	105				105	4				4
	Total	7599	2448	116		10163	2329	1366	6		3701

Note: Parcel intersect method, completed includes all parcels mitigated or eligible for mitigation.

2008 Base Case Contours

Figure 5-2

Minneapolis - St Paul International Airport (MSP)

5.4 2030 PREFERRED ALTERNATIVE FORECAST NOISE CONTOURS

As is detailed in Chapter 4 there are a number of development elements included in the preferred 2030 alternative. Although these developments include additional gates and terminal amenities, because no additional runway capacity is being developed there are no substantive impacts on the forecast noise contours resulting from the proposed developments.

5.4.1 2030 AIRCRAFT OPERATIONS AND FLEET MIX

The forecast information provided in Chapter 2 was the principal source of operations information used in the preparation of the 2030 day/night fleet mix projections. **Table 5.7** provides the total operations summary for 2030.

TABLE 5.7: 2030 TOTAL OPERATIONS NUMBERS

Operations Category	Number of Operations
Scheduled Passenger Air Carrier (a)	576,682
Cargo	18,834
Charter	218
GA (b)	32,988
Military	2,115
Total	**630,837**

Notes:

(a) Includes both air carrier and regional carrier operations

(b) Includes True Air Taxi

This analysis also included the development of detailed fleet mix and stage length information for most of the aircraft operations projected for 2030. Additional analysis utilizing ANOMS and other data sources was required to generate the day/night splits and refine the fleet mix estimates for the general aviation and military operations. **Table 5.8** provides a detailed breakdown of the forecasted 2030 fleet mix at MSP.

TABLE 5.8: 2030 AIRCRAFT FLEET MIX AVERAGE DAILY OPERATIONS

Group	Aircraft Type	Day	Night	Total
Manufactured/Re-engined Stage 3 Jet	737300	0.0	0.0	0.0
	737400	1.8	5.2	7.0
	737700	0.6	0.1	0.7
	737800	227.3	33.3	260.6
	747400	2.1	0.1	2.2
	757300	0.0	0.0	0.0
	757RR	4.4	5.6	10.1
	767300	13.3	3.2	16.5
	767CF6	13.4	1.5	14.9
	777200	8.3	0.5	8.9
	777300	6.4	0.1	6.5
	A300-622R	3.1	2.7	5.9
	A310-304	0.1	0.4	0.5
	A319-131	82.5	9.6	92.1
	A320-211	134.0	15.2	149.3
	A320-232	51.7	5.7	57.4
	A321-232	40.6	5.0	45.6
	A330-301	7.1	0.6	7.7
	A330-343	9.7	0.1	9.8
	CIT3	7.9	0.8	8.7
	CL600	4.2	0.4	4.6
	CL601	251.6	19.5	271.1
	CNA500	2.7	0.2	3.0
	CNA55B	1.1	0.1	1.2
	CNA750	6.1	0.6	6.7
	DC1010	0.4	0.3	0.7
	DHC6	3.6	0.8	4.4
	DHC8	0.1	0.7	0.8
	DHC830	139.0	9.0	147.9
	DO328	0.1	0.0	0.1
	ECLIPSE500	0.5	0.0	0.5
	EMB145	29.9	3.5	33.3
	F10062	0.9	0.1	1.0
	GIV	7.8	0.8	8.5
	GV	271.5	23.4	294.8
	HS748A	0.2	0.0	0.2
	IA1125	0.9	0.1	1.0
	LEAR35	8.6	1.5	10.1
	MD11GE	0.5	0.6	1.1
	MD81	0.1	0.0	0.1
	MD9025	28.7	2.3	31.0
	MU3001	7.0	0.7	7.7
	Total	**1380.0**	**154.2**	**1534.1**

Stage 2 less than 75,000 lbs	FAL20	2.2	0.2	2.4
	GII	1.0	0.1	1.1
	GIIB	0.1	0.0	0.2
	LEAR25	6.5	0.6	7.2
	Total	**9.9**	**1.0**	**10.9**
Propeller	1900D	4.9	0.9	5.8
	BEC58P	14.7	4.5	19.3
	C130	0.1	0.0	0.1
	C-130E	5.0	0.2	5.2
	CNA172	0.1	0.0	0.1
	CNA208	0.8	1.6	2.5
	CNA441	0.8	0.1	0.9
	PA31	0.3	0.1	0.4
	GASEPF	2.1	0.1	2.3
	GASEPV	0.6	0.0	0.6
	Total	**29.5**	**7.7**	**37.1**
Hushkit Stage 3 Jet	737QN	132.0	13.5	145.4
	Total	**132.0**	**13.5**	**145.4**
Helicopter	A109	0.0	0.0	0.1
	B206L	0.1	0.0	0.1
	H500D	0.0	0.0	0.0
	S70	0.0	0.0	0.0
	Total	**0.1**	**0.0**	**0.1**
Military Jet	C17	0.1	0.0	0.1
	C5A	0.0	0.0	0.0
	F16GE	0.0	0.0	0.0
	F-18	0.0	0.0	0.0
	KC-135	0.0	0.0	0.0
	T1	0.1	0.0	0.1
	T34	0.0	0.0	0.0
	T-38A	0.1	0.0	0.1
	U21	0.0	0.0	0.0
	Total	**0.4**	**0.0**	**0.4**
Total Operations		**1551.8**	**176.3**	**1728.1**

Source: ops_calc.dbf from INM Version 7.0b

Notes: Differences may exisit due to rounding

This is the modeled INM fleet mix and due to aircraft substitutions, it will not exactly match the fleet mix in the LTCP

In summary, a total of 630,837 annual operations, which equates to approximately 1,728 daily operations, are forecasted for 2030.

5.4.2 2030 RUNWAY USE

Table 5.9 shows the 2030 modeled runway use.

TABLE 5.9: 2030 RUNWAY USE

Op Type	Runway	Day	Night	Total
Arrivals	04	0.0%	0.0%	0.0%
	22	0.3%	0.3%	0.3%
	12L	18.6%	17.6%	18.5%
	30R	20.7%	13.2%	19.9%
	12R	22.6%	24.8%	22.8%
	30L	10.4%	10.6%	10.4%
	17	0.0%	0.0%	0.0%
	35	27.5%	33.6%	28.1%
	Total	**100.0%**	**100.0%**	**100.0%**
Departures	04	0.2%	0.0%	0.2%
	22	0.1%	0.1%	0.1%
	12L	15.4%	16.5%	15.5%
	30R	20.9%	20.0%	20.8%
	12R	8.1%	10.9%	8.4%
	30L	24.6%	26.9%	24.8%
	17	30.8%	25.6%	30.3%
	35	0.0%	0.0%	0.0%
	Total	**100.0%**	**100.0%**	**100.0%**
Overall	04	0.1%	0.0%	0.1%
	22	0.2%	0.2%	0.2%
	12L	17.0%	17.0%	17.0%
	30R	20.8%	16.7%	20.4%
	12R	15.3%	17.6%	15.6%
	30L	17.4%	19.0%	17.6%
	17	15.4%	13.2%	15.1%
	35	13.8%	16.2%	14.1%
	Total	**100.0%**	**100.0%**	**100.0%**

The runway use modeled for the scheduled and un-scheduled aircraft operations in the development of the forecasted 2030 noise contour is the same as the runway use included in the July 2005 MSP 2015 Terminal Expansion Environmental Assessment. This was determined based on discussions with the MAC and the Federal Aviation Administration related to how the proposed alternatives at MSP would impact the use of the airfield in 2030. The data used were extracted from Table B.2.2 – 2015 Estimated Average Annual Runway Use for the 2015 Proposed Project located in Appendix B, Page B.2.5 of the July 2005 MSP 2015 Terminal Expansion EA.

The runway use modeled for the military operations forecasted in 2030 is based on the runway use modeled in the 2008 base case noise analysis.

The use of the helicopter pads was limited to the six pads modeled in the 2008 base case noise analysis. The operations were distributed evenly across the six pads.

For the purposes of this analysis the runway use for the scheduled and un-scheduled operations was applied to the fleet mix based on aircraft operational categories. This is consistent with the methodology used in the analysis included in the July 2005 MSP 2015 Terminal Expansion EA.

5.4.3 2030 FLIGHT TRACKS

The flight track layout and associated use for all the modeled operations were derived from the 2008 base case noise contour analysis. The Integrated Noise Model (INM) flight tracks used for the 2030 noise contour are the same as those used for the 2008 base case noise contour as provided in **Figures 5.1 (a-h).** The 2030 INM track usage percentages are provided in **Table 5.10** in Appendix B. As with the runway use, the flight track use for scheduled and un-scheduled operations was also applied to the fleet mix by a secondary aircraft operational category. To this end, the fleet mix modeled was categorized by Heavy (H), Passenger (P), Regional (R) and Propeller (P). The 2030 fleet mix was then assigned the corresponding operational categories, so as to assign the aircraft to the appropriate track, to and from the runway, being used for each operation.

The military operations were assigned to the appropriate tracks in the same manner as was done in the 2008 base case noise contour analysis. The helicopter operations were distributed evenly across the tracks associated with the six pads modeled in the 2008 base case noise contour analysis.

5.4.4 2030 ATMOSPHERIC CONDITIONS

The weather data that were used in the 2030 noise contour modeling were derived from the July 2005 MSP 2015 Terminal Expansion EA. This assumes an annual average temperature of 47.7 degrees Fahrenheit, an average annual pressure of 29.9 inches, an average annual humidity of 64% and a 5.3 knot operational headwind.

5.4.5 2030 NOISE CONTOUR IMPACTS

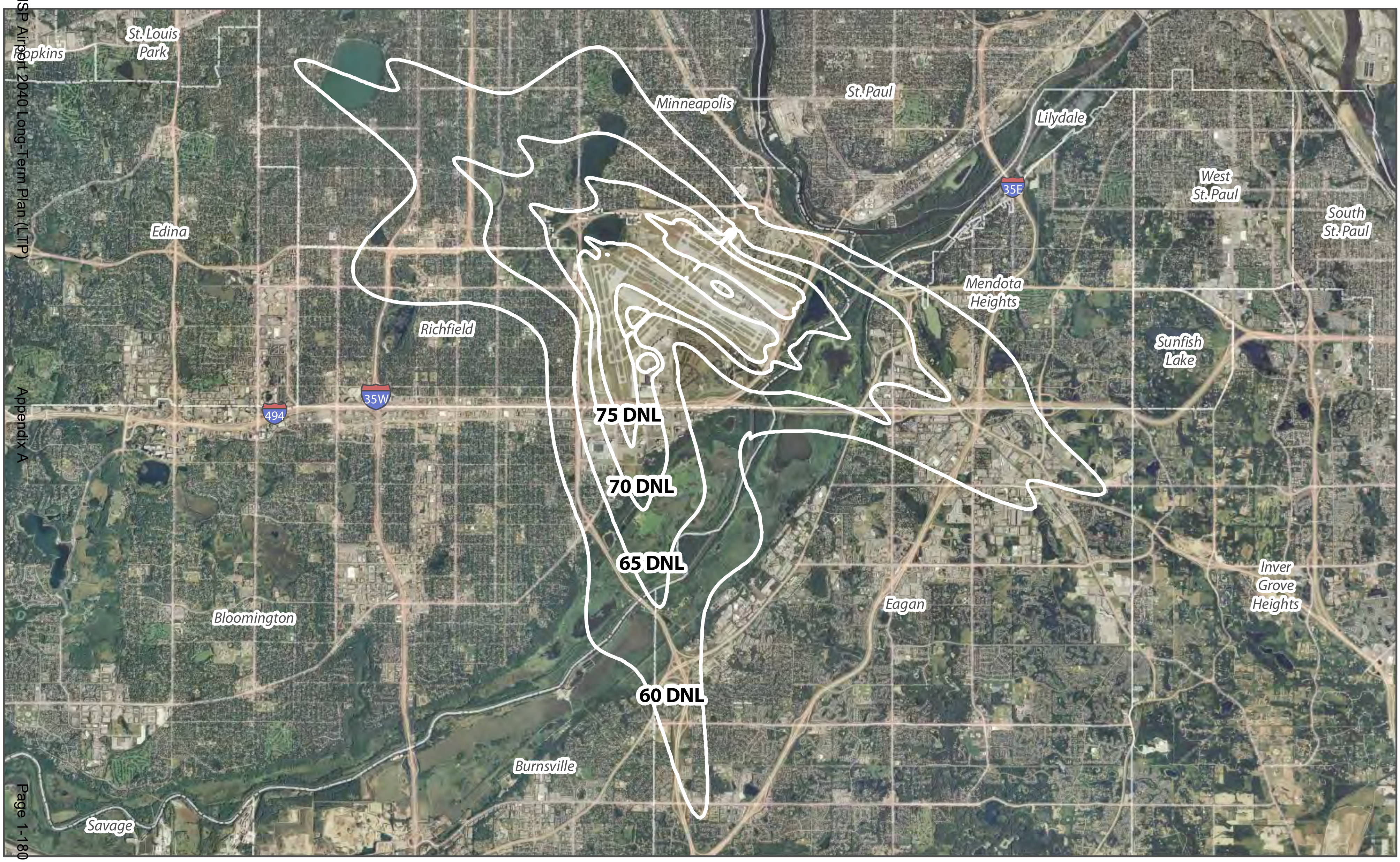
Based on the 630,837 total operations forecasted in 2030, approximately 8,540 acres are in the 65 DNL noise contour (an increase of 2,823.5 acres from the 2008 base case noise contour) and approximately 21,185.1 acres are in the 60 DNL noise contour (an increase of 7,209.7 acres from the 2008 base case noise contour).

Table 5.11 contains the counts of single-family (one unit per structure) and multi-family (greater than one unit per structure) dwelling units in the forecast 2030 noise contour. The counts are based on the parcel intersect methodology where all parcels that are within or touched by the noise contour are counted.

A depiction of the 2030 actual noise contour is provided in **Figure 5-3.**

2030 Preferred Alternative Contours

Figure 5-3



Minneapolis - St Paul International Airport (MSP)

The forecast 2030 and 2008 base case noise contours are provided in **Figure 5-4**. The 2030 65 DNL noise contour is 49.4% larger than the 2008 base case 65 DNL noise contour, and the 2030 base case 60 DNL noise contour is 55.6% larger than the 2008 base case 60 DNL noise contour.

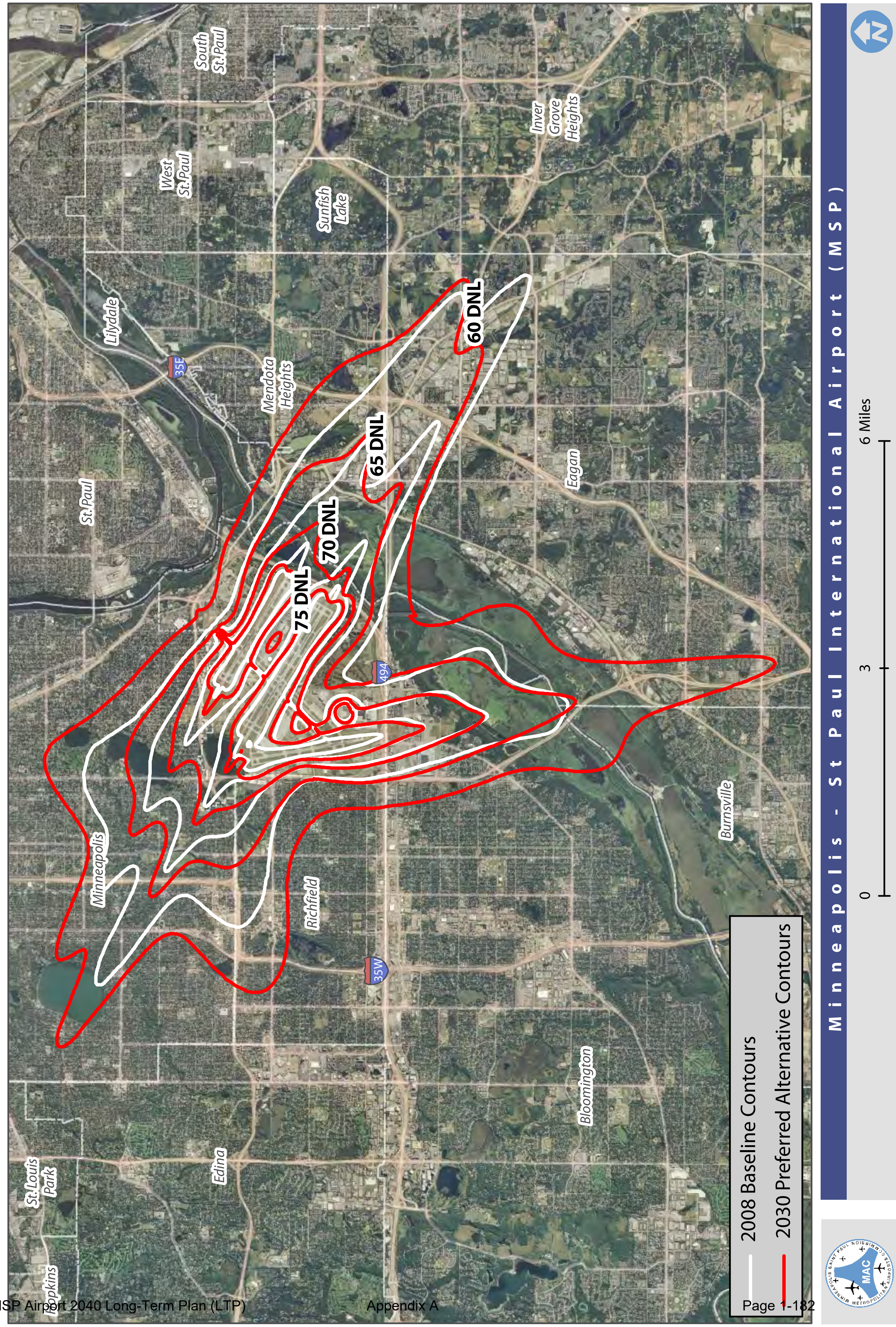
TABLE 5.11: SUMMARY OF 2030 FORECAST DNL NOISE CONTOUR SINGLE-FAMILY AND MULTI-FAMILY UNIT COUNTS

City	Count	Dwelling Units Within DNL (dB) Interval									
		Single-Family					Multi-Family				
		60-64	65-69	70-74	75+	Total	60-64	65-69	70-74	75+	Total
Bloomington	Completed	306	98	0	0	404	666	447	620	0	1733
	Additional	45	0	0	0	45	24	50	0	0	74
	Total	351	98	0	0	449	690	497	620	0	1807
Burnsville	Completed	0	0	0	0	0	0	0	0	0	0
	Additional	29	0	0	0	29	0	0	0	0	0
	Total	29	0	0	0	29	0	0	0	0	0
Eagan	Completed	194	0	0	0	194	0	0	0	0	
	Additional	342	0	0	0	342	104	0	0	0	104
	Total	536	0	0	0	536	104	0	0	0	104
Mendota	Completed	0	0	0	0	0	0	0	0	0	0
	Additional	13	0	0	0	13	0	0	0	0	0
	Total	13	0	0	0	13	0	0	0	0	0
Mendota Heights	Completed	66	4	0	0	70	49	0	0	0	49
	Additional	13	0	0	0	13	226	0	0	0	226
	Total	79	4	0	0	83	275	0	0	0	275
Minneapolis	Completed	6548	3966	784	0	11298	2513	606	525	0	3644
	Additional	3600	2	0	0	3602	1556	0	0	0	1556
	Total	10148	3968	784	0	14900	4069	606	525	0	5200
Richfield	Completed	1172	545	69	0	1786	1407	218	0	0	1625
	Additional	1578	0	0	0	1578	1252	4	0	0	1256
	Total	2750	545	69	0	3364	2659	222	0	0	2881
All Cities	Completed	8286	4613	853	0	13752	4635	1271	1145	0	7051
	Additional	5620	2	0	0	5622	3162	54	0	0	3216
	Total	13906	4615	853	0	19374	7797	1325	1145	0	10267

Note: Parcel intersect method, completed includes all parcels mitigated or eligible for mitigation.

Figure 5-4

2008 Base Case Contours and 2030 Preferred Alternative Contours



Minneapolis - St Paul International Airport (MSP)

5.5 AIR QUALITY

5.5.1 AIRCRAFT EMMISSIONS

This analysis details the data inputs used to develop the emissions inventory for use in the Long Term Comprehensive Plan Update (LTCP) at Minneapolis St. Paul International Airport (MSP) and the results of the analysis. The purpose of this analysis is to determine the aircraft-related emissions for National Ambient Air Quality Standard (NAAQS) criteria pollutants at MSP for the years 2008 and 2030.

Pollutants Considered

Air pollutants associated with emissions include major criteria pollutants. The US Environmental Protection Agency has established National Ambient Air Quality Standards (NAAQS) and identified six "criteria pollutants" that cause or contribute to air pollution and could endanger the public's health and welfare. The NAAQS criteria pollutants and/or their precursors included in this study are: Carbon Monoxide (CO), Particulate Matter (PM-10, PM-2.5), Sulfur Dioxide (SO_X), Nitrogen Dioxide (NO_X), Volatile Organic Compounds (VOCs) and lead.

Operational Pollutant Sources

Aircraft operations that potentially contribute to pollutant concentrations on the ground include departure taxiing, queuing, takeoff, climb-out, approach, landing and arrival taxiing. Other aircraft-related emissions included in this emission inventory are aircraft ground support equipment (GSE) and Auxiliary Power Units (APUs) that provide power and air-conditioning to aircraft when the engines are not running.

Aircraft Operations

Annual landing and takeoff aircraft operational levels were determined from the 2008 Integrated Noise Model (INM) operations database file generated and provided by the MAC and the operations database file for the 2030 noise contours. **Tables 5.12** and **5.13** provide the INM and Emissions and Dispersion Modeling System (EDMS) fleet mix modeled and annual landing takeoff operations (LTOs) for 2008 and 2030, respectively. It should be noted that EDMS total operations vary slightly from INM total operations due to rounding functions within the EDMS model.

TABLE 5.12: FLEET MIX AND LTO ANNUAL OPERATIONS – 2008

INM Type	EDMS Type	LTO Annual
F16GE	Lockheed Martin F-16 Fighting Falcon	7.6
GASEPF	Cessna 172 Skyhawk	607.4
GASEPV	Cessna 182	215.3
A109	Agusta A-109	3.5
A300-622R	Airbus A300B4-600 series	755.3
A310-304	Airbus A310-300 series	228.0
A319-131	Airbus A319-100 series	23,163.9
A320-211	Airbus A320-200 series	27,343.8
A321-232	Airbus A321-200 series	137.5
A330-301	Airbus A330-300 series	1,890.8
IA1125	Israel IAI-1125 Astra	168.3
B206L	Bell 206 JetRanger	6.1
B212	Bell UH-1 Iroquois	0.5
B222	Agusta A109	1.0
737N17	Boeing 737-200 series	10.1
737N9	Boeing 737-200 series	7.6
BAC111	BAC 1-11 300/400	2.0
BEC58P	Raytheon Beech Baron 58	2,493.1
1900D	Raytheon Beech 1900-D	885.6
717200	Boeing 717-200 series	1,106.6
737300	Boeing 737-300 series	3,290.5
737400	Boeing 737-400 series	123.9
737500	Boeing 737-500 series	2,282.1
737700	Boeing 737-700 series	2,023.7
737800	Boeing 737-800 with winglets	6,730.0
747100	Boeing 747-100 series	2.0
747200	Boeing 747-200 series	126.4
747400	Boeing 747-400 series	417.6
757PW	Boeing 757-200 series	12,597.1
757300	Boeing 757-300 series	6,486.6
767CF6	Boeing 767-200 series	51.1
767300	Boeing 767-300 series	101.6
777200	Boeing 777-200-ER	5.1
C-130E	Lockheed C-139 Hercules	1,246.3
C17	Boeing C-17A	20.2
C9A	Boeing DC-9-10 series	1.0
CNA172	Cessna 172 Skyhawk	31.8
CNA206	Cessna 206	56.6
CNA500	Cessna 501 Citation I SP	274.5
CIT3	Cessna 500 Citation 1	618.3

INM Type	EDMS Type	LTO Annual
CNA750	Cessna 750 Citation X	1,013.1
CL600	Bombardier Challenger 600	668.8
CL601	Bombardier Challenger 601	50,210.2
CNA441	Cessna 441 Conquest II	222.4
DHC6	DeHavilland DHC-6-300 Twin Otter	1,686.4
DHC8	DeHavilland DHC-8-100	19.2
DC1010	Boeing DC-10-10 series	1,103.6
DC820	Boeing DC-8- series 50	1.5
DC860	Boeing DC-8 series 60	1.0
DC870	Boeing DC-8 series 70	295.3
DC93LW	Boeing DC-9-30 series	9,967.0
DC9Q9	Boeing DC-9-30 series	28.2
DC95HW	Boeing DC-9-50 series	9,972.1
EMB145	Embraer ERJ145-ER	6,299.6
F-18	Boeing F/A-18 Hornet	4.5
727EM1	Boeing 727-100 series	1.0
727EM2	Boeing 727-200 series	840.2
GII	Gulfstream II	380.7
GIIB	Gulfstream II-B	56.6
GIV	Gulfstream IV-SP	388.2
GV	Gulfstream G500	13,286.0
HS748A	Hawker HS748-2	29.8
KC-135	Boeing KC-135 Stratotanker	9.1
L1011	Lockheed L-1011 Tristar	12.1
LEAR25	Bombardier Learjet 25	1,131.8
LEAR35	Bombardier Learjet 36	1,791.5
MD11GE	Boeing MD-11	208.8
MD81	Boeing MD-81	6,003.3
MD9025	Boeing MD-90	132.5
MU3001	Mitsubishi MU-300 Diamond	1,660.1
PA31	Piper PA-31 Navajo	137.5
PA28	Piper PA-28 Cherokee series	7.1
S70	Sikorsky UH-60 Black Hawk	1.0
SD330	Shorts 330-200 series	27.8
SF340	Saab 340-B	21,222.3
T1	Rockwell T-2 Buckeye	19.2
T34	Raytheon Beech Bonanza 36	1.0
U21	Raytheon King Air 90	10.6
Grand Total		224,371.4

Source: MAC INM Input files for 2008 DNL contour; HNTB Analysis, 2009.

TABLE 5.13: FLEET MIX AND LTO ANNUAL OPERATIONS – 2030

INM Type	EDMS Type	LTO Annual
GASEPF	Cessna 172 Skyhawk	413.8
GASEPV	Cessna 182	109.7
A109	Agusta A-109	9.3
A300-622R	Airbus A300B4-600 series	1,073.7
A310-304	Airbus A310-300 series	95.3
A319-131	Airbus A319-100 series	16,800.0
A320-211	Airbus A320-200 series	27,240.2
A320-232	Airbus A320-200 series	10,474.4
A321-232	Airbus A321-200 series	8,319.1
A330-301	Airbus A330-300 series	1,409.3
A330-343	Airbus A330-300 series	1,786.2
IA1125	Israel IAI-1125 Astra	174.7
B206L	Bell 206 JetRanger	11.6
BEC58P	Raytheon Beech Baron 58	3,513.6
1900D	Raytheon Beech 1900-D	1,055.6
737QN	Beoing 737-200 series	26,543.6
737300	Boeing 737-300 series	5.4
737400	Boeing 737-400 series	1,275.7
737700	Boeing 737-700 series	123.3
737800	Boeing 737-800 with winglets	47,566.7
747400	Boeing 747-400 series	397.2
757RR	Boeing 757-200 series	1,836.6
757300	Boeing 757-300 series	6.4
767CF6	Boeing 767-200 series	2,718.5
767300	Boeing 767-300 series	3,020.1
777200	Boeing 777-200-ER	1,617.7
777300	Boeing 777-300 series	1,178.9
C-130E	Lockheed C-139 Hercules	952.2
C130	Lockheed C-139 Hercules	22.5
C17	Boeing C-17A	15.0
C5A	Lockheed C-5 Galaxy	3.8
CNA172	Cessna 172 Skyhawk	26.7
CNA208	Cessna 208 Caravan	449.3
CNA55B	Cessna 550 Citation II	213.9
CNA500	Cessna 500 Citation 1	542.1
CIT3	Cessna 500 Citation 1	1,581.7
CNA750	Cessna 750 Citation X	1,229.2
CL600	Bombardier Challenger 600	838.6
CL601	Bombardier Challenger 601	49,481.4
CNA441	Cessna 441 Conquest II	161.1

INM Type	EDMS Type	LTO Annual
DHC6	DeHavilland DHC-6-300 Twin Otter	795.2
DHC8	DeHavilland DHC-8-100	149.6
DHC830	DeHavilland DHC-8-300	26,998.8
DC1010	Boeing DC-10-10 series	122.3
DO328	Donier 328-100 series	21.9
ECLIPSE500	Piper PA-42 Cheyenne Series	99.9
EMB145	Embraer ERJ145-ER	6,085.2
F10062	Fokker F100	188.2
F16GE	Lockheed Martin F-16 Fighting Falcon	6.0
F-18	Boeing F/A-18 Hornet	5.3
FAL20	Dassault Falcon 20-D	445.1
GII	Gulfstream II	205.8
GIIB	Gulfstream II-B	27.9
GIV	Gulfstream IV-SP	1,553.7
GV	Gulfstream G500	53,806.2
H500D	Hughes 500D	2.3
HS748A	Hawker HS748-2	36.5
KC-135	Boeing KC-135 Stratotanker	5.3
LEAR25	Bombardier Learjet 25	1,309.0
LEAR35	Bombardier Learjet 36	1,840.6
MD11GE	Boeing MD-11	194.1
MD81	Boeing MD-81	22.9
MD9025	Boeing MD-90	5,660.3
MU3001	Mitsubishi MU-300 Diamond	1,400.1
PA31	Piper PA-31 Navajo	68.9
S70	Sikorsky UH-60 Black Hawk	2.3
T1	Rockwell T-2 Buckeye	10.5
T34	Raytheon Beech Bonanza 36	0.8
T-38A	T-38 Talon	14.3
U21	Raytheon King Air 90	6.8
Grand Total		315,379.3

Source: HNTB Analysis, 2009.

Table 5.14 identifies the taxi times used in the EDMS model for each year.

TABLE 5.14: TAXI TIMES (MINUTES)

Year	Taxi-out	Taxi-in
2008	19.2	8.2
2030	18.1	10.7

Source: ASPM Data extracted 11/4/2009, HNTB Analysis, 2005.

The following assumptions were made in development of the inventory:

- Default ground support equipment (GSE) and times for equipment assigned by EDMS were used for individual aircraft types.
- Default auxiliary power unit (APU) values were used (EDMS uses 13 minutes of APU for arrival and departure, a total of 26 minutes).

Version 5.1.1 of EDMS (the latest version) was used to determine aircraft-related emissions.

Results

Tables 5.15 and **5.16** provide the air pollutant emissions in tons per year from aircraft, GSE, and APU operations in 2008 and 2030, respectively. It should be noted that the 2030 GSE pollutants are much lower than 2008 due to EDMS technology assumptions for 2030 GSE. The EDMS model assumes that emission factors (EF) for equipment such as gasoline baggage tractors will be significantly reduced by the year 2030. An example of the CO EF for a baggage tractor in 2008 is 125.6 (grams/hp/hr) and in 2030 CO EF is reduced to 14.0 (grams/hp/hr). These reductions provide a significant decrease in the amount of pollutants created from GSE.

TABLE 5.15: 2008 EMISSIONS INVENTORY (TONS/YEAR)

	Pollutant					
Category	**CO**	**VOC**	**NOx**	**SOx**	**PM-10**	**PM-2.5**
Aircraft	2,210.42	369.82	2,112.56	233.22	34.23	34.23
GSE	2,265.40	79.01	267.33	7.27	8.03	7.71
APUs	99.18	4.83	66.52	8.72	8.00	8.00
Grand Total	4,574.99	453.66	2,446.41	249.20	50.25	49.94

Source: HNTB Analysis, 2009.

TABLE 5.16: 2030 EMISSIONS INVENTORY (TONS/YEAR)

	Pollutant					
Category	**CO**	**VOC**	**NOx**	**SOx**	**PM-10**	**PM-2.5**
Aircraft	3,161.21	441.15	3,260.18	351.11	48.58	48.58
GSE	416.08	17.00	37.91	4.35	2.59	2.41
APUs	108.72	5.68	104.67	13.07	10.64	10.64
Grand Total	3,686.01	463.83	3,402.77	368.54	61.82	61.64

Source: HNTB Analysis, 2009.

5.5.2 ROADWAY AND PARKING EMISSIONS – MSP 2008 AND 2030

Roadway and parking emissions are estimated for existing (2008) vehicle volumes and projected 2030 volumes, assuming development occurs as described in this Long Term Comprehensive Plan Update.

Because the Twin Cities Metropolitan Region is a designated maintenance area for carbon monoxide (CO), the primary pollutant of concern from vehicular traffic is CO. The Minnesota Pollution Control Agency generated CO emission factors from the US Environmental Protection Agency data. However, for this assessment, all criteria pollutants addressed by the EDMS model have also been evaluated.

Default CO emission rates used in the EDMS model were compared with those used by the Minnesota Pollution Control Agency and the Metropolitan Council and found to inadequately represent regional CO emissions. Some reasons for these differences are: the default EDMS evaluation month is July while the Minnesota evaluation month is January, when assumed minimum and maximum temperatures are more than 30 degrees lower; the Reid Vapor Pressure assumed in Minnesota is almost 70% higher than the EDMS default value; the EDMS model uses a national default average vehicle mix, while a vehicle mix unique to the Twin Cities Metropolitan Area is used by the Metropolitan Council. The EDMS default Mobile 6.2 input files do include, however, various fuel-related factors that are not assumed in the Minnesota model since these do not affect CO emissions. Pollutant emission rate predictions for 2008 and 2030 were therefore generated using the Mobile 6.2 emissions model with merged Minnesota and EDMS inputs rather than using the EDMS model directly. In this way, the model reflects regional vehicle registration and age data for the Twin Cities Metropolitan Area and Minnesota temperature and fuel-related parameters, along with fuel-related assumptions in the EDMS model for calculating non-CO emission rates. A range of predicted speeds from 2.5 mph to 65 mph was used in this evaluation for predictions in parking ramps, arterial/collector roads and freeways.

<u>Roadway Emissions</u>

Roadway emissions are based upon traffic forecasts provided by the Metropolitan Council, for public roadways on and surrounding MSP. Traffic estimates on these roadways associated with the Lindbergh Terminal and the Humphrey Terminal parking ramps were generated for 2009 and for 2030 without the MSP 2030 improvements. The increase in background traffic between these two years was small; it is therefore reasonable to assume that 2009 volumes can be used for 2008. The 2030 public roadway volumes were adjusted upwards to account for the MSP 2030 plan using the Average Daily Traffic volume growth on Glumack Drive projected in Section 3.6. This growth factor, based on **Table 3.3**, is 1.366.

The allocation of traffic on Lindbergh Terminal roadways developed in the MSP 2015 Terminal Expansion Environmental Assessment was assumed in this study but with volumes adjusted upward using the growth factor noted above. Limited growth was assumed on the airport road servicing the air cargo area.

An estimate of criteria pollutant emissions on major roadways around the perimeter of MSP and within the airport was made for each roadway segment for which traffic volumes were available.

Emissions were based upon daily travel volumes, average travel speed, and emission factors. As noted above, emission factors were generated with the Mobile 6.2 model for the Twin Cities Metropolitan Area. Annual traffic volumes were estimated from daily traffic, assuming traffic occurs 365 days per year. Summaries of roadway emissions for 2008 and 2030 are presented below in **Table 5.17** and **Table 5.18**, respectively.

TABLE 5.17: ROADWAY CRITERIA POLLUTANTS EMISSIONS 2008 (SHORT TONS PER YEAR)

Roadway Segment	Length (mi)	MPH	ADT	CO	NMHC	VOC	TOG	NOx	SOx	PM-10	PM-2.5
34th Avenue	0.985	40	43,154	298.52	13.01	13.17	14.09	27.74	0.15	0.82	0.53
West Service Road	1.924	35	1,245	16.37	0.75	0.76	0.82	1.53	0.01	0.05	0.03
I-494 (TH77 to 24th Ave)	0.454	60	37,104	133.33	4.76	4.82	5.14	14.53	0.06	0.32	0.21
I-494 (24th Ave to 34TH Ave)	0.727	60	46,599	267.91	9.57	9.68	10.32	29.20	0.12	0.65	0.43
I-494 (34th Ave to TH5)	0.454	65	37,251	138.30	4.73	4.78	5.09	16.18	0.06	0.33	0.21
Lindbergh Exit	0.660	35	34,371	154.96	7.14	7.22	7.74	14.49	0.08	0.44	0.29
Lindbergh Entrance	0.614	35	34,371	143.99	6.63	6.71	7.19	13.47	0.07	0.40	0.27
Post Road	1.298	40	34,371	101.04	4.40	4.46	4.77	9.39	0.05	0.28	0.18
Terminal Roadways	0.677	20	10,243	96.18	5.04	5.11	5.51	9.30	0.05	0.25	0.17
TH 5 (TH55 to Entrance)	1.119	65	50,255	459.18	15.70	15.88	16.90	53.72	0.20	1.08	0.71
TH 5 (Entrance to 34th Ave)	0.510	65	43,839	182.38	6.24	6.31	6.71	21.34	0.08	0.43	0.28
TH 5 (34th Ave to I-494)	0.946	65	37,179	287.12	9.82	9.93	10.57	33.59	0.12	0.68	0.44
TH 55 (TH62 to TH5)	0.900	55	22,961	158.17	5.93	6.00	6.40	16.40	0.07	0.40	0.26
TH 62 (TH77 to 28th Ave)	0.441	60	12,468	43.49	1.22	1.28	1.21	1.52	0.02	0.07	0.04
TH 62 (36th Ave to TH55)	0.820	60	13,212	85.59	2.40	2.52	2.38	2.99	0.04	0.14	0.08
TH 77 (I-494 to 66th St)	1.470	55	4,659	52.45	1.97	1.99	2.12	5.44	0.02	0.13	0.09
TH77 (66th St to TH62)	0.849	55	4,055	26.35	0.99	1.00	1.07	2.73	0.01	0.07	0.04
Roadway Emissions (2008)				2645.33	100.30	101.62	108.01	273.56	1.22	6.53	4.25

TABLE 5.18: ROADWAY CRITERIA POLLUTANT EMISSIONS 2030 (SHORT TONS PER YEAR)

Roadway Segment	Length (mi)	MPH	ADT	CO	NMHC	VOC	TOG	NOx	SOx	PM-10	PM-2.5
34th Avenue	0.985	40	58,948	267.23	7.28	7.37	7.96	8.14	0.21	0.66	0.31
West Service Road	1.924	35	1,700	14.64	0.42	0.42	0.46	0.45	0.01	0.04	0.02
I-494 (TH77 to 24th Ave)	0.454	60	50,246	118.62	2.72	2.76	2.96	3.73	0.08	0.26	0.12
I-494 (24th Ave to 34TH Ave)	0.727	60	63,029	238.08	5.45	5.54	5.95	7.48	0.17	0.52	0.25
I-494 (34th Ave to TH5)	0.454	65	51,613	125.94	2.78	2.83	3.04	4.05	0.08	0.27	0.13
Lindbergh Exit	0.660	35	47,401	139.87	4.00	4.06	4.37	4.31	0.11	0.35	0.17
Lindbergh Entrance	0.614	35	47,401	129.97	3.71	3.77	4.06	4.01	0.11	0.33	0.16
Post Road	1.298	40	47,401	88.24	2.40	2.43	2.63	2.69	0.07	0.22	0.10
Terminal Roadways	0.677	20	13,650	86.44	2.82	2.87	3.11	2.78	0.07	0.21	0.10
TH 5 (TH55 to Entrance)	1.119	65	68,190	409.48	9.04	9.20	9.87	13.18	0.28	0.86	0.41
TH 5 (Entrance to 34th Ave)	0.510	65	60,666	165.87	3.66	3.73	4.00	5.34	0.11	0.35	0.17
TH 5 (34th Ave to I-494)	0.946	65	52,411	266.01	5.87	5.97	6.41	8.56	0.18	0.56	0.27
TH 55 (TH62 to TH5)	0.900	55	30,904	139.79	3.33	3.38	3.63	4.32	0.10	0.32	0.15
TH 62 (TH77 to 28th Ave)	0.441	60	16,049	36.78	0.84	0.86	0.92	1.16	0.03	0.08	0.04
TH 62 (36th Ave to TH55)	0.820	60	17,137	72.94	1.67	1.70	1.82	2.29	0.05	0.16	0.08
TH 77 (I-494 to 66th St)	1.470	55	5,917	43.74	1.04	1.06	1.14	1.35	0.03	0.10	0.05
TH77 (66th St to TH62)	0.849	55	5,211	22.23	0.53	0.54	0.58	0.69	0.02	0.05	0.02
Roadway Emissions (2030)				2365.86	57.58	58.51	62.91	74.53	1.70	5.33	2.55

Parking Emissions

Parking emissions are estimated from the major parking facilities on the airport that are shown in **Table 5.19**. No parking was assumed for the Econo-Lot and the Delta F Ramp.

TABLE 5.19: MAJOR MSP PARKING FACILITIES ANALYZED

Parking Area	2008 Parking Spaces	2030 Parking Spaces
Lindbergh Ramp	14,400	24,500
Humphrey Ramp	9,200	15,100
Delta B Ramp	1,700	1,700
Delta C South Lot	2,300	2,300
Delta C North Lot	1,500	1,500
Total Spaces	29,100	45,100

Emissions are not related directly to the number of parking spaces, but are related to the vehicular activity within each parking area, the average travel speed of vehicles on access roads to and from the ramp and within the ramp, and the average idling time within the ramp. Detailed activity in the Lindbergh Terminal and Humphrey Terminal ramps was developed for the MSP 2015 Terminal Expansion Environmental Assessment and has been assumed in this study. This activity (hourly inbound and outbound vehicle volumes by time of day and day of week) has not changed and is therefore still relevant for this analysis.

Assumed travel distance on ramp access roads and within the ramp, average travel speed and vehicle activity per 24-hour day are shown in **Table 5.20**. Travel distance includes the ramp access road that is separated from the terminal roadway. A speed of 35 mph is assumed along these roadways at the Lindbergh Terminal and Humphrey Terminal ramps with a ramp speed of 5 mph. Delta's (formerly Northwest's) parking demand was reduced to account for an expected reduction in work force at MSP although use of these spaces remains uncertain.

TABLE 5.20: PARKING FACILITY PARAMETERS ASSUMED FOR THE EMISSIONS ANALYSIS

Parking Facility	Travel (ft)	Speed (mph)	Veh/space	
			Weekday	Weekend
Lindbergh	6800	35/5	0.988	0.697
Humphrey	4500	35/5	0.727	0.531
Delta B Ramp	400	10	2.55	0.638
Delta C South	800	10	1.656	0.414
Delta C North	700	10	1.787	0.447

Note: From EA-2015 Terminal Expansion Project, August 2005.

The average weekday and weekend activity in the combined Lindbergh Terminal general and short-term parking areas and in the Humphrey Terminal ramp is presented in **Table 5.21**.

TABLE 5.21: ASSUMED ENTRY PLUS EXIT MOVEMENTS

	Lindbergh Ramp		Humphrey Ramp	
	Weekday	Weekend	Weekday	Weekend
2008	12,406	8,749	4,465	3,496
2030	24,196	17,064	10,975	8,014

Note: Adjusted from EA-2015 Terminal Expansion Project, August 2005.

For the Lindbergh ramp, the number of vehicles entering and exiting is essentially the same on weekdays and weekends. This may also be true for the Humphrey ramp in 2030 but data from actual activity were deemed more reliable.

The resulting carbon monoxide emission estimates for parking facilities in 2008 and 2030 are presented in **Table 5.22** to demonstrate the relative contributions of each ramp. Relative contributions of other pollutants are similar.

TABLE 5.22: PARKING CARBON MONOXIDE EMISSIONS (SHORT TONS/YEAR)

Parking Area	2008	2030
Lindbergh Ramp	137.88	172.87
Humphrey Ramp	34.70	53.89
Delta B Ramp	5.42	3.41
Delta C South Lot	9.22	4.30
Delta C North Lot	5.65	2.84
All spaces	192.86	237.30
Net Change		44.44

Combined Roadway and Parking Emissions

A comparison of the combined roadway and parking emissions for 2008 and 2030 is presented in **Table 5.23**.

TABLE 5.23: COMBINED ROADWAY AND PARKING CARBON MONOXIDE EMISSIONS (TONS)

	CO	NMHC	VOC	TOG	NOx	SOx	PM-10	PM-2.5
2008								
Roadway	2645.33	100.30	101.62	108.01	273.56	1.22	6.53	4.25
Parking	192.86	12.80	12.65	13.87	18.40	0.07	0.40	0.26
Total	2838.19	113.10	114.27	121.88	291.96	1.29	6.93	4.51
2030								
Roadway	2365.86	57.58	58.51	62.91	74.53	1.70	5.33	2.55
Parking	237.30	9.83	9.68	10.74	7.77	0.14	0.45	0.22
Total	2603.17	67.41	68.19	73.65	82.30	1.84	5.78	2.77
Change	-235.02	-45.69	-46.09	-48.23	-209.66	0.55	-1.14	-1.74

The change in emissions resulting from the implementation of the 2030 Long Term Comprehensive Plan Update is a decrease of 235 tons of carbon monoxide emissions and 210 tons of NOx. This result is based upon an evaluation of traffic changes in the immediate vicinity of the airport combined with parking changes on the airport. The lower emissions in 2030 are due primarily to reductions in pollutant emissions from motor vehicles that are significant enough to overcome the projected increase in airport-related vehicle volumes.

Therefore, a reduction in overall traffic and parking emissions is predicted in the immediate airport area, and no regional adverse impacts on air quality is anticipated with implementation of the 2030 Long Term Comprehensive Plan Update.

Infrastructure Emissions

Infrastructural emissions are primarily associated with heating of terminal facilities. Other point sources include vehicle fueling, paint, generators and solvents. Actual emissions from these sources for 2008 are listed below in **Table 5.24**.

According to an analysis completed by Michaud Cooley Erickson, the Metropolitan Airports Commission’s energy consultant, the extension of the G Concourse at the Lindbergh Terminal is expected to generate an additional 54% of demand on the heating system. The current system has the capability to absorb the majority of this load; however, additional boiler capacity will need to be added or greater efficiencies will need to be incorporated into the building envelope to reduce the demand. The Humphrey Terminal is scheduled for significant development and will require an additional 178% of demand capacity over the existing system per this same analysis. Other sources are not anticipated to change significantly. A comparison of the 2008 and 2030 infrastructure emissions is presented in **Table 5.24**.

TABLE 5.24: INFRASTRUCTURE EMISSIONS

	CO	VOC	Lead	NOx	SOx	PM-10	PM-2.5
2008 (tons/year)							
Lindbergh Terminal	14.690	0.962	0.000	17.488	0.105	1.329	1.329
Humphrey Terminal	1.273	0.083	0.000	1.516	0.009	0.115	0.115
Other Sources	4.227	2.845	0.000	6.396	0.496	3.556	2.120
Total MAC	20.19	3.890	0.000	25.4	0.610	5.000	3.564
2030 (tons/year)							
Lindbergh Terminal	22.623	1.481	0.000	26.932	0.162	2.047	2.047
Humphrey Terminal	3.539	0.231	0.000	4.214	0.025	0.320	0.320
Other Sources	4.227	2.845	0.000	6.396	0.496	3.556	2.120
Total MAC	30.389	4.557	0.000	37.542	0.683	5.922	4.486
Change	10.199	0.667	0.000	12.142	0.073	0.922	0.922

The 2030 Long Term Comprehensive Plan Update (LTCP) terminal expansions represent an opportunity to incorporate a significant number of building efficiency improvements to address the anticipated energy needs. The Metropolitan Airports Commission may consider LEED-certified buildings, green roof designs and a number of energy sources such as solar, geothermal and wind technologies to incorporate renewable energy advancements. The above emissions estimate is expected to be a worst-case scenario, using current efficiencies and system management controls. The increase in emissions in 2030 is due to increased terminal square footage and no incorporation of energy conservation technologies.

Emissions Summary

The emissions analysis conducted for this LTCP included an evaluation of aircraft, Ground Service Equipment (GSE), Auxiliary Power Unit, roadway and parking emissions as well as infrastructure. During this planning period there will be an increase in emissions associated with infrastructure development. However, US Environmental Protection Agency and Federal Aviation Administration model assumptions incorporate significant carbon monoxide (CO) emission reductions associated with GSE and vehicles. As previously stated, the Twin Cities Metropolitan Region is a designated maintenance area for CO. The estimated reduction in CO with the 2030 development is in excess of 1100 tons.

5.6 SANITARY SEWER AND WATER

5.6.1 SANITARY SEWER

Wastewater discharges from MSP are conveyed to the Metropolitan Council Environmental Services (MCES) Metro Plant on Childs Road. This plant has a design capacity of 250 million gallons per day (MGD). The proposed projects are expected to increase passenger loads by approximately 50% between 2008 and 2030. This passenger growth will be accompanied by an approximately equivalent increase in wastewater discharges.

Wastewater is discharged to the Metro Plant through the MCES sewer interceptor system. Discharges from MSP are conveyed to the interceptor system through three different sewer systems. The majority is discharged from the airport to a tunnel near the Mississippi River that discharges into the interceptor system. A small volume of wastewater is discharged into the City of Minneapolis sewer system prior to reaching the MCES interceptors. Wastewater from the southwest portion of MSP is discharged through the City of Richfield sewer system prior to reaching the MCES interceptors.

The estimated 50% increase in passenger loads is predicted to increase the daily sanitary discharge volume by approximately 0.35 MGD. This increase would be conveyed through the tunnel and Richfield systems. Assuming a 2.5 peak loading factor, this would amount to a peak addition of approximately 37,000 gallons per hour. This increase in loading is not expected to be an issue with the Metro Plant's total capacity, because the increase amounts to less than 0.2% of the plant's daily treatment capacity. However, there could be issues with the wet-weather conveyance capacity of the interceptor system from other municipal sources. The MCES has informed Metropolitan Airports Commission (MAC) staff and consultants that there is sufficient dry-weather capacity in the MCES interceptor system to handle the proposed increase in flow (see discussion below regarding wet-weather capacity). In addition, the Richfield system is oversized to provide options for the City of Bloomington to divert its discharges through the Richfield system to the Metro Plant if Bloomington's conveyance to the Seneca Treatment Facility is obstructed. Recent upgrades to the Bloomington conveyance system make Bloomington's use of the Richfield system unlikely. Therefore, the Richfield system should have adequate capacity.

Additionally, the City of Minneapolis and the MCES have been working diligently on a Combined Sewer Overflow (CSO) separation project that will return sewer capacity and reduce the CSO problems that exist within the sanitary sewer network. Although the issue is not unique to airport growth, the MAC is considering the timing and impact of these projects in future planning for MSP.

Whether or not the proposed Capital Improvement Program projects for MSP are implemented, the MAC-owned sanitary sewer infrastructure may require upgrades to convey the higher volume of wastewater from the Lindbergh and/or Humphrey Terminals (upstream of the "tunnel" and Richfield systems). As it makes development decisions, the MAC will evaluate the existing capacity of the MAC-owned sanitary sewer system to determine where and when capacity limitations may be encountered.

The MAC has reduced the use of municipality-supplied potable water by specifying and using high-efficiency fixtures/valves, such as automatic sensors, to reduce water usage and wastewater volumes. These measures have resulted in sanitary sewer flow reduction; therefore, capacity exists for the projects planned in the LTCP.

Any environmental concerns associated with this project activity are mitigated with the acquisition and the maintenance of appropriate permits.

5.6.2 WATER SUPPLY

As noted in Chapter 1, the MSP campus currently uses approximately one million gallons of potable water per day. The uses include restrooms, concessions, tenant facilities, facility cleaning, irrigation, cargo uses, and rental car wash facilities. The proposed projects in this LTCP document include expansions to concourses at both the Lindbergh and Humphrey Terminals. These expansions will include additional restrooms and concessions, along with other water using services. The proposed plan also includes a hotel, which would be a significant user of potable water.

By 2030, the proposed projects would increase water demand at the airport. As projects are reviewed for preliminary engineering and design, water usage and fire flow demands will be incorporated. It is not expected that water usage would exceed 1.5 million gallons per day based on the proposed projects in this LTCP document.

The City of Minneapolis currently provides 100% of the water used on campus. The city's current maximum capacity is 180 million gallons per day. The maximum peak usage in the city in 2007 was approximately 145 million gallons per day. Therefore, the MAC's increased usage will not require capacity enhancements in Minneapolis. The MAC has also studied the possibility of obtaining some of its water from either the City of Richfield or the City of St. Paul. While not proposed at this time, these are alternatives that could be reviewed as a part of future ways to meet increasing water demands.

5.6.3 SOLID WASTE

The quantities of waste generated by an increase in the traveling public cannot be identified with certainty at this time; however such an increase is not expected to have a significant impact on the airport's solid waste capacity. The MAC and MSP tenants will continue efforts in waste reduction and recycling, commensurate with increased awareness and participation on the part of the traveling public.

Any increases in solid waste generation are assumed to be within the capability of the regional solid waste management system.

5.7 WATER QUALITY

Based on a review of the anticipated projects identified in this LTCP Update, there will be a minor (2 %) increase in new impervious pavement. The MAC will evaluate each phase of construction and the associated storm water runoff from the new impervious surface with respect to the drainage areas previously discussed in Chapter 1. The various project sites are located primarily on previously-developed areas. Each drainage area and the associated pond will be evaluated during the environmental review process to minimize the impacts, and measures such as green roofs and emerging technologies will be used to manage the storm water flows. Based on these measures it is not anticipated that the storm water quality will be affected; therefore storm water runoff will be able to be to be handled by the current detention ponds. It should be noted, however, that storm water from the MSP detention ponds discharges to the Minnesota River, which then flows to the Mississippi River. Both of these rivers have been identified by the MPCA as water quality impaired for a number of pollutants and stressors.

The MAC is considering utilizing a green roof concept on some of the proposed terminal expansions. This initiative may result in a reduction in the amount and rate (peak flow) of runoff entering the storm water drainage system. The retained water would be available for use by the roof vegetation instead of being added to the storm drains.

As mentioned in Chapter 1, storm water runoff from nearly all of MSP is directed to one of three storm water detention pond systems. These ponds provide protection for the Minnesota River against fuel spills and, as designed, remove total suspended solids, phosphorus and other pollutants from the storm water.

There are no known groundwater impacts in the area of the LTCP Update projects. The projects may have minor short-term localized groundwater movement but are not expected to have a significant effect on hydro-geological conditions on the airport.

If groundwater impacts are encountered during project implementation or during site prep, mitigation of the impacted water will occur in accordance with Minnesota Pollution Control Agency (MPCA) permits and regulations. Under the construction dewatering National Pollutant Discharge Elimination System permit, groundwater is brought to a water management area and, if contaminated, is either treated through a carbon system for a surface water discharge or is routed to the municipal wastewater treatment system.

Expansion of the terminals will require an expansion of the existing fuel hydrant system. Although this will not affect the groundwater, it may create a potential source of groundwater impacts should the hydrant system have an unintended release. Leak detection equipment, system maintenance procedures and Best Management Practices currently employed with the airport hydrant system will be applied to a new system to ensure that the potential for unsought releases is minimized. Additionally, the MPCA will incorporate and review any additions to the hydrant fueling system as part of the Aboveground Storage Tank permitting process.

5.8 WETLANDS

As briefly discussed in Chapter 1, very few wetlands remain on the MSP campus, aside from Mother Lake. It is unlikely that any of the proposed projects will impacts remnant wetlands. There are no obvious wetland impacts identified for the projects proposed in this LTCP Update document. However, project locations will be reviewed in more detail as part of any environmental review document completed for specific projects, with any necessary impacts and corresponding mitigation identified.

CHAPTER 6: LAND USE COMPATIBILITY

CHAPTER 6: LAND USE COMPATIBILITY

6.1 INTRODUCTION

Planning for the maintenance and development of airport facilities is a complex process. Successfully developing airports requires insightful decision-making predicated on various facts that drive the need for the development of additional airport infrastructure. Airports cannot be developed in a vacuum; the development effort must consider the needs of the surrounding populations and the land uses in the area surrounding the airport.

Cities and airport operators are both responsible for the ongoing development of public assets. The development of United States airports, as well as city infrastructure, falls within the concept of conducting development predicated on the greater public interest. The responsible development of such community and airport infrastructure requires cooperative efforts on behalf of the airport proprietor and the community.

As city governments are responsible for the development and enhancement of city infrastructure, airport proprietors are responsible for the federally endorsed enhancement of our nation’s airport system. Airport operators would be remiss in their duties if such efforts did not consider the land use consequences of decisions made regarding airport development.

This chapter evaluates the land use implications of the planned operation and development of the Minneapolis-St. Paul International Airport.

6.2 LAND USE COMPATIBILITY

The Federal Aviation Administration (FAA) has established Land Use Compatibility criteria in 14 C.F.R. Part 150 detailing acceptable land uses around airports by considering noise impacts in terms of Day-Night Sound Level (DNL). In the case of airports located in the Minneapolis-St. Paul Metropolitan Area additional criteria also must be evaluated in relation to noise exposure as established by the Metropolitan Council’s Transportation Policy Plan (TPP).

6.2.1 FAA LAND USE COMPATIBILITY GUIDELINES

Federal guidelines for compatible land use that take into account the impact of aviation noise have been developed for land near airports. They were derived through an iterative process that started before 1972. Independent efforts by the FAA, US Department of Housing and Urban Development, US Air Force, US Navy, US Environmental Protection Agency and other Federal agencies to develop compatible land use criteria were melded into a single effort by the Federal Interagency Committee on Urban Noise (FICUN) in 1979, and resulted in the FICUN Guidelines document (1980). The Guidelines document adopted DNL as its standard noise descriptor, and the Standard Land Use Coding Manual (SLUCM) as its standard descriptor for land uses. The noise-to-land use relationships were then expanded for the FAA’s Advisory Circular Airport-Land Use Compatibility Planning. The current individual agency compatible land use criteria have been, for the most part, derived from those in the FICUN Guidelines. Airport environments pertain only to certain categories of these guidelines.[5]

In 1985 the FAA adopted 14 C.F.R. Part 150 outlining land use compatibility guidelines around airports. **Table 6.1** provides the land use compatibility guidelines as established by the FAA.

According to FAA standards, areas with noise levels less than 65 DNL are considered compatible with residential development.

6.2.2 METROPOLITAN COUNCIL LAND USE COMPATIBILITY GUIDELINES

The Metropolitan Council has developed a set of land-use planning guidelines for responsible community development in the Minneapolis-St. Paul Metropolitan Area. The intent is to provide city governments with a comprehensive resource with regard to planning and community development in a manner that considers the adequacy, quality and environmental elements of planned land uses.

In 1976 the Minnesota Legislature enacted the Minnesota State Land Planning Act, the underlying law that requires local units of government to prepare a comprehensive plan and submit it for Metropolitan Council review. Under the 1976 legislation, communities designated land uses and defined the zoning applicable to the particular land use parcel. Zoning was the statute's priority. The land use measure was a request that local jurisdictions review existing zoning in Airport Noise Zones to determine consistency with the regional compatibility guidelines and rezone property for compatible development if consistent with other development factors. In 1977, the Metropolitan Council also updated the 1973 Aviation Chapter of the Metropolitan Development Guide. In 1983, the Metropolitan Council amended its Aviation Policy Plan to include "Land Use Compatibility Guidelines for Aircraft Noise."

In 1994 the Minnesota Legislature amended the Land Planning Act to require that communities update their comprehensive plans at least every 10 years. As a result, all Metropolitan Development Guide chapters were updated by December 1996. Under the amended Land Planning Act, communities determine the land use designation; zoning must be consistent with that designation. Thus, the communities had to re-evaluate designated use, permitted uses within the designation, zoning classifications and adequacy.

[5] Federal Interagency Committee On Noise (FICON), "Federal Agency Review of Selected Airport Noise Analysis Issues, " (1992), pp. 2-6 to 2-7.

TABLE 6.1: FAA AIRCRAFT NOISE AND LAND USE COMPATIBILITY GUIDELINES

Land Use	DNL Contour Interval (dB)					
	Less than 65	65-69	70-74	75-79	80-84	Greater than 85
Residential						
Residential, other than mobile homes and transient lodgings	Y	N(1)	N(1)	N	N	N
Mobile home park,	Y	N	N	N	N	N
Transient Lodgings	Y	N(1)	N(1)	N(1)	N	N
Public Use						
Schools	Y	N(1)	N(1)	N	N	N
Hospitals and nursing homes	Y	25	30	N	N	N
Churches, auditoriums, and concert halls	Y	25	30	N	N	N
Governmental services	Y	Y	25	30	N	N
Transportation	Y	Y	Y(2)	Y(3)	Y(4)	Y(4)
Parking	Y	Y	Y(2)	Y(3)	Y(4)	Y
Commercial Use						
Offices, business and professional	Y	Y	25	30	N	N
Wholesale and retail–building materials, Hardware and farm equipment	Y	Y	Y(2)	Y(3)	Y(4)	N
Retail trade–general	Y	Y	25	30	N	N
Utilities	Y	Y	Y(2)	Y(3)	Y(4)	N
Communication	Y	Y	25	30	N	N
Manufacturing and Production						
Manufacturing, general	Y	Y	Y(2)	Y(3)	Y(4)	N
Photographic and optical	Y	Y	25	30	N	N
Agriculture (except livestock) and forestry	Y	Y(6)	Y(7)	Y(8)	Y(8)	Y(8)
Livestock farming and breeding	Y	Y(6)	Y(7)	N	N	N
Mining and fishing, resource Production and extraction	Y	Y	Y	Y	Y	Y
Recreational						
Outdoor sports arenas and spectator sports	Y	Y(5)	Y(5)	N	N	N
Outdoor music shells, amphitheaters	Y	N	N	N	N	N
Nature exhibits and zoos	Y	Y	N	N	N	N
Amusements, parks, resorts and camps	Y	Y	Y	N	N	N
Golf courses, riding stables, and water recreation	Y	Y	25	30	N	N

See following page for Table Key and Notes.

Key

SLUCM	Standard Land Use Coding Manual.
Y(Yes)	Land use and related structures compatible without restrictions.
N(No)	Land use and related structures are not compatible and should be prohibited.
NLR	Noise Level Reduction (outdoor to indoor) to be achieved through incorporation of noise attenuation into the design and construction of the structure.
25, 30, or 35	Land use and related structures generally compatible; measures to achieve NLR of 25, 30, or 35 dB must be incorporated into design and construction of structure.

Notes

The designations contained in this table do not constitute a federal determination that any use of land covered by the program is acceptable or unacceptable under federal, state, or local law. The responsibility for determining the acceptable and permissible land uses and the relationship between specific properties and specific noise contours rests with the local authorities. FAA determinations under Part 150 are not intended to substitute locally determined land uses for those determined to be appropriate by local authorities in response to locally determined needs and values in achieving noise compatible land uses.

(1) Where the community determines that residential or school uses must be allowed, measures to achieve outdoor to indoor Noise Level Reduction (NLR) of at least 25 dB and 30 dB should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide a NLR of 20 dB, thus, the reduction requirements are often stated as 5, 10, or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year round. However, the use of NLR criteria will not eliminate outdoor noise problems.

(2) Measures to achieve NLR of 25 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low.

(3) Measures to achieve NLR of 30 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low.

(4) Measures to achieve NLR of 35 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low.

(5) Land use compatible provided special sound reinforcement systems are installed.

(6) Residential buildings require an NLR of 25.

(7) Residential buildings require an NLR of 30.

(8) Residential buildings not permitted.

Source: 14 CFR Part 150

In 2004 the Metropolitan Council incorporated its Aviation Policy Plan into the Transportation Policy Plan (TPP) of the Metropolitan Development Guide. It was updated in January 2009. Land use compatibility guidelines for all metropolitan system airports are included in the TPP. The TPP considered noise exposure associated with airports located in the Minneapolis-St. Paul Metropolitan Area and provided land use guidelines based on four noise zones around an airport. The following is the Metropolitan Council's description of each noise zone:

- **Zone 1** – Occurs on and immediately adjacent to the airport property. Existing and projected noise intensity in the zone is severe and permanent. It is an area affected by frequent landings and takeoffs and subjected to aircraft noise greater than 75 DNL. Proximity of the airfield operating area, particularly runway thresholds, reduces the probability of relief resulting from changes in the operating characteristics of either the aircraft or the airport. Only new, non-sensitive, land uses should be considered – in addition to preventing future noise problems the severely noise-impacted areas should be fully evaluated to determine alternative land use strategies including eventual changes in existing land uses.[6]

- **Zone 2** – Noise impacts are generally sustained, especially close to runway ends. Noise levels are in the 70 to 74 DNL range. Based upon proximity to the airfield the seriousness of the noise exposure routinely interferes with sleep and speech activity. The noise intensity in this area is generally serious and continuing. New development should be limited to uses that have been constructed to achieve certain exterior-to-interior noise attenuation and that discourage certain outdoor uses.[7]

- **Zone 3** – Noise impacts can be categorized as sustaining. Noise levels are in the 65 to 69 DNL range. In addition to the intensity of the noise, location of buildings receiving the noise must also be fully considered. Aircraft and runway use operational changes can provide some relief for certain uses in this area. Residential development may be acceptable if it is located outside areas exposed to frequent landings and takeoffs, is constructed to achieve certain exterior-to-interior noise attenuation, and is restrictive as to outdoor use. Certain medical and educational facilities that involve permanent lodging and outdoor use should be discouraged.[8]

- **Zone 4** – Defined as a transitional area where noise exposure might be considered moderate. Noise levels are in the 60 to 64 DNL range. The area is considered transitional since potential changes in airport and aircraft operating procedures could lower or raise noise levels. Development in this area can benefit from insulation levels above typical new construction standards in Minnesota, but insulation cannot eliminate outdoor noise problems.[9]

- **Noise Buffer Zones -** Additional area that can be protected at the option of the affected community; generally, the buffer zone becomes an extension of noise zone 4. At MSP, a one-mile buffer zone beyond the DNL 60 has been established to address the range of variability in noise impact, by allowing implementation of additional local noise mitigation efforts. A buffer zone, out to DNL 55 is optional at those reliever airports with noise policy areas outside the MUSA.[10]

[6] Metropolitan Council 2030 Transportation Policy Plan, Appendix L, January 2009.
[7] Ibid.
[8] Ibid.
[9] Ibid.
[10] Ibid.

The listed Metropolitan Council noise zones also use the DNL noise exposure metric. The Metropolitan Council Land Use Compatibility Guidelines for Aircraft Noise are provided in **Table 6.2.**

As outlined above, the Metropolitan Council developed the Aviation Chapter of the Metropolitan Development Guide, including the Builder's Guide and Model Ordinance for Aircraft Noise Attenuation, to provide a program framework for community adoption, pursuant to MSP Part 150 preventive land use measures.

The Model Ordinance and Builder's Guide are intended to ensure consistency with local land use planning practices in areas of infill development (e.g., building a home on a vacant lot on a residential block – including reconstruction and/or additions to existing structures) in known airport noise impact areas (2007 - 60+ DNL noise contours) around MSP. Specifically, the documents provide a mechanism for cities around MSP to adopt building material and construction standards to ensure that developments in the airport impact areas are constructed consistent with MSP Part 150 program goals.

In establishing noise reduction level requirements the March 2006 Metropolitan Council Builder's Guide states the following on page 20:

"The overall noise reduction level (NRL) required within a given noise zone can be determined by subtracting the desired level (45 dBA) from the highest noise level within that contour. For example, in Noise Zone 4 (60 to 64 dBA), the required reduction is calculated as 64 – 45 = 19 dBA."[11]

[11] The Metropolitan Council's NRL calculation approach is consistent with FAA's calculations in 14 C.F.R. Part 150.

TABLE 6.2: LAND USE COMPATIBILITY GUIDELINES

Metropolitan Council Land Use Compatibility Guidelines for Aircraft Noise										
	Noise Exposure Zones									
Type of Development	**New Development or Major Redevelopment**					**Infill - Reconstruction or Additions to Existing Structures**				
Land Use Category	1 DNL 75+	2 DNL 74-70	3 DNL 69-65	4 DNL 64-60	BZ	1 DNL 75+	2 DNL 74-70	3 DNL 69-65	4 DNL 64-60	BZ
Residential										
Single/Multiplex, with individual entrance	INCO	INCO	INCO	INCO		COND	COND	COND	COND	
Multiplex/Apartment, with shared entrance	INCO	INCO	COND	PROV		COND	COND	PROV	PROV	
Mobile Home	INCO	INCO	INCO	COND		COND	COND	COND	COND	
Educational, Medical, Schools, Churches, Hospitals, & Nursing Homes	INCO	INCO	INCO	COND		COND	COND	COND	PROV	
Cultural, Entertainment, & Recreation										
Indoor	COND	COND	COND	PROV		COND	COND	COND	PROV	
Outdoor	COND	COND	COND	COND		COND	COND	COND	COMP	
Office, Commercial, Retail	COND	PROV	PROV	COMP		COND	PROV	PROV	COMP	
Services										
Transportation - Passenger Facilities	COND	PROV	PROV	COMP		COND	PROV	PROV	COMP	
Transient Lodging	INCO	COND	PROV	PROV		COND	COND	PROV	PROV	
Other Medical, Health, and Education	COND	PROV	PROV	COMP		COND	PROV	PROV	COMP	
Other Services	COND	PROV	PROV	COMP		COND	PROV	PROV	COMP	
Industrial, Communication, & Utilities	PROV	COMP	COMP	COMP		PROV	COMP	COMP	COMP	
Agriculture, Land/Water Area, & Resource Extraction	COMP	COMP	COMP	COMP		COMP	COMP	COMP	COMP	

Table Key:

- **COMP** – "Compatible" – uses that are acoustically acceptable for both indoors and outdoors.
- **PROV** – "Provisional" – uses that should be discouraged if at all feasible; if allowed, must meet certain structural performance standards to be acceptable according to MS473.192 (metropolitan area Noise Attenuation Act). Structures built after December 1983 shall be acoustically constructed so as to achieve interior noise levels as follows:
  - Residential, Educational and Medical = 45 dBA Interior Sound Level
  - Cultural, Entertainment, Recreational, Office, Commercial, Retail and Services = 50 dBA Interior Sound Level
  - Industrial, Communications, Utility, Agricultural Land, Water Area, Resource Extraction = 60 dBA Interior Sound Level

  Each local governmental unit having land within the airport noise zones is responsible for implementing and enforcing the structural performance standards in its jurisdiction.
- **COND** – "Conditional" – uses that should be strongly discouraged; if allowed, must meet the structural performance standards, and requires a comprehensive plan amendment for review of the project under the Conditional Land Use Review Factors outlined in the Metropolitan Council's 2030 Transportation Policy Plan, Appendix H, Table 5.
- **INCO** – "Incompatible" – land uses that are not acceptable even if acoustical treatment were incorporated in the structure and outside uses restricted.

Source: Metropolitan Council 2030 Transportation Policy Plan, Appendix H – December 15, 2004.

Table 6.3 provides the Metropolitan Council's Structural Performance Standards (interior noise level goals).

TABLE 6.3: STRUCTURE PERFORMANCE STANDARDS[1]

Land Use	Typical Interior[2] Sound Level
Residential	45 dBA
Educational/Medical/Churches, etc.	45 dBA[3]
Cultural/Entertainment/Recreational	50 dBA
Office/Commercial/Retail	50 dBA
Services	50 dBA
Industrial/Communication/Utility	60 dBA
Agricultural Land/Water Area/Resource Extraction	60 dBA

[1] These performance standards do not apply to buildings, accessory buildings, or portions of buildings that are not normally occupied by people.
[2] The noise description used to delineate the appropriate noise policy zone is an annualized Ldn.
[3] Special attention is required for certain noise sensitive uses, such as concert halls.

Source: Metropolitan Council 2030 Transportation Policy Plan, Appendix L – January 2009.

6.3 RUNWAY SAFETY ZONING CONSIDERATIONS

At the Federal level, the Federal Aviation Administration (FAA) is the agency primarily responsible for land use compatibility around airports. Although the FAA does not play a direct role in the zoning and land use planning practices around United States airports, it provides critical land use planning guidance, technical assistance and funding to airports. In this capacity, the FAA issues a variety of regulations and guidance documents under federal law that affects land use planning around airports.

FAA land use guidance focuses on two areas: (1) runway protection zones; and (2) airspace protection.

6.3.1 FEDERAL RUNWAY PROTECTION ZONES

Runway Protection Zones (RPZs) are defined in FAA Advisory Circular 150/5300-13, *Airport Design*. RPZs are trapezoid shapes centered on the approximate extended runway centerline radiating from the end of a runway. The dimensions of an RPZ are a function of the type of aircraft using the runway and approach visibility minimums associated with the runway end. The intent of RPZs is to provide safety for people and property on the ground in the vicinity of runway ends at airports. The FAA accomplishes this goal through land use controls in RPZs designed to maintain areas near the ends of airport runways that are free of incompatible objects and activities.

6.3.2 FEDERAL AIRSPACE PROTECTION

Federal Aviation Regulation Part 77, *Objects Affecting Navigable Airspace*, establishes standards for determining obstructions to navigable airspace and the effects of such obstructions on the safe and efficient use of that airspace.

The height limitations associated with Part 77 are defined in terms of imaginary surfaces in the airspace surrounding an airport. These surfaces extend from about two to three miles from the airport, except for runways with precision instrument approaches, in which case the surfaces extend approximately 9.5 miles from the runway end. The various imaginary surfaces include the primary surface, transitional surface, horizontal surface, conical surface and the approach surface.

Under Part 77, the FAA has established a process for reviewing and evaluating proposed structures in the vicinity of airports. FAA Advisory Circular 7460 establishes an airspace review process and provides information to individuals wishing to erect or alter structures that may affect navigable airspace around an airport. In administering 14 CFR Part 77, the FAA's main objective is to ensure the safe and efficient use of navigable airspace around airports.

The FAA has established five different thresholds for evaluating whether a structure may affect navigable airspace around an airport. If any one of these thresholds is reached, the FAA requests that an individual wishing to erect or alter a structure seek its approval before commencing construction. One of the FAA thresholds applies if a structure is within "20,000 feet of an airport or seaplane base with at least one runway more than 3,200 feet in length and the object would exceed a slope of 100:1 horizontally (100 feet horizontally for each 1 foot vertically) from the nearest point of the nearest runway."[12]

After receiving a request for approval, the FAA will typically issue one of the following three determinations:

- **Determination of No Hazard to Air Navigation** – "The subject construction does not exceed obstruction standards and marking/lighting is not required."
- **Conditional Determination** – "The proposed construction/alteration would be acceptable contingent upon implementing mitigating measures (marking and lighting etc.)."
- **Objectionable** – "The proposed construction/alteration is determined to be a hazard and is thus objectionable. The reasons for this determination are outlines to the proponent."

By establishing threshold criteria and then requiring a detailed airspace hazard analysis, the FAA process provides a safety buffer. In certain circumstances, the FAA's detailed airspace hazard analysis results in FAA approval for developments near airports that may be in excess of the general height limitations set forth in 14 CFR Part 77.

6.3.3 STATE MODEL ZONING ORDINANCE

On January 1, 1946, the State of Minnesota enacted its first model airport zoning ordinance. By 1958 the State designated Safety Zones A, B and C as part of the model airport zoning standard. In 1973, local protective airport zoning was made a condition for receiving federal and state funds. Minnesota is one of the few states that has land use safety controls for airports that go beyond the requirements of FAA regulations.

[12] Federal Aviation Administration Advisory Circular 70/7460.2k, pg 2.

State Runway Safety Zones

The State Safety Zone A is a trapezoidal shape at the end of a runway, beginning at the edge of the primary surface and flaring outward to a distance of approximately 2/3 of the runway length. State Safety Zone B is a trapezoidal shape, with the same flare as Zone A, extending outward from the end of Zone A to a distance of approximately 1/3 of the runway length. The extent of State Safety Zone C is coincidental with the extent of the horizontal airspace surface.

Under Minnesota law, Zone A must not contain buildings, temporary structures, exposed transmission lines, or other similar above-ground land use structural hazards. Land uses in Zone A are restricted to those uses that will not create, attract, or bring together an assembly of persons. Permitted uses in Zone A include, but are not limited to, agriculture (seasonal crops), horticulture, animal husbandry, raising of livestock, wildlife habitat, light outdoor recreation (non-spectator), cemeteries, and automobile parking.

Zone B uses are restricted as follows:

- Each use must be on a site whose area is not less than 3 acres.
- Each use must not create, attract, or bring together a site population that would exceed 15 times that of the site acreage.
- Each site must have no more than one building plot upon which any number of structures may be erected.
- A building plot must be a single, uniform, and non-contrived area, whose shape is uncomplicated and whose area must not exceed minimum ratios with respect to the total site area.
- The following uses are specifically prohibited in Zone B: Churches, hospitals, schools, theaters, stadiums, hotels, motels, trailer courts, campgrounds, and other places of frequent public or semi-public assembly.

In Zone C no use may be made of any land that creates or causes interference with the operations of radio or electronic facilities on the airport or with radio or electronic communications between the airport and aircraft. In addition, Zone C prohibits land uses that make it difficult for pilots to distinguish between airport lights and other lights, result in glare in the eyes of pilots using the airport, impair visibility in the vicinity of the airport, or otherwise endanger the landing, taking off, or maneuvering of aircraft. All structure heights in Zone C are limited to 150 feet above the primary surface at the airport.

State Model Zoning Ordinance Airspace Protection

The State Model Zoning Ordinance height restrictions are predicated directly on the FAA's Part 77 imaginary airspace surfaces.

6.4 MSP ZONING ORDINANCE

Minnesota Statutes establish that airports in the state must adopt airport zoning ordinances. To do this, the statutes spell out the formation of a Joint Airport Zoning

Board comprised of two members from each jurisdiction with land use control in the areas affected by airport zoning, as well as the airport proprietor.

The MSP Joint Airport Zoning Board met to discuss and recommend a revised MSP zoning ordinance in light of the construction of Runway 17-35. An important part of this process was balancing the land use controls needed to provide safety while at the same time considering the social and economic impacts related to prospective land use controls. Minn. Stat. §360.066, subd. 1 is particularly instructive when addressing the question of zoning around complex urbanized airports such as MSP. The statute also addresses the concept of "reasonableness" when balancing the variables to be considered in the zoning process. Specifically, Minn. Stat. §360.066, subd. 1 states:

> "Reasonableness Standards of the commissioner defining airport hazard areas and the categories of uses permitted and airport zoning regulations adopted under sections 360.011 to 360.076, shall be reasonable, and none shall impose a requirement or restriction which is not reasonably necessary to effectuate the purposes of sections 360.011 to 360.076. In determining what minimum airport zoning regulations may be adopted, the commissioner and a local airport zoning authority shall consider, among other things, the character of the flying operations expected to be conducted at the airport, the location of the airport, the nature of the terrain within the airport hazard area, the existing land uses and character of the neighborhood around the airport, the uses to which the property to be zoned are planned and adaptable, and the social and economic costs of restricting land uses versus the benefits derived from a strict application of the standards of the commissioner."

Consistent with the guidance provided in Minn. Stat. §360.066, subd. 1, the MSP Joint Airport Zoning Board focused its discussion on the land use controls that were necessary to ensure a reasonable degree of safety around MSP. Based on the substantial property development and/or structural modification restrictions that would be placed on the largely urbanized and developed areas around the airport, the MSP Joint Airport Zoning Board turned its focus to safety. The MSP Joint Airport Zoning Board directed staff to conduct a risk analysis to provide the Board with further clarification on the question of zoning requirements necessary to ensure a "reasonable standard of safety."

In short, the analysis found that within State Zones A and B but outside the federal RPZ, the accident probability at MSP was less than the FAA standard of one accident in 10 million operations. Additionally, based on the accident rate calculations, the MSP Joint Airport Zoning Board determined that the likelihood of a fatality from an accident in State Safety Zones A and B outside the RPZ is extremely remote or extremely improbable, based on FAA criteria.

In addition to the risk analysis, the MSP Joint Airport Zoning Board focused on addressing the economic considerations as the statute requires. The Board relied on the analyses and information that were provided by the respective cities with jurisdiction over the land uses, and concluded that there were significant financial costs associated with implementation of the State Model Zoning Ordinance.

In summary, based on the findings of the Safety Study and the Economic Analysis, the Board adopted the following changes to the State Model Zoning Ordinance:

- Safety Zone A – is co-terminus with the Federal Runway Protection Zone (RPZ).
- Safety Zone B – use restrictions do not include site acre/structure limitations and site-area-to-building-plot-area ratios and population criteria.
- Exemption for Established Residential Neighborhoods – allows for the improvement, expansion and development of new residential uses in and adjacent to Established Residential Neighborhoods in Safety Zone B.

In 2004 the Commissioner of Transportation for the State of Minnesota approved the MSP Joint Airport Zoning Board's recommended ordinance.

6.5 LAND USE COMPATIBILITY ANALYSIS

The Minneapolis-St. Paul International Airport (MSP) is located in Hennepin County. The airport is bordered to the northwest by the City of Minneapolis, to the west by the City of Richfield, south by the City of Bloomington, to the southeast by the cities of Eagan and Mendota Heights and to the north by the City of St. Paul. The airport is bordered by residential land uses to the north, northwest, and west. A combination of mixed-use industrial, commercial and single-family residential exists to the south and southeast of the airport.

The following sections detail land use considerations in the context of existing and planned land uses around MSP focusing on airport noise and runway safety zones.

6.5.1 EXISTING CONDITION LAND USE COMPATIBILITY

In general, the area around the airport is primarily residential to the north, northwest, and east and to the south and southeast a combination of commercial/industrial and park/open space land uses. The Runway Protection Zones (RPZ) and State Safety Zones for MSP are shown on **Figure 6-1**.

Land Use Compatibility and Airport Noise Considerations

As detailed in Chapter 5, Section 5.3.6, the 2008 baseline noise contours around MSP contain 10,163 single-family homes and 3,701 multi-family units in the 60 and greater DNL noise contours, and 2,564 single-family homes and 1,372 multi-family units in the 65 and greater DNL noise contours. The 70 and greater DNL contours contained 116 single family homes and six multi- family units. The 75 and greater DNL does not contain any residential units.

Figure 6-2 provides the 2008 base case 60 and greater DNL noise contours around MSP with 2005 land use data provided by the Metropolitan Council.

Land Use Compatibility and Existing Runway Protection/Safety Zones

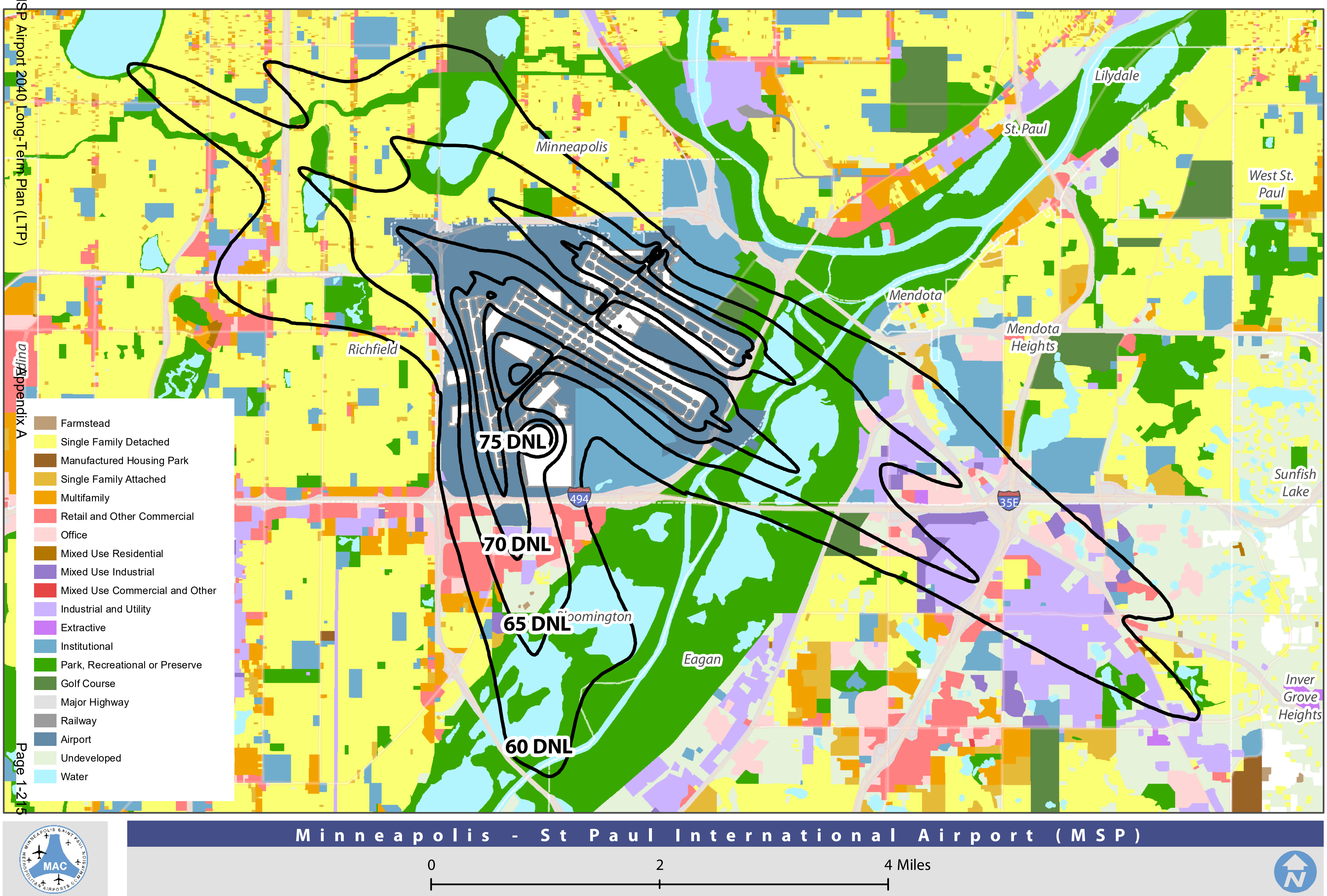
The existing RPZs and State Safety Zones A and B at MSP are depicted in **Figure 6-3** with the existing land uses around the airport.

RPZs and State Zones

Figure 6-1

2008 Base Case Contours with 2005 Land Use

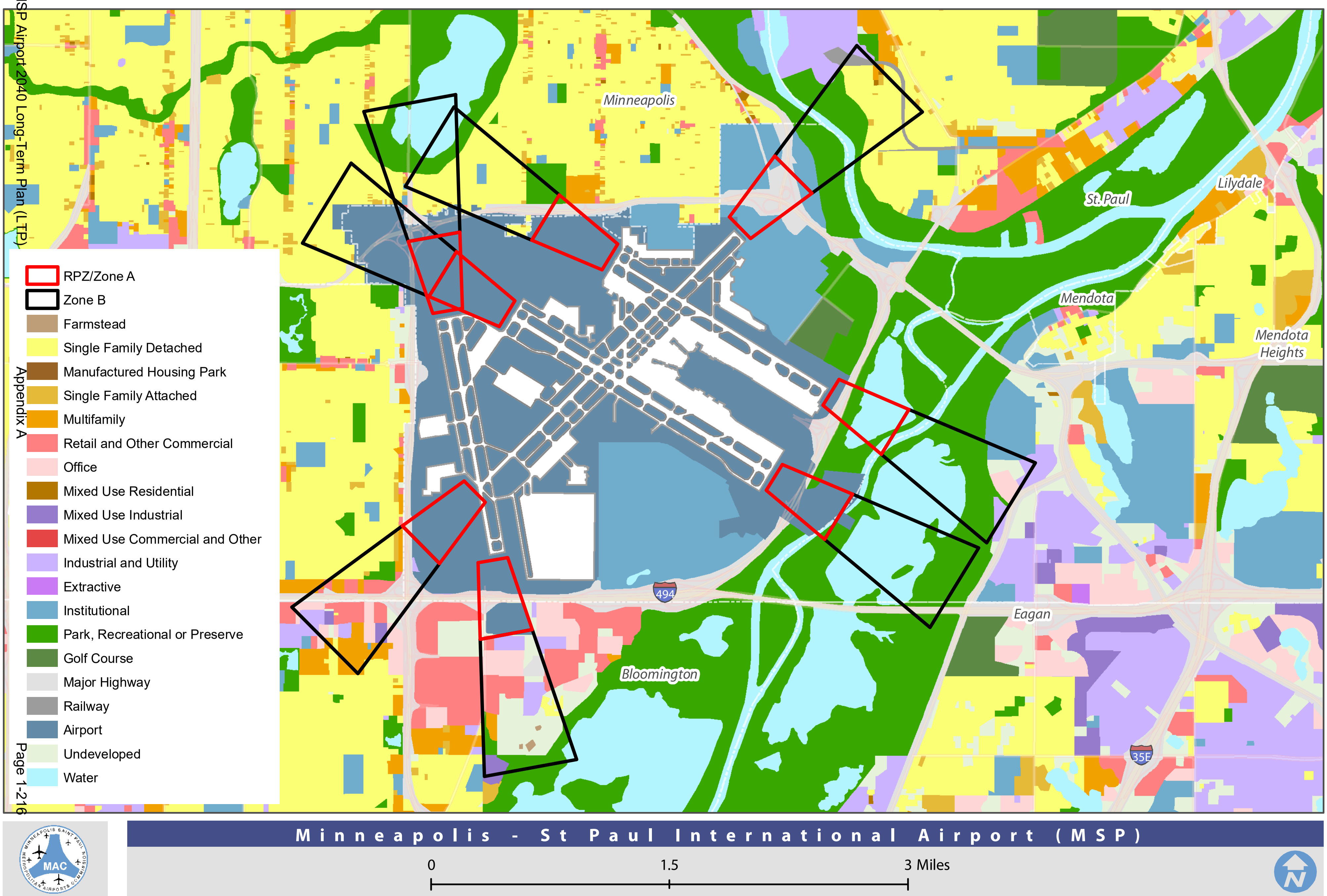
Figure 6-2



Minneapolis - St Paul International Airport (MSP)

RPZs and State Zones with 2005 Land Use

Figure 6-3



Minneapolis - St Paul International Airport (MSP)

The Runway 4 RPZ/State Zone A is 78.85 acres total and encompasses 76.97 acres of airport property, 1.87 acres of major highway and 0.01 acres of single-family attached land use. Zone B covers 250.3 acres: 17.55 acres of airport property, 15.25 acres of industrial and utility land use, 0.58 acres institutional, 53.80 acres major highway, 8.33 acres mixed use industrial, 40.77 acres multi-family land use, 22.94 acres office, 10.2 acres of park land, 40.92 acres retail and other commercial land use, 4.18 acres single-family attached, 30.49 acres single-family detached and 5.30 acres undeveloped land. State Zone B contains 113 single-family homes and 706 multi-family units.

The RPZ/State Zone A for Runway 17 is 78.85 acres and is entirely on airport property. Zone B covers 250.3 acres: 32.93 acres are airport property, 1.91 acres institutional, 11.42 acres major highway, 60.32 acres park land, 0.91 acres retail and other commercial, 3.48 acres single-family attached, 64.35 acres single-family detached, and 74.99 acres water. State Zone B contains 341 single-family homes and 32 multi-family units.

The Runway 22 RPZ/ State Zone A encompasses 78.85 acres: 46.26 acres major highway, 31.69 acres institutional land use, and 0.90 acres airport property. State Zone B is 250.3 acres total and covers 100.69 acres park land, 81.47 acres single-family detached, 25.51 acres institutional, 16.24 acres water, 8.85 acres railway, 8.55 acres major highway, 3.23 acres industrial and utility, 2.52 acres single-family attached, 2.16 acres multi-family, and 1.08 acres mixed use residential. State Zone B contains two single-family homes.

The Runway 35 RPZ/State Zone A is 78.85 acres total and covers 58.94 acres airport, 14.44 acres major highway, 4.08 acres undeveloped, 1.30 acres retail and other commercial, and 0.08 acres industrial and utility land use. Zone B encompasses 250.3 acres: 86.93 acres undeveloped land, 36.37 acres retail and other commercial, 34.87 acres park, 26.41 acres industrial and utility, 25.94 acres office, 10.01 acres mixed use industrial, 8.48 acres major highway, 6.59 acres multi-family, 6.07 acres single-family detached 4.21 acres water, 2.83 acres farmstead, and 1.60 acres airport. State Zone B contains two multi-family units.

The Runway 12L RPZ/State Zone A encompasses 78.85 acres: 70.45 acres airport property, 6.87 acres major highway, 1.42 acres park, and 0.10 acres multi-family. Zone A contains 12 multi-family units. State Zone B covers 250.3 acres: 137.58 acres single-family detached, 43.97 acres park, 22.05 acres airport, 20.23 acres water, 19.31 acres major highway, 5.06 acres institutional, 1.84 acres single-family attached, and 0.27 acres undeveloped land. State Zone B contains 759 single-family homes and 24 multi-family units.

The RPZ/State Zone A for Runway 12R is 78.85 acres and is entirely on airport property. Zone B encompasses 250.3 acres: 171.55 acres airport, 70.66 acres single-family detached, 4.16 acres major highway, 3.52 acres single-family attached, 0.17 acres undeveloped land, 0.13 acres retail and other commercial, 0.05 acres industrial and utility, and 0.05 acres park land. State Zone B contains 390 single-family homes and 40 multi-family units.

The Runway 30L RPZ/Zone A covers 78.85 acres: 72.04 acres airport, 4.29 acres park land, 1.44 acres water, and 1.07 acres major highway. State Zone B encompasses

250.3 acres: 133.32 acres water, 104.37 acres park, 6.97 acres airport, and 5.65 acres major highway.

The RPZ/State Zone A for Runway 30R covers 78.85 acres: 45.91 acres water, 17.18 acres park, 8.45 acres major highway, and 7.30 acres airport property. Zone B encompasses 250.3 acres: 109.27 acres park, 92.38 acres water, 14.63 acres office, 12.51 acres industrial and utility, 12.16 acres undeveloped land, 9.06 acres institutional, and 0.28 acres major highway.

6.5.2 PREFERRED ALTERNATIVE LAND USE COMPATIBILITY

The preferred development alternative at MSP maintains the existing runway infrastructure. The increase in overall operations and increase in larger jet operations results in larger noise contours around MSP.

Forecast Land Use Compatibility and Airport Noise Considerations

As detailed in Chapter 5, Section 5.4.5, the 2030 preferred alternative forecast 60 and greater DNL noise contours around MSP contains 19,374 single-family homes and 10,267 multi-family units. The 65 DNL and greater contours contain 5,468 single-family homes and 2,470 multi-family units and the 70 DNL and greater contours contain 853 single-family homes and 1,145 multi-family units. The 75 and greater contours do not contain any residential units.

Figure 6-4 provides the 2030 preferred alternative forecast 60 and greater DNL noise contours around MSP with 2005 land use data provided by the Metropolitan Council.

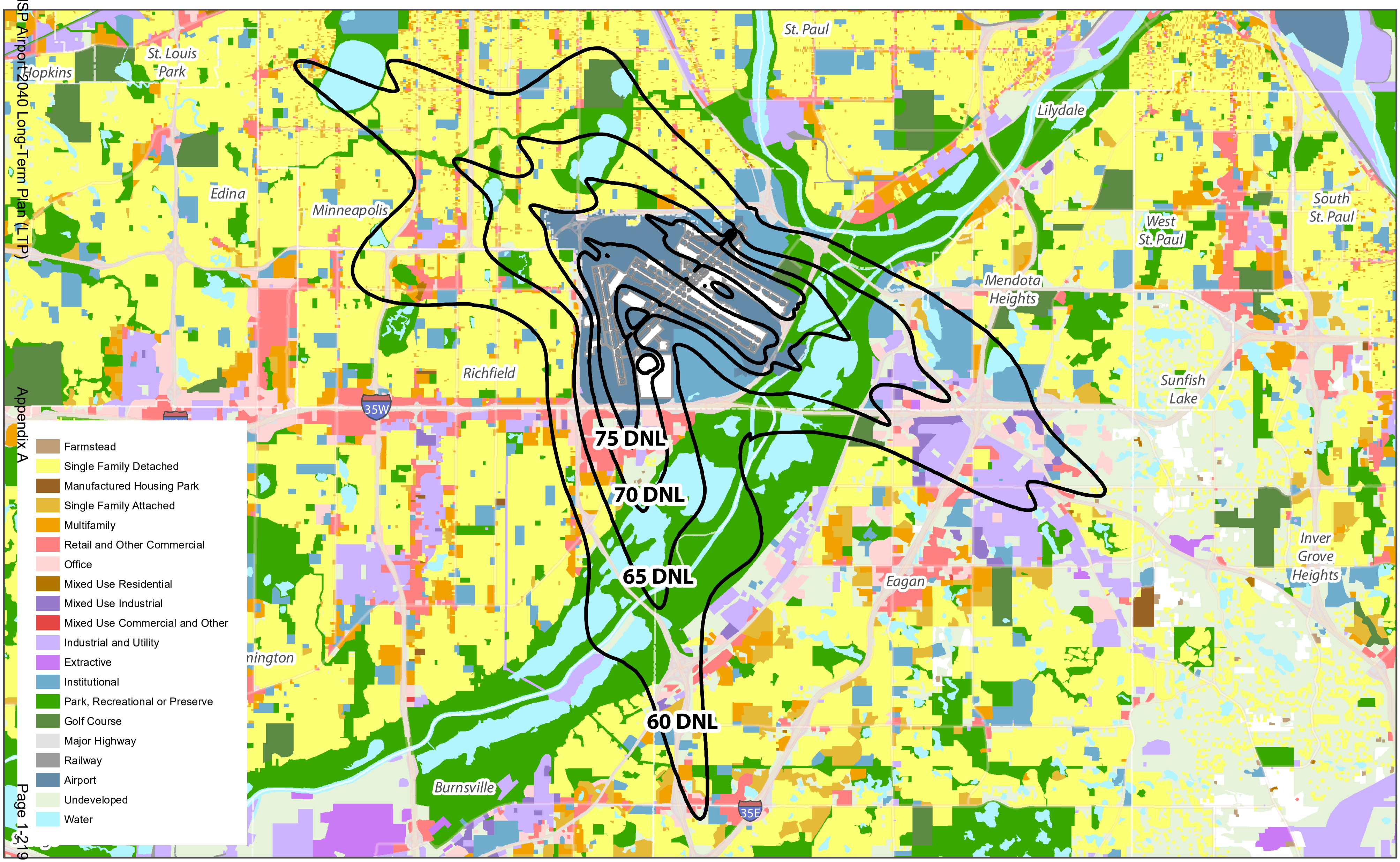
Land Use Compatibility and Preferred Alternative Runway Protection/Safety Zones

The 2030 preferred alternative RPZs and State Safety Zones A and B at MSP are the same as the 2008 RPZs and zones. They are depicted in **Figure 6-4** with existing land uses around the airport.

Additional analysis was conducted relative to the planned 2020 land uses around MSP as provided by the Metropolitan Council. The only substantive proposed changes occur in State Zone B of Runway 35 where undeveloped land becomes commercial land use and in State Zone B off Runway 30R where undeveloped land changes to industrial land use.

2030 Preferred Alternative Contours with 2005 Land Use

Figure 6-4



Minneapolis - St Paul International Airport (MSP)

0 3 6 Miles

CHAPTER 7: FACILITY IMPLEMENTATION SCHEDULE AND COST

CHAPTER 7: FACILITY IMPLEMENTATION SCHEDULE AND COST

7.1 IMPLEMENTATION STRATEGY

Below is a summary of the overall physical and operational development phasing over the next 20 years.

PHASE I: 2010 – 2015

- Construct 16 new gates at the Humphrey Terminal including jet bridges, apron improvements, hydrant fueling, and site utility improvements
- New explosive detection system
- Humphrey Terminal auto rental facility
- Humphrey Terminal parking expansion
- Humphrey Terminal roadway system improvements including 34th Ave / I-494 interchange improvements

PHASE II: 2015 – 2020

- Lindbergh Terminal curbside expansion
- Lindbergh Terminal remodeling including Concourse E, ticketing, and baggage claim
- Phase I expansion of Concourse G including jet bridges, apron improvements, hydrant fueling, and site utility improvements
- Lindbergh Terminal parking expansion

PHASE III: 2020 – 2025

- Construct 10 new gates at the Humphrey Terminal including jet bridges, apron improvements, hydrant fueling and site improvements
- Humphrey Terminal roadway access improvements, including reconstruction of the Post Road/Highway 5 intersection, the 70th Street/34th Avenue intersection and improvements to Post Road/70th Street
- Humphrey Parking Orange Ramp expansion
- Lindbergh Terminal in/outbound roadway improvements including demolition of the Maroon ramp and Delta Hangar, relocation of the Xcel substation and realignment of the in/outbound roadways
- Phase II expansion of Concourse G including jet bridges, apron improvements, hydrant fueling, and site improvements
- MSP Hotel
- Delta overnight package express relocation
- Airline flight kitchen replacement

PHASE IV: 2025 – 2030

- Crossover taxiway construction
- Lindbergh Terminal parking expansion
- Loading dock facility relocation
- Post Office retail operation relocation

7.2 COST ESTIMATES

Conceptual "order of magnitude" cost estimates have been prepared to get a general sense of the cost of implementing the 20-year Long Term Comprehensive Plan for MSP as envisioned in this document. These cost estimates have been prepared using planning level concepts and the projects are considered to be "Demand-Driven Capital Improvement Projects" that will be undertaken only if demand exists for such projects. The Commission anticipates financing these projects through a combination of proceeds from General Airport Revenue Bonds, Passenger Facility Charges (PFCs) (either on a pay-as-you-go basis or PFC secured bonds), Federal and State grants, and other available revenues of the Commission.

These estimates should not be used for budgeting purposes. More accurate estimates will be possible once a preliminary decision has been made to move forward with these projects and conduct more detailed planning, programming, and preliminary design. A summary of these "order of magnitude" cost estimates is shown in **Table 7.1**. Additional information can be found in Appendix C of this report.

TABLE 7.1: LTCP IMPLEMENTATION COSTS

Phase I: 2010-2015	**Cost Range (in Millions)**
Humphrey Terminal Gates	$224 - $264
Explosive Detection System	$47 - $55
Humphrey Terminal Auto Rental Facility	$53 - $62
Humphrey Terminal Parking Expansion	$27 - $32
Humphrey Terminal Roadway Improvements	$26 - $31
Phase I Total	***$380 - $445***
Phase II: 2015-2020	
Lindbergh Terminal Curbside Expansion	$100 - $117
Lindbergh Terminal Remodeling	$9 - $10
Lindbergh Terminal Concourse G Expansion Phase I	$500 - $600
Lindbergh Terminal Parking Expansion Phase I	$200 - $233
Phase II Total	***$810 - $960***
Phase III: 2020-2025	
Humphrey Terminal Gates	$216 - $254
Humphrey Terminal Roadway Access Improvements	$80 - $95
Humphrey Terminal Parking Expansion	$50 - $60
Lindbergh Terminal In/Outbound Roadway	$144 - $169
Lindbergh Terminal Concourse G Expansion Phase II	$158 - $186
MSP Hotel	Funding by Others
Delta Overnight Package Express	$3 - $3.5
Airline Flight Kitchen	$14 - $16
Phase III Total	***$665 - $783***
Phase IV: 2025-2030	
Crossover Taxiway	$65 - $77
Lindbergh Terminal Parking Expansion	$118 - $138
Loading Dock Relocation	$6 - $7
Post Office Retail Relocation	$1 - $2
Phase IV Total	***$190 - $225***

Note: All costs are in 2009 dollars and include a 15% construction contingency and a 15% design and administration contingency.

Appendix B: MSP 2020 Improvements Environmental Assessment/Environmental Assessment Worksheet (MSP 2020 Improvements EA/EAW)

Minneapolis-St. Paul International Airport

MINNEAPOLIS, MINNESOTA

VOLUME I:

2020 Improvements

Final Environmental Assessment /

Environmental Assessment Worksheet

January 2013

Prepared for:

Metropolitan Airports Commission

This environmental assessment becomes a Federal document when evaluated, signed, and dated by the Responsible FAA Official.

Responsible FAA Official

Date

EXECUTIVE SUMMARY

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EXECUTIVE SUMMARY

The Metropolitan Airports Commission (MAC/Sponsor) is proposing development at the Minneapolis-St. Paul International Airport (MSP). Environmental review of the proposed development is required to comply with both the National Environmental Policy Act (NEPA) and the Minnesota Environmental Policy Act (MEPA). The environmental review of the proposed development is documented in this Environmental Assessment (EA) and Environmental Assessment Worksheet (EAW).

ES.1 Introduction

The proposed development will require actions / approvals on the part of the Federal Aviation Administration (FAA), the Federal Highway Association (FHWA) and the MAC. Therefore, the environmental review of the proposed development must satisfy each of these agencies related regulatory requirements.

Federal agencies must comply with NEPA prior to taking actions or issuing approvals. The FAA and FHWA have different policies and requirements regarding NEPA and decision making. The FAA considers near-term and immediate-term development as ripe for decision making. Therefore, this EA considers proposed terminal and airport landside development needed through 2020. The FHWA decision making process is focused on development proposed for the 20 year planning horizon. Therefore, this EA addresses proposed regional roadway improvements needed through 2030.

The FAA and FHWA also have different requirements/guidance regarding NEPA impact analysis. FAA NEPA requirements are contained in Orders 1050.1E, *Environmental Impacts: Policies and Procedures* and 5050.4B, *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions.* The FHWA policies and procedures to implement NEPA are prescribed in 23 CFR Part 771, *Environmental Impact and Related Procedures*. Related guidance includes the FHWA Technical Advisory T6640.8A, *Guidance for Preparing and Processing Environmental and Section 4(f) Documents*. Therefore, this EA includes analysis of environmental impact categories in a manner that is consistent with both FAA's and FHWA's requirements and guidance.

The MAC must comply with MEPA prior to taking action. Therefore, the MAC must prepare an EAW for the proposed development. Use of a federal EA as a substitute for the EAW is authorized under the Minnesota Environmental Review Program provided that the EA addresses the impact categories required in the EAW and the procedural requirements of the EAW process are completed. Therefore, this EA addresses all of the EAW impact categories as well as the FAA and FHWA NEPA impact categories.

ES.2 Purpose and Need

The purpose of the proposed development is to accommodate the expected demand such that the level of service is acceptable throughout MSP's terminal and landside facilities through 2020 and the regional roadway system through 2030.

MSP's terminal and landside facilities do not and/or will not meet current and forecasted demand. MSP is experiencing unacceptable levels of service within Terminal 1-Lindbergh at both landside and terminal facilities: the arrivals curb, parking ramps and international arrivals facility are currently congested. Additionally, the demand for gates at Terminal 2-Humphrey exceeds capacity during the winter period. As passenger activity grows, the levels of service for landside facilities and regional roadways are expected to deteriorate further. Similarly, the levels of service within the terminal environment are projected to deteriorate to unacceptable levels based on standard airport planning practices.

ES.3 Alternatives

The examination of alternatives is a critical component of the environmental review process. A range of alternatives were identified and then evaluated to determine if they were reasonable; i.e., met the purpose and need. Reasonable alternatives were further screened to determine which alternatives would be analyzed in detail within the NEPA document.

Table ES.3.1 provides a brief comparison of all the alternatives considered and whether they were carried forward for detailed analysis. A comparison of the alternatives retained for detailed environmental analysis is provided in **Table ES.3.2.** Based on this comparison the MAC has identified the Airlines Relocate Alternative as the Sponsor's Preferred Alternative.

In order to meet the purpose and need, the Sponsor's Preferred Alternative/Proposed Action includes providing additional arrival curb area; remodeling ticketing and baggage claim areas; remodeling Concourse E; extending and remodeling Concourse G; constructing a new international facility; and constructing a new parking ramp at Terminal 1-Lindbergh. Improvements to Terminal 2-Humphrey include constructing new gates, providing auto rental facilities, expanding parking, and improving the roadway access system to the terminal.

The specific improvements are listed in **Table E.3.3** and illustrated on **Figures ES.3-1**, **ES.3-2** and **ES.3-3**.

Table ES.3.1
Summary of Alternatives Considered

Alternative	Meets Purpose and Need?	Reasons for Meeting or Not Meeting Purpose and Need	Carried Forward for Detailed Review?
Other Airports	No	Neither the development of a competing hub nor a supplemental airport appears likely given current airline behavior and trends. Additionally, even if the Tier 2 Airports are able to capture 100 percent of their markets, the need for MSP terminal and landside improvements would only be temporarily delayed.	No
Other Transportation	No	Analysis of the high speed rail corridors concluded that the diversion of air travelers to rail would have little effect on the needs at MSP. Even if the current Minnesota high speed rail initiatives are implemented, they would not be available during the planning time period and the need for improvements at MSP would only be temporarily delayed.	No
New Terminal	No	The investment needed in both money and time to develop a new west side terminal including reconstructing Terminal 1-Lindbergh into remote concourses, constructing roadways, parking facilities and an underground hub tram as well as relocating the air traffic control tower, etc., would be markedly greater than expanding the current terminal complex. For these reasons as well as the changes in the airline industry, the new west side terminal was not included in the 2030 LTCP Update and is eliminated from further consideration.	No
Alternative 1 - Airlines Remain	Yes	This alternative includes the improvements needed through 2020 presuming that the airlines remain in their current terminals. The gate, terminal, landside, roadway and airside facility improvements consist of those necessary to accommodate the forecasted airlines' growth at each terminal.	Yes
Alternative 2 - Airlines Relocate (Sponsor's Preferred Alternative)	Yes	This alternative includes the improvements needed through 2020 presuming that the non-SkyTeam airlines currently located in Terminal 1-Lindbergh are relocated to Terminal 2-Humphrey. This Alternative was conceived in recognition of the fact that the MSP's two-terminal system could be utilized more efficiently. Relocating all airlines other than Delta and the SkyTeam airlines would relieve some capacity constraints at Terminal 1-Lindbergh while better balancing the mix of passengers at the two terminals.	Yes
No Action	No	The No Action Alternative does not meet the Purpose and Need of the Proposed Action, but is retained as required by NEPA per Council on Environmental Quality (CEQ) Regulations.	Yes

Table ES.3.2

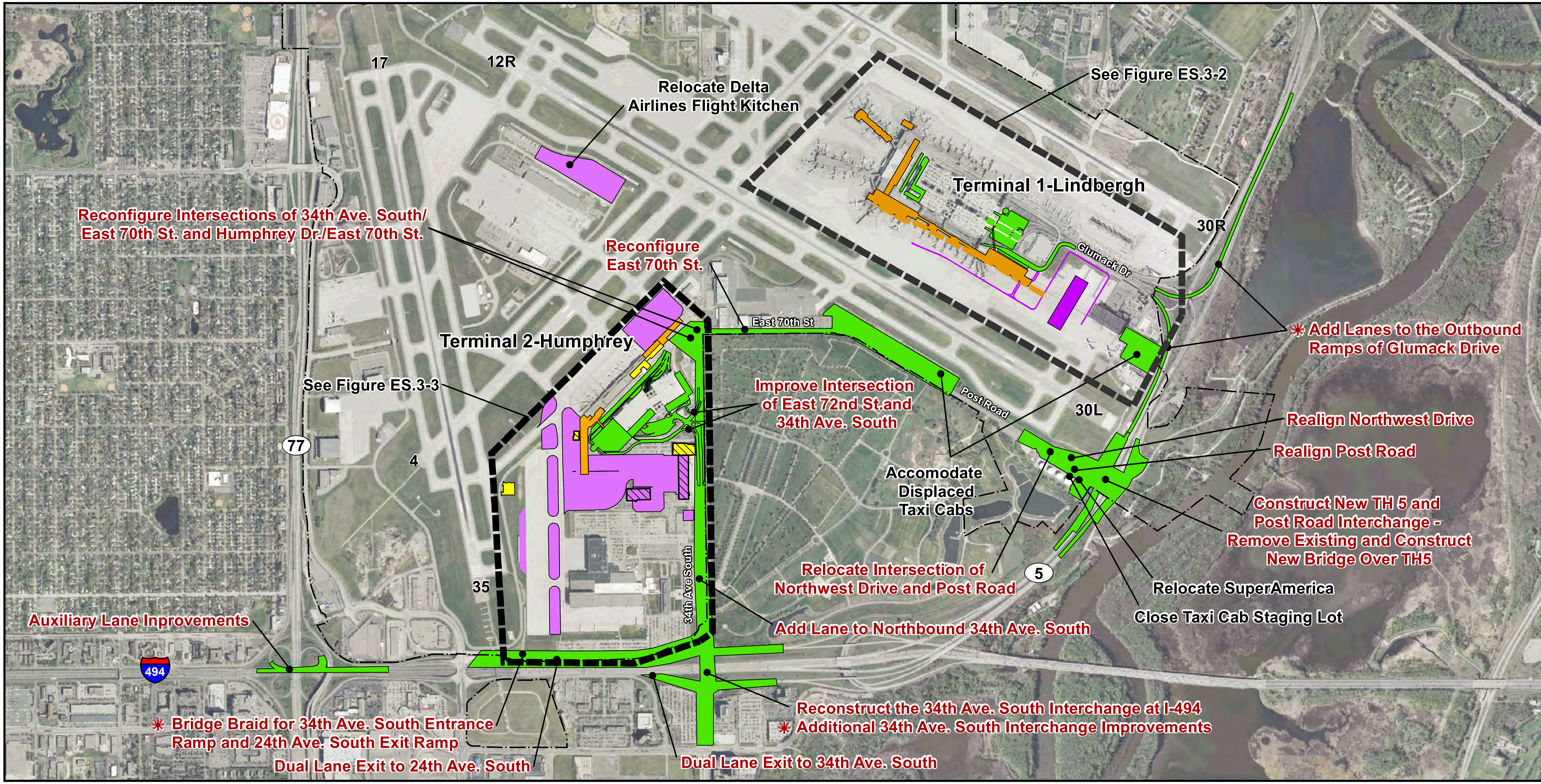
Comparison of Alternatives Retained for Further Consideration

Comparison Criteria	**Alternative**		
	No Action	**Airlines Remain**	**Airlines Relocate**
Airfield/ Airspace Simulation	Airfield and airspace analysis was conducted for all of the alternatives by using the airport and airspace simulation model (SIMMOD). SIMMOD is a standard analysis tool used by the airport industry and accepted by FAA to develop detailed simulations of current and proposed airport and airspace operations. Based on the simulation, all of the Alternatives would result in about the same level of annual delay per aircraft operation in 2020 and in 2025. This was to be expected given that the Alternatives do not include changes to the runways and they include only minor changes to taxiways. Information regarding the simulation analysis is provided in ***Appendix D,*** *MSP Airfield Simulation Analysis*.		
Construction Phasing	Not Applicable	Phasing of projects at Terminal 1-Lindbergh would be difficult because many of the facilities are already operating at or over their design capacities. As a result construction will likely be more difficult to schedule, take longer and cost more. Although the MAC would strive to maintain an adequate LOS it would be very difficult to avoid negatively impacting the passengers' experience during construction.	Phasing of projects at Terminal 1-Lindbergh would be facilitated by the movement of the non-SkyTeam Airlines to Terminal 2-Humphrey. After the move, demand on strained facilities would be reduced and abandoned space could be renovated or temporarily used while other facilities are being renovated/constructed. In addition, the expansion of facilities at Terminal 2-Humphrey would be generally outside the confines of the existing terminal and could be accomplished with minimal disruption to passengers.
Order of Magnitude Cost	Minor	$1.3 billion dollars Because this is a rough estimate of cost based on conceptual/preliminary planning it does not include the added cost attributed to the difficulty of phasing construction at Terminal 1-Lindbergh. Detailed planning would be required to determine the magnitude of cost associated with phasing the construction at Terminal-1 Lindbergh with this alternative.	$1.5 billion dollars Part of the reason that the Airlines Relocate Alternative is more expensive than the Airlines Remain Alternative is that the Airlines Relocate provides for more capacity. By virtue of building out the full footprint of some of the facilities at Terminal 1-Lindbergh, the Airlines Relocate Alternative provides more capacity albeit at a higher cost. Though the airport will be able to handle more capacity as a result of this alternative, the additional capacity is not needed as part of this project and will occur as a secondary benefit. All applicable environmental documentation will be completed in the future when additional capacity is necessary.
Customer Service	Customer service would deteriorate as aircraft operations and the number of passengers grows.	Once construction is complete, customer service with the Airlines Remain Alternative would be improved when compared to the customer service with the No Action Alternative. However, during construction customer service would suffer because construction would impact facilities that are already operating at or over their design capacities.	The primary reason to move all of the non-SkyTeam Airlines to Terminal 2-Humphrey is to improve customer service. With this Alternative, the traveling public would be able to easily determine the "correct terminal," the terminal they need to go to depart or drop off/pick-up passengers: Terminal 1-Lindbergh for Delta/SkyTeam Airlines and Terminal 2-Humphrey for everyone else. In addition, customer service would be less impacted by construction than with the Airlines Remain Alternative because the renovation/expansion could be completed with minimal disruption to passengers.
Post 2020	Poor LOS and potential near grid lock of some facilities.	Additional capacity would be needed particularly in terms of gates almost immediately post-2020 to accommodate any growth in passengers without a deterioration in service.	Though the intent of this project is to improve the level of service at terminal facilities, this Alternative would result in adequate capacity to handle growth at Terminal 1-Lindbergh without the need for additional facilities.
Environmental Impact	No potential environmental impacts that would exceed the thresholds of significance were identified for any of the Alternatives. There would be little or no difference in the potential environmental impacts associated with the Airlines Remain and the Airlines Relocate Alternatives.		

Source: MAC Analysis, 2011.

Table ES.3.3

<table>
<tr><th colspan="2">Sponsor's Preferred Alternative</th></tr>
<tr><th>Terminal 1-Lindbergh</th><th>Terminal 2-Humphrey</th></tr>
<tr><td>• Terminal
– Expand and remodel Concourse G
▪ Construct new International Facility
▪ Install new Concourse G tram
– Remodel and reconfigure the terminal lobby
– Reconfigure and expand baggage claim area
– Remodel Concourse E</td><td>• Terminal
– Expand terminal</td></tr>
<tr><td>• Landside / Roadway
Before 2020
– Expand terminal arrivals curb and relocate commercial ground transportation center (GTC)
– Construct a new parking ramp
▪ Relocate portions of Glumack Drive
▪ Extend underground hub tram tunnel
After 2020
– Add dual lane exits to the outbound ramps from Glumack Drive to Trunk Highway (TH) 5</td><td>• Landside / Roadway
Before 2020
– Expand terminal curb
– Expand existing and construct new parking ramps
– Reconstruct 34th Avenue South interchange at I-494
– Add lane to Northbound 34th Avenue South
– Improve intersection of East 72nd Street and 34th Avenue South
– Reconfigure the intersections of 34th Avenue South / East 70th Street and Humphrey Drive / East 70th Street
– Reconfigure East 70th Street
– Construct a new Trunk Highway (TH) 5 and Post Road Interchange
▪ Remove existing and construct new bridge over TH 5
▪ Realign Post Road and Northwest Drive
▪ Relocate the intersection of Northwest Drive and Post Road
▪ Relocate SuperAmerica
▪ Close taxi cab staging lot and accommodate displaced taxi cabs
– Construct a dual lane exit from eastbound I-494 to 34th Avenue South
– Construct a dual lane exit from westbound I-494 to 24th Avenue South
– Construct auxiliary lane improvement on westbound I-494 between 24th Avenue South and the exit to southbound TH 77
After 2020
– Construct bridge braid for 34th Avenue South entrance ramp to westbound I-494 and exit ramp to 24th Avenue South from westbound I-494
– Additional expansion of the 34th Avenue South interchange at I-494</td></tr>
<tr><td>• Airside
– Relocate Runway 30L deicing pad
– Relocate airfield service road
– Extend Airport Operations Area tunnel and A Street
– Relocate Concourse G Fuel Main Line</td><td>• Airside
– Expand terminal apron
– Construct Remain Overnight (RON) aircraft apron
▪ Construct new taxiway
▪ Demolish Building F
– Relocate run-up pad
– Demolish and relocate Delta Air Lines Flight Kitchen
– Relocate ground support equipment facility</td></tr>
</table>



LEGEND

- Proposed Terminal Projects
- Proposed Landside/Roadway Projects
- Proposed Airside Projects
- Planned Post 2020
- Projects that are Underway
- Remove and/or Relocate
- MAC Property

Sponsor's Preferred Alternative

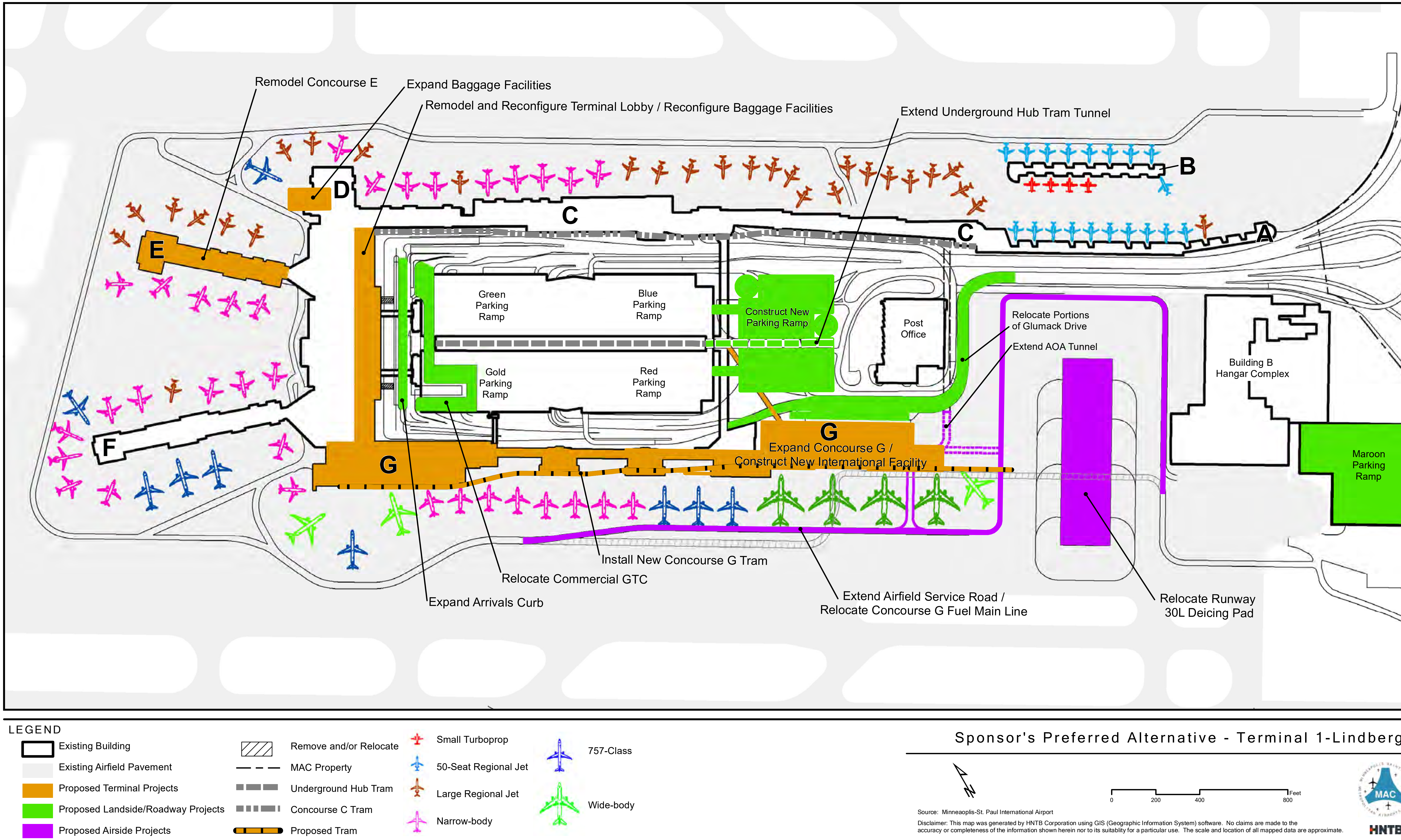
N

0 750 1,500 3,000 Feet

Source: Minneapolis-St. Paul International Airport

Disclaimer: This map was generated by HNTB Corporation using GIS (Geographic Information System) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitablity for a particular use. The scale and location of all mapped data are approximate.

HNTB

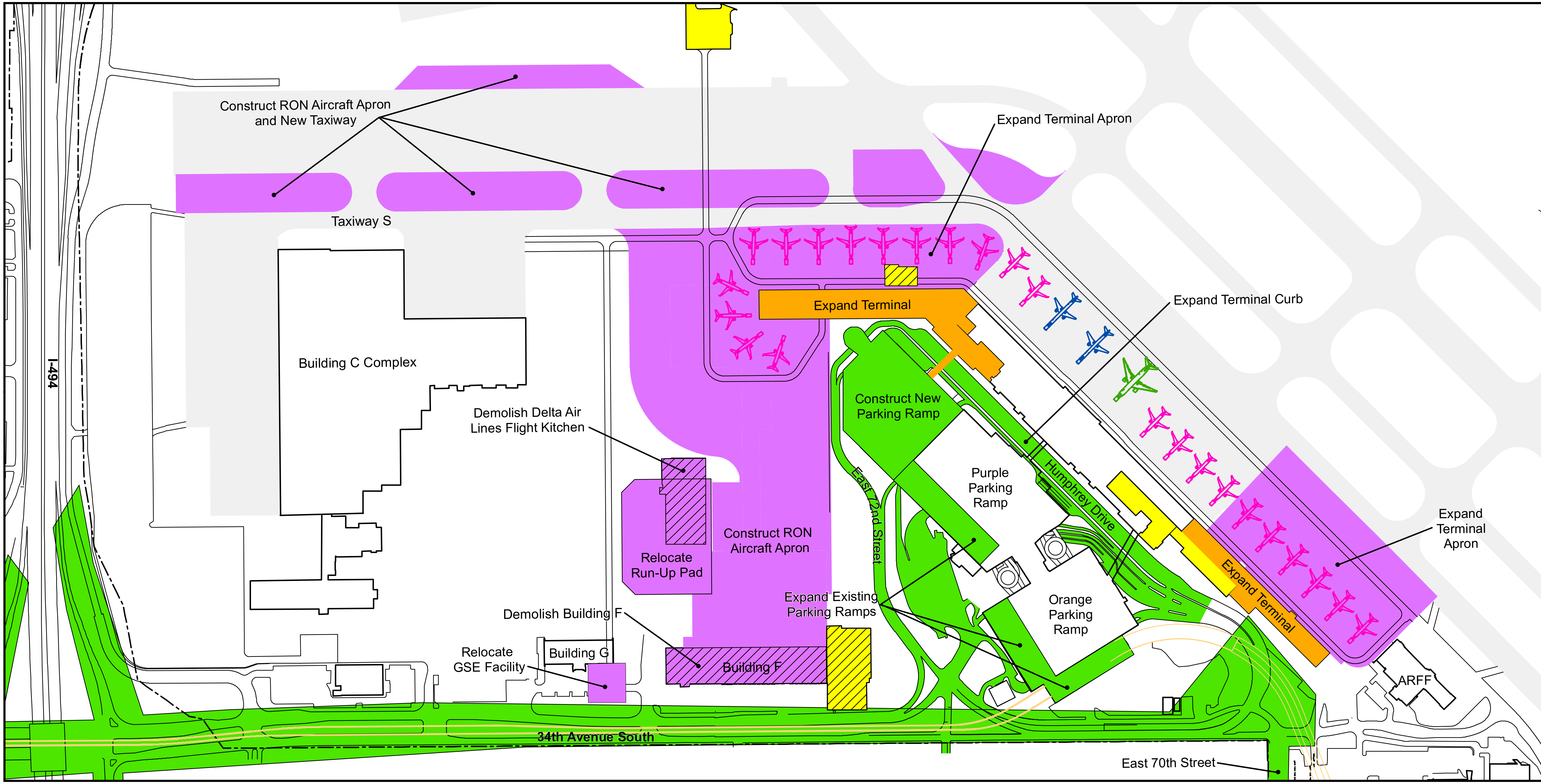


Sponsor's Preferred Alternative - Terminal 1-Lindbergh

Source: Minneapolis-St. Paul International Airport

Disclaimer: This map was generated by HNTB Corporation using GIS (Geographic Information System) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitablity for a particular use. The scale and location of all mapped data are approximate.

FIGURE ES.3-3



LEGEND

- Existing Building
- Existing Airfield Pavement
- Proposed Terminal Projects
- Proposed Airside Projects
- Proposed Landside/Roadway Projects
- Projects that are Underway
- LRT Tracks
- MAC Property
- Demolish and/or Relocate
- Small Turboprop
- 50-Seat Regional Jet
- Large Regional Jet
- Narrow-body
- 757-Class
- Wide-body

Sponsor's Preferred Alternative - Terminal 2-Humphrey

0 210 420 840 Feet

Source: Minneapolis-St. Paul International Airport

Disclaimer: This map was generated by HNTB Corporation using GIS (Geographic Information System) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitability for a particular use. The scale and location of all mapped data are approximate.

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ES.4 Environmental Effects and Mitigation Measures

The impacts of the Action Alternatives were determined by comparing the projected future conditions of the Action Alternatives with the corresponding future conditions of the No Action Alternative. In accordance with FAA guidance, impacts were evaluated for the year of implementation, 2020, and five years thereafter, 2025. The year 2025 was included to adequately disclose potential impacts after implementation of the proposed projects. In addition, for traffic related impacts, effects were analyzed for 2030 to address FHWA's requirement to consider the 20 year planning horizon.

Impacts were assessed in accordance with FAA Orders 1050.1E and 5050.4B. Analysis beyond that required in these Orders was completed to meet FHWA requirements and address all impact categories in the Minnesota EAW.

Table ES.4.1 provides an overview of the environmental impacts associated with the Action Alternatives and the No Action Alternative. Additional information regarding the assessment of environmental impacts is provided following Table ES.4.1.

Table ES.4.1

Environmental Consequences Summary

Environmental Impact Category	**Environmental Impact**		
	No Action Alternative	**Alternative 1 – Airlines Remain**	**Alternative 2 – Airlines Relocate**
Air Quality	MSP is within a carbon monoxide (CO) maintenance area	- Operational and construction-related emissions do not exceed *de-minimis* levels. - CO concentrations are below the NAAQS/MAAQS.	
	- 2030 Mobile Source Air Toxic emissions are not expected to differ substantially between alternatives and no impacts are anticipated under any of the alternatives.		
Climate	No Impact	- Greenhouse gas emissions increase slightly compared to the No Action Alternative.	
Coastal Resources	n/a		
Compatible Land Use	No impact	- No noise changes to noise sensitive land uses exceed the threshold of significance. - No change in land use compatibility related to safe aircraft operations or wildlife hazards.	
Construction Impacts	Minimal construction	- Air emissions conform to SIP. - Construction stormwater permit needed.	
Department of Transportation: Section 4(f)	No impact	- No use of a Section 4 (f) resource would be anticipated.	
Farmlands	n/a		
Fish, Wildlife and Plants	No impact	- No listed endangered or threatened species in Study Area. - No adverse impacts to biotic resources would be expected.	
Floodplains	n/a		
Hazardous Materials, Pollution Prevention and Solid Waste	No impact	- No solid/hazardous waste facilities disturbed at MSP, but hazardous materials could be encountered during construction.	

Table ES.4.1

Environmental Consequences Summary

Environmental Impact Category	Environmental Impact		
	No Action Alternative	**Alternative 1 – Airlines Remain**	**Alternative 2 – Airlines Relocate**
Historical, Architectural, Archaeological and Cultural Resources	No impact	- There may be an archaeological site in the area NW of the Post Road/TH 5 interchange. Both Action Alternatives include construction at this interchange. More detailed design information and potentially a site investigation are required to determine if there is potential to impact the archaeological site.	
Light Emissions and Visual Effects	No impact	- Additional apron and parking facility lighting not anticipated to cause adverse impacts.	
Natural Resources and Energy Supply	- Minimal differences in energy consumption between No Action and Action Alternatives.		
Aircraft Noise	No impact	- No noise changes at noise sensitive land uses exceed the threshold of significance (an increase of 1.5 dB DNL or above at the 65 DNL exposure). - Minor variations in contours between alternatives.	
Vehicular Noise	There are 35 daytime and 25 nighttime modeled receptors that approach or exceed state or federal standards.	- None of the modeled receptor locations are projected to experience a substantial increase in traffic noise levels. - Noise levels would approach or exceed federal noise abatement criteria at 24 modeled receptor in 2030. - The 2030 vehicular noise analysis found that noise barriers were not reasonable because they did not meet the federal noise reduction design goal or cost effectiveness criteria.	
Secondary (Induced) Impacts	- No significant impacts in other categories, therefore no secondary impacts expected.		
Socioeconomic Impacts, Environmental Justice and Children's Health and Safety Risks (including Traffic and Circulation)	No impact	- Requires relocation of SuperAmerica, but no anticipated loss in businesses or employment. - In terms of traffic and circulation, the Airlines Remain and Airlines Relocate Alternatives would generally operate significantly better than the No Action Alternative.	
Water Quality	No impact	- 6.5 acres net increase of impervious surface (of which 3.7 acres are associated with roadway improvements).	- 28.4 acres net increase of impervious surface (of which 1.1 acres are associated with roadway improvements).
		- Insignificant changes relative to surface water discharges as all projects will meet construction NPDES permit and Lower Minnesota River Watershed District (LMRWD) requirements. - Potential increase in deicing fluid collection efficiencies.	
Wetlands	n/a		
Wild and Scenic Rivers	n/a		
Cumulative Effects	The impacts associated with the Alternatives are minor. No single impact; even when considered with past, present and future actions; represents a substantial impact that cannot be mitigated. Therefore, none of the Alternatives would result in significant cumulative impacts.		

Note: n/a = No impact to Environmental Impact Category and/or category not applicable to MSP area.
NAAQS = National Ambient Air Quality Standard; MAAQS= Minnesota Ambient Air Quality Standard

Source: HNTB analysis, 2011.

ES.4.1 Air Quality

Air quality analyses included air emissions inventories and dispersion analysis to satisfy both FAA and FHWA Clean Air Act (CAA) and NEPA requirements.

To meet CAA regulations applicable to the FAA, the proposed projects were evaluated in terms of General Conformity. Under General Conformity, if the project-related emissions (those expected to result from the proposed projects) are within prescribed *de-minimis* levels, they automatically conform to the State Implementation Plan (SIP). Only carbon monoxide emissions were inventoried because MSP is located in an area designated as in attainment for all other criteria pollutants except carbon monoxide (CO). Analysis showed that the differences in CO emissions between each Action Alternative and the No Action Alternative would be below the General Conformity *de-minimis* threshold. Also, construction-related CO emissions associated with the Action Alternatives would be within the *de-minimis* threshold.

Dispersion analyses were conducted to address NEPA air quality requirements in accordance with FAA guidance. Macroscale and intersection CO dispersion concentrations were calculated for 2020 and 2025. As a result of these analyses, it was determined that the CO macroscale and intersection concentrations would be below the applicable standards.

The FHWA required that the following items be addressed in the 2030 air quality analysis of the regional roadway improvements:

- A hot-spot analysis if US Environmental Protection Agency (USEPA) approved screening thresholds are exceeded.
- That regionally significant projects are part of a conforming Long Range Transportation Policy Plan (LRTPP) and four-year Transportation Improvement Program (TIP).
- A Mobile Source Air Toxics (MSAT) analysis.

The FHWA adheres to the USEPA approved screening method to determine which intersections need a hot-spot analysis. The hot-spot screening method uses a threshold of 79,400 entering vehicles per day and the 2030 forecast entering traffic volumes to determine if a hot-spot analysis is required. Entering volumes at all intersections studied in the EA were forecast to be less than this threshold, therefore a hot-spot analysis was not completed for 2030.

The USEPA issued final rules on transportation conformity (40 CFR 93, Subpart A) which describe the methods required to demonstrate State Implementation Plan compliance for transportation projects. It requires that transportation projects must be part of a conforming Long Range Transportation Policy Plan (LRTPP) and four-year Transportation Improvement Program (TIP). The proposed regional roadway improvements are not considered regionally significant, as the proposed auxiliary lane addition along Interstate 494 (I-494) is less than one mile in length and no new interchange access would be provided. Therefore, these improvements do not conflict with the assumptions and conformity determination in the current LRTPP (approved by FHWA on February 2, 2011) and TIP (approved by FHWA on December 16, 2011).

The FHWA was consulted to determine the appropriate level of Mobile Source Air Toxic (MSAT) analysis for the proposed roadway improvements. This consultation resulted in the following response:

Although the projected 2030 ADT on I-494 exceeds the 140,000 to 150,000 ADT [Average Daily Traffic] threshold outlined in FHWA guidance that would [require] a quantitative assessment, the anticipated scope of work appears to (1) primarily improve highway operations without adding substantial new capacity, and (2) result in a facility that is not likely to meaningfully increase MSAT emissions.

As such, it was concluded that a qualitative MSAT analysis is adequate for the proposed roadway improvements in the MSP 2020 Improvements EA. The 2030 ADT would be the same for all Alternatives because the proposed improvements provide operational benefits but are not expected to reroute trips from elsewhere in the transportation network. As a result, MSAT emissions would not be expected to differ substantially between Alternatives.

ES.4.2 Climate

Greenhouse gas (GHG) emission inventories were completed for the No Action Alternative and the Action Alternatives.

With the implementation of the Airlines Remain Alternative, total GHG emissions would increase by 17,388 and 7,097 metric tons carbon dioxide equivalents (MT CO_2e) for 2020 and 2025 respectively, over the No Action Alternative. This change equates to a 0.44 and 0.16 percent increase over the No Action Alternative. With the implementation of the Airlines Relocate Alternative, total GHG emissions would increase by 18,715 and 24,624 metric tons for 2020 and 2025, respectively, over the No Action Alternative. This change equates to a 0.48 and 0.57 percent increase over the No Action Alternative.

The incremental increases in MT CO_2e emissions were considered in the context of US and global MT CO_2e emissions. For the Airline Remain Alternative, the increases would comprise less than 0.0003 percent of U.S.-based GHG emissions and less than 0.00004 percent of global GHG emissions. For the Airline Relocate Alternative, the increases would comprise less than 0.0004 percent of U.S.-based GHG emissions and less than 0.00006 percent of global GHG emissions.

ES.4.3 Historical, Architectural, Archaeological and Cultural Resources

Potential impacts to historical, architectural, archaeological and cultural resources were assessed in accordance with the National Historic Preservation Act of 1966 (as amended) (NHPA). A historic or cultural resource is defined as one that is listed, or eligible for listing, on the National Register of Historic Places (NRHP), the official list of the nation's cultural resources.

A reconnaissance assessment and an archaeological assessment were completed to determine if there are any cultural resources within the area impacted by the alternatives. The only potentially eligible NRHP site identified was an archaeological site in the area northwest of the Post Road/TH 5 interchange.

The Airlines Remain and Airlines Relocate Alternatives include construction of a new TH 5/Post Road interchange and therefore may result in an impact to the potential archaeological resource, if present. Additional design to define the limit of construction and additional archaeological investigations to determine if resources are present are necessary to determine if either Action Alternative will result in an adverse effect. However, additional design will not be completed until after the completion of this EA. Therefore, this project has been broken down into two separate phases to allow portions of the project to move forward while still meeting the requirements of the NHPA.

Phase I will include the entire project area except for the area around the Post Road/Trunk Highway (TH) 5 intersection. Phase II will include the Post Road/TH 5 intersection and all associated work (relocation of Northwest Drive and Post Road intersection, relocation of SuperAmerica, and construction of new Post Toad/TH 5 bridge and intersection).

The reconnaissance assessment and archaeological assessment did not identify any resources listed on or eligible for listing on the NRHP for Phase I. Therefore, the FAA has determined that a No Historic Properties Affected finding is adequate for Phase I. This finding was submitted to the State Historic Preservation Office (SHPO) and the Tribes with the Draft EA. Upon review, the SHPO concurred with the FAA's finding for Phase I. The letter from the SHPO is included in ***Appendix F***, *Historic Resources.*

Phase II will occur after the EA process is complete. Additional information is needed to determine if Phase II will result in an adverse effect. The impacts associated with Phase II will be determined prior to any construction activities in consultation with the SHPO and the Tribes.

ES.4.4 Noise

Aircraft noise impacts and vehicular noise impacts were evaluated for the alternatives.

ES.4.4.1 Aircraft

The threshold of significance for noise is triggered if the proposed action alternative would cause an increase of 1.5 dB DNL or greater for a noise sensitive land use at or above the 65 dB DNL noise exposure when compared to the No Action Alternative. [For instance, the threshold of significance is exceeded if an action results in a 1.5 dB DNL increase at a noise sensitive site where the No Action noise exposure is 63.5 dB DNL.]

There are no areas of sensitive land uses that would experience a 1.5 dB, or greater, increase in the 65 DNL noise contour and or a 3.0 dB, or greater, increase in the 60 DNL noise contour when comparing the 2020 and 2025 Airlines Remain Alternative and the Airlines Relocate Alternative noise contours to the respective No Action Alternative DNL noise contours. In 2020, the lowest number of residential units in the 65+ DNL noise contours is provided by the No Action Alternative. There are 10 more residential units in the Airlines Remain Alternative and 4 more residential units in the Airlines Relocate Alternative within the 65+ DNL noise contours. In 2025, the lowest number of residential units in the 65+ DNL noise contour is provided by the Airlines Remain Alternative. There are 81 more residential units in the No Action Alternative and 171 more residential units in the Airlines Relocate Alternative. However, in both 2020 and 2025 all residential units within the 65+ DNL noise contours of the development alternatives being considered have been provided noise mitigation and, as such, are considered a mitigated incompatible land use.

However, in consideration of the circumstances unique to MSP by virtue of past mitigation activities, the terms of the Consent Decree, and the local land use compatibility guidelines defined by the Metropolitan Council, mitigation is proposed. The proposed mitigation in the Draft EA/EAW was based on the 2020 Sponsor's Preferred Alternative 60+ DNL noise contour. The trigger for commencement of the mitigation was 484,879 annual operations or the year 2020, whichever came first.

The proposed noise mitigation program in the Draft EA/EAW was revised during the development of the Final EA/EAW. The mitigation program was revised to provide a more flexible framework that addresses actual noise impacts in the context of future airport development scenarios and FAA operational initiatives.

The revised program eligibility and timing are based on annually-developed actual noise contours. An outline of the proposed mitigation program follows:

- Mitigation eligibility would be assessed annually based on the actual noise contours for the previous year.
- The annual mitigation assessment would begin with the actual noise contour for the year in which the ROD was approved.
- For a home to be considered eligible for mitigation it must be located in the actual 60+ DNL noise contour, within a higher noise impact mitigation area when compared to its status relative to the Consent Decree noise mitigation program, for a total of three consecutive years, with the first of the three years beginning no later than 2020.
- The noise contour boundary would be based on the block intersect methodology.
- Homes would be mitigated in the year following their eligibility determination.

ES.4.4.2 Vehicular

A separate noise analysis was conducted for the 2030 vehicular traffic changes that would result from the proposed airport alternatives.

A traffic noise impact analysis is required for all Federal or Federal-aid Type I projects (construction of a highway meeting one or more of eight criteria defined in 23 CFR 772.5). Noise impacts are determined based on land use activities and predicted worst hourly L_{10} noise levels under future conditions. A "substantial increase" is defined as an increase of 5 dBA or greater from existing to future conditions.

Traffic noise levels were modeled at a total of 108 representative receptor locations along the I-494 and Trunk Highway (TH) 5 project corridor. Based on the modeling results, none of the modeled receptor locations would be projected to experience a substantial increase in traffic noise levels.

While there would not be a substantial increase in noise at the receptors, modeling showed that L_{10} noise levels would approach or exceed Federal noise abatement criteria at 24 modeled receptor locations within the project area in 2030. Receptor locations where noise levels are "approaching" or exceeding the criterion level must be evaluated for noise abatement feasibility and reasonableness. The evaluation of noise abatement measures included consideration of noise barriers. Noise barriers were evaluated at modeled receptor locations where traffic noise levels were predicted to exceed State standards or approach/exceed Federal noise abatement criteria. None of the modeled noise barriers were found to be reasonable (i.e. meet the noise reduction design goal of 7 dBA or the cost effectiveness criteria of $43,500/benefited receptor). Also, none of the other types of noise abatement measures considered for a Type I highway project would be reasonable.

ES.4.5 Traffic and Circulation

The analysis for traffic impacts consisted of evaluating on- and off-airport ground transportation facilities including roadways, parking facilities and curb roadways for the No Action, Airlines Remain and Airlines Relocate Alternatives in 2020 and 2025. In addition regional roadway improvements were evaluated out to 2030 based on the 2030 LTCP and background traffic growth to satisfy FHWA NEPA requirements. The potential vehicular traffic impacts resulting from implementation of the alternatives were determined by comparing the demand to the capacity of the facility under each alternative, and examining measures of effectiveness such as speed and density.

The Action Alternatives would provide sufficient parking and curb roadways for 2020, unlike the No Action Alternative. Additionally, nearly all of the on-airport roadways would operate at an acceptable LOS with all of the Alternatives. The only exception being outbound Glumack Drive which would operate at a LOS of F in 2025 with both the No Action and Airlines Remain Alternative.

For the off-airport ground transportation facilities within the Circulation and Traffic Study Area, the modeling results showed that the Airlines Remain and Airlines Relocate Alternatives would operate significantly better than the No Action Alternative. Under both Action Alternatives there would be no overall intersections with an undesirable LOS in 2020 or 2025. This compared to seven and 14 intersections that would have an undesirable LOS with the No Action Alternative in 2020 and 2025, respectively. Under 2030 build conditions there would be no overall intersections that would operate at an undesirable LOS.

ES.4.6 Water Resources

Surface water quality and groundwater quality impacts were evaluated for the alternatives.

ES.4.6.1 Surface Water

The following were evaluated to assess potential surface water quality impact: stormwater network hydrology, total suspended solids (TSS) removal, organic loading and the potential for petroleum/fuel releases.

A hydrologic analysis was conducted to evaluate the impact of the Action Alternatives on the storm sewer and pond system, taking into account the amount of impervious surface being drained. The Airlines Remain Alternative and Airlines Relocate Alternative include the addition of 6.5 and 28.4 acres of net new impervious surface, respectively. However, based on the result of the hydrologic modeling, the net increases would result in insignificant impacts to the peak discharges to the Minnesota River.

TSS is a pollutant of concern because the Minnesota River has very high TSS loads. An analysis was completed to determine the effect of new construction on the performance of the stormwater ponds and related best management practices (BMPs) in reducing TSS discharges. The analysis showed that the new construction from the Action Alternatives resulted in insignificant decreases in pond treatment efficiency.

Organic loadings in the airport's stormwater discharges are largely due to impacts from aircraft deicing activities. The primary component in Aircraft Deicing Fluid (ADF) is propylene glycol, which can exert an oxygen demand on receiving waters and potentially reduce dissolved oxygen levels. Therefore, a quantitative analysis of the estimated ADF collection efficiency of the alternatives was conducted. Based on this analysis, the Action Alternatives would result in an overall increase in collection efficiencies, which will reduce the overall organic loadings to the Minnesota River when compared with the No Action Alternative.

The Action Alternatives do not include any major modifications to the stormwater conveyance systems near the end of pipe where the petroleum impact discharge prevention mechanisms are located. It is expected that the location of fueling activities will be different based on the alternative selected, however, it is not anticipated this will impact petroleum surface water discharges.

ES.4.6.2 Groundwater

Impacts to groundwater at MSP are largely associated with fuel spills/leaks and the potential vertical migration or exfiltration of aircraft deicing fluids. Since the total number of aircraft operation in a given year would be the same for all alternatives, the total fueling operations are likely similar. Therefore, no material difference in the potential for groundwater impacts from fueling activities would be expected between the three alternatives. Additionally, the Action Alternatives would be expected to nominally reduce the overall potential for groundwater impacts because they include construction of new pavement with storm sewer systems that would likely include design criteria to improve collection of glycol-impacted stormwater.

The MAC is not aware of significant groundwater contamination issues in the roadway improvement areas. Furthermore, the industrial activities of concern, primarily aircraft fueling and deicing, have not and will not occur in roadway improvement areas.

ES.4.7 Cumulative Effects

Both CEQ Regulations and the Minnesota Administrative Rules require the consideration of cumulative effects. A cumulative effect is defined as the combined incremental effects of a proposed project and other past, present, and reasonable foreseeable projects. The first step in assessing cumulative effects was to identify past, present and reasonably foreseeable projects. Completed and anticipated projects at the airport and in the abutting communities, including the cities of Richfield, Bloomington and Minneapolis were identified for consideration of cumulative effects.

The next step was to identify the impacts associated with the Action Alternatives. Cumulative effects analysis is resource specific and generally addresses environmental resources that would be affected by the Alternatives. The key question is “do the effects of the proposed action on a particular environmental resource, when added to affects on the same resource due to other nearby and near-term actions, adversely impact that resource.”[1]

Based on the analysis in the EA, the Action Alternatives would not likely impact the following environmental categories: air quality; coastal resources; compatible land use; DOT Section 4(f) resources, farmlands; fish, wildlife and plants; floodplains; hazardous materials; historic resources, light emissions and visual effects; secondary impacts; socioeconomic impacts (except traffic), environmental justice, children’s health and safety risks; wetlands; and wild and scenic rivers. The Alternatives would potentially result in construction, traffic and circulation, water quality and noise impacts. Therefore, these impact categories were considered in identifying the potential for cumulative effects.

Construction of the Action Alternatives may create some unavoidable temporary impacts to surrounding communities such as noise, fugitive dust, and degraded water quality. These impacts would be minimized by implementing BMPs and would be localized; predominantly on the airport at the Post Road/TH 5 and 34th Avenue South/I-494 interchanges. Due to the localized nature of construction impacts, the potential for cumulative effects is likely most relevant to the South Loop District Plan. The MAC and City of Bloomington are coordinating construction sequencing for slated improvements. Given the need for the MAC and City of Bloomington to maintain traffic flow, it is unlikely construction projects will take place at the same time and in the same vicinity. Therefore, it is unlikely that the Alternatives along with the other identified projects would result in cumulative construction effects.

The Alternatives would result in traffic and circulation impacts. However, the analysis showed that the transportation facilities would generally operate significantly better with the Action Alternatives than with the No Action Alternative. Therefore, the Action Alternatives would not contribute to cumulative adverse traffic and circulation impacts.

The Alternatives including both airport and roadway improvements would result in minimal impacts to stormwater. Since none of the other projects considered would discharge stormwater to the storm sewer system at MSP, water quality impacts would not be cumulative. Other projects that discharge to non-MSP systems would be designed with rate and volume control measures to address water quality impacts. Therefore, significant cumulative impacts to the Minnesota River are not expected when considering past, present and future projects. Furthermore, NPDES permitting protects against water quality impacts that would exceed water quality standards.

Though the Action Alternatives do not result in any significant noise impacts, a cumulative analysis was completed to determine if the Action Alternatives; when considered with other past, present and reasonably foreseeable future actions; would potentially result in a cumulative significant noise impact. The only other project at the airport that could result in a noise impact is the proposed FAA Air Traffic Organization's (ATO) Performance Based Navigation (PBN) procedures, which includes Area Navigation (RNAV) and Required Navigation Performance (RNP) procedures, and are considered reasonably foreseeable. Therefore, an analysis was conducted to assess the potential for cumulative noise effects of the Alternatives and the proposed PBN procedures.

Based on extensive input from community leaders and airport neighbors, the MAC Full Commission voted on November 19, 2012 to provide support for partial implementation of the FAA ATO proposed PBN procedures. Specifically, the MAC passed the following action: "The Metropolitan Airports Commission supports implementation of the Area Navigation (RNAV) procedures as designed by the Federal Aviation Administration with the exception of RNAV departure procedures off Runways 30L and 30R at Minneapolis-St. Paul International Airport."

Therefore, the assessment of cumulative impacts included the partial implementation of the FAA ATO proposed PBN procedures. The combined noise impacts of the alternatives and the partial implementation of the proposed PBN procedures were assessed for 2020 and 2025. The noise modeling was updated to analyze the combined impacts of the proposed PBN procedures and the alternatives. The RNAV departure tracks off Runways 12L, 12R and 17 were incorporated into the forecasted scenarios for each of the alternatives without needing to adjust the arrival tracks.

The results of the analysis showed that following the partial implementation of the PBN procedures, no areas of sensitive land uses would experience a 1.5 dB, or greater, increase in the 65 DNL noise contour when comparing the No Action Alternative for 2020 and 2025 with either of the action alternatives, Airlines Remain and the Airlines Relocate Alternative for the respective years. Therefore, the cumulative effects of the alternatives along with the proposed PBN procedures would not exceed the FAA's threshold of significance.

In summary, no single impact; even when considered with past, present and future actions; represents a substantial impact that cannot be mitigated. Therefore, none of the Alternatives would result in significant cumulative impacts.

ES.5 Public and Agency Involvement

Public and agency coordination is conducted throughout the NEPA process to exchange information relevant to the Proposed Action and its potential impacts.

ES.5.1 Coordination Prior to the Publication of the Draft EA/EAW

The MAC coordinated with interested agencies and the public throughout the preparation of the EA. Coordination began early in the NEPA process with Agency and Community Briefings in late 2010. These briefings were followed by presentations and briefings at various Noise Oversight Committee (NOC) meetings. Also, the MAC conducted three open houses; two in July of 2011 and one in January of 2012.

Coordination focused on developing regional roadway improvements was also conducted. Potential interchange concepts to improve the level of service and reduce queuing were assessed as part of the MSP Area Roadway Improvements Project. The project management team (PMT) included representatives from the MAC, City of Bloomington, Minnesota Department of Transportation, FHWA, FAA, Metro Transit, Metropolitan Council and the Minnesota Department of Economic Development. The PMT played a key role in evaluating the interchange concepts and identifying a preferred concept.

ES.5.2 Coordination Related to the Publication of the Draft EA/EAW

The Draft EA/EAW was released for agency and public review on August 30th, 2012. Following the release of the Draft EA/EAW the MAC conducted open houses on September 17th and 18th, and October 1st, 2012. The purpose of these open houses was to share information regarding the Draft EA/EAW in an informal setting. The open house on October 1st preceded the public hearing on the same date. The purpose of the public hearing was to allow the public to formally submit verbal or written comments.

Agency and public comments received during the comment period from August 30th to October 11th, 2012 were considered in the development of the Final EA/EAW. Responses to all verbal and written comments received during the public hearing and all written comments received prior to the close of the comment period are provided in ***Appendix R***, *Draft EA/EAW Comments and Responses*.

Endnotes

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[1] FAA, *Environmental Desk Reference for Airport Actions,* Chapter 23, Cumulative Impacts, Sections 5a and 6a, October 2007.

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APPENDICES

Chapter 1: INTRODUCTION

This Environmental Assessment (EA) is prepared to comply with both the National Environmental Policy Act (NEPA) and the Minnesota Environmental Policy Act (MEPA). NEPA requires environmental review of federal actions including federal funding, approvals and certifications. The Metropolitan Airports Commission (MAC/Sponsor) is proposing development at the Minneapolis-St. Paul International Airport (MSP) which would require several Federal actions / approvals by the Federal Aviation Administration (FAA) and the Federal Highways Administration (FHWA). FAA actions /approvals include possible funding and airport layout plan (ALP) approval. FHWA actions / approvals include approval of the Interchange Access Request (IAR) for the proposed Interstate 494 (I-494) /34th Avenue South interchange modification and other improvements affecting the interstate. Therefore, environmental review of the proposed development is required per NEPA.

The environmental review is documented in an EA in accordance with FAA and FHWA NEPA policies and procedures. FAA NEPA requirements are contained in Orders 1050.1E, *Environmental Impacts: Policies and Procedures* and 5050.4B, *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions.* The FHWA policies and procedures to implement NEPA are prescribed in 23 CFR Part 771. Related guidance includes the FHWA Technical Advisory T6640.8A, *Guidance for Preparing and Processing Environmental and Section 4(f) Documents.*

MEPA requirements are addressed under the Minnesota Environmental Review Program. This program requires the Responsible Government Unit (RGU) to review projects using a standardized public process in order to disclose the environmental effects as well as ways to minimize and avoid the effects. In this case the MAC is the RGU, and per 1988 legislation specific to the MAC, must prepare an Environmental Assessment Worksheet (EAW) for the proposed development. Use of a federal EA as a substitute for the EAW form is authorized under the Minnesota Environmental Review Program provided that the EA addresses the impact categories required in the EAW and the procedural requirements of the EAW process are completed. Therefore, this EA addresses all of the EAW impact categories as well as the FAA and FHWA NEPA impact categories. It is noted that the term EA from this point forward refers to both the EA and EAW and is used interchangeably with the term EA/EAW.

The content and structure of this EA reflect the requirements / guidance provided in FAA Orders 5050.4B and 1050.1E as well as 23 CFR Part 771 and FHWA's T6640.8A. For this EA, the required content and related information is organized in the following manner:

Chapter 1: Introduction – provides background information

Chapter 2: Purpose and Need – describes why the proposed development is needed

Chapter 3: Alternatives – discusses the alternatives considered and why they are either dismissed or carried forward for detailed environmental analysis

Chapter 4: Affected Environment – provides an overview of the environment at and within the vicinity of MSP

Chapter 5: Environmental Consequences – describes the existing conditions of potentially impacted environmental resources and discloses the potential environmental impacts of the alternatives carried forward for detailed analysis

Chapter 6: Public and Agency Involvement – documents the public and agency outreach conducted for the EA

Chapter 7: List of Preparers – lists the document preparers along with their experience

Chapter 8: List of Abbreviations, Acronyms, & Glossary

1.1 Background

MSP is a large commercial service airport managed and run by the MAC, a public corporation established in 1943 by the Minnesota State legislature to provide for coordinated aviation services throughout the Twin Cities metropolitan area.[1] In 2010, MSP served nearly 33 million passengers and accommodated 437,075 landings and takeoffs, ranking it 15th in North America for the number of travelers served and the 12th busiest airfield in the United States.[2,3]

MSP is situated on 3,400 acres approximately seven miles south of downtown Minneapolis, Minnesota and seven miles southwest of downtown St. Paul, Minnesota. The location of MSP is depicted in **Figure 1.1-1**. MSP is not part of any city but is surrounded by Minneapolis, St. Paul and the suburban cities of Bloomington, Eagan, Mendota Heights, and Richfield.

Features of the airfield, terminals and landside facilities are described in Sub-sections 1.1.1, 1.1.2 and 1.1.3, respectively.

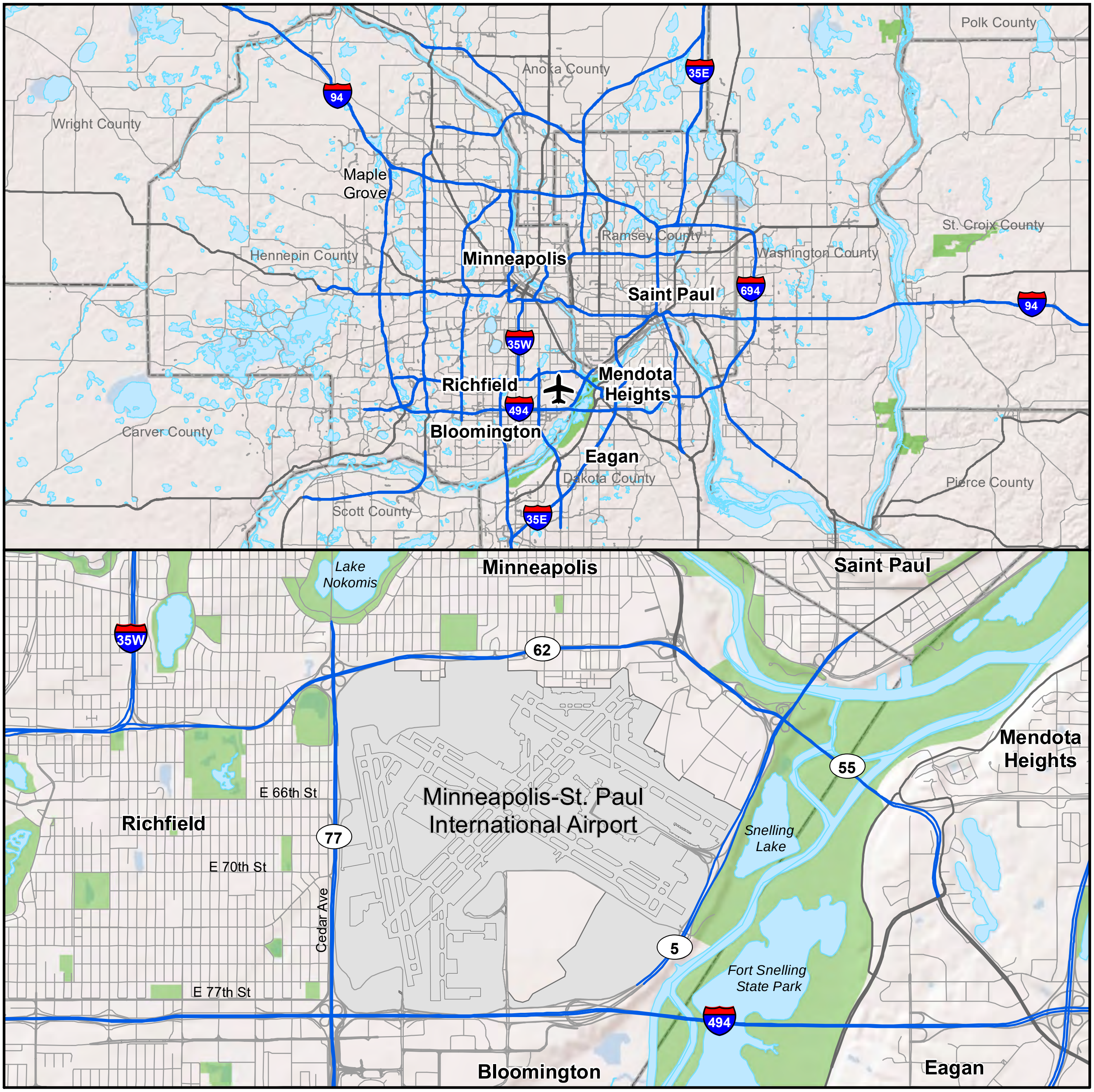
1.1.1 Airfield Facilities

The general airfield layout of MSP is illustrated in **Figure 1.1-2**. The airfield consists of four runways; two parallel, one north-south and a crosswind. The two parallel runways, Runways 12L/30R and 12R/30L are 8,200 and 10,000 feet long, respectively. The north-south runway, Runway 17/35, is 8,000 feet long and the crosswind runway, Runway 4/22, is 11,006 feet long. Each runway has at least one associated full length taxiway. Additional taxiways provide access to and from the terminals. Service roads provide access to the all aspects of the airfield. The parallel runways have deicing pads at each end. Runway 17/35 has a deicing pad at the north end.

1.1.2 Terminals

Two terminals serve MSP: Terminal 1-Lindbergh and Terminal 2-Humphrey. Together, they provide a total of 3.2 million square feet of terminal facilities and 127 aircraft gate positions.

FIGURE 1.1-1



LEGEND

494	Interstate
5	Trunk Highway
	Secondary Road
	Parks
	Water

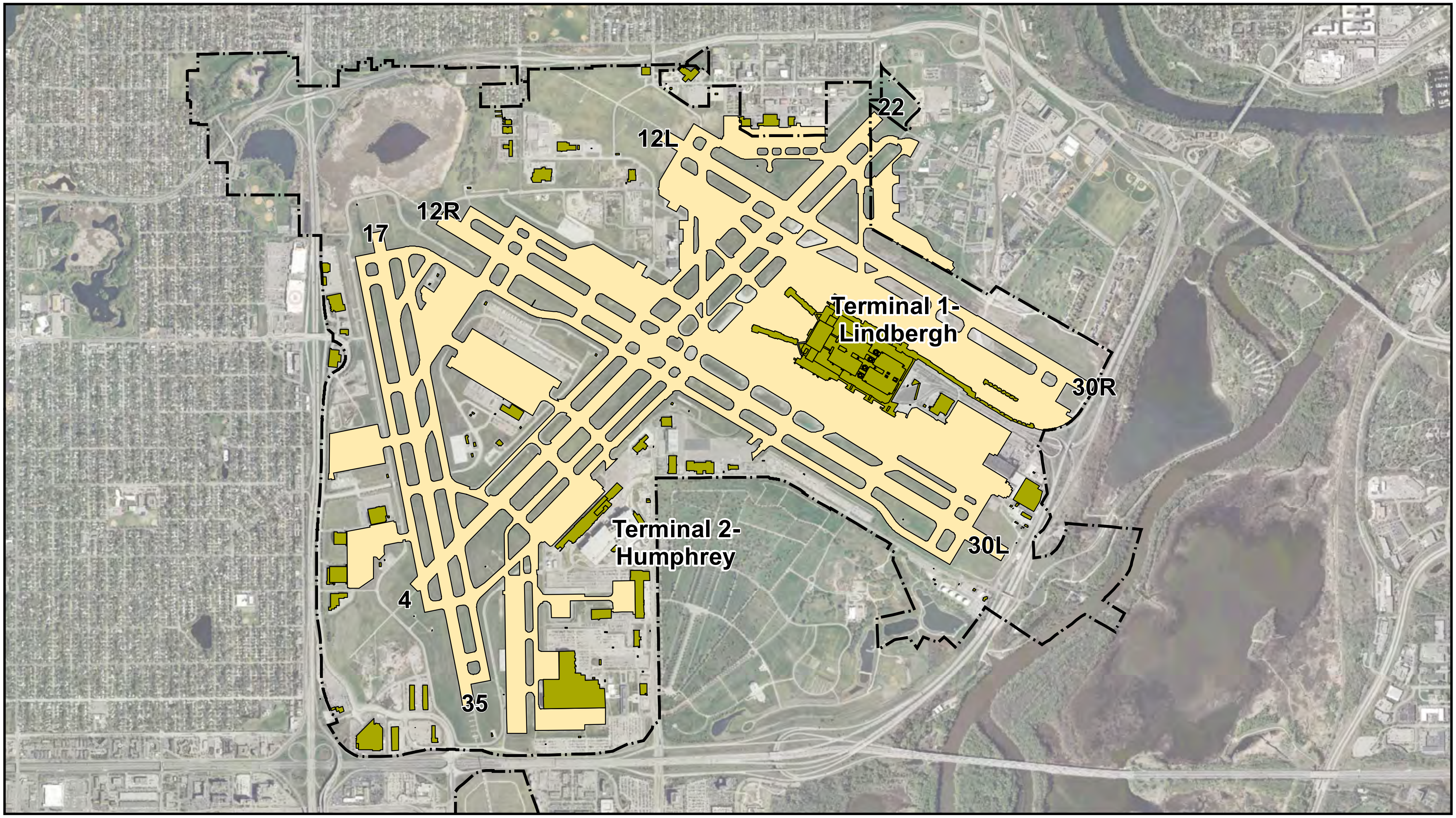
Airport Location and Vicinity Map

N

0 8 16 Miles

Source: ESRI Data

Disclaimer: This map was generated by HNTB Corporation using GIS (Geographic Information System) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitablity for a particular use. The scale and location of all mapped data are approximate.



Airfield Layout

LEGEND

Airport Pavement

Building

Airport Boundary

12R Runways

N

0 0.5 1 Miles

Source: ESRI Data

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MAC

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Terminal 1-Lindbergh

Terminal 1-Lindbergh is located between the two parallel runways, east of the crosswind runway as shown in Figure 1.1-2. Currently Air Canada, Alaska Airlines, American Airlines, Delta Air Lines, Frontier Airlines, United Airlines (including the former Continental Airlines), and US Airways are located at Terminal 1-Lindbergh.

Terminal 1-Lindbergh is illustrated in **Figure 1.1-3**. Aircraft gates, positions where aircraft are parked at the terminal to allow passengers to board or exit aircraft, are distributed among seven concourses labeled A through G. There are a total of 117 gate positions and 10 of these gates can support international arrivals into the International Arrival Facility, as well as domestic operations. Passenger bridges connect aircraft parked at the gates to Level 2 of Terminal 1-Lindbergh where ticketing/check-in facilities, passenger security screening, gate hold rooms and a wide array of concessions are provided. Domestic bag claim functions are located on Level 1.

Passenger movement is facilitated by moving sidewalks, trams and light rail transit (LRT). Moving sidewalks are provided along Concourses A, B, C, G and through the connector bridge between Concourses C and G. A concourse tram eases passenger travel along Concourse C. An underground tram connects Terminal 1-Lindbergh with parking and rental car facilities as well as a light rail transit (LRT) station. The LRT connecting Terminal 1-Lindbergh and Terminal 2-Humphrey provides for passenger movement between the two terminals.

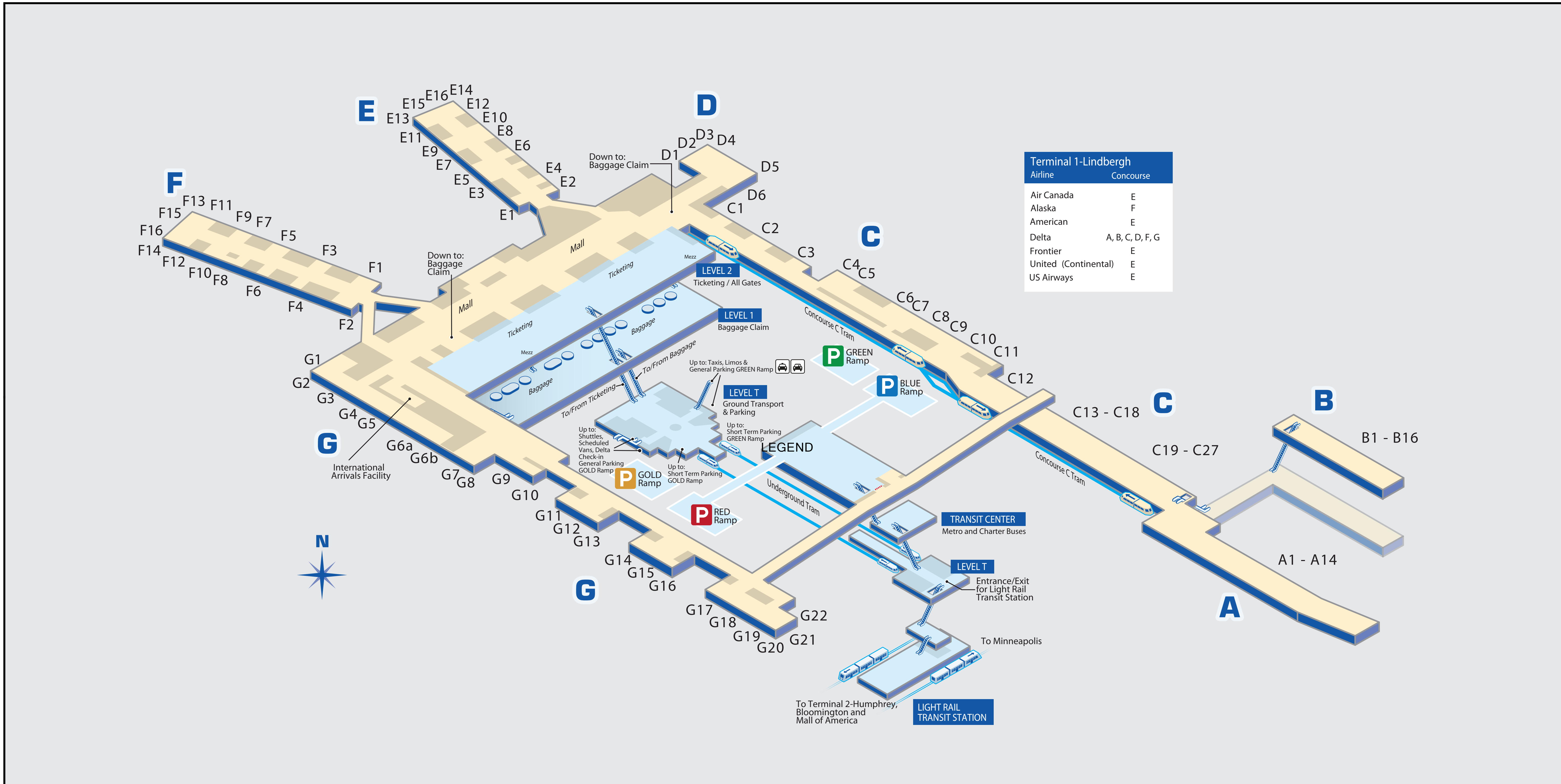
Use of public transportation to and from Terminal 1-Lindbergh is promoted by providing easy access to the LRT. Not only does the Metro Transit Hiawatha Line LRT connect the two terminals, it also allows MSP travelers and visitors to commute between the terminals and off-airport locations such as downtown Minneapolis and the Mall of America. The Terminal 1-Lindbergh LRT station is located below ground at the south end of the Terminal 1-Lindbergh parking complex. The Transit Center at ground level above the Terminal 1-Lindbergh LRT station provides additional mass transit service and connectivity between the LRT and bus systems.

Terminal 2-Humphrey

Terminal 2-Humphrey is located east of the crosswind runway and between Runways 12R/30L and 17/35 as shown in Figure 1.1-2. Terminal 2-Humphrey provides 10 gates (with four of those capable of serving the International Arrivals Facility as well as domestic operations) used by Icelandair, Southwest Airlines (including AirTran Airways provided the Single Operating Certificate is granted by the FAA), Sun Country Airlines and several charter airlines.

The general layout of Terminal 2-Humphrey is shown in **Figure 1.1-4**. The lower level, Level 1, features the ticketing/check-in area, international arrivals processing and the bag claim area. Level 2 of the terminal includes the security screening checkpoint and gate hold rooms.

There is also convenient access to the LRT from Terminal 2-Humphrey. An LRT station is located adjacent to the Orange Parking Ramp just to the east of the terminal.



LEGEND

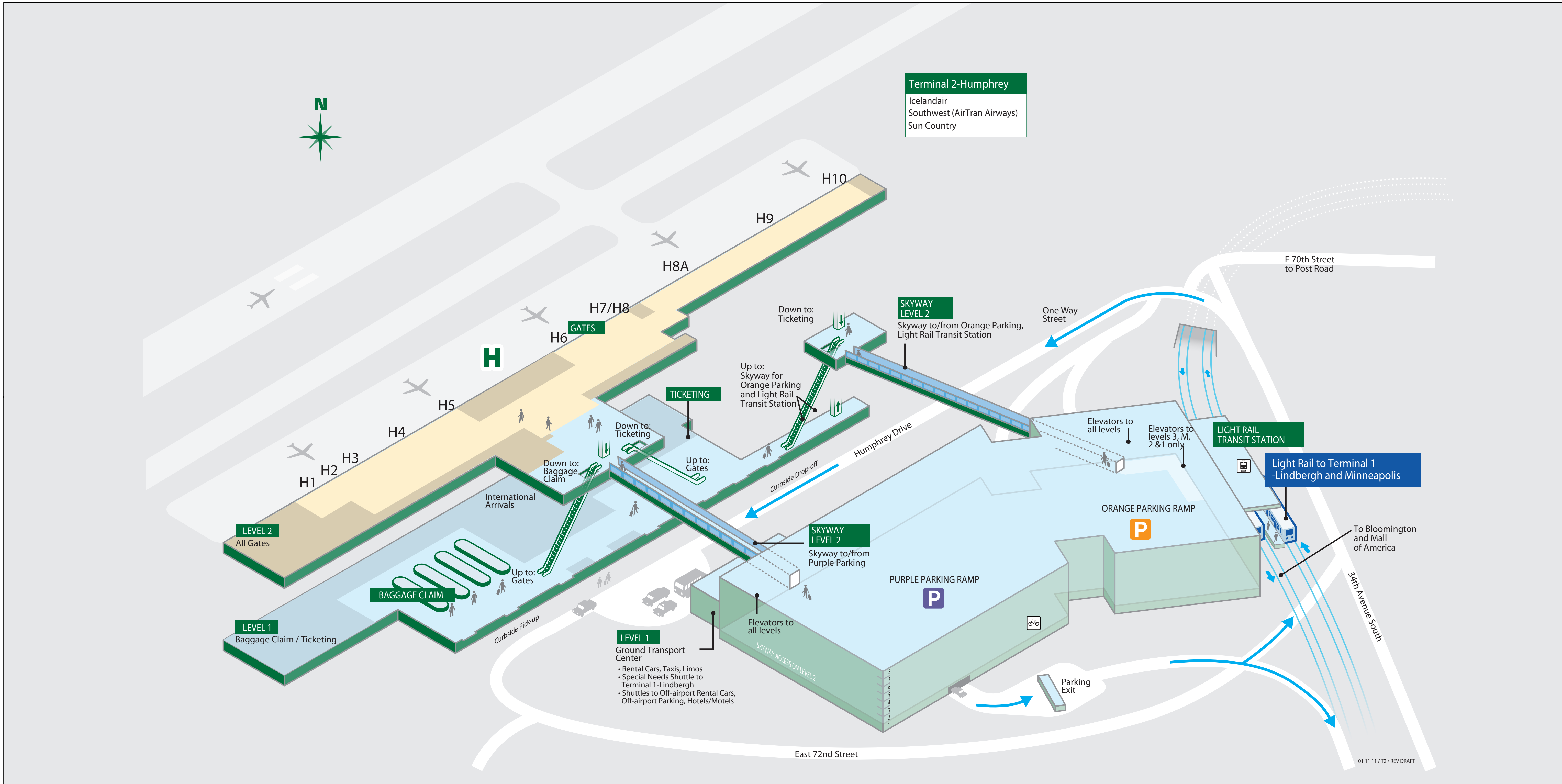
Inside Security

Outside Security

Terminal 1-Lindbergh

Source: Metropolitan Airports Commission

HNTB



LEGEND

Inside Security

Outside Security

Terminal 2-Humphrey

Source: Metropolitan Airports Commission

1.1.3 Landside Facilities

Landside facilities include terminal curb roadways, ground transportation centers, parking facilities, rental car facilities and access roads. Each of these is described in the following paragraphs.

Terminal Curb Roadways

Terminal curb roadways are where passengers are dropped off or picked up in front of the terminal. At Terminal 1-Lindbergh there is a two-level curb roadway system with multiple parallel curbs on both the ticketing (departures) and baggage claim (arrivals) levels. The departures curb roadway (upper level) is designated for drop-offs of all departing passengers and is illustrated in **Figure 1.1-5**. The inner departures curb is the primary curb for drop-offs. It is 830 feet long with four striped lanes of traffic. The outer departures curb is currently used as a “backup” curb for peak periods, and for shuttles and shared ride vans. It is 40 feet wide with two full (12-foot wide) lanes and three 16-foot wide left lane curb pockets, totaling 630 linear feet of curbside for passenger drop off. This configuration allows two through lanes of traffic with opposite-side unloading in the curb pockets.

The Terminal 1-Lindbergh arrivals curb roadway (lower level) is designated for pick-ups of all arriving passengers and is illustrated in **Figure 1.1-6**. The inner arrivals curb, used for passenger pick up by privately-owned vehicles (POV), is 700-feet long and 60-feet wide with five striped lanes of traffic. This roadway generally operates with the outer two lanes accommodating through traffic. The remaining three lanes are used for loading, standing or through traffic, depending on the airport’s level of activity. The outer arrivals curb is used by commercial vehicles and is separated from the inner curb by a barrier preventing pedestrians from crossing the roadway.

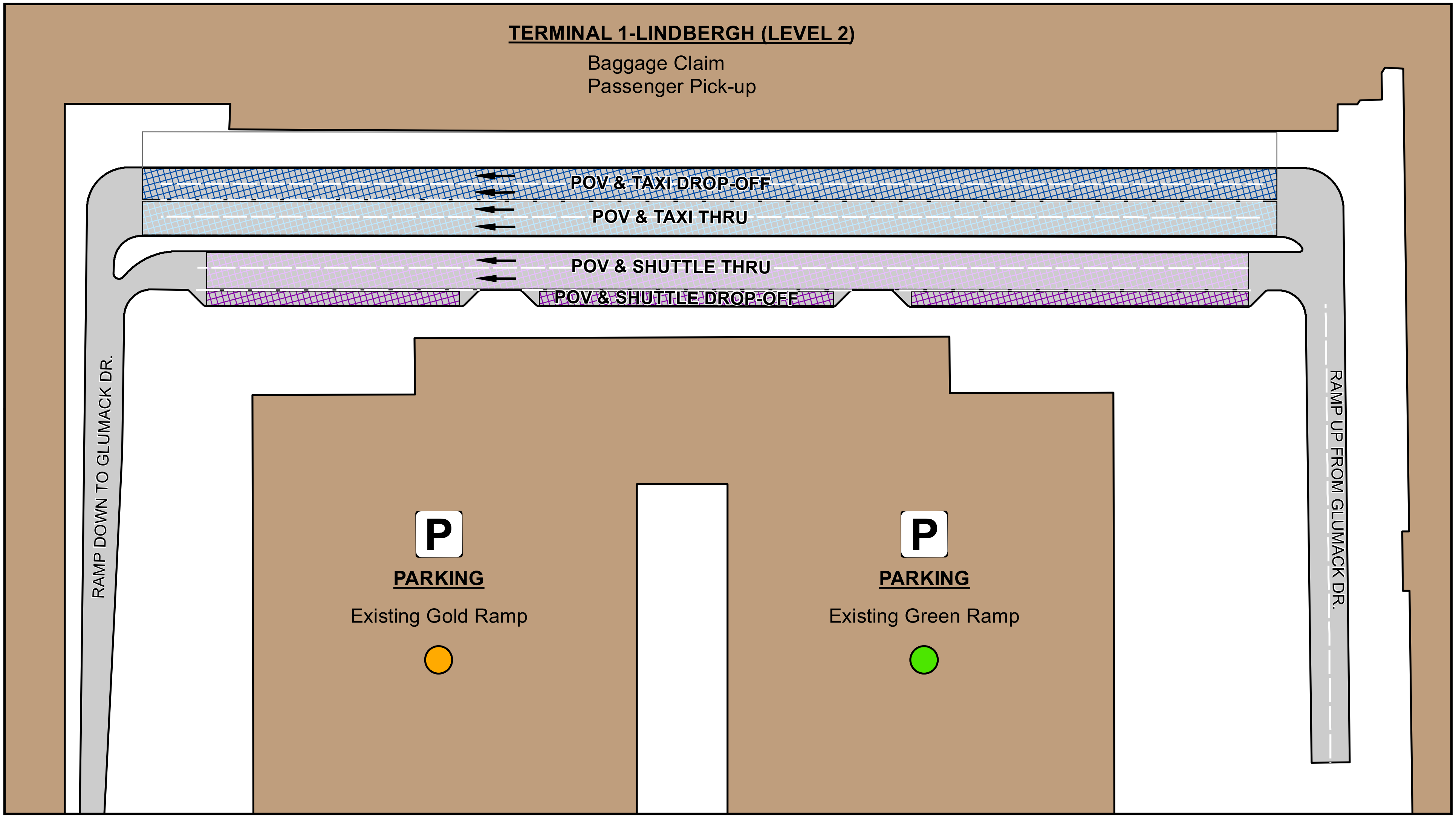
The Terminal 2-Humphrey curb roadway, illustrated in **Figure 1.1-7** is 700-feet long. The curb is a single-level four lane roadway, half of which is used for passenger drop-off at ticketing/check-in and half of which is used for passenger pick up at baggage claim. The left lane is signed to direct rental car return traffic to the rental car area.

Commercial Ground Transportation Centers

Commercial ground transportation centers (GTC) are provided at both Terminal 1-Lindbergh and Terminal 2-Humphrey for commercial vehicle operations. The commercial GTCs provide parking spaces for taxis, limousines, hotel shuttles, off-airport parking shuttles and scheduled shuttles picking up passengers.

At Terminal 1-Lindbergh the commercial GTC is located directly across from the terminal on the lower level between the Gold and Green Parking Ramps. Commercial vehicles enter the commercial GTC from the outer arrivals curb roadway. The west side of the commercial GTC has 25 pull-through spaces for taxicabs and hotel shuttle services. An additional 23 pull-through stalls are provided on the east side of the commercial GTC to serve special taxis, limousines, scheduled shuttles and off-airport parking shuttles.

The commercial GTC at Terminal 2-Humphrey is located adjacent to the Purple Parking Ramp. Commercial vehicles access the commercial GTC via Humphrey Drive. The commercial GTC has 15 loading spaces.



LEGEND

Building

Road Pavement

POV & Shuttle Drop-off

POV & Shuttle Thru

POV & Taxi Thru

POV & Taxi Drop-off

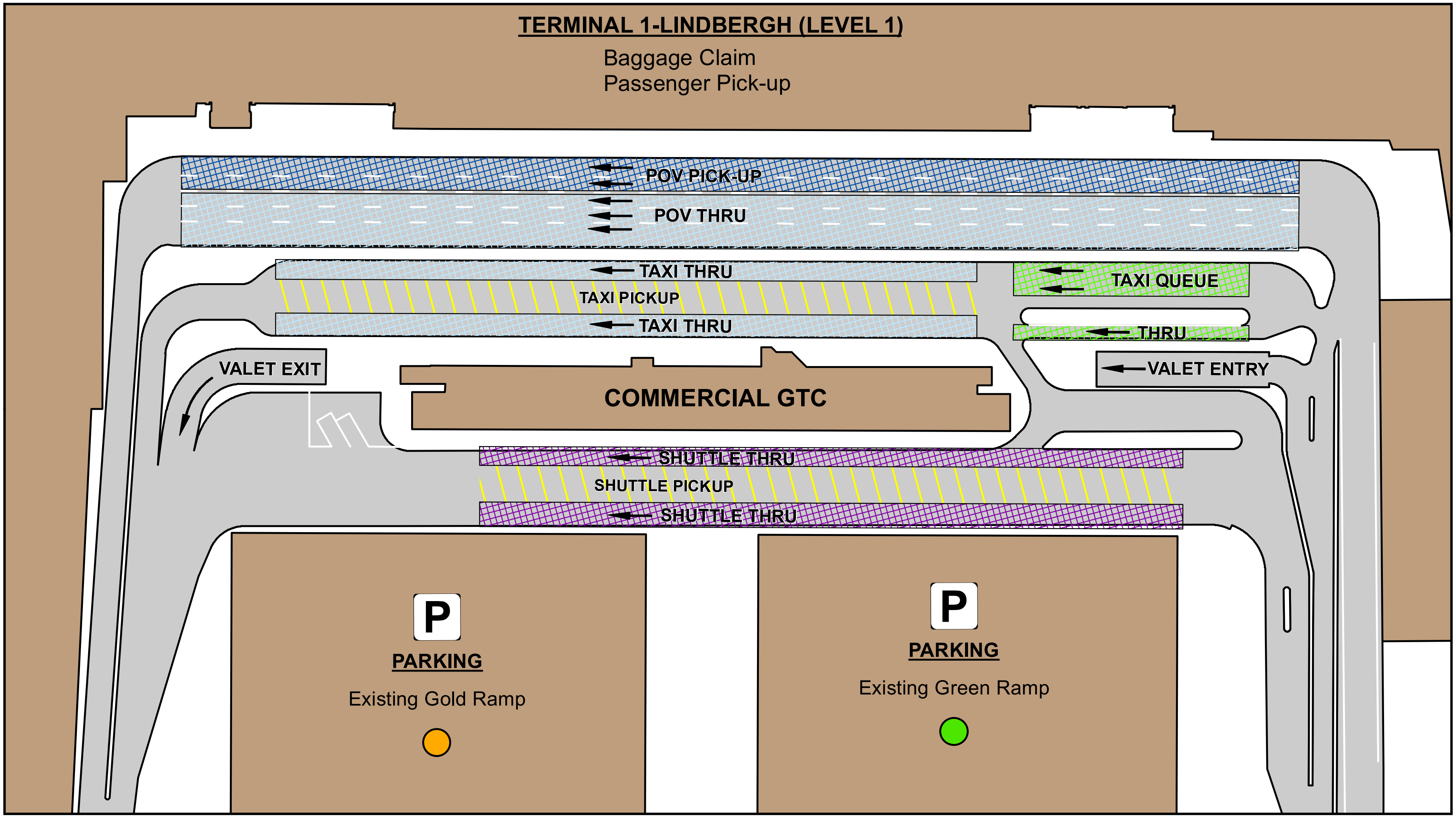
POV = Privately Owned Vehicle

Terminal 1-Lindbergh Departures Curb Roadway

Not to Scale

Source: ESRI Data

Disclaimer: This map was generated by HNTB Corporation using GIS (Geographic Information System) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitablity for a particular use. The scale and location of all mapped data are approximate.



Terminal 1-Lindbergh Arrivals Curb Roadway

LEGEND

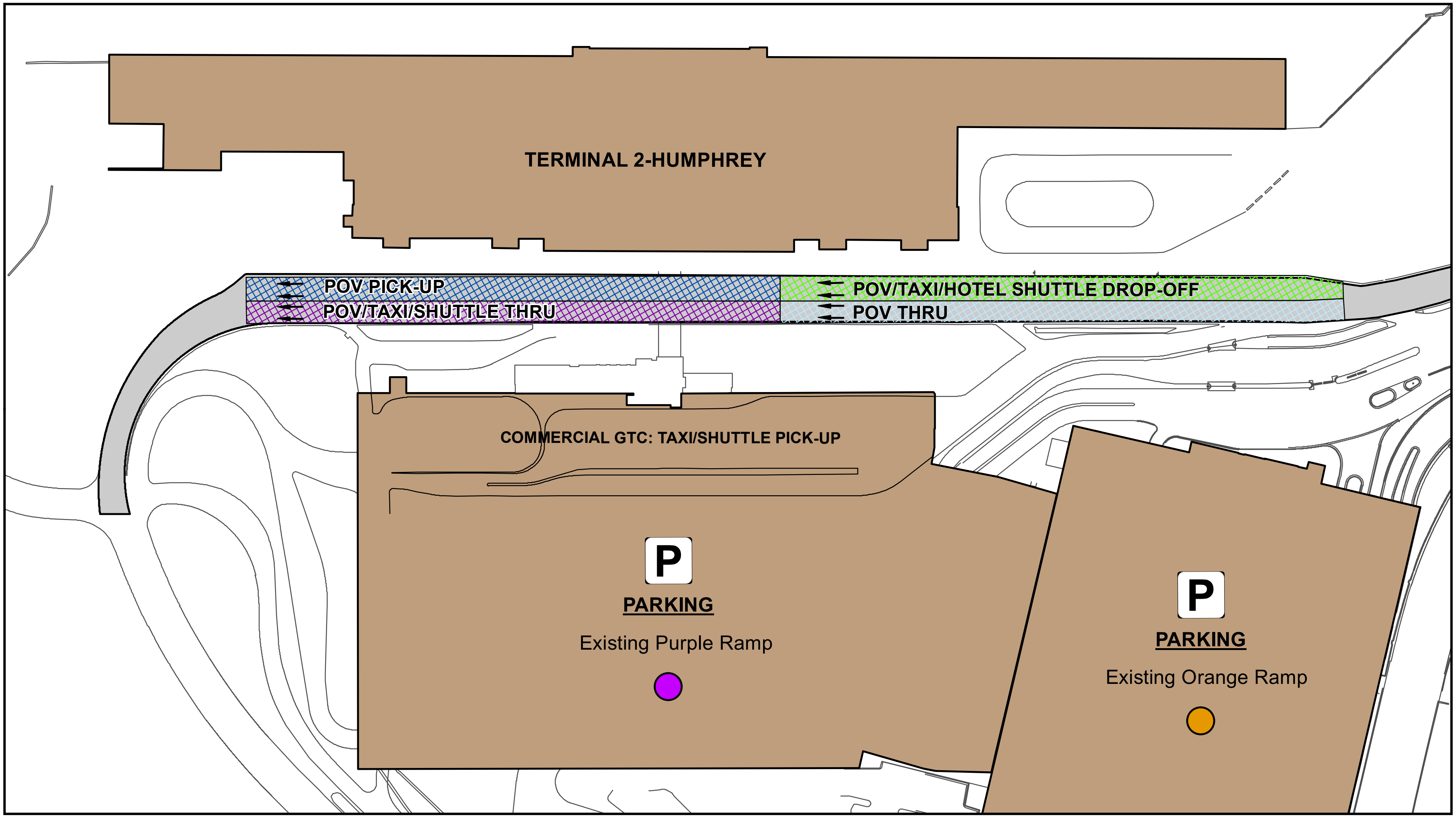
	Building		Taxi Queue/Thru
	Road Pavement		POV/Taxi Thru
	Shuttle Thru		POV Pick-Up

POV = Privately Owned Vehicle
GTC = Grand Transportation Center

Not to Scale

Source: ESRI Data

Disclaimer: This map was generated by HNTB Corporation using GIS (Geographic Information System) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitablity for a particular use. The scale and location of all mapped data are approximate.



Terminal 2-Humphrey Curb Roadway

LEGEND

- Building
- Road Pavement
- POV/Taxi/ShuttleThru
- POV/Taxi/Hotel Shuttle Drop-Off
- POV Thru
- POV Pick-Up

POV = Privately Owned Vehicle
GTC = Ground Transportation Center

Not to Scale

Source: ESRI Data

Disclaimer: This map was generated by HNTB Corporation using GIS (Geographic Information System) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitablity for a particular use. The scale and location of all mapped data are approximate.

Parking

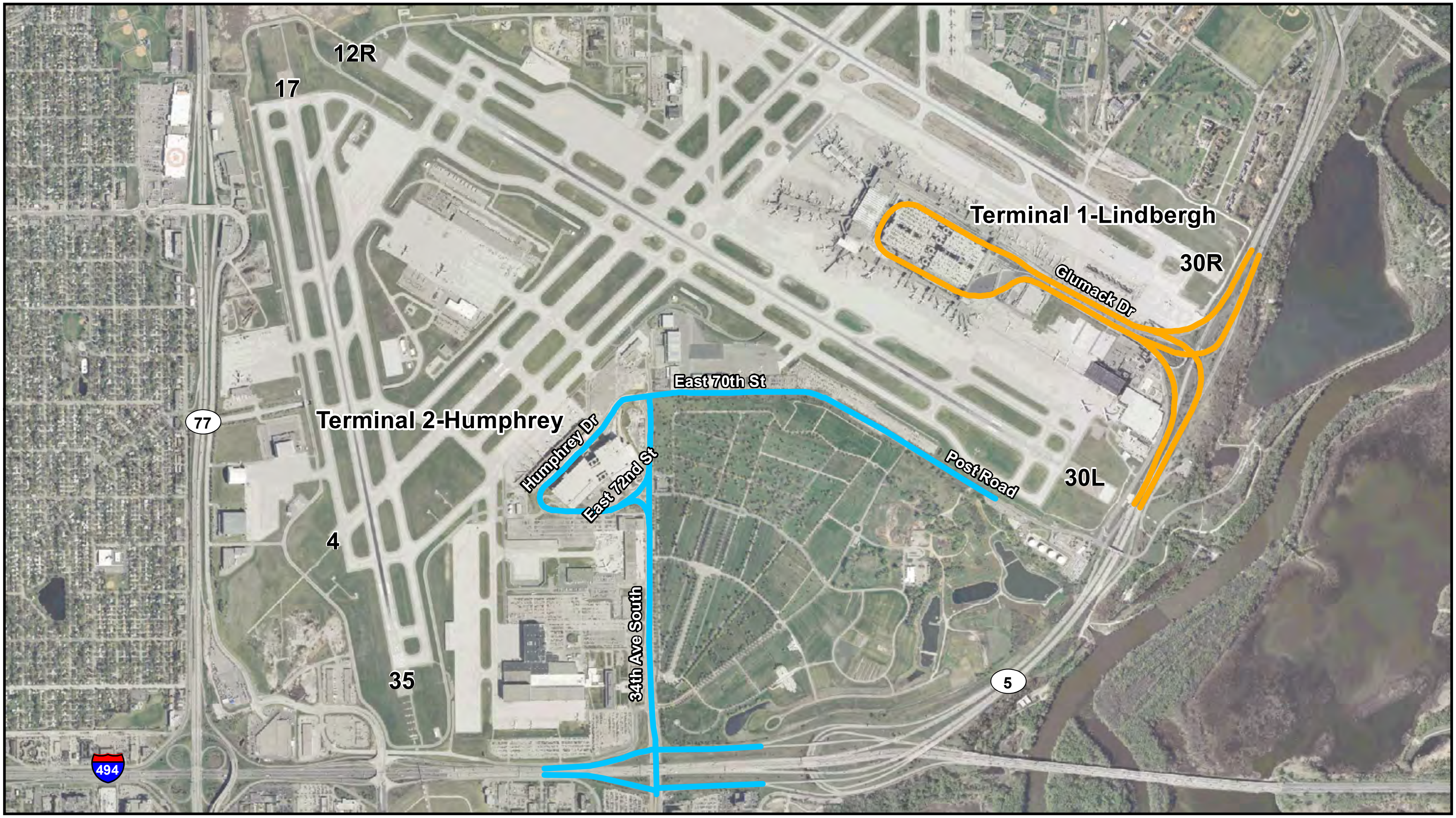
There are approximately 23,850 public, rental and employee parking spaces at MSP, split between the Terminal 1-Lindbergh and Terminal 2-Humphrey parking ramps. Terminal 1-Lindbergh and associated parking ramps provide a total of 14,595 spaces (12,870 public and employee, and 1,725 rental car). The locations of the four parking ramps serving Terminal 1-Lindbergh, Green, Gold, Red and Blue are shown in Figure 1.1-3. These ramps provide short-term and general parking for passengers as well as space for rental cars. Short-term parking is located on Level 1 and the Mezzanine Level of the Green Ramp and Level 1 of the Gold Ramp. Rental car parking is provided on Levels 2 and 3 of the Red and Blue Ramps. Valet parking is also available in the lower level of Terminal 1-Lindbergh. Terminal 2-Humphrey has approximately 9,255 spaces (9,110 public and employee, and 145 rental car) in two parking ramps designated as the Orange and Purple ramps. The locations of the Orange and Purple ramps are illustrated in Figure 1.1-4.

Rental Car Facilities

Rental car ready-return facilities, where customers pick-up and return rental cars, are provided at both Terminal 1-Lindbergh (1,725 spaces) and Terminal 2-Humphrey (145 spaces); however the quick-turn-around (QTA) facility, where rental vehicles are fueled and washed between rentals, is provided only at Terminal 1-Lindbergh. The QTA at Terminal 1-Lindbergh Is located on Level 1 of the Red and Blue Ramps. Terminal 2-Humphrey rental cars are shuttled between Terminal 2-Humphrey rental spaces and the QTA facility at Terminal 1-Lindbergh between rentals.

Access Roads

MSP is the only major airport in the United States to have two terminals located on entirely separate roadway systems. Access routes to both terminals are highlighted on **Figure 1.1-8**. Terminal 1-Lindbergh is accessed directly off of Trunk Highway (TH) 5 via Glumack Drive. Terminal 2-Humphrey is accessed directly off of 34th Avenue South from Interstate 494 (I-494), or off of Post Road/East 70th Street from TH 5, via Humphrey Drive/East 72nd Street.



Access Routes to Terminals

LEGEND

- 494 Interstate
- 5 Trunk Highway
- Access Routes to Terminal 1-Lindbergh
- Access Routes to Terminal 2-Humphrey

N

0 1,000 2,000 4,000 Feet

Source: ESRI Data

Disclaimer: This map was generated by HNTB Corporation using GIS (Geographic Information System) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitablity for a particular use. The scale and location of all mapped data are approximate.

MAC

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Endnotes

[1] Minneapolis-St. Paul International Airport, "About MSP", http://www.mspairport.com/about-msp.aspx (accessed 11/12/10).

[2] Minneapolis-St. Paul International Airport, "statistics", http://www.mspairport.com/about-msp/statistics.aspx (accessed 11/01/11).

[3] ACI North America, North American Airports Ranking, Passengers and Total Operations, May 2011, pages R-1 and R-9.

Chapter 2: PURPOSE AND NEED

The Purpose and Need for a proposed action are identified by describing the current problems and the proposed solutions. The Purpose and Need is used as the primary foundation to develop reasonable alternatives as required by the National Environmental Policy Act (NEPA).

The Federal Aviation Administration (FAA) and the Federal Highways Administration (FHWA) have different policies and requirements regarding NEPA and decision making. The FAA considers near-term and immediate-term development as ripe for decision making. Therefore, this EA describes the purpose and need for the terminal and airport landside development proposed for implementation by 2020. The FHWA decision making process is focused on development proposed for the 20 year planning horizon. Therefore, this EA also addresses the purpose and need for regional roadway improvements proposed for implementation by 2030.

This Chapter begins with the statement of Purpose and Need. The subsequent sections provide:

- information to support the statement of Purpose and Need; and
- the requested Federal Actions required to implement the proposed projects.

2.1 Statement of Purpose and Need

Airport facilities do not and/or will not meet existing and future demand. Terminal 1-Lindbergh landside and terminal facilities including the arrivals curb, parking and the international arrivals facility are currently overcrowded. Also, during the winter, when seasonal charter carrier activity peaks, the demand for gates at Terminal 2-Humphrey exceeds capacity.

As passenger activity grows, current congestion will be exacerbated and spread to additional facilities. Conditions at landside facilities, including access and regional roads, are expected to deteriorate further. Similarly, terminal areas at gates, ticket counters, passenger check-in areas, security screening checkpoints and baggage claim areas will be overcrowded.

The purpose of the proposed project is to accommodate the expected demand such that the level of service is acceptable throughout MSP's facilities under both existing and 2020 conditions, and regional roadways under 2030 conditions.

Need (Problem):

Congestion and overcrowding at MSP terminal and landside facilities under current and 2020 conditions

Purpose (Solution):

Accommodate expected demand at MSP such that the airside and landside level of service is acceptable through the 2020 planning timeframe, and that the regional roadway level of service is acceptable through the 2030 planning timeframe.

2.2 Supporting Information

This section briefly presents information which supports the statement of Purpose and Need. Sub-section 2.2.1 discusses the MSP Long Term Comprehensive Plan. Sub-section 2.2.2 presents the aviation activity forecast developed for this EA. Finally, Sub-section 2.2.3 identifies the specific current and future needs based on the aviation activity forecast.

2.2.1 MSP Long Term Comprehensive Plan (LTCP)

The LTCP is a 20-year plan for MSP to accommodate forecast growth in a safe and efficient manner, and with a high level of customer service. The LTCP is prepared by the MAC in accordance with the Metropolitan Council's guidelines to plan, develop and operate MSP in a manner compatible with its surrounding environs.

In the latest version, completed in 2010, the MSP 2030 Long Term Comprehensive Plan Update (LTCP Update), the MAC identified development needed at MSP to efficiently serve the Twin Cities' commercial air transport demand through 2030. It demonstrated that airport improvements were needed to accommodate substantial changes in the aviation industry as well as future aviation activity.

Airline mergers, shifts in aircraft fleet, new technologies and evolving security protocols resulted in changes to airport operations. These changes affected airline service patterns, as well as passenger processing and behavior. For example, when security regulations limited the items in carry-on luggage, passengers checked more luggage. This in turn led to the need for more baggage handling facilities.

The LTCP Update stated that, "Over time, some of MSP's facilities have become less efficient and some have not been improved to meet the dynamic needs of today's travelers. While MSP's airfield was dramatically improved with the addition of a fourth runway in 2005, portions of the terminal and landside facilities have become outdated and need improvement."[1]

In the LTCP Update, the MAC identified specific needs based on forecasts of aviation activity. The forecast was prepared to determine future passenger and operation levels expected at MSP. Aviation planning was then conducted using these forecasts to determine if existing facilities were in need of improvement.

The LTCP Update concluded that, "the existing passenger terminal complexes and their landside facilities are not able to accommodate planned forecast growth without expansion. Growth in passenger boardings will prompt additional aircraft gates, parking, roadway improvements and terminal space to allow passengers to enjoy a safe and comfortable airport environment."

2.2.2 EA Activity Forecasts

Aviation and vehicular activity forecasts were developed for this EA.

2.2.2.1 Aviation Activity Forecast

An aviation activity forecast was prepared to support the purpose and need as well as provide information required for environmental analysis.

The FAA's Terminal Area Forecast (TAF) was considered for use in this study. "The TAF is prepared to assist the FAA in meeting its planning, budgeting, and staffing requirements. In addition, state aviation authorities and other aviation planners use the TAF as a basis for planning airport improvements."[2] However, the TAF did not provide the detail required to assess the noise and air quality impacts. Therefore, the TAF was not used for this EA.

The LTCP Update forecast was also considered. The LTCP Update forecast was prepared in 2009. Since then several significant factors have resulted in changes to aviation activity. These factors include the lagging economic recovery, the merger of Southwest Airlines and AirTran Airways, and changes in airline fleet plans. Additionally, more detailed forecast information was needed for various studies. Therefore, the LTCP Update forecast was updated and refined for this EA.

The forecast for this EA included the years for which environmental analysis would be conducted: 2010 (current), 2020 (year by which proposed improvements would be implemented) and 2025 (five years beyond implementation). Separate annual forecasts were developed for scheduled domestic and international passenger, non-scheduled passenger, air cargo, general aviation and military activity for each of the forecast years.

Table 2.2.1 summarizes domestic and international passenger enplanement forecasts. Total enplanements at MSP are projected to increase from 15.7 million in 2010 to 20.2 and 23.1 million in 2020 and 2025, respectively. The projected increase in enplanements equates to an average annual growth rate between 2010 and 2025 of 2.6 percent

Table 2.2.2 summarizes the forecast of aircraft operations at MSP. Total aircraft operations are estimated to increase from 437,075 in 2010 to 484,879 and 526,040 in 2020 and 2025, respectively. The scheduled passenger operation categories are projected to grow the most rapidly, while air cargo, general aviation and military aircraft operations are projected to grow at a slower rate. The projected increase in overall aircraft operations equates to an average annual growth rate between 2010 and 2025 of 1.2 percent.

Table 2.2.1

Forecast of Annual Domestic and International Revenue Enplanements

Year	Domestic	International	Charter	Total
2010	14,568,881	1,141,442	4,736	15,715,059
2020	18,608,747	1,564,092	6,081	20,178,920
2025	21,260,499	1,815,444	6,956	23,082,899

Sources: MAC Monthly Summary Reports and HNTB analysis, 2011.

Table 2.2.2

Summary of Forecast Aircraft Operations

	2010	2020	2025
Domestic Scheduled Air Carrier	367,851	410,410	448,074
International Scheduled Air Carrier	26,556	29,530	32,886
Charter	103	96	106
All-Cargo Carrier	12,499	12,764	12,826
General Aviation and Air Taxi	27,921	29,934	30,003
Military	2,145	2,145	2,145
Total	**437,075**	**484,879**	**526,040**

Sources: MAC Monthly Summary Reports and HNTB analysis, 2011.

The EA forecast was compared to the FAA's TAF. **Table 2.2.3** provides a comparison of the forecasts' enplanements and operations for the years of analysis. There are almost no differences in the number of operations while there are differences in the number of forecasted enplanements. The TAF enplanement forecasts are lower because they are based on a more recent base year and include more conservative assumptions about Delta Air Line's development of the MSP hub.

The differences between the forecasts are acceptable based on FAA Guidance and FAA's review of the EA forecast. FAA Guidance on the review and approval of aviation forecasts states that forecasts for total enplanements and total operations are "considered consistent with the TAF if they meet the following criterion: Forecasts differ by less than 10 percent in the 5-year forecast period, and 15 percent in the 10-year forecast period."[3] The EA forecast meets this criterion for both enplanements and aircraft operations. Additionally, the FAA reviewed and approved the EA forecast in July 2012.

Details regarding the forecast assumptions, methodology and results including the FAA's approval letter are included in ***Appendix A**, Aviation Activity Forecast Technical Report*.

2.2.2.2 Vehicular Activity Forecast

A vehicular activity forecast was also prepared to support the purpose and need as well as provide information required for environmental analysis.

As shown in **Table 2.2.4**, total vehicular trips are estimated to increase from 82,000 in 2010 to 111,000, 129,000 and 145,000 in 2020, 2025 and 2030, respectively. This equates to an average annual growth rate between 2010 and 2025 of 3.1 percent.

Table 2.2.3

Comparison of MSP Aviation Activity Forecasts

	2010	2020	2025
Enplanements			
EA Forecast [(1)]	15,715,059	20,178,920	23,082,899
2011 TAF [(1)]	15,295,616	18,643,055	20,626,495
% difference		8.2	11.9
Operations			
EA Forecast	437,075	484,879	526,040
2011 TAF	427,558	485,065	525,526
% difference		0.0	0.1

Note:
(1) Does not include non-revenue enplanements.

Sources: FAA 2010 Terminal Area Forecast and HNTB analysis, 2011.

Table 2.2.4

Summary of Daily Vehicular Trips

	2010	2020	2025	2030
MSP Airport Total Volume	82,000	111,000	129,000	145,000

Sources: Kimley-Horn and Associates, Inc. and SRF Consulting Group, Inc. analysis, 2011.

2.2.3 Aviation Flight Tracks

Flight tracks were developed in consultation between the FAA Air Traffic Control Tower and MAC. In addition, radar flight track data was also utilized.

The FAA along with representatives from various airlines, airport users, and support contractors and the MAC developed Performance Based Navigation (PBN), which includes Area Navigation (RNAV) and Required Navigation Performance (RNP) procedures for MSP. The proposed PBN procedures were not part of the Proposed Action/Alternatives evaluated in this EA. The PBN procedures have independent utility and are evaluated in a separate environmental review that is currently under review by the FAA Air Traffic Organization (ATO). The PBN procedures will also have their own, separate approval. However, the PBN procedures and associated flight tracks were considered in this Final EA/EAW in the context of cumulative impacts. See Section 5.21.4.2 *Cumulative Effects: Aircraft Noise.*

2.2.4 Current and Future Needs

Actual 2010 data and the EA forecast were used to verify the needs originally identified in the LTCP Update. Detailed planning was conducted to identify aircraft gate requirements, as well as terminal and landside needs for current (2010) and future (2020) conditions. The future needs are based on the assumption that MSP would operate as it currently does with respect to terminal use and the respective airlines use the same terminal in the future as they do today. **Table 2.2.5** shows the current and future needs at MSP. Refer to ***Appendix O***, *Purpose and Need Technical Report*, for more information on how these needs were identified.

2.2.5 Timeframe for Implementation

Subject to completion of the Federal and State environmental approval processes and provided funding is available, construction of the Proposed Action is anticipated to commence in late 2012 and be completed by 2020. Regional roadway improvements out to 2030 have been identified based on the 2030 LTCP and background traffic growth to satisfy FHWA NEPA requirements.

2.3 Requested Federal Actions

The requested Federal actions include FAA approval of the Airport Layout Plan (ALP) and environmental approval of the Sponsor's Proposed Action. Environmental approval would allow the MAC to establish eligibility for funding through the Federal Airport Improvement Program funds or Passenger Facility Charges (PFCs) for eligible airport development, assuming the independent requirements of these programs are met (49 U.S.C. Section 47101 et seq., 49 U.S.C. Section 40117).

The requested Federal actions also include FHWA approval of the Sponsor's Proposed Action. Environmental approval would allow FHWA to approve the Interstate Access Request (IAR) for the proposed Interstate 494 (I-494)/34th Avenue South interchange modifications and other improvements affecting the interstate.

Table 2.2.5

Current and Future Needs at MSP

Airport Component	Current Need (2010)	Future Need (2020)
Gates		
	Additional Gates are needed at Terminal 2-Humphrey to maintain adequate level of service during the winter period from late December through early April. Operations have grown considerably at Terminal 2-Humphrey and as a result the ability to meet the needs of seasonal charters at Terminal 2-Humphrey has deteriorated. Charter carriers submit requests for gate use on a specific day(s) at specific times. During the winter period, the MAC is often unable to accommodate the requested times and must offer alternative times to the charter carriers. The charter carriers may have limited ability to accept the alternative times because their schedules and planned use of their aircraft fleet must be adjusted. As a result, flexibility within Terminal 2-Humphrey is reduced and the level of service is impacted because operators are forced to operate within compressed time periods.	15,000 feet of additional gate frontage to accommodate future fleet
Terminals		
	Concourse E at Terminal 1-Lindbergh requires refurbishing	
	Additional 17,000 square feet of waiting area for the ticket counter in Terminal 1-Lindbergh	Additional 26,000 square feet of waiting area for the ticket counter in Terminal 1-Lindbergh
		Additional 6,000 square feet at security check points in Terminal 1-Lindbergh
	Additional 14,000 square feet at baggage claim in Terminal 1-Lindbergh	Additional 20,000 square feet at baggage claim in Terminal 1-Lindbergh
	International facilities, passenger processing and baggage claim overstressed at daily peak demand	Additional 11,000 square feet for international processing at Terminal 1-Lindbergh and 16 additional processing stations

Table 2.2.5

Current and Future Needs at MSP

Airport Component	**Current Need (2010)**	**Future Need (2020)**
Landside		
	Additional 100 feet of arrival curb roadway at Terminal 1-Lindbergh	Additional 400 feet of arrival curb at Terminal 1-Lindbergh
		14 additional commercial vehicle loading spaces, 13 at Terminal 1-Lindbergh and 1 at Terminal 2-Humphrey
		8,500 additional parking stalls at Terminal 1-Lindbergh
		150 and 350 new rental car spaces at Terminal 1-Lindbergh and Terminal 2-Humphrey, respectively, 81,900 square feet of new QTA area with 79,800 square feet of that area at Terminal 2-Humphrey
Regional Roadways		
		Under existing conditions there are periods of congestion at the existing I-494 and 34th Avenue S. interchange. Westbound I-494 also operates at LOS F during the AM and PM peak hours between TH 77 and 24th Avenue South. Under 2020 No Action conditions the north intersection at the I-494 & 34th Avenue South interchange will operate at an LOS F during the AM peak hour. The south intersection at TH 5 & Post Road will operate at LOS F during the 2020 No Action airport and PM peak hours. Traffic congestion on I-494 and TH 77 is also anticipated under 2020 No Action conditions. Roadway improvements are necessary to reduce congestion on the regional roadway network in 2030 under either the No Action or Build Alternative.

Source: Purpose and Need Technical Report, MAC and HNTB, 2012.

Endnotes

[1] Metropolitan Airports Commission, MSP Long Term Comprehensive Plan Update, 7/26/10, p.E.1.

[2] Federal Aviation Administration, Terminal Area Forecast Summary Fiscal Years 2010-2030, p. 3.

[3] FAA, *Review and Approval of Aviation Forecasts*, June 2008, p. 1.

Chapter 3: ALTERNATIVES

The evaluation of reasonable alternatives is considered the heart of the National Environmental Policy Act (NEPA) process according to the Council on Environmental Quality (CEQ). This chapter describes the alternatives considered.

A range of alternatives were identified and evaluated to determine if they were reasonable, i.e., met the purpose and need. Reasonable alternatives were then screened and the alternatives to be analyzed in detail within the NEPA document were determined.

When identifying alternatives, it is customary to consider both off-site and on-site alternatives. The following sections describe the off-site and on-site alternatives and whether they are reasonable.

3.1 Off-Site Alternatives

The evaluation of off-site alternatives included consideration of the use of other airports as well as other modes of transportation.

3.1.1 Other Airports

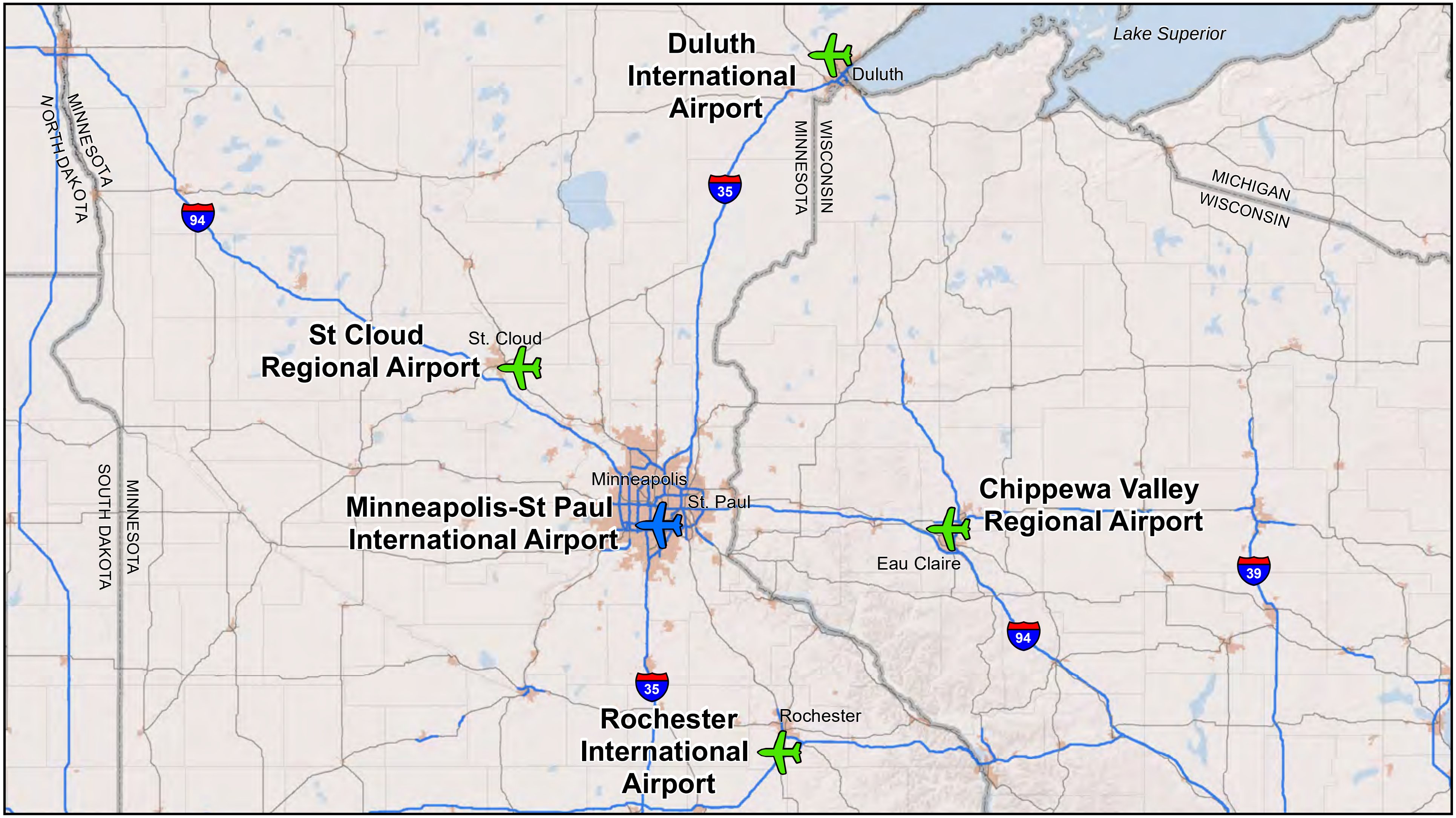
The use of another airport or airports was considered in the analysis of alternatives. Specifically, the ability to divert passengers to another airport(s) and thereby reduce/eliminate the need for improvements at Minneapolis-St. Paul International Airport (MSP) was assessed.

The first step in evaluating the Other Airports Alternative was to identify the airports with the most potential to draw passengers away from MSP. The Tier 2 Air Service Study[1] served as the basis for identifying these airports.

The Tier 2 Air Service Study was completed in 2003 by the Minnesota Department of Transportation Office of Aeronautics. The purpose of the Tier 2 Air Service Study was to explore how the perimeter regional airports or Tier 2 Airports could contribute to an inter-regional system of passenger airports surrounding the Minneapolis – St. Paul area. The Tier 2 Airports include:

- Duluth International Airport (DLH)
- Rochester International Airport (RST)
- Chippewa Valley Regional Airport (EAU)
- St. Cloud Regional Airport (STC)

While the Tier 2 Air Service Study is now eight years old, it remains relevant for the purposes of evaluating the Other Airports Alternative. The same four airports are of interest because they continue to be the most likely candidates for diverting passengers from MSP. All four of these airports have passenger service facilities, have an air traffic control tower and are located within approximately 70 to 170 drive miles from MSP. The locations of the Tier 2 Airports are illustrated on **Figure 3.1-1**.



LEGEND

Tier 2 Airports

MSP
Tier 2 Airport
Interstate
State Highway
State Line
County Line

0 60 120 Miles

Source: ESRI Data

Disclaimer: This map was generated by HNTB Corporation using GIS (Geographic Information System) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitablity for a particular use. The scale and location of all mapped data are approximate.

In addition, the socioeconomic characteristics of the Tier 2 Airports' market areas have not changed significantly. Therefore, the findings of the study in terms of capture rates are also still relevant.

Once the other airports were identified, three alternative ways in which the Tier 2 Airports might be able to divert passengers from MSP were examined:

- Turn a Tier 2 Airport into a competing connecting hub airport
- Convert a Tier 2 Airport into a low-cost carrier supplemental airport
- Increase the market capture of the Tier 2 Airports

The following sub-sections present a summary of the analysis completed for this EA and the resulting conclusions. A detailed discussion of the analysis is provided in ***Appendix B***, *Potential for Tier 2 Airports to Accommodate Projected MSP Activity.*

3.1.1.1 Competing Connecting Hub

The best opportunity to postpone the need for terminal development at MSP past 2020 would occur if one of the Tier 2 Airports were to develop into a competing connecting hub. Since the airlines determine the location of their connecting hubs, past airline hubbing behavior was considered. Major airlines tend to locate their hubs in large metropolitan areas. Memphis is the smallest metropolitan area currently served by an airline hub in the U.S. The population of Memphis is more than four times larger than the population of the largest populated area associated with any of the Tier 2 Airports. In addition, Memphis is more than a 4-hour drive from the closest competing airline hub – St. Louis. Therefore, it does not face the competitive pressures that Tier 2 Airports would face with their proximity to MSP. Thus, it was concluded that the Tier 2 Airport markets are too small to be considered viable candidates for connecting airline hubs. Additionally, the airline industry trend has been to reduce and consolidate hubbing activities rather than to expand into new communities.

3.1.1.2 Low-Cost Carrier Supplemental Airport

Low-cost carrier behavior was examined to determine the likelihood that a low-cost airline would opt to provide service at a Tier 2 Airport. In the 1980s and 1990s, most low-cost carriers, such as Southwest avoided direct competition with major airlines, by serving large metropolitan areas from supplemental/secondary airports. However, most low-cost carriers' strategies have changed in recent years. Within the past decade, Southwest has elected to challenge its competitors directly by adding service to the primary airport serving major metropolitan areas. MSP is a case in point; Southwest initiated service at Terminal 2-Humphrey in 2009.

Unlike most low-cost carriers, Sun County has always concentrated service at major airports such as MSP. Therefore, Sun Country is less likely than most low-cost carriers to introduce regular service at a Tier 2 Airport.

With the exception of very large markets, airlines prefer to serve a market through a single airport. Concentrating service at a single airport allows airlines to achieve economies of scale and reduce unit costs, while at the same time concentrating demand so that more nonstop markets become viable.

Houston is the smallest market with a significant secondary airport, William P. Hobby Airport, which is much closer to the center of market demand than any of the Tier 2 Airports in the Minneapolis-St. Paul area. Because of its proximity to the metropolitan area, Houston Hobby is much better positioned to compete with George Bush Intercontinental Airport than any of the Tier 2 Airports are positioned to compete with MSP. Additionally, the Houston market is about 25 percent larger than the Minneapolis-St. Paul market.

Therefore, based on recent low-cost carrier behavior and strategies, it was determined that attracting a low-cost carrier to one of the Tier 2 Airports is not likely.

3.1.1.3 Increased Capture of Local Market

The final Tier 2 Airports alternative considered was to divert passengers from MSP by attracting or "capturing" a greater number of the locally based air passengers. For this alternative, travelers that currently drive to MSP to initiate their air travel would instead choose to initiate their travel at a nearby Tier 2 Airport. Analysis was completed to determine whether the potential increased capture of passengers would be enough to delay or eliminate the need for improvements at MSP. The need for terminal-related improvements at MSP is driven by the number of passenger enplanements (departures and arrivals) and the need for landside-related improvements is driven by the number of originating passengers. Therefore, the impact of the increased Tier 2 Airports' capture of passengers on the needs at MSP was measured in terms of the anticipated reduction in passenger enplanements and originating passengers at MSP.

Two scenarios were examined:

- Scenario A - Tier 2 Airports capture 50 percent of the passengers from their local areas that currently use MSP.
- Scenario B – Tier 2 Airports capture 100 percent of the passengers from their local areas that use MSP.

Scenarios A and B reduced the future number of enplaning passengers at MSP by 0.9 percent and 1.8 percent, respectively. Based on these estimated reductions, the need for gate and terminal improvements could be postponed by about six months under Scenario A and for up to a year under Scenario B. Scenarios A and B reduced the future number of originating passengers at MSP by greater percentages, 4.2 percent and 8.5 percent, respectively. Thus, Scenario A could delay the need for landside facilities by about two years, and Scenario B could result in a three- or four-year delay.

It should be noted that, in order for the Tier 2 Airports to attract a greater percentage of air travelers from their local markets they must offer increased airline service. While several of the Tier 2 Airports are involved in aggressive air service development efforts, recent trends show that developing increased service may be difficult to achieve. Currently, airlines are withdrawing service from small airports (both nationally and in Minnesota), as they eliminate smaller aircraft from their fleet and consolidate operations. For example, commercial service at STC ceased in 2010 when Delta Air Lines stopped its scheduled service between MSP and STC and in November 2011 Delta Air Lines eliminated direct service from RST to Detroit Metropolitan Wayne County Airport (DTW). Given this airline trend of withdrawing service, the Tier 2 Airports may not be able to capture traffic that currently drives to MSP and their capture share could actually decline in the future. In that instance, facility expansion at MSP may need to be accelerated slightly.

3.1.1.4 Other Airports - Summary

Neither the development of a competing hub nor a supplemental airport appears likely given current airline behavior and trends. Additionally, even if the Tier 2 Airports are able to capture 100 percent of their markets, the need for MSP terminal and landside improvements would be delayed only temporarily. Therefore, it was concluded that the use of other airports would not meet the purpose and need for the Proposed Action and thus the Other Airports Alternative was dismissed from further consideration.

3.1.2 Other Modes of Transportation

Alternatives involving travel modes other than aviation were also considered. Among the other modes of transportation considered — automobile, bus, and rail — high-speed rail likely has the highest potential to divert passengers from air travel. As with the Other Airports Alternative, the ability to divert passengers and thereby reduce/eliminate the needs at MSP was assessed.

Three potential high-speed rail corridors were considered based on the Minnesota Comprehensive Statewide Freight and Passenger Rail Plan (State Rail Plan). Completed in early 2010, the purpose of the State Rail Plan "is to guide the future of the rail system and rail services in the State.".[2] According to the State Rail Plan one of the priorities for the passenger rail program is "High-Speed Rail passenger service from the Twin Cities to Madison / Milwaukee / Chicago, to Duluth and to Rochester (sustained speeds of 110 mph), with connections in Chicago to numerous other Midwestern cities also via high speed service."[3] Thus, the proposed high-speed rail projects in these corridors were reviewed with respect to their ability to divert passengers from MSP.

3.1.2.1 Twin Cities to Madison/Milwaukee/ Chicago High-speed Rail

The Twin Cities to Madison/ Milwaukee/Chicago corridor is part of the proposed Midwest Regional Rail System (MWRRS). One of the major plan elements of the MWRRS is to operate a "hub-and-spoke" passenger rail system with Chicago as the hub and locations like Minneapolis and Kansas City as the spokes. Another major element is to have the trains travel at speeds up to 110 miles per hour.[4]

The planning process for the section of the corridor between the Twin Cities and Madison/Milwaukee was initiated in 2010 with the commencement of an environmental impact statement (EIS). The EIS will result in the identification of a preferred alternative for the Milwaukee-Twin Cities corridor. The preliminary estimated travel time "between Milwaukee and Minneapolis/St. Paul is 5 hours and 58 minutes (making all stops) and 4 hours and 27 minutes (express)."[5]

Two factors were considered in estimating the number of passengers that could be diverted from air travel to high-speed rail. First, according to America 2050's report *High-Speed Rail in America*, rail competes with air travel for trip distances ranging between 200 to 600 miles. The report states that "To compete with air travel at these distances, very high-speeds must be maintained …"[6] Also, based on case studies of eight European air/rail routes, a high correlation has been found between rail journey time and rail/air share of the market.[7] From these case studies it was concluded that "Under present airport conditions, when a European train can provide city-center to city-center service in less than 3.5 hours, that train can gain a market share of greater than 50% of the aggregate of air and rail combined."[8]

The second factor is that connecting passengers are more difficult to divert to high-speed rail than origin-destination passengers. According to *High-Speed Rail in America*, connecting "…passengers differ from origin-destination passengers in that their destination is the airport, not another point within the metro region. It is therefore more difficult to attract these passengers to rail, even with competitive trip times and frequent service."[9]

Based on these two factors, a rough approximation of the number of diverted passengers was calculated. Given the estimated express travel time of 4 hours and 27 minutes between Milwaukee and Minneapolis/St. Paul, the estimated time between Chicago and Minneapolis/St. Paul would be more than 5 hours. Because this travel time is greater than 3.5 hours, a diversion rate of 50 percent was applied. With travel times greater than 3.5 hours, a 50 percent passenger diversion from air travel to high-speed rail is an aggressive estimation. Also, because of the difficulty in attracting connecting passengers, especially with the anticipated train travel time, the 50 percent diversion rate was applied to origination-destination passengers only.

Based on the forecast prepared for this EA, a total of approximately 859,000 air passengers would travel from the Twin Cities to Madison, Milwaukee and Chicago in 2020 assuming no high-speed rail service would be available. If 50 percent were diverted to high-speed rail in 2020, the forecast of total MSP originations would be reduced by 4.2 percent and the forecast of total enplanements would be reduced by 2.1 percent. These percentages are similar to the percentages that other airports would divert under the Other Airports Alternative. Therefore, similar conclusions can be drawn. The reduction in originating passengers attributed to high-speed rail is similar to the estimated reduction in originating passengers with Scenario A under the Other Airports Alternative. Thus, as with Scenario A, it is concluded that the need for landside improvements could be delayed by about two years. The reduction in enplaning passengers attributed to high-speed rail is similar to the estimated reduction in enplaning passengers with Scenario B under the Other Airports Alternative. Thus, as with Scenario B, it is concluded that the need for gate and terminal improvements could be delayed for up to a year.

3.1.2.2 Northern Lights Express

The Northern Lights Express (NLX) Passenger Rail is a proposed high-speed rail that would provide service between the Twin Cities and Duluth. Trains would travel a 155-mile corridor at top speeds of 110 miles per hour with an estimated trip time of two and one quarter hours.[10]

The potential for the NLX to reduce the need for improvements at MSP was considered. Based on the forecast, approximately 3,200 non-connecting passengers would travel via air between MSP and Duluth in 2020 assuming no high-speed rail service would be available. If 100 percent of these passengers would be diverted to the NLX, the number of originations and enplanements at MSP would decrease by less than 0.1 percent. Thus, the diversion of air travelers to the NLX would have little or no effect on the identified needs at MSP.

3.1.2.3 Zip-Rail

Zip-Rail is the name of the proposed high-speed rail between the Twin Cities and Rochester. Ultimately, high-speed passenger trains would travel at speeds of 150-220+ miles per hour on this route. New tracks would be required along most of the route in order to achieve these speeds. According to the Zip-Rail Web site, "Proponents of the Zip-Rail line are optimistic the line can be developed within the next 10-15 years."[11]

Similar to the NLX, the potential for the Zip-Rail to reduce the need for improvements at MSP was considered. Based on the forecast approximately 1,800 non-connecting passengers would travel via air between MSP and Rochester in 2020 assuming no high-speed rail service would be available. If 100 percent of these passengers would be diverted to the Zip-Rail, the number of originations and enplanements at MSP would decrease by less than 0.1 percent. Therefore, it is again concluded that the diversion of air travelers to the ZIP-Rail would have little or no effect on the identified needs at MSP.

3.1.2.4 Other Modes of Transportation - Summary

Considering the modes of transportation other than aviation, high-speed rail likely has the highest potential to divert additional air travelers because it may be able to compete in travel time. Even if the current Minnesota high-speed rail initiatives are implemented, the need for improvements at MSP would be delayed only temporarily. In addition, although these three high speed rail projects may become more viable in the future actual implementation would not likely occur prior to 2020 when the improvements are needed at MSP.

3.2 On-Site Alternatives

The range of on-site alternatives consisted of alternatives to develop new or expanded terminal and landside facilities at MSP to accommodate the anticipated 2020 demand.

3.2.1 New Terminal

The MSP 2020 Concept plan presented in the 1998 Dual Track Final EIS included a new terminal on the west side of MSP.[12] At that time, expansion of Terminal 1-Lindbergh to the east was severely limited by the presence of the Northwest Airlines (NWA) maintenance facility referred to as the Building B Hangar Complex. Therefore, the intent was for the new west side terminal to replace the existing Terminal 1-Lindbergh, which was to be reconfigured to a series of remote concourses. Terminal 2-Humphrey was anticipated to serve only charter operations.

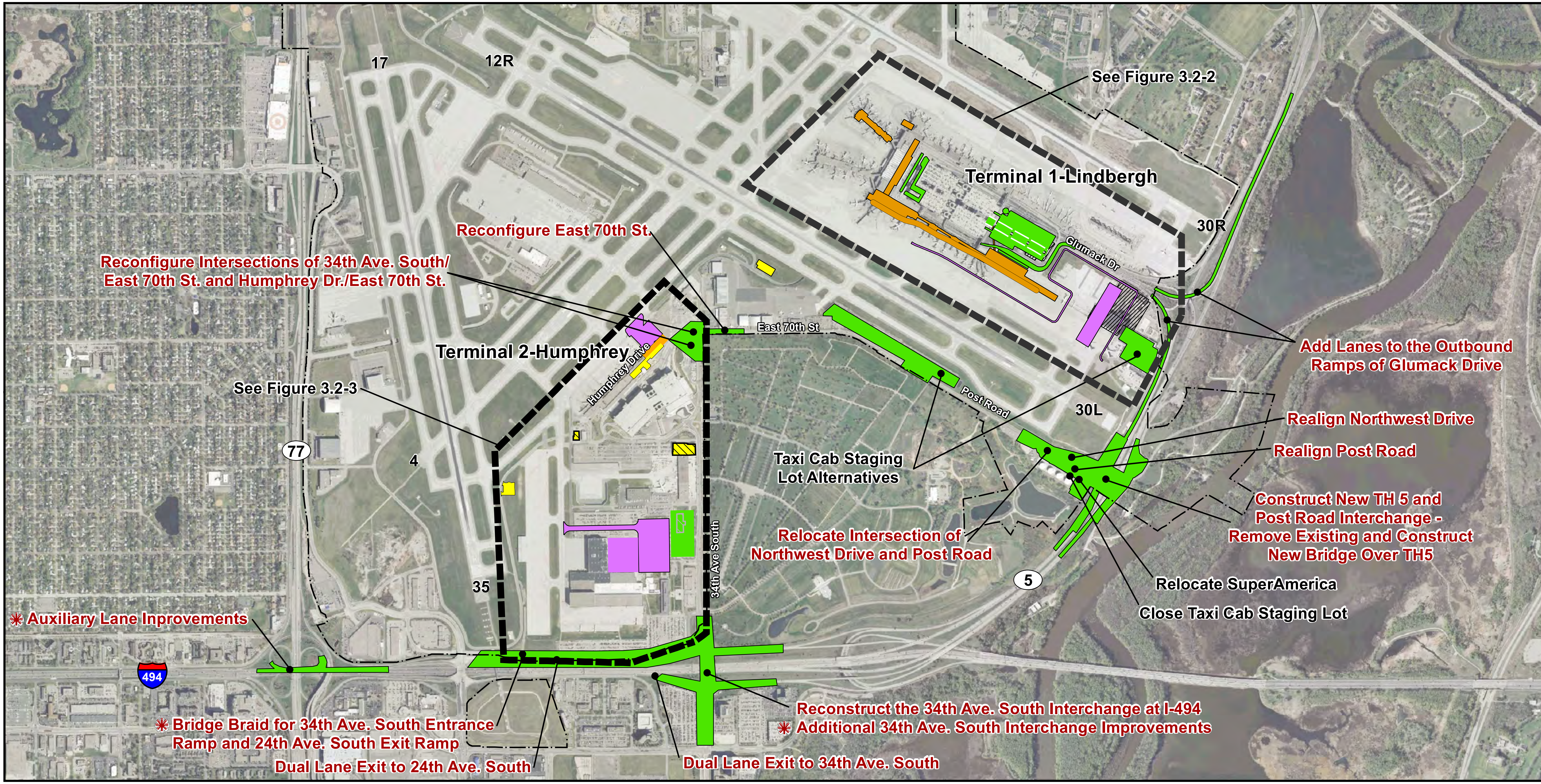
Post 1998, changes in the airline industry along with improvements in the existing airport infrastructure have impacted the feasibility of constructing a west side terminal. In 2005, Northwest Airlines declared bankruptcy and in 2008 announced a merger with Delta Air Lines. These events and an industry change to maintenance outsourcing led to a consolidation of the Northwest Airlines and Delta Air Lines maintenance facilities. This in turn resulted in the return of a significant portion of the Building B Hangar Complex to the MAC which has since been demolished. Therefore, the Building B Hangar Complex no longer limits the eastward expansion of Terminal 1-Lindbergh.

Since 1998, as part of the MSP 2010 Airport Expansion Plan, significant expansion and improvements were made to the existing terminal system. Forty-six new gates were added at Terminal 1-Lindbergh along with two 9-level general parking ramps and two passenger trams and an expanded Terminal 2-Humphrey was constructed with 10 gates and access to two new parking ramps. Several access road improvements were also constructed including a new Humphrey Drive. A light rail tunnel system was also constructed between the terminals. The Metro Transit operates the light rail between downtown Minneapolis and the Mall of America with stops at Terminal 1-Lindbergh and Terminal 2-Humphrey, facilitating free passenger transfers between the terminals.

The investment needed in both money and time to develop a new west side terminal including reconstructing Terminal 1-Lindbergh into remote concourses, constructing roadways, parking facilities and an underground hub tram as well as relocating the air traffic control tower, etc., would be markedly greater than expanding the current terminal complex. For these reasons as well as the changes in the airline industry, the new west side terminal was not included in the LTCP Update and is eliminated from further consideration.

3.2.2 Airlines Remain Alternative

The Airlines Remain Alternative includes the improvements needed through 2020 presuming that the airlines remain in their current terminals. Regional roadway improvements out to 2030 have been identified based on the 2030 LTCP and background traffic growth to satisfy FHWA NEPA requirements. The gate, terminal, landside, roadway and airside facility improvements consist of those necessary to accommodate the forecasted airlines' growth at each terminal. The specific gate, terminal and landside requirements are identified in ***Appendix O**, Purpose and Need Technical Report*. The following sub-sections describe the proposed infrastructure improvements required to accommodate those needs. The improvements included in the Airlines Remain Alternative are illustrated on **Figure 3.2-1** and listed in **Table 3.2.1**.



LEGEND

- Proposed Terminal Projects
- Proposed Landside/Roadway Projects
- Proposed Airside Projects
- Planned Post 2020
- Projects that are Underway
- Remove and/or Relocate
- MAC Property

Alternative 1 - Airlines Remain

N

0 750 1,500 3,000 Feet

Source: Minneapolis-St. Paul International Airport

Disclaimer: This map was generated by HNTB Corporation using GIS (Geographic Information System) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitablity for a particular use. The scale and location of all mapped data are approximate.

MAC

HNTB

Table 3.2.1

<table>
<tr><th colspan="2">Alternative 1 - Airlines Remain</th></tr>
<tr><th>Terminal 1-Lindbergh</th><th>Terminal 2-Humphrey</th></tr>
<tr><td>• Terminal
– Expand Concourse G
▪ Construct new International Facility
▪ Install new Concourse G tram
– Remodel and reconfigure the terminal lobby
– Reconfigure and expand baggage facilities
– Remodel Concourse E</td><td>• Terminal
– Expand terminal</td></tr>
<tr><td>• Landside / Roadway
Before 2020
– Expand terminal arrivals curb and relocate commercial ground transportation center (GTC)
– Construct a new parking ramp
▪ Relocate portions of Glumack Drive
▪ Remove above-ground portion of Post Office
▪ Extend underground hub tram tunnel
– Add lanes to the outbound ramps of Glumack Drive to Trunk Highway (TH) 5</td><td>• Landside / Roadway
Before 2020
– Construct new Delta Air Lines Employee Parking Ramp
▪ Demolish Building G
– Reconstruct 34th Avenue South interchange at I-494
– Reconfigure the intersections of 34th Avenue South / East 70th Street and Humphrey Drive / East 70th Street
– Reconfigure East 70th Street
– Construct new Trunk Highway (TH) 5 and Post Road Interchange
▪ Remove existing and construct a new bridge over TH 5
▪ Realign Post Road and Northwest Drive
▪ Relocate the intersection of Northwest Drive and Post Road
▪ Relocate SuperAmerica
▪ Close taxi cab staging lot and accommodate displaced taxi cabs
– Construct a dual lane exit from eastbound I-494 to 34th Avenue South
– Construct a dual lane exit from westbound I-494 to 24th Avenue South
After 2020
– Construct auxiliary lane improvement on westbound I-494 between 24th Avenue South and the exit to southbound TH 77
– Construct bridge braid for 34th Avenue South entrance ramp to westbound I-494 and exit ramp to 24th Avenue South from westbound I-494
– Additional expansion of 34th Avenue South interchange at I-494</td></tr>
</table>

Table 3.2.1

Alternative 1 - Airlines Remain	
Terminal 1-Lindbergh	**Terminal 2-Humphrey**
• **Airside** – Relocate Runway 30L deicing pad ▪ Demolish remainder of Building B Hangar Complex – Extend airfield service road – Extend Airport Operations Area (AOA) tunnel and A Street – Relocate Concourse G Fuel Main Line	• **Airside** – Expand terminal apron – Construct Replacement Hangar B Complex ▪ Construct access taxiway ▪ Construct apron

3.2.2.1 Terminal 1-Lindbergh

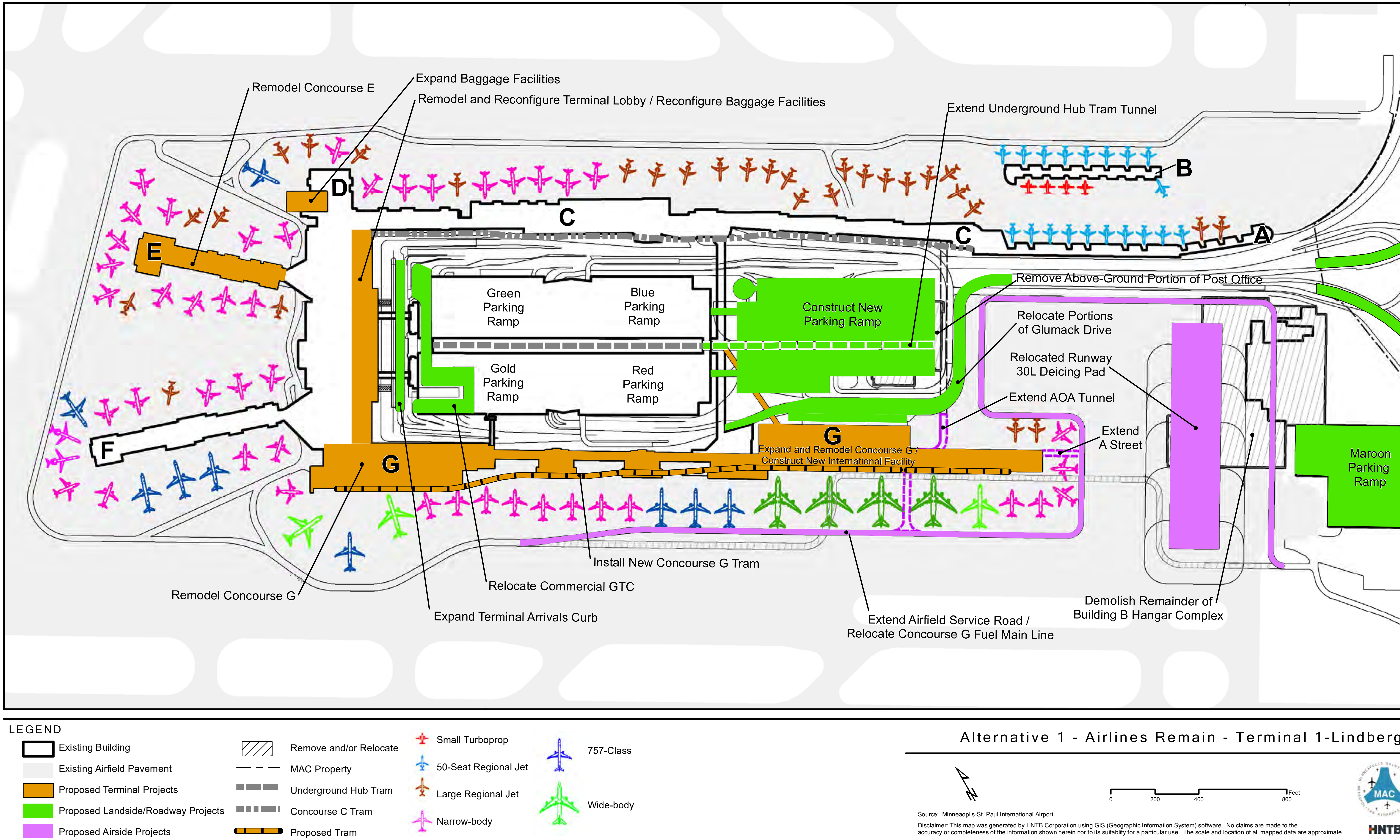
This sub-section identifies proposed terminal, landside/roadway and airside improvements needed at Terminal 1-Lindbergh to implement the Airlines Remain Alternative.

Alternative 1 - Airlines Remain
Terminal 1-Lindbergh
• **Terminal** – Expand Concourse G ▪ Construct new International Facility ▪ Install new Concourse G Tram – Remodel and reconfigure the terminal lobby – Reconfigure and expand baggage facilities – Remodel Concourse E

Expand Concourse G

Expansion of Concourse G would be required to accommodate the needed aircraft gate frontage as well as a new, larger International Facility.

The overall 2020 gate requirements are identified in *Appendix O*, Sub-section 2.3.1. Based on the gated aviation activity forecast for the Airlines Remain Alternative, the number and size of the gates required at Terminal 1-Lindbergh were identified. The type of aircraft dictates the size of the gate including the depth and length of terminal frontage. Using this information, a conceptual layout of the gates was completed. **Figure 3.2-2** depicts the conceptual layout developed for Terminal 1-Lindbergh.



Alternative 1 - Airlines Remain - Terminal 1-Lindbergh

Source: Minneapolis-St. Paul International Airport

Disclaimer: This map was generated by HNTB Corporation using GIS (Geographic Information System) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitability for a particular use. The scale and location of all mapped data are approximate.

At Terminal 1-Lindbergh, the conceptual layout shows how the forecasted fleet would be accommodated at the gates. Modifications to gates and jet bridge locations may be necessary and the terminal would need to be expanded to accommodate the forecasted aircraft fleet. Concourse G is the only concourse with significant adjacent expansion space in part because of the removal/relocation of a significant portion of the Building B Hangar Complex. The conceptual layout shows that Concourse G can be extended to accommodate the required length of terminal frontage. Expansion of Concourse G includes remodeling of the existing gates at the east end of the concourse. All gates in the expanded concourse, as well as the gates from the modified existing concourse, would have the flexibility to accommodate domestic operations or to process international passengers through sterile corridors to US Customs and Border Protection processing.

It is envisioned that the new International Facility, located within the Concourse G expansion, would include development on three levels: gate, ground and below ground. The new ticket lobby and security checkpoint would be on the gate level. The ground level would include a meeter/greeter area and access to curbside pick-up. The curb would also function as a drop-off for departing international passengers. Access to parking, the underground tram and the Ground Transportation Center (GTC) would be provided via a pedestrian tunnel. A tug drive tunnel to the baggage processing area would be constructed one level below grade. Baggage carts would access the tug drive tunnel via an extension of the existing Airport Operations Area (AOA) tunnel.

The extension of Concourse G would also require installation of a new passenger tram system. The new tram is needed based on the findings of the 2006 *G Concourse Tram Study*.[13] The Study indicated that any significant extension of Concourse G, without addition of a tram, would result in an unacceptable customer level of service (LOS) and potential connecting passenger delays due to increased walking distance. Alternative locations were considered for the passenger tram. In order to avoid interference with the jet bridges, the passenger tram had to be constructed at or above the roof level of Concourse G. Options to build the actual tram infrastructure on top of or alongside the roof were evaluated. Locating the tram on top of the concourse would require significant structural improvements. A tram located alongside of the concourse at roof level would be supported as an independent structure. Thus, this option posed less inherent risk and fewer construction challenges and therefore was identified as the preferred option for the tram.

The new passenger tram system would have three roof-level stations; one at the west end of the concourse, one near the Concourse G to C Connector and one above the east end of the expanded Concourse G. The west station would require significant reconfiguration of the area connecting the main terminal building to the vertical circulation serving the station. The center station would require infill at the airside recess between existing gates. Beyond the east station, a facility would be required to provide a service area for the tram vehicles.

Remodel and Reconfigure the Terminal Lobby

The Airlines Remain Alternative would include remodeling and reconfiguring the existing Terminal 1-Lindbergh lobby area and adjacent facilities. Re-configuration would allow for more efficient use of existing space, resulting in additional space for passenger check-in, security checkpoints and adjacent queuing areas.

Reconfigure and Expand Baggage Facilities

Existing and future deficiencies in the baggage claim area would be addressed through a combination of improvements including reconfiguration of the existing areas, installation of new equipment and the construction of additional space. Reconfiguration of the existing baggage claim area would allow for better use of redundant circulation space. In addition, the baggage claim area would be expanded into the existing area allocated to inbound/outbound baggage where bags enter and exit the terminal facility. Thus, additional space would be created for baggage claim device queue areas and replacement of the existing round claim with new lengthened baggage claim devices that provide increased retrieval frontage.

The inbound/outbound baggage areas would be expanded to meet projected demands. The existing areas would be reconfigured to maximize efficiency and expanded at the ground level under Concourse D. An existing baggage storage area would be renovated and an adjacent expansion at the ground level of Concourse D would provide additional space for inbound and outbound baggage operations.

Remodel Concourse E

The Airlines Remain Alternative would include reconfiguring the interior of Concourse E to accommodate restroom upgrades and additions, concessions relocations and hold room modifications. Also, mechanical and technological upgrades and exterior modifications would be included to reduce energy consumption and increase passenger comfort.

Alternative 1 - Airlines Remain

Terminal 1-Lindbergh

- **Landside / Roadway**
  - Expand terminal arrivals curb and relocate commercial GTC
  - Construct a new parking ramp
    - Relocate portions of Glumack Drive
    - Remove above-ground portion of Post Office
    - Extend underground hub tram tunnel
  - Add lanes to the outbound ramps of Glumack Drive to TH 5

Expand Terminal Arrivals Curb and Relocate Commercial GTC

Terminal curb roadway improvements would be needed to address the 400-foot deficiency in arrivals curb length identified in *Appendix O*, Sub-section 2.3.3. Additional arrival curb would be provided by relocating the commercial GTC from the outer curb of the lower level and reconfiguring this area to allow for arriving passenger pick up by privately-owned vehicles (POV). Figure 3.2-2 shows the proposed arrivals curb and relocated commercial GTC.

In order to expand the arrival curbside for the private vehicle pick up, the commercial vehicle activity on the lower level outer roadway would be relocated to a reconfigured GTC on the West Commercial Roadway within the Gold Ramp. The reconfigured commercial GTC would provide more than double the current capacity of 25 vehicles and would accommodate 61 commercial vehicles during the peak period. This would replace the existing east and west commercial GTC combined capacity of 48 vehicles and provide space for an additional 13 vehicles.

Several sites such as the existing transit center were considered for the commercial GTC facility. However, the most efficient solution was to locate the commercial GTC in the Gold Parking Ramp because the necessary infrastructure already exists and this location is close to the terminal thereby maintaining relatively easy wayfinding and providing a high passenger level of service with short walking distances.

In addition, to provide convenient curbside access to and from the International Facility, a new single-level curb roadway would be added adjacent to the east face of Concourse G.

Construct a New Parking Ramp

With the Airlines Remain Alternative, approximately 8,300 additional public (general and short-term) parking spaces would be needed at Terminal 1-Lindbergh in order to meet demand in 2020. It is estimated that approximately 2,300 parking spaces would be required for Terminal 1-Lindbergh employees. To balance supply, it was assumed that approximately 27 percent of the Terminal 1-Lindbergh employees would continue to park at Terminal 2-Humphrey and approximately 1,700 would relocate to Terminal 1-Lindbergh. Therefore, a total of approximately 10,000 parking spaces would be needed.

Also, additional space would be needed for rental car services. Under the Airlines Remain Alternative, services for all rental cars would be provided at the Terminal 1-Lindbergh quick turn-around (QTA) facility. Therefore, approximately 82,000 additional square feet of space dedicated to rental car services at Terminal 1-Lindbergh would be needed in 2020.

Thus, it was determined that additional parking was needed to satisfy both future parking and rental car requirements. Options to provide a parking facility that would meet this need were studied.

The primary criterion for evaluation of the parking facility options was that the new parking facility must provide convenient parking for passengers and employees. Therefore, locations not within a walkable distance from Terminal 1-Lindbergh were eliminated from further consideration.

Various locations for additional parking facilities between the existing Red and Blue Ramps and TH 5 were considered. Based on the number of parking spaces needed and the limited area of available land, it was determined that surface parking was not a viable option. Therefore, various sites for a new parking ramp in the subject area were evaluated. Sites requiring demolition of existing facilities such as the Post Office and Building B were included in the evaluation. The sites were evaluated based on walking distance and the ability for construction to be accomplished in phases. The best site, the site that provided the shortest walking distance while also allowing for phased construction, was the site adjacent to the existing Red and Blue Ramps. This site was thus selected as the preferred option for a new parking ramp because it could accommodate the full parking demand while creating a cohesive landside network and it could be easily constructed in phases.

The new parking ramp with approximately 10,000 parking spaces would require both the relocation of Glumack Drive and the demolition of the aboveground portion of the Post Office. Glumack Drive would be relocated around the footprint of the existing Post Office to accommodate the new ramp construction and to provide access to the proposed International Facility.

The new parking ramp would be constructed above the underground portion of the Post Office in order to retain the existing loading docks. The aboveground portion of the existing Post Office would be demolished. Only a small portion of the aboveground structure currently serves as an actual post office. Given the consolidation efforts that are ongoing in the US Postal Service, similar services could be provided at a nearby community post office. It is not anticipated that a retail post office would be required at the airport. Currently, the belowground portion of the Post Office accommodates airmail processing and cargo activities, and serves as a loading dock. The belowground structure is valuable because it has access to the existing AOA tunnel via which goods can be distributed from the loading dock to the airfield.

The underground hub tram currently transfers travelers and employees between Terminal 1-Lindbergh and parking ramps, auto rental and the light rail station. An extension beyond its current termination point at the existing Red and Blue parking ramps is not required to meet demand in the 2020 timeframe. However, the construction of the hub tram tunnel structure extension would need to be accomplished with the Airlines Remain Alternative as an integral part of the new parking structure. This will allow for open cut excavation of the tunnel as opposed to boring, which minimizes cost, congestion and future service interruptions and provides for improved connectivity and level of service for travelers.

Add Lanes to the Outbound Ramps of Glumack Drive to Trunk Highway (TH) 5

Traffic exiting Terminal 1-Lindbergh under this alternative is anticipated to operate at level of service (LOS) E and LOS F during the peak hours. To mitigate these poor conditions, the exit ramps to both eastbound and westbound TH 5 would be expanded to two lanes. These lanes would be extended in both directions along TH 5 to facilitate safer vehicle merging to TH 5 and increase capacity.

Alternative 1 - Airlines Remain

Terminal 1-Lindbergh

- **Airside**
  - Relocate Runway 30L deicing pad
    - Demolish remainder of Building B Hangar Complex
  - Extend airfield service road
  - Extend AOA tunnel and A Street
  - Relocate Concourse G Fuel Main Line

Relocate Runway 30L Deicing Pad

At MSP deicing pads are located near the ends of the runways that are most frequently used for departures during deicing event weather conditions. Airlines apply deicing fluid to aircraft just prior to takeoff during snow, sleet or icing conditions. The location of the pad is integral to minimizing the timeline between application of the fluid and aircraft departure. Each deicing pad is designed to capture aircraft deicing fluid (glycol) for recycling and to minimize runoff to receiving waters.

The existing Runway 30L deicing pad would be displaced by proposed terminal expansion and would need to be relocated. The new deicing pad would be reconstructed with enhanced deicing fluid capture capabilities.

Given the desire to locate the pad in close proximity to the runway end, only two options for the relocation were considered. The first option was to relocate the pad to the east. In this location the pad could accommodate the necessary aircraft; however, access through and around the pad may be restricted by the existing Maroon parking ramp and Northwest Drive frontage road. While the Maroon parking ramp could be demolished and replaced elsewhere on the campus, access to Terminal 1–Lindbergh via Northwest Drive is critical and needs to be maintained. It is the only access available for deliveries to the Terminal, and there are currently no viable alternatives for relocating this road.

The second option considered, the preferred option, was to orient the pad in a north-south direction and place it where the Building B Hangar Complex currently exists, as shown on Figure 3.2-2. Therefore, the Building B Hangar Complex activities would need to be relocated to a new facility and the old building demolished to accommodate the relocated deicing pad. This deicing pad orientation is also consistent with the long-range plans for the future crossover taxiway identified in the Long Term Comprehensive Plan (LTCP) Update.

The Building B Hangar Complex has been reduced in size in recent years through demolition of the office spaces and five of the seven aircraft hangars. The remaining sections of the complex, currently occupied by Delta Air Lines, would need to be completely demolished in order to allow for the relocation of the Runway 30L deicing pad. This demolition would include:

- Removal of the remaining concrete slab (approximately 750,000 square feet), footings and foundations associated with the portion of the building that was previously demolished.
- Removal of approximately 38,000 square feet of underground tunnel that remains under the existing exposed slab.
- Demolition of 300,000 square feet of structures including two large hangars, three engine test cells and support facilities.
- Remediation of soil and removal of hazardous materials associated with the previous tenant's use of Building B.

Under the Airlines Remain Alternative, the Building B Hangar Complex would be relocated south of Terminal 2–Humphrey as depicted on Figure 3.2-3.

Extend Airfield Service Road

Airfield service roads are marked around terminal areas to define safe areas for vehicles to drive and access gate areas from the airside in order to service airplanes, transfer baggage and to clean and prepare aircraft for departure.

The service road must be in close proximity to the gate areas, and must provide access to all aircraft gates. Thus, the proposed terminal expansion would require an extension to the existing service road in order to provide access to the new gates. This road would also be extended around the newly constructed deicing pad to provide access for vehicles to other areas of the airfield.

Extend AOA Tunnel and A Street
To accommodate the extension of Concourse G, the AOA tunnel that connects the Concourse G airfield service road to the Concourse C airfield service road must be extended under Concourse G. This tunnel is an important asset because it reduces service vehicle travel time and air side congestion. Service vehicles use the tunnel between Concourses A, B and C located north of Glumack Drive and Concourse G located south of Glumack Drive. Without this tunnel, service vehicles would have to travel around Concourses E and F located on the west end of the terminal. The AOA tunnel must be extended to maintain this important route.

Similar to the AOA tunnel, A Street also provides important access between terminal concourses and the airfield at ground level. A Street runs under the G Concourse and is used by luggage tugs and MSP service vehicles. In order to maintain the connection to the airfield, A Street would be extended when the G Concourse is extended.

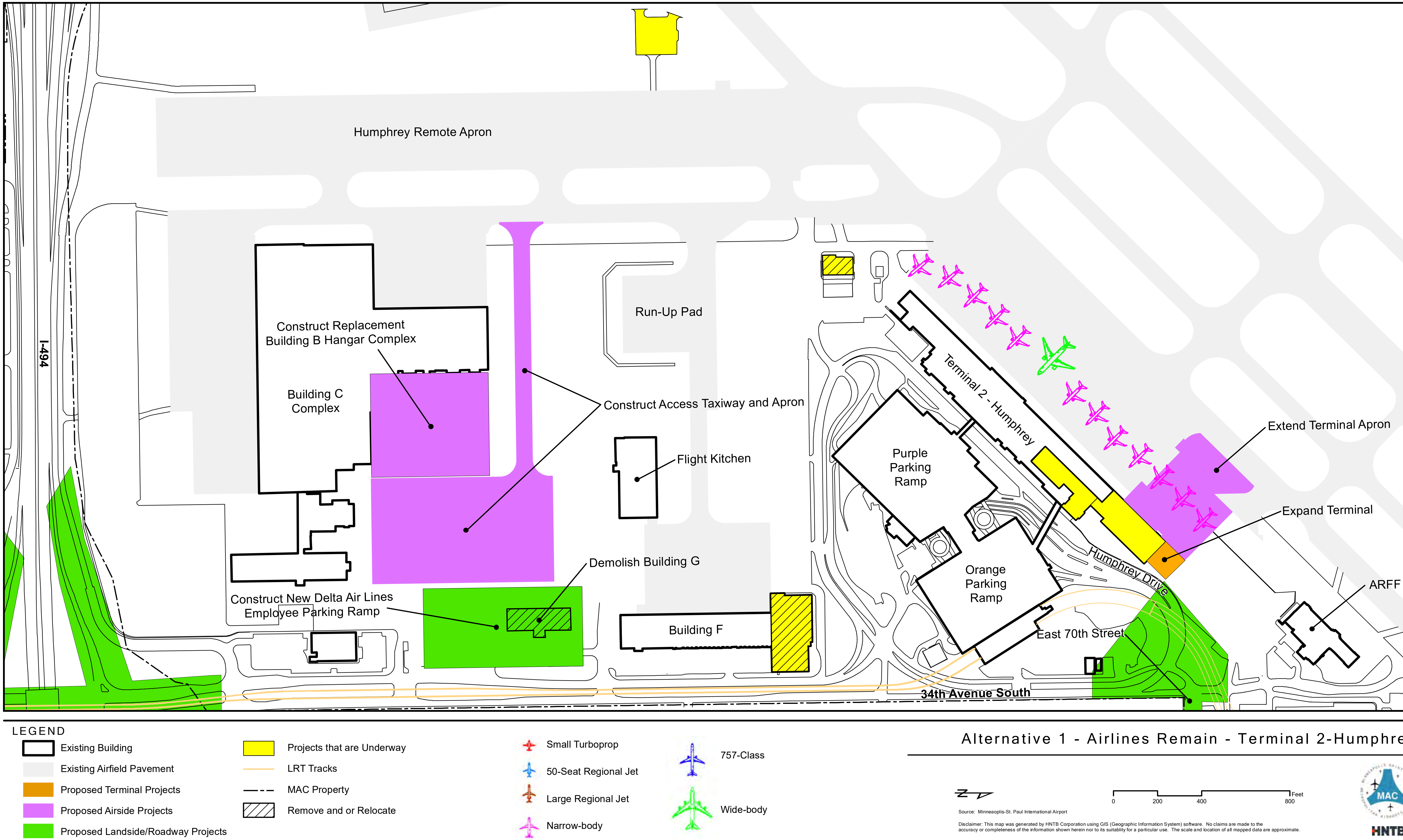
Relocate the Concourse G Fuel Main Line
Extension of Concourse G and construction of a concourse tram system would require the relocation of an existing fuel main line in order to comply with safety separation requirements from the tram columns. The relocated fuel line would serve the existing and new aircraft gates along Concourse G. The main is part of the underground hydrant fueling system and must be located close to the aircraft parking positions at each gate.

3.2.2.2 Terminal 2-Humphrey

This sub-section identifies proposed terminal, landside and airside improvements needed at Terminal 2-Humphrey to implement the Airlines Remain Alternative.

Alternative 1 - Airlines Remain
Terminal 2-Humphrey
• **Terminal** – Expand terminal

The 2020 gated forecast for the Airlines Remain Alternative, shows that three additional narrow-body aircraft gates would be needed at Terminal 2-Humphrey for airline growth of existing or new entrant carriers. Therefore, as part of the Airlines Remain Alternative, Terminal 2-Humphrey would be expanded to accommodate additional gates. The terminal would be expanded to the northeast where space is readily available. **Figure 3.2-3** depicts the expanded terminal and the conceptual gate layout for Terminal 2-Humphrey. The three gates would be constructed as an extension to the northeast end of the Terminal above the new outbound bag handling areas currently approved for development. To provide access to these gates and necessary amenities: additional gate hold room seating, concourse circulation and concession areas would be included in this alternative.



Alternative 1 - Airlines Remain - Terminal 2-Humphrey

Alternative 1 - Airlines Remain

Terminal 2-Humphrey

- **Landside/Roadway**

Before 2020

- Construct new Delta Air Lines Employee Parking Ramp
  - Demolish Building G
- Reconstruct 34th Avenue South interchange at I-494
- Reconfigure intersections of 34th Avenue South / East 70th Street and Humphrey Drive / East 70th Street
- Reconfigure East 70th Street
- Construct new TH 5 and Post Road Interchange
  - Remove existing and construct a new bridge over TH 5
  - Realign Post Road and Northwest Drive
  - Relocate the intersection of Northwest Drive and Post Road
  - Relocate SuperAmerica
  - Close taxi cab staging lot and accommodate displaced taxi cabs
- Construct a dual lane exit from eastbound I-494 to 34th Avenue South
- Construct a dual lane exit from westbound I-494 to 24th Avenue South

After 2020

- Construct auxiliary lane improvement on westbound I-494 between 24th Avenue South and the exit to southbound TH 77
- Construct bridge braid for 34th Avenue South entrance ramp to westbound I-494 and exit ramp to 24th Avenue South from westbound I-494
- Additional expansion of the 34th Avenue South interchange at I-494

For the Airlines Remain Alternative, sufficient parking capacity exists within the existing Terminal 2-Humphrey ramps to accommodate the forecasted growth through 2020. Additionally, existing arrival and departure curb roadway and GTC facilities will provide an acceptable Level of Service (LOS) through 2020. Thus, the only landside related improvement that would be needed, is the construction of a new Delta Air Lines Employee Parking Ramp.

Construct new Delta Air Lines Employee Parking Ramp

Delta Air Lines employees park in surface lots located adjacent to the Building C Complex. The north lot would necessarily be removed in order to construct the Building B Hangar Complex replacement facilities and its associated aircraft apron. Therefore, this Alternative would include the construction of a new elevated parking ramp in order to replace the lost Delta employee parking spaces. The parking ramp would be located adjacent to 34th Avenue South just south of Building F. In order to construct the parking ramp at the selected site building G would be demolished and its cargo receiving function accommodated in the replacement Building B Hangar Complex site.

Reconstruct 34th Avenue South Interchange at I-494

The existing diamond interchange at I-494 / 34th Avenue South would suffer significant queuing and delay in 2020 if not improved. The 2020 Airlines Remain Alternative operations would be anticipated to be similar to the 2020 No Action Alternative operations. Under the 2020 No Action Alternative, it is anticipated that the north ramp intersection would operate at an overall LOS F and several individual turning movements would operate at an LOS E or F throughout the day. Therefore, the Airlines Remain Alternative includes improvements to the 34th Avenue South Interchange at I-494.

Potential interchange concepts to improve the LOS and reduce queuing were assessed as part of the MSP Area Roadway Improvements Project. This project evaluation process commenced in 2010 and is funded by the Metropolitan Airports Commission (MAC), City of Bloomington and Minnesota Department of Transportation. One of the main objectives was to develop interchange concepts at I-494/34th Avenue South, TH 5/Post Road, and TH 5/Glumack Drive. A project management team (PMT) was formed to garner input from key agencies throughout the project duration. The agencies represented on the PMT included the following:

- Metropolitan Airports Commission
- City of Bloomington
- Minnesota Department of Transportation
- Federal Highway Administration
- Federal Aviation Administration
- Metro Transit
- Metropolitan Council
- Minnesota Department of Economic Development

The PMT played a key role in evaluating the interchange concepts and identifying a preferred concept. For the I-494/34th Avenue South Interchange, five concepts were evaluated using evaluation criteria developed by the PMT. Two concepts were based on improving the existing diamond interchange by providing additional grade separated ramps to reduce the volume of traffic that has to travel through the existing signalized intersections. These concepts would ultimately remove left turn movements from the two signal controlled intersections at the I-494 ramp terminals.

Two other concepts were based on a diverging diamond interchange (DDI). The DDI design "…accommodates left turning movements onto arterials and limited access highways while eliminating the need for a left-turn signal phase at signalized ramp terminal intersections. On the cross street, the traffic moves to the left side of the roadway between the signalized ramp intersections. This allows drivers of vehicles on the cross street who want to turn left onto the ramps the chance to continue to the ramps without conflicting with opposing through traffic and without stopping."[14]

The fifth concept featured a Single Point Urban Interchange (SPUI). With the SPUI all thru traffic on the cross-street and all left turns are controlled at a single signalized intersection.

Based on the evaluation criteria, the DDI was selected by the PMT as the preferred concept because it would require little or no right-of-way acquisition, it was the least expensive and it offered the most capacity. Thus, the Airlines Remain Alternative includes the reconstruction of the 34th Avenue South interchange at I-494 to a DDI configuration. Additional information including sketch diagrams of the various concepts can be found in ***Appendix C,*** *MSP Area Roadway Improvements Project Memos*.

Metro Transit has expressed concern regarding potential safety impacts of a DDI configuration that includes light-rail transit. The MAC, City of Bloomington and Mn/DOT all acknowledge a DDI with light-rail transit is unique. To address safety concerns for all agencies involved, a design enhancement study that reviewed several potential design considerations that may improve safety has been completed. The study includes a list of recommendations that should be further considered for incorporation into the design documents. The MAC will continue to work with the City of Bloomington, Mn/DOT and Metro Transit to develop a design that includes additional enhancements. It is noted that the potential safety related design enhancements are not anticipated to have environmental impacts and therefore would not change the evaluations included within this EA.

Construct a dual lane exit from eastbound I-494 to 34th Avenue South

To improve exiting traffic operations along eastbound I-494 at the exit to 34th Avenue South this exit will be converted from a single lane exit to a dual lane exit.

Construct a dual lane exit from westbound I-494 to 24th Avenue South

To improve exiting traffic operations along westbound I-494 at the exit to 24th Avenue South this exit will be converted from a single lane exit to a dual lane exit.

Reconfigure intersections of 34th Avenue South / East 70th Street and Humphrey Drive / East 70th Street

The 34th Avenue South / East 70th Street and Humphrey Drive / East 70th intersections are located to the northeast of Terminal 2-Humphrey as shown on Figure 3.2-3. The eastern intersection, 34th Avenue South / East 70th Street, is an all-way stop controlled intersection. The western intersection, Humphrey Drive / East 70th Street, is signalized. In 2020, these intersections would be anticipated to operate at an LOS F primarily because the intersections are too closely spaced and the eastern intersection is an all-way stop. Therefore, as part of the Airlines Remain Alternative, these intersections would be reconfigured into a single signalized intersection to increase capacity and improve the LOS.

Reconfigure East 70th Street

The Airlines Remain Alternative includes reconfiguring East 70th Street in the vicinity of the reconfigured intersection discussed in the previous sub-section. From the intersection, approximately 750 feet of East 70th Street would be expanded to a four lane divided roadway. The added lanes would allow for the reconfigured signalized intersection of Humphrey Drive, 34th Avenue south and East 70th Street to operate at an acceptable LOS. The new 750-foot long westbound lane would adequately store the westbound queues of traffic on the approach to 34th Avenue South. Without the addition of the second lane, the traffic queue would extend beyond several of the Signature Flight Support access points and thus would result in operational and safety concerns.

Construct new TH 5 / Post Road interchange and realign Northwest Drive

The interchange at TH 5 and Post Road would operate over capacity by 2020 under the No Action Alternative. The intersection of the eastbound TH 5 ramps and Post Road would operate at LOS F during the Airport and PM peak hours. Since the 2020 Airlines Remain Alternative's operations would be similar to the 2020 No Action Alternative's, improvements to increase the capacity of this interchange were included in the Airlines Remain Alternative.

This interchange at TH 5 and Post Road was also studied as part of the MSP Area Roadway Improvements Project. For this interchange, nearby features such as the MAC storm water ponds and the Runway 30L runway protection zone (RPZ) and approach surfaces limited the amount of land available for alternative interchange configurations. Many interchange alternatives that would normally be considered were not feasible due to impacts on adjacent infrastructure. Thus the PMT focused on interchange concepts based on diamond configurations. Various concepts were developed by considering a variety of options to improve capacity that included the following:

- Constructing a new bridge over TH 5 to supplement or replace the existing bridge
- Eliminating or relocating the intersection of Northwest Drive and Post Road
- Relocating the taxi cab staging lot and/or SuperAmerica

Ultimately, the PMT selected a new diamond interchange located south of the existing Post Road and TH 5 interchange. This option was preferred because the existing interchange could be used during construction, access to Northwest Drive could be maintained, and impacts to the RPZ for Runway 30L were minimized. Additional information including concept drawings of the various interchange configurations can be found in *Appendix C*.

Therefore, in order to improve the capacity of the Post Road and TH 5 interchange, the Airlines Remain Alternative includes the construction of a new Post Road and TH 5 diamond interchange. Construction of the new interchange would require the following improvements that are also included in the Airlines Remain Alternative:

- Remove existing and construct a new bridge over TH 5
- Realign Post Road and Northwest Drive
- Relocate the intersection of Northwest Drive and Post Road to the west
- Relocate the SuperAmerica just south of its current location
- Close taxi cab staging lot and accommodate displaced taxi cabs

Alternatives to accommodate the displaced taxi cabs were considered. Two potential sites were identified as viable alternatives: the Maroon Parking Ramp and an existing parking area on the north side of Post Road west of the current facility. Based on transportation analysis minor roadway improvements would be required for either option. To accommodate a taxi staging area at the Post Road location, a new right turn lane along Post Road and modifications to the parking lot entrances and exits would be required. To accommodate a taxi staging area at the Maroon Parking Ramp, the configuration of the Northwest Drive and Post Road intersection would be modified to provide southbound double left turn lanes from Northwest Drive to Post Road.

Other alternatives may become viable prior to the time when the existing taxi cab staging area is closed for the construction of the new diamond interchange at Post Road and TH 5. For instance, technology advances may result in a superior alternative that features a virtual taxi staging area. Therefore, the Sponsor has not identified a preferred alternative to accommodate the displaced taxi cabs as of the writing of this EA. The assessment of potential environmental impacts includes the evaluation of both of the potential relocation sites as part of this EA. If a different alternative to accommodate the taxi cabs is ultimately selected, additional environmental study will be completed and included in a supplement to this EA, if required.

The freeway modeling results show that without additional improvements to I-494 there will be significant congestion on westbound I-494 between TH 77 and 34th Avenue South and at the I-494/34th Avenue South interchange beyond 2020. The following improvements will be made along I-494 to serve the anticipated traffic demand post 2020:

Construct auxiliary lane improvement on westbound I-494 between 24th Avenue South and the exit to southbound TH 77

Construct a bridge braid for the 34th Avenue South entrance ramp to westbound I-494 and exit ramp to 24th Avenue South from westbound I-494.

This improvement allows traffic entering westbound I-494 from 34th Avenue South and traffic exiting from westbound I-494 to 24th Avenue South to cross via grade separation which reduces the weaving conflict on westbound I-494 improving freeway operations.

Additional expansion of the 34th Avenue South interchange at I-494 which will include:

- Modification of the southbound double right-turn lane to a triple right at the westbound I-494 ramps
- Modification of the eastbound left and right turn lanes from double to triple turn lanes at the eastbound I-494 ramps
- Modification of the northbound right to a triple right turn lane at the eastbound I-494 ramps
- Modification of the westbound left turn lane to southbound 34th Avenue from a double to a triple left at the westbound I-494 ramps

Alternative 1 - Airlines Remain

Terminal 2-Humphrey

- **Airside**
  - Expand terminal apron
  - Construct Replacement Hangar B Complex
    - Construct access taxiway
    - Construct apron

Expand Terminal Apron

Expansion of Terminal 2-Humphrey to accommodate three additional gates would require expansion of the adjacent aircraft apron and extension of the existing service road. Expansion of the apron would include not only the construction of concrete apron but also extension of the existing hydrant fueling system and deicing fluid capture facilities. The proposed apron location is tied to the terminal expansion, so there are no alternative sites for the apron.

<u>*Construct Replacement Building B Hangar Complex*</u>

Delta Air Lines currently provides maintenance and storage of aircraft, engines and ground support equipment (GSE) at the Building B Hangar Complex. Delta Air Lines plans to continue providing these services as part of its hubbing operation at MSP. Therefore, the relocated Building B Hangar Complex is expected to require the following services/shops and associated areas:

- Engine shop with test cells and associated engine storage (approximately 92,000 square feet).
- GSE maintenance shop (approximately 41,000 square feet) along with an exterior storage area for vehicles and equipment.
- Two large aircraft hangars, able to accommodate wide-body aircraft for maintenance, and the associated storage, personnel offices, break rooms and support areas for the maintenance operations (approximately 165,000 square feet).

In addition to providing a total of nearly 300,000 square feet of interior space, the new facility would require an apron area and airfield access so that large aircraft can move to and from the new hangar space.

Alternative locations that would accommodate the space and access needed for the relocated Building B Hangar Complex were considered. There is very little area available on the airport for development, particularly with airside access. Therefore, the options were limited to three areas: two areas adjacent to Longfellow Avenue South, one just north, and one just south of the West Cargo Apron, and one area adjacent to the Building C Complex. Based on preliminary layouts of the needed facilities, the airspace-related height restrictions for the areas adjacent to Longfellow Avenue South would limit the available parking for wide-body aircraft. The area adjacent to the Building C Complex is further from a runway than the Longfellow Avenue South areas, and therefore has fewer height restrictions and would allow for more flexibility for wide-body aircraft parking and service. Also, this area has the added advantage of being adjacent to Delta's other maintenance facilities. Therefore, the Building B Hangar Complex would be reconstructed in the area adjacent to the Building C Complex. The proposed new Building B Hangar Complex, associated apron and access taxiway are shown on Figure 3.2-3.

3.2.3 Airlines Relocate Alternative

The Airlines Relocate Alternative includes the improvements needed through 2020 presuming that the non-SkyTeam airlines currently located in Terminal 1-Lindbergh are relocated to Terminal 2-Humphrey. Regional roadway improvements out to 2030 have been identified based on the 2030 LTCP and background traffic growth to satisfy FHWA NEPA traffic, traffic-related air quality and traffic-related noise evaluation requirements.

This Alternative was developed during the LTCP Update when it was determined that MSP's 2-terminal system could be used more efficiently. Several factors contributed to this determination:

- Facilities at Terminal 1-Lindbergh, such as the bag claim, security check points and arrivals curb roadway are already congested. As passenger activity continues to grow, conditions at Terminal 1-Lindbergh will further deteriorate.

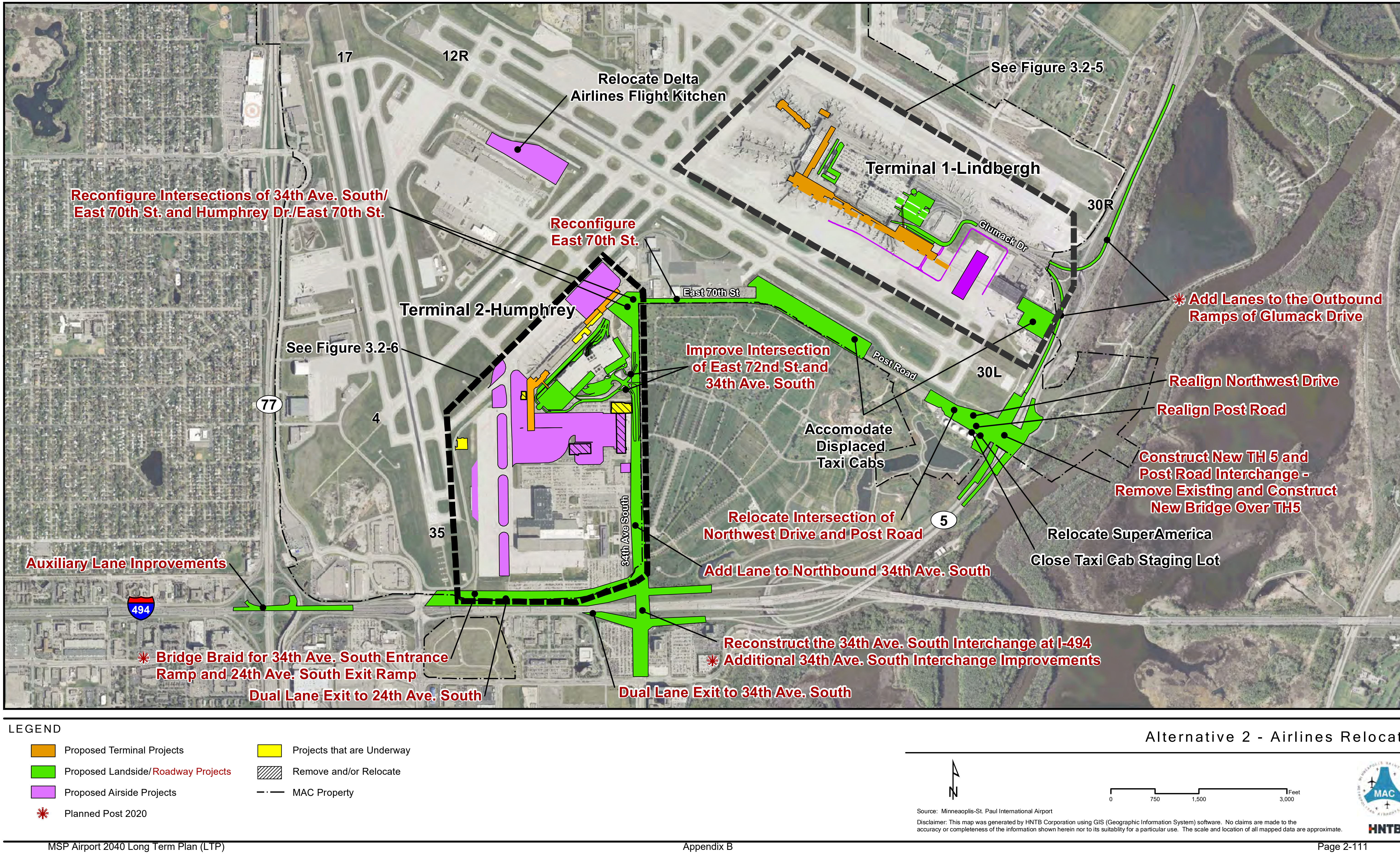
- Different types of airline operations require different passenger facilities. Delta Air Lines operates a major hub at MSP within Terminal 1-Lindbergh. Approximately 60 percent of Delta Air Lines' passengers at MSP are connecting passengers who do not begin or end their trips at MSP; they simply fly through on their way to another airport. These connecting passengers do not normally use baggage claim facilities, ticketing facilities, roadways or parking at MSP.

- Future expansion of the terminal and landside facilities at Terminal 2-Humphrey is more feasible than expansion at Terminal 1-Lindbergh because there is more available land and the supporting landside parking facilities have capacity to serve more passengers.

The LTCP Update concluded that relocating the non-SkyTeam airlines to Terminal 2-Humphrey would relieve some constraints at Terminal 1-Lindbergh.

The MAC proposed improvements based on the LTCP Update conclusions and recommendations. These improvements form the Airlines Relocate Alternative. The specific improvements are illustrated on **Figure 3.2-4** and listed in **Table 3.2.2**. The improvements address the forecasted terminal, landside/roadway and airside needs at each terminal complex. The specific needs at each terminal vary from those identified in *Appendix O*. This is because the analysis of future need conducted for *Appendix O* is based on the airlines remaining at their current terminal while the specific Airline Relocate Alternative improvements are based on relocating the non-SkyTeam airlines to Terminal 2-Humphrey. Regardless, the Airlines Relocate Alternative meets the purpose and need for the proposed project by accommodating expected demand at MSP such that the level of service is acceptable through the 2020 planning timeframe.

It is noted that the Airlines Relocate Alternative would provide terminal capacity beyond what is needed in 2020, albeit at a reduced level of service. Upon relocation of the non-Sky Team airlines, terminal space would become available at Concourse E in Terminal 1-Lindbergh. Not all of the available terminal space at Concourse E would be needed by 2020 to accommodate the forecasted SkyTeam partner's growth. Therefore, once this space is renovated, it would be available for growth in operations beyond the year 2020.



Alternative 2 - Airlines Relocate

Source: Minneapolis-St. Paul International Airport

Disclaimer: This map was generated by HNTB Corporation using GIS (Geographic Information System) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitablity for a particular use. The scale and location of all mapped data are approximate.

Table 3.2.2

Alternative 2 - Airlines Relocate	
Terminal 1-Lindbergh	**Terminal 2-Humphrey**
• **Terminal** – Expand and Remodel Concourse G ▪ Construct new International Facility ▪ Install new Concourse G tram – Remodel and reconfigure the terminal lobby – Reconfigure and expand baggage claim area – Remodel Concourse E	• **Terminal** – Expand terminal
• **Landside / Roadway** **Before 2020** – Expand terminal arrivals curb and relocate commercial GTC – Construct a new parking ramp ▪ Relocate portions of Glumack Drive ▪ Extend underground hub tram tunnel **After 2020** – Add dual lane exits to the outbound ramps from Glumack Drive to Trunk Highway (TH) 5	• **Landside / Roadway** **Before 2020** – Expand terminal curb – Expand existing and construct new parking ramps – Reconstruct 34th Avenue South interchange at I-494 – Add lane to Northbound 34th Avenue South – Improve intersection of East 72nd Street and 34th Avenue South – Reconfigure the intersections of 34th Avenue South / East 70th Street and Humphrey Drive / East 70th Street – Reconfigure East 70th Street – Construct a new Trunk Highway (TH) 5 and Post Road Interchange ▪ Remove existing and construct new bridge over TH 5 ▪ Realign Post Road and Northwest Drive ▪ Relocate the intersection of Northwest Drive and Post Road ▪ Relocate SuperAmerica ▪ Close taxi cab staging lot and accommodate displaced taxi cabs – Construct a dual lane exit from eastbound I-494 to 34th Avenue South – Construct a dual lane exit from westbound I-494 to 24th Avenue South – Construct auxiliary lane improvement on westbound I-494 between 24th Avenue South and the exit to southbound TH 77 **After 2020** – Construct bridge braid for 34th Avenue South entrance ramp to westbound I-494 and exit ramp to 24th Avenue South from westbound I-494 (post 2020) – Additional expansion of the 34th Avenue South interchange at I-494 (post 2020)

Table 3.2.2

Alternative 2 - Airlines Relocate	
Terminal 1-Lindbergh	**Terminal 2-Humphrey**
• **Airside** – Relocate Runway 30L deicing pad – Relocate airfield service road – Extend AOA tunnel and A Street – Relocate Concourse G Fuel Main Line	• **Airside** – Expand terminal apron – Construct Remain Overnight (RON) aircraft apron ▪ Construct new taxiway ▪ Demolish Building F – Relocate run-up pad – Demolish and relocate Delta Air Lines Flight Kitchen – Relocate GSE facility

3.2.3.1 Terminal 1-Lindbergh

This sub-section identifies proposed terminal, landside/roadway and airside improvements needed at Terminal 1-Lindbergh to implement the Airlines Relocate Alternative.

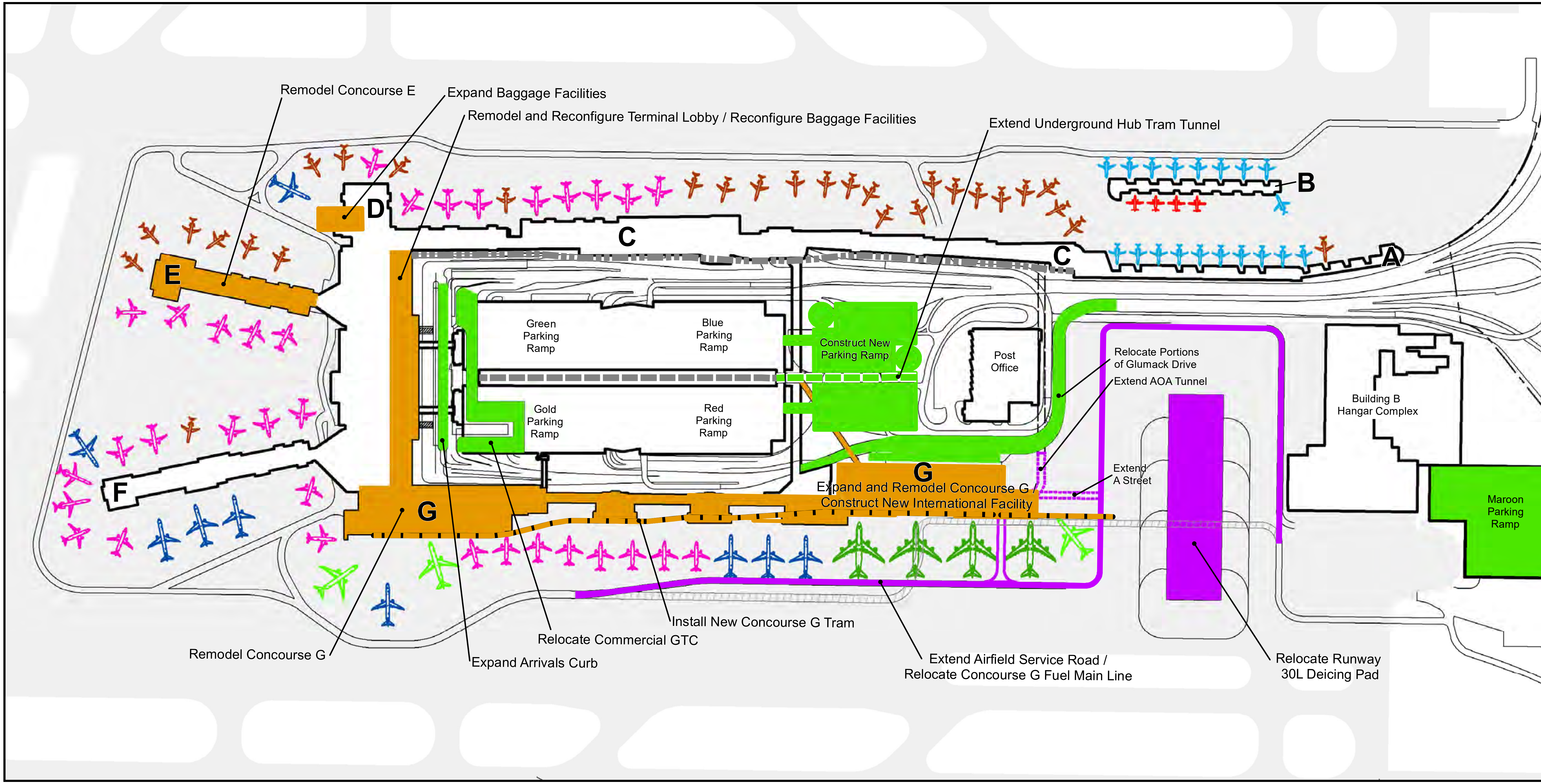
Alternative 2 - Airlines Relocate
Terminal 1-Lindbergh
• **Terminal** – Expand and Remodel Concourse G ▪ Construct new International Facility ▪ Install new Concourse G tram – Remodel and reconfigure the terminal lobby – Reconfigure and expand baggage claim area – Remodel Concourse E

The following sub-sections briefly describe the Terminal 1-Lindbergh improvements proposed as part of the Airlines Relocate Alternative. It is noted that, with the exception of the extent of the Concourse G expansion, most of the terminal improvements included in the Airlines Remain Alternative would also be included in the Airlines Relocate Alternative.

Expand and Remodel Concourse G

Expansion and Remodeling of Concourse G would be required to accommodate the needed aircraft gate frontage as well as a new larger International Facility. Based on the gated aviation activity forecast for the Airlines Relocate Alternative, the number and size of the gates required at Terminal 1-Lindbergh were identified. Using this information, a conceptual layout of the gates was completed. **Figure 3.2-5** depicts the conceptual layout developed for Terminal 1-Lindbergh under the Airlines Relocate Alternative.

At Terminal 1-Lindbergh, the conceptual layout shows how the forecasted fleet will be accommodated at the gates. Modifications to gates and jet bridge locations may be necessary and the terminal would need to be expanded to accommodate the forecasted aircraft fleet. Since Concourse G was the sole concourse



LEGEND

Existing Building	Remove and/or Relocate	Small Turboprop
Existing Airfield Pavement	MAC Property	50-Seat Regional Jet
Proposed Terminal Projects	Underground Hub Tram	Large Regional Jet
Proposed Landside/Roadway Projects	Concourse C Tram	Narrow-body
Proposed Airside Projects	Proposed Tram	757-Class
		Wide-body

Alternative 2 - Airlines Relocate - Terminal 1-Lindbergh

Feet
0 200 400 800

Source: Minneapolis-St. Paul International Airport

Disclaimer: This map was generated by HNTB Corporation using GIS (Geographic Information System) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitability for a particular use. The scale and location of all mapped data are approximate.

HNTB

with significant adjacent expansion space available, the conceptual layout shows that Concourse G would be expanded or extended to accommodate the required length of terminal frontage. Expansion of Concourse G includes remodeling of the existing gates at the east end of the concourse. All gates in the expanded concourse, as well as the gates from the modified existing concourse, would have the flexibility to accommodate domestic operations or to collect arriving international passengers through sterile corridors to US Customs and Border Protection processing.

As would be expected, the required expansion of Concourse G with the Airlines Relocate Alternative is less than that required with the Airlines Remain Alternative. This is because all of the non-SkyTeam partners would move out of Terminal 1-Lindbergh with the Airlines Relocate Alternative.

It is envisioned that the new International Facility, located within the Concourse G expansion, would include development on three levels: gate, ground and below ground. The new ticket lobby and security checkpoint would be on the gate level. The ground level would include a meeter/greeter area and access to curbside pick-up. The curb would also function as a drop-off for departing international passengers. Access to parking, the underground hub tram and the GTC would be provided via a pedestrian tunnel. A tug drive tunnel to the baggage processing area would be constructed one level below grade. Baggage carts would access the tug drive tunnel via an extension of the existing AOA tunnel.

The extension of Concourse G would also require installation of a new passenger tram system. The new tram is needed based on the findings of the *G Concourse Tram Study*.[15] The study indicated that any significant extension of Concourse G, without addition of a tram, would result in an unacceptable LOS and potential connecting passenger delays due to increased walking distance. Alternative locations were considered for the passenger tram. In order to avoid interference with the jet bridges, the passenger tram had to be constructed at or above the roof level of Concourse G. Options to build the actual tram infrastructure on top of or alongside the roof were evaluated. Locating the tram on top of the concourse would require significant structural improvements. The tram located alongside of the concourse at roof level would be supported on an independent structure as opposed to on top of the existing Concourse G structure. Thus, this option posed less inherent risk and fewer construction challenges and therefore was identified as the preferred option for the tram location.

The passenger tram would be the same length as with the Airlines Remain Alternative in order to facilitate future expansion of Concourse G as shown in the LTCP Update. Building the full length of the tram as part of the Airlines Relocate Alternative would prevent expensive modifications when further extension of Concourse G is needed post 2020.

The new passenger tram system would have three roof-level stations; one at the west end of the concourse, one near the Concourse G to C Connector and one above the east end of the expanded Concourse G. The west station would require significant reconfiguration of the area connecting the main terminal building to the vertical circulation serving the station. The center station would require infill at the airside recess between existing gates. Beyond the east station, a facility would be required to provide a service area for the tram vehicles.

Remodel and Reconfigure the Terminal Lobby

The Airlines Relocate Alternative would include remodeling and reconfiguring the existing Terminal 1-Lindbergh lobby area and adjacent facilities. Re-configuration would allow for more efficient use of existing space thus resulting in additional space for the security checkpoints and adjacent queuing area.

Reconfigure and Expand Baggage Claim Area

The Airlines Relocate Alternative includes the same improvements to the baggage claim area as does the Airlines Remain Alternative. Existing and future deficiencies in the baggage claim area would be addressed through a combination of improvements: reconfiguration of the existing areas, installation of new equipment and the construction of additional space. Reconfiguration of the existing baggage claim area would allow for better use of redundant circulation space. In addition, the baggage claim area would be expanded into the existing area allocated to inbound/outbound baggage where bags enter and exit the terminal facility. Thus, additional space would be created for baggage claim device queue areas and replacement of the existing round claim with new lengthened baggage claim devices that provide increased frontage.

The inbound/outbound baggage areas would be expanded to meet projected demands. The existing areas would be reconfigured to maximize efficiency and expanded at the ground level under Concourse D. An existing baggage storage area would be renovated and an adjacent expansion at the ground level of Concourse D would provide additional space for inbound and outbound baggage operations.

These improvements would address current deficiencies that require enhanced capacity prior to the relocation of the non-SkyTeam airlines from Terminal 1-Lindbergh to Terminal 2-Humphrey. After the relocation of the non-SkyTeam airlines, the improved Terminal-1 Lindbergh baggage claim would provide a high level of passenger service and capacity to accommodate continued growth.

Remodel Concourse E

The Airlines Relocate Alternative would include remodeling the interior of Concourse E to accommodate restroom upgrades and additions, concessions relocations and hold room modifications. Also, mechanical and technological upgrades and exterior modifications would be included to reduce energy consumption.

Alternative 2 - Airlines Relocate

Terminal 1-Lindbergh

- **Landside / Roadway**

Before 2020

- Expand terminal arrivals curb roadway and relocate commercial GTC
- Construct a new parking ramp
  - Relocate portions of Glumack Drive
  - Extend underground hub tram tunnel

After 2020

- Add dual lane exits to the outbound ramps from Glumack Drive to Trunk Highway (TH) 5

The Airlines Relocate Alternative would result in the movement of airlines and passengers from Terminal 1-Lindbergh to Terminal 2-Humphrey which would shift demand on the landside facilities. Although demand would shift to Terminal 2-Humphrey, many facilities would continue to operate at or over capacity at Terminal 1-Lindbergh without modifications. Thus, necessary improvements to Terminal 1-Lindbergh landside facilities are described in the following sub-sections.

Expand Terminal Curb Roadway and Relocate Commercial GTC

Terminal curb roadway improvements would be needed to address the deficiency in arrivals curb length. This deficiency would be reduced with the shift in passengers to Terminal 2-Humphrey; however, to ensure passenger level of service is not diminished, additional arrival curb is still necessary. This would be provided by relocating the commercial GTC from the outer curb of the lower level, and reconfiguring this area to allow for arriving passenger pick up by privately-owned vehicles (POV).

In order to expand the arrivals curbside for POV pick up, the commercial vehicle activity occurring on the lower level outer roadway would be relocated to a reconfigured commercial GTC on the West Commercial Roadway within the Gold Ramp. The reconfigured commercial GTC would provide more than double the current capacity of 25 vehicles and would accommodate 61 vehicles during the peak period. This would replace the existing east and west commercial GTC combined capacity of 48 vehicles and provide space for an addition 13 vehicles.

In addition, to provide convenient curbside access to and from the International Facility, a new single-level curb roadway would be added adjacent to the east face of Concourse G.

Construct New Parking Ramp

With the Airlines Relocate Alternative, the deficiency in the number of Terminal 1-Lindbergh general parking spaces would be reduced. However, 2,400 additional public parking spaces (general and short-term) would still be needed at Terminal 1-Lindbergh in order to meet demand in 2020. In addition, it was recognized that employees working at Terminal 1-Lindbergh but currently parking at Terminal 2-Humphrey would be better served if they could park at Terminal 1-Lindbergh. It is estimated that approximately 1,500 parking spaces would be required for these employees. Therefore, a total of 3,900 parking spaces would be needed.

Under the Airlines Relocate Alternative, services for Terminal 2-Humphrey rental cars would be provided at a new Terminal 2-Humphrey QTA facility. As a result of this shift, adequate rental car service area would be available at Terminal 1-Lindbergh and no expansion would be needed.

To meet the parking space needs, it was determined that a new parking ramp would be required. Alternatives for siting the new parking ramp were considered in the same manner as for the Airlines Remain Alternative. Therefore, locations not within a walkable distance from Terminal 1-Lindbergh were eliminated from consideration.

Various locations for additional parking facilities between the existing Red and Blue Ramps and TH 5 were considered. Based on the number of parking spaces needed and the limited amount of available land, it was determined that surface parking was not a viable option. Therefore, various sites for a new parking ramp in the subject area were evaluated. Sites requiring demolition of existing facilities such as the Post Office and Building B Hangar Complex were included in the evaluation. The sites were evaluated based on walking distance and the ability for construction to be accomplished in phases. The best site, the site that provided the shortest walking distance while also allowing for phased construction, was the site adjacent to the existing Red and Blue Ramps. This site was thus selected as the preferred option for a new parking ramp because it could accommodate the full parking demand while creating a cohesive landside network and it could be easily constructed in phases.

Because fewer additional parking spaces are needed with the Airlines Relocate Alternative, it was determined that the new ramp could be accommodated between the existing Blue and Red Ramps and the existing Post Office, leaving the Post Office in service. Alternatives without additional vertical circulation and without vehicular access between the existing ramps were eliminated because of customer service concerns.

The proposed configuration would provide a uniform entrance plaza, maximize available space and connectivity and maintain future growth potential. An approximately 4,700-space structure would be provided on the selected site located east of the existing ramps. Development would require relocation of Glumack Drive around the Post Office to accommodate the new ramp construction and provide easy access to the proposed International Facility curb roadway. The additional 1,000 spaces above the needed amount are the result of building out the footprint of the parking structure and would allow for growth beyond 2020.

Just as with the Airlines Remain Alternative, the extension of the underground hub tram beyond its current termination point at the existing Red and Blue parking ramps would not be needed to meet demand in the 2020 timeframe. However, the construction of the tunnel structure would be included in the Airlines Relocate Alternative because constructing it as an integral part of the new parking structure would allow for open cut excavation, which minimizes cost, congestion and service interruptions after the ramp is constructed and in service.

The freeway modeling results show that without additional improvements at the Trunk Highway (TH) 5/Glumack Drive interchange there will be significant congestion exiting Terminal 1-Lindbergh post 2020. The following improvements will be made at the TH 5/Glumack Drive interchange to serve the anticipated traffic demand after 2020:

Add dual lanes exits to the outbound ramps from Glumack Drive to Trunk Highway (TH) 5

Alternative 2 - Airlines Relocate

Terminal 1-Lindbergh

- **Airside**
  - Relocate Runway 30L deicing pad
  - Relocate airfield service road
  - Extend AOA tunnel
  - Relocate Concourse G Fuel Main Line

Relocate Runway 30L Deicing Pad

As with the Airlines Remain Alternative, the Runway 30L existing deicing pad would be displaced by the terminal expansion and therefore would be relocated. Given the desire to locate the pad in close proximity to the runway end, only two sites for the relocation were considered. The first alternative was to relocate the pad to the east. The second alternative was to orient the pad north-south and fit it in between the new terminal and the existing Building B Hangar Complex. Upon further consideration, it was determined that the first alternative would not work because, during deicing conditions, the access doors to the aircraft maintenance hangar, Building B, would be blocked. Therefore, the Airlines Relocate Alternative includes relocating the Runway 30L deicing pad by constructing a new north-south-oriented pad between the expanded terminal and the Building B Hangar Complex.

Relocate Airfield Service Road

The service road must be located close to the gate areas, and must provide access to all aircraft gates. Thus, the terminal expansion would require an extension to the existing service road in order to provide access to the new gates. This road would also be extended to route around the relocated deicing pad in order to provide access for vehicles to eastern portions of the airfield.

Extend AOA Tunnel and A Street

To accommodate the extension of Concourse G, the AOA tunnel that connects the Concourse G airfield service road to the Concourse C airfield service road must be extended under Concourse G. This tunnel is an important asset because it reduces service vehicle travel time and air side congestion. Service vehicles use the tunnel between Concourses A, B and C located north of Glumack Drive and Concourse G located south of Glumack Drive. Without this tunnel, service vehicles would have to travel around Concourses E and F located on the west end of the terminal. The AOA tunnel must be extended to maintain this important route.

Similar to the AOA tunnel, A Street also provides important access between terminal concourses and the airfield at ground level. A Street runs under the G Concourse and is used by luggage tugs and MSP service vehicles. In order to maintain the connection to the airfield, A Street would be extended when the G Concourse is extended.

Relocate the Concourse G Fuel Main Line

Extension of Concourse G and construction of a concourse tram system would require the relocation of an existing fuel main line in order comply with safety separation requirements from the tram columns. The relocated fuel line would serve the existing and new aircraft gates along Concourse G. The main is part of the underground hydrant fueling system and must be located close to the aircraft parking positions at each gate.

3.2.3.2 Terminal 2-Humphrey

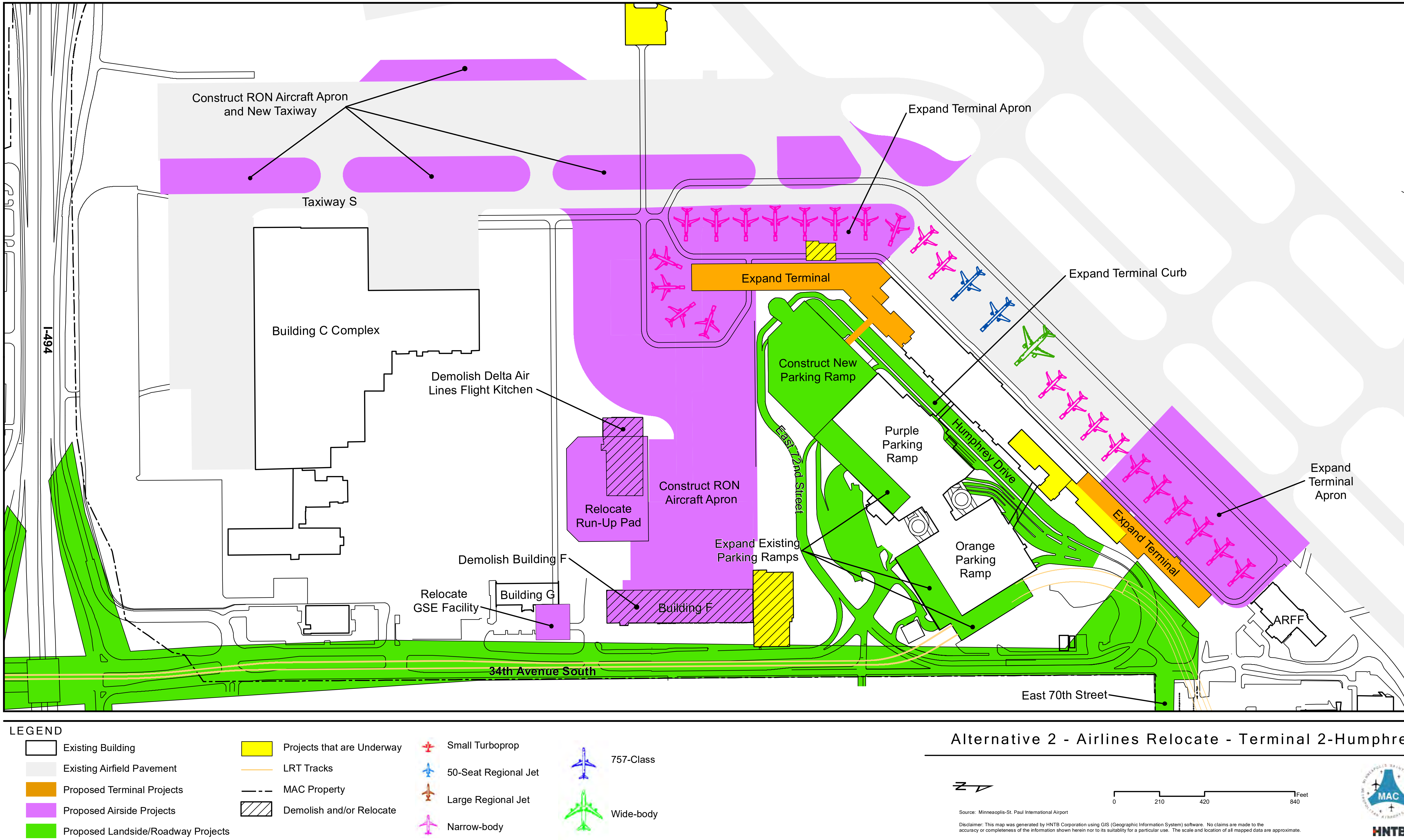
The following sub-sections describe the Terminal 2-Humphrey terminal, landside/roadway, airside and other improvements proposed as part of the Airlines Relocate Alternative. As would be expected, the improvements would be more extensive than with the Airlines Remain Alternative because of the shift of the non-SkyTeam airlines to Terminal 2-Humphrey. The proposed improvements at Terminal 2-Humphrey are illustrated in **Figure 3.2-6**.

Alternative 2 - Airlines Relocate
Terminal 2-Humphrey
• **Terminal** – Expand terminal

The terminal would be expanded to accommodate the additional gates needed to meet the projected demand of existing and relocated airlines in 2020. Six narrow-body gates would be added on the northeast end of the existing Terminal. The existing Aircraft Rescue and Fire Facility (ARFF) precludes expansion beyond the six gates. The ARFF's location is directly related to runway response time requirements, and maintaining this location is vital for that reason. Therefore, the terminal would also be expanded to the south to provide the remainder of the needed gates. The expansion would be phased, with the north end of the terminal expansion completed first. Loading dock facilities would be relocated to the north end as part of the first phase. This would allow for the south expansion to take place in the area of the original loading dock during the next phase of construction.

In addition to the gates themselves, a significant increase in the capacity of all the Terminal 2-Humphrey functions would be required with the Airlines Relocate Alternative. The concourse, lobby, parking access and baggage areas would be expanded to accommodate the increased number of passengers. The concourse would be expanded to provide added circulation area, gate hold area seating, restrooms and concessions in the vicinity of the new gates. The lobby would be expanded to provide additional circulation area as well as to accommodate a new 6-lane security checkpoint. A third skyway would be added for access to the parking ramps. The baggage claim area would be expanded to accommodate four new baggage claim devices. The baggage facilities for arriving international passengers would be expanded to include two additional Explosive Detection System (EDS) machines and associated baggage handling equipment. Lastly, the baggage inbound/outbound area would be expanded to include eight new sloped-plate carousels.

FIGURE 3.2-6



Alternative 2 - Airlines Relocate - Terminal 2-Humphrey

Alternative 2 - Airlines Relocate

Terminal 2-Humphrey

- **Landside/Roadway**

Before 2020

- Expand terminal curb
- Expand existing and construct new parking ramps
- Reconstruct the 34th Avenue South interchange at I-494
- Construct a dual lane exit from eastbound I-494 to 34th Avenue South
- Construct a dual lane exit from westbound I-494 to 24th Avenue South
- Construct auxiliary lane improvement on westbound I-494 between 24th Avenue South and the exit to southbound TH 77
- Add a lane to Northbound 34th Avenue South
- Improve the intersection of East 72nd Street and 34th Avenue South
- Reconfigure the intersections of 34th Avenue South / East 70th Street and Humphrey Drive / East 70th Street
- Reconfigure East 70th Street
- Construct a new TH 5 and Post Road Interchange
  - Remove existing and construct new bridge over TH 5
  - Realign Post Road and Northwest Drive
  - Relocate the intersection of Northwest Drive and Post Road
  - Relocate SuperAmerica
  - Close taxi cab staging lot and accommodate displaced taxi cabs

After 2020

- Construct bridge braid for 34th Avenue South entrance ramp to westbound I-494 and exit ramp to 24th Avenue South from westbound I-494
- Additional expansion of the 34th Avenue South interchange at I-494

The Airlines Relocate Alternative would result in the movement of airlines and passengers from Terminal 1-Lindbergh to Terminal 2-Humphrey which would shift demand to Terminal 2-Humphrey. This increased demand at Terminal 2-Humphrey would require improvement to ensure sufficient landside/roadway capacity would be provided and adequate passenger level of service would be maintained. Proposed improvements to landside/roadway facilities are described in the following sub-sections.

Expand Terminal Curb

Terminal curb roadway improvements would be needed to address the increased demand on the single-level curbside. Two additional lanes would be provided to accommodate demand, along with an additional 840 linear feet of curb.

Expand Existing and Construct New Parking Ramps

With the Airlines Relocate Alternative, there would be an increase in public parking demand at Terminal 2-Humphrey associated with the shift in passengers. This increase would be partially offset by the shift of approximately 1,500 employee parking spaces to Terminal 1-Lindbergh. As a result an additional 4,285 public and employee parking spaces would be needed to meet demand. However, the shift in passenger demand would also result in the need for an additional 875 rental car ready-return spaces at Terminal 2-Humphrey. Thus, a total of approximately 5,200 new public, employee and rental car parking spaces would be needed at Terminal 2-Humphrey.

Added space would also be needed to accommodate rental car servicing. Under the Airlines Relocate Alternative all rental car servicing for Terminal 2-Humphrey rental cars, currently provided at Terminal 1-

Lindbergh, would be shifted to Terminal 2-Humphrey. This shift would result in a need for 164,700 square feet of space dedicated to rental car servicing at Terminal 2-Humphrey.

As a result, it was determined that expanded parking facilities would be required to meet demand through 2020. All of the alternatives considered included vertical expansion of the existing ramp outriggers. The outriggers are where the upper levels of the existing ramp are not built out to the entire footprint of the base of the ramp. Alternatives with rental car spaces provided in the Orange Ramp and QTA service facilities outside of the ramp footprints were eliminated due to circulation problems and concerns that the rental car service area would be unprotected from the weather. The proposed improvements would include an expansion of the Purple and Orange ramp outriggers, providing 2,450 additional spaces, a two-level vertical expansion of the Orange Ramp to 10 levels, providing 1,000 additional stalls and a new 3,450-space ramp to the south of the Purple Ramp. In total, 6,900 additional passenger and employee parking spaces as well as a rental car QTA would be provided and would allow for growth beyond 2020. This alternative would provide GTC, rental car and parking access close to the terminal while maintaining a logical flow and segregation of traffic entering and exiting the ramps.

Reconstruct the 34th Avenue South interchange at I-494

The I-494 and 34th Avenue South interchange would also suffer significant queuing and delay with the Airlines Relocate Alternative. For example, during the PM peak hours both ramp intersections would be anticipated to operate at an overall intersection LOS F. As previously explained, potential interchange concepts to improve the LOS and reduce queuing were assessed as part of the MSP Area Roadway Improvements Project. Under this Project the PMT identified the DDI design as the preferred concept for the interchange modification. Thus, the Airlines Relocate Alternative includes the preferred concept of modifying the 34th Avenue South interchange at I-494 to a DDI design. Additional information can be found in *Appendix C*.

Metro Transit has expressed concern regarding potential safety impacts of a DDI configuration that includes light-rail transit. The MAC, City of Bloomington and Mn/DOT all acknowledge a DDI with light-rail transit is unique. To address safety concerns for all agencies involved, a design enhancement study reviewing several potential design considerations that may improve safety has been completed. The study includes a list of recommendations that should be further considered for incorporation into the design documents. The MAC will continue to work with the City of Bloomington, Mn/DOT and Metro Transit to develop a design that includes additional enhancements. It is noted that the potential safety related design enhancements are not anticipated to have environmental impacts and therefore would not change the evaluations included within this EA.

Construct a dual lane exit from eastbound I-494 to 34th Avenue South

To improve exiting traffic operations along eastbound I-494 at the exit to 34th Avenue South the exit will be converted from a single lane exit to a dual exit.

Construct a dual lane exit from westbound I-494 to 24th Avenue South & Construct auxiliary lane improvement on westbound I-494 between 24th Avenue South and the exit to southbound TH 77 to improve westbound traffic operations along I-494.

Add a lane to Northbound 34th Avenue South

Northbound 34th Avenue South would be modified by adding an additional lane to provide three northbound lanes. Without the additional lane there would not be adequate northbound capacity and the northbound approaches to several intersections would operate at a LOS F. The additional lane would be provided by modifying the available median between the roadway and the light rail transit way. No impacts would be anticipated on the Fort Snelling National Cemetery property.

Improve the intersection of East 72nd Street and 34th Avenue South

The intersection of East 72nd Street and 34th Avenue South would have several movements that operate at LOS E and F by 2020 during peak periods if no improvements were constructed. Therefore, this intersection would be modified to include the following improvements as part of the Airlines Relocate Alternative: a two-lane light rail track crossing for the eastbound to northbound movement, a dual right turn lane onto southbound 34th Avenue South from East 70th Street, and the conversion of the secondary access at the Fort Snelling National Cemetery to a right-in / right-out access.

Reconfigure the intersections of 34th Avenue South / East 70th Street and Humphrey Drive / East 70th Street

The 34th Avenue South / East 70th Street and the Humphrey Drive / East 70th intersections are located to the northeast of Terminal 2-Humphrey as shown on Figure 3.2-6. The eastern intersection, 34th Avenue South / East 70th Street, is an all-way stop controlled intersection. The western intersection, Humphrey Drive / East 70th Street, is signalized. In 2020, these intersections would be anticipated to operate at an LOS F primarily because the intersections are too closely spaced and the eastern intersection is an all-way stop control at the eastern intersection. Therefore, as part of the Airlines Relocate Alternative, these intersections would be reconfigured into a single signalized intersection to increase capacity and improve the LOS.

Reconfigure East 70th Street

The Airlines Relocate Alternative includes reconfiguring East 70th Street in the vicinity of the reconfigured intersection discussed in the previous sub-section. From the intersection, approximately 1,500 feet of East 70th Street would be expanded to a four lane divided roadway. The added lanes would allow for the reconfigured signalized intersection of Humphrey Drive, 34th Avenue south and East 70th Street to operate at an acceptable LOS. Reconfiguration would primarily be required to adequately store the westbound queues of traffic on the approach to 34th Avenue South and provide additional distance for drivers to move into the appropriate lane. With two westbound lanes, one lane would be used primarily to access the parking facilities and the other would be used to travel to the curb at Terminal 2-Humphrey. Also, the length of the added westbound lane would allow for an adequate distance for signing and for drivers to choose and travel into the appropriate lane. Without the addition of the westbound lane, the traffic queue would extend beyond several of the Signature Flight Support access points and thus would result in operational and safety concerns.

Construct a new TH 5 and Post Road Interchange and realign Northwest Drive

As with the Airlines Remain Alternative, the interchange at TH 5 and Post Road would also operate over capacity by 2020 with the Airlines Relocate Alternative. Due to inadequate capacity during the PM peak period, the eastbound approach to the TH 5 / Post Road interchange will operate at a LOS F. There are also periods during the day when the queue for the northbound TH 5 to westbound Post Road traffic will extend onto TH 5 due to undesirable delays at the east ramp intersection.

As previously discussed, this interchange was also studied as part of the MSP Area Roadway Improvement Project. For this interchange, nearby features such as the MAC storm water ponds and the Runway 30L runway protection zone (RPZ) and approach surfaces limited the amount of land available for alternative interchange configurations. Many interchange alternatives that would normally be considered were not feasible due to impacts on adjacent infrastructure. Thus the PMT focused on interchange concepts based on diamond configurations. Various concepts were developed by considering a variety of options to improve capacity that included the following:

- Constructing a new bridge over TH 5 to supplement or replace the existing bridge
- Eliminating or relocating the intersection of Northwest Drive and Post Road
- Relocating the taxi cab staging lot and/ SuperAmerica

Ultimately, the PMT selected a new diamond interchange located south of the existing Post Road and TH 5 interchange. This option was preferred because the existing interchange could be used during construction, access to Northwest Drive could be maintained, and impacts to the runway protection zone (RPZ) for Runway 30L were minimized. Additional information including concept drawings of the various interchange configurations can be found in *Appendix C*.

Therefore, in order to improve the capacity of the Post Road and TH 5 interchange, the Airlines Relocate Alternative includes the construction of a new Post Road and TH 5 diamond interchange. Construction of the new interchange would require the following improvements that are also included in the Airlines Relocate Alternative:

- Remove existing and construct a new bridge over TH 5
- Realign Post Road and Northwest Drive
- Relocate the intersection of Northwest Drive and Post Road to the west
- Relocate the SuperAmerica just south of its current location
- Close taxi cab staging lot and accommodate displaced taxi cabs

As previously explained, alternatives to accommodate the displaced taxi cabs were considered and there are viable alternatives for the relocation of the staging area. Two potential sites were identified: the Maroon Parking Ramp and an existing parking area on the north side of Post Road west of the current facility. Based on transportation analysis minor roadway improvements would be required with both options. To accommodate a taxi staging area at the Post Road location, a new right turn lane along Post Road and modifications to the parking lot entrances and exits would be required. To accommodate a taxi staging area at the Maroon Parking Ramp, the configuration of the Northwest Drive and Post Road intersection would be modified to provide southbound double left turn lanes from Northwest Drive to Post Road.

The Sponsor has not identified a preferred alternative to accommodate the displaced taxi cabs as of the writing of this EA. Therefore, assessment of potential environmental impacts will include the consideration of both of the potential relocation sites.

The freeway modeling results show that without additional improvements to I-494 there will be significant congestion on westbound I-494 between TH 77 and 34th Avenue South and at the I-494/34th Avenue South interchange beyond 2020. The following improvements will be constructed along I-494 to serve the anticipated traffic demand after 2020:

Construct bridge braid for 34th Avenue South entrance ramp to westbound I-494 and exit ramp to 24th Avenue South from westbound I-494.

This improvement allows traffic entering westbound I-494 from 34th Avenue South and traffic exiting from westbound I-494 to 24th Avenue South to cross via grade separation which reduces the weaving conflict on westbound I-494 improving freeway operations.

Additional expansion of the 34th Avenue South interchange at I-494 which will include:

- Modification of the southbound double right-turn lane to a triple right at the westbound I-494 ramps
- Modification of the eastbound left and right turn lanes from double to triple turn lanes at the eastbound I-494 ramps
- Modification of the northbound right to a triple right turn lane at the eastbound I-494 ramps
- Modification of the westbound left turn lane to southbound 34th Avenue from a double to a triple left at the westbound I-494 ramps

Alternative 2 - Airlines Relocate

Terminal 2-Humphrey

- **Airside**
  - Expand terminal apron
  - Construct RON aircraft apron
    - Construct new taxiway
    - Demolish Building F
  - Relocate run-up pad
  - Demolish and Relocate Delta Air Lines Flight Kitchen
  - Relocate GSE facility

Expand Terminal Apron

The addition of gates at Terminal 2-Humphrey would require construction of additional aircraft apron adjacent to the Terminal expansions. Concrete aprons would be constructed adjacent to both the north and south extensions of Terminal 2-Humphrey. As part of the proposed apron construction, the existing in-pavement fueling systems and deicing fluid capture capabilities would be extended. An extension to the existing service road would also be needed to provide vehicle access to all of the new gates.

Construct RON Aircraft Apron

The relocation of the non-SkyTeam airlines would result in a need for additional Remain Overnight (RON) parking near Terminal 2-Humphrey. RON parking is needed when airline schedules dictate that an aircraft stay overnight at the airport for a next-day departure. Not all of these aircraft can remain parked at the terminal gates until their departure the next day because other aircraft are scheduled to use the subject gates in the interim. In this event, aircraft are moved to unused gates or the RON apron until their scheduled departure.

Future RON requirements would be met by allowing aircraft to park at unused Terminal 2-Humphrey gates and at two expanded aircraft aprons. One of these aprons would be the Building F apron and the other would be the Humphrey Remote apron.

To accommodate a portion of the RON requirement, the existing aircraft apron adjacent to Building F would be reconstructed and expanded. In order to expand the apron, Building F would be demolished. Building F currently houses offices and cargo processing facilities for Delta Air Lines. The building, formerly owned by Delta Air Lines, has reverted to MAC ownership, although Delta Air Lines continues to lease space within the cargo section of the building. It is anticipated that Delta Air Lines would not continue to lease this space long-term and that the MAC would demolish the building to provide space for RON aircraft.

In addition to the Building F site apron, the existing Humphrey Remote apron would provide expanded RON parking. In order to accommodate the increasing fleet and size of aircraft, taxiways would be needed on the east and west sides of the Humphrey Remote apron to facilitate the movement of aircraft in and out for RON parking. Given the fleet mix forecast for this Alternative, it is anticipated that wide-body aircraft would use the Humphrey Remote apron for RON parking. Thus, the taxiways would need to provide the clearance appropriate for wide-body aircraft. The existing Taxiway S lies too close to the Delta maintenance hangar, Building C, to provide the necessary clearance. In addition, the Humphrey Remote Apron cannot be expanded to the west because of the close proximity of Runway 17/35. Therefore, to develop a

RON apron that accommodates wide-body aircraft, the existing grass islands between the Humphrey Remote Apron and Taxiway S would be paved. the Taxiway S centerline would be moved to the west and a new taxiway would be established on the west side of the existing Humphrey Remote apron.

The reconstructed/expanded RON aprons would result in additional impervious surfaces. Therefore, associated storm water management measures would be implemented as part of the Airlines Relocate Alternative.

Relocate Run-up Pad, and Demolish and Relocate Delta Air Lines Flight Kitchen

The expansion of Terminal 2-Humphrey to the south would displace the existing run-up pad. The run-up pad, located south of the existing terminal building, is a perimeter enclosure where aircraft mounted engines are tested by performing up to and including full throttle engine run-ups. The enclosure is made up of a blast fence to prevent blast-borne debris from damaging nearby buildings, vehicles or aircraft. Under this alternative, the run-up pad would be relocated in the same general vicinity south of the terminal, but would be moved to the east/southeast approximately 900 feet, toward 34th Avenue South.

Other locations around the airfield were considered for the relocation of the run-up pad. However, it was recognized that maintaining the existing site is critical for maintenance operations. Delta Air Lines, as the hub operator, is the main user of the facility. The current run-up pad location is near Delta's maintenance facility and therefore taxiing between the maintenance facility and the run-up pad is minimized. Other potential sites would require that Delta Air Lines' aircraft cross a runway in order to travel between the run-up pad and the maintenance facility. Additional aircraft runway crossings are undesirable because of the increased potential for runway incursions. The facility is centrally-located on the airport which minimizes impacts in the neighboring communities. From a noise standpoint, maintaining the facility in the same general vicinity will not create changes in the noise footprint.

In order to construct the run-up pad in the preferred location, the existing Delta Air Lines flight kitchen must be relocated. This building houses the facilities needed to prepare in-flight meals for aircraft passengers. The existing flight kitchen is accessible from both landside/public roadways and airside/airfield service roads. Ingredients are delivered to the flight kitchen via the public roadways. Once prepared, the meals are trucked to the aircraft via the airfield service road system. Therefore, the replacement location must have both airside and landside access.

There are alternative sites on the airfield that meet this requirement. These sites have varying height restrictions based on their distance from the runways. The sites with few to no height restrictions are reserved for aircraft-related uses where hangars and related structures must be high enough to accommodate aircraft. Therefore, the potential sites for the relocated flight kitchen were limited to those with more restrictive height limits. As a result, the proposed location of the flight kitchen would be just south of Runway 12R/30L as shown on Figure 3.2-4.

Relocate GSE

A ground support equipment (GSE) facility is located just to the south of the existing Terminal 2-Humphrey. This facility would be demolished in order to extend the terminal to the south. Therefore this GSE facility would be relocated as part of the Airlines Relocate Alternative.

The new location for the GSE facility was determined by considering available sites near the Terminal 2-Humphrey Complex. Available space is extremely limited and further constrained by the relocation of the run-up pad. Therefore, the GSE facility would be relocated to a site adjacent to Building G and adjacent to the proposed Delta parking structure. Service road access would also be provided to this location.

3.3 No Action Alternative

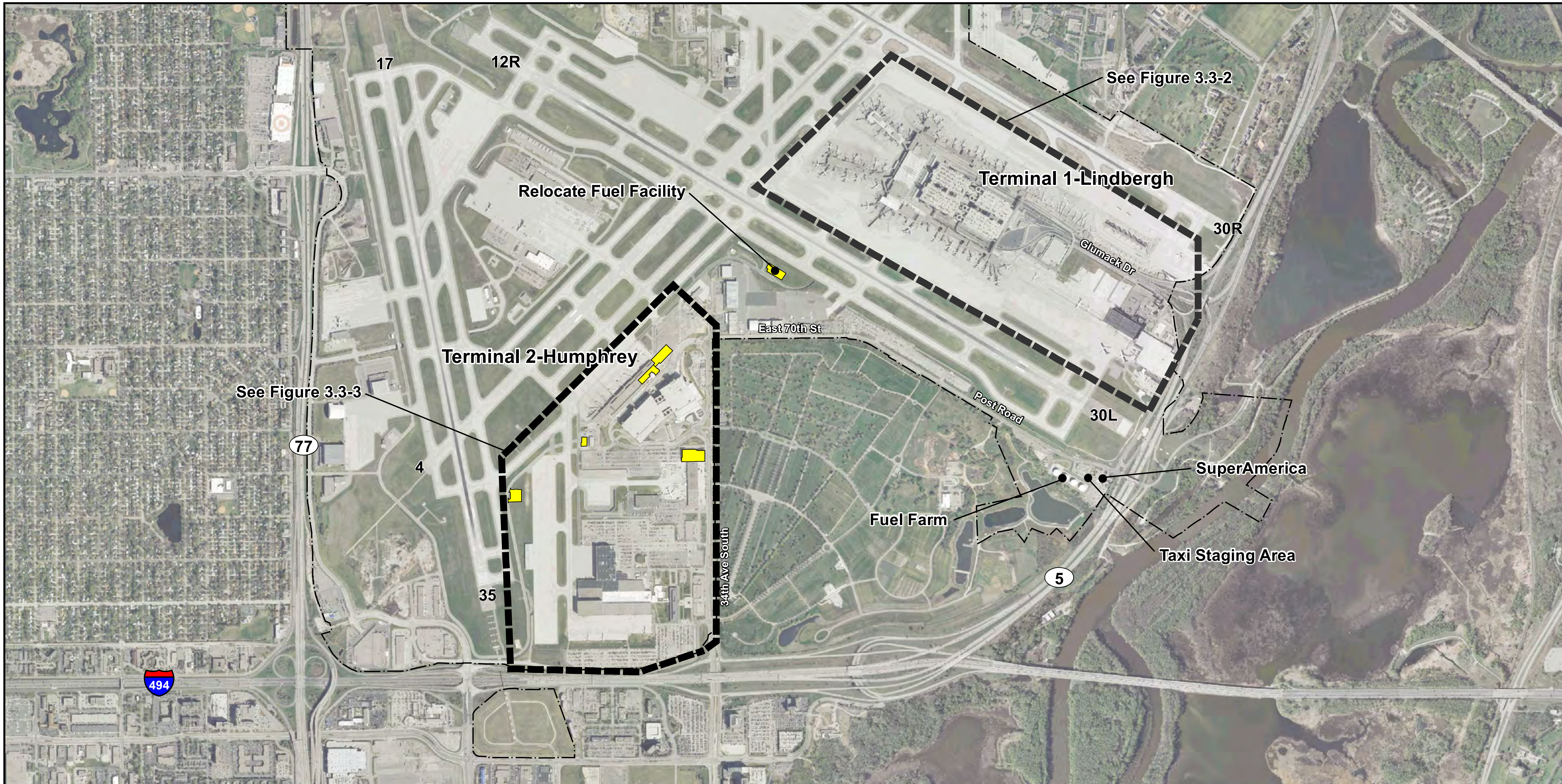
Consideration of the No Action Alternative is required by NEPA per CEQ Regulations. This alternative serves as a basis of comparison with other alternatives considered for detailed analysis.

The No Action Alternative represents the airport without any improvements . The No Action Alternative includes some airport improvements that will be implemented prior to the completion of the EA. These improvements are independent and have already received environmental approval or are categorically excluded from formal environmental assessment by the FAA and the Minnesota Environmental Quality Board (EQB).

Table 3.3.1 lists the improvements that are included in the No Action Alternative and an illustration of the No Action Alternative is presented on **Figure 3.3-1**. Illustrations of the No Action Alternative for Terminal 1-Lindbergh and Terminal 2-Humphrey are presented on **Figures 3.3-2 and 3.3-3** respectively.

Table 3.3.1

No Action Alternative	
Terminal 1-Lindbergh	**Terminal 2-Humphrey**
	• **Terminal** – Construct north security checkpoint – Construct Checked Baggage Inspection System (CBIS)
	• **Airside** – Construct new Glycol Storage Facility – Relocate Fuel Facility
	• **Other** – Demolish Building F Tower



LEGEND

Projects that are Underway

MAC Property

No Action Alternative

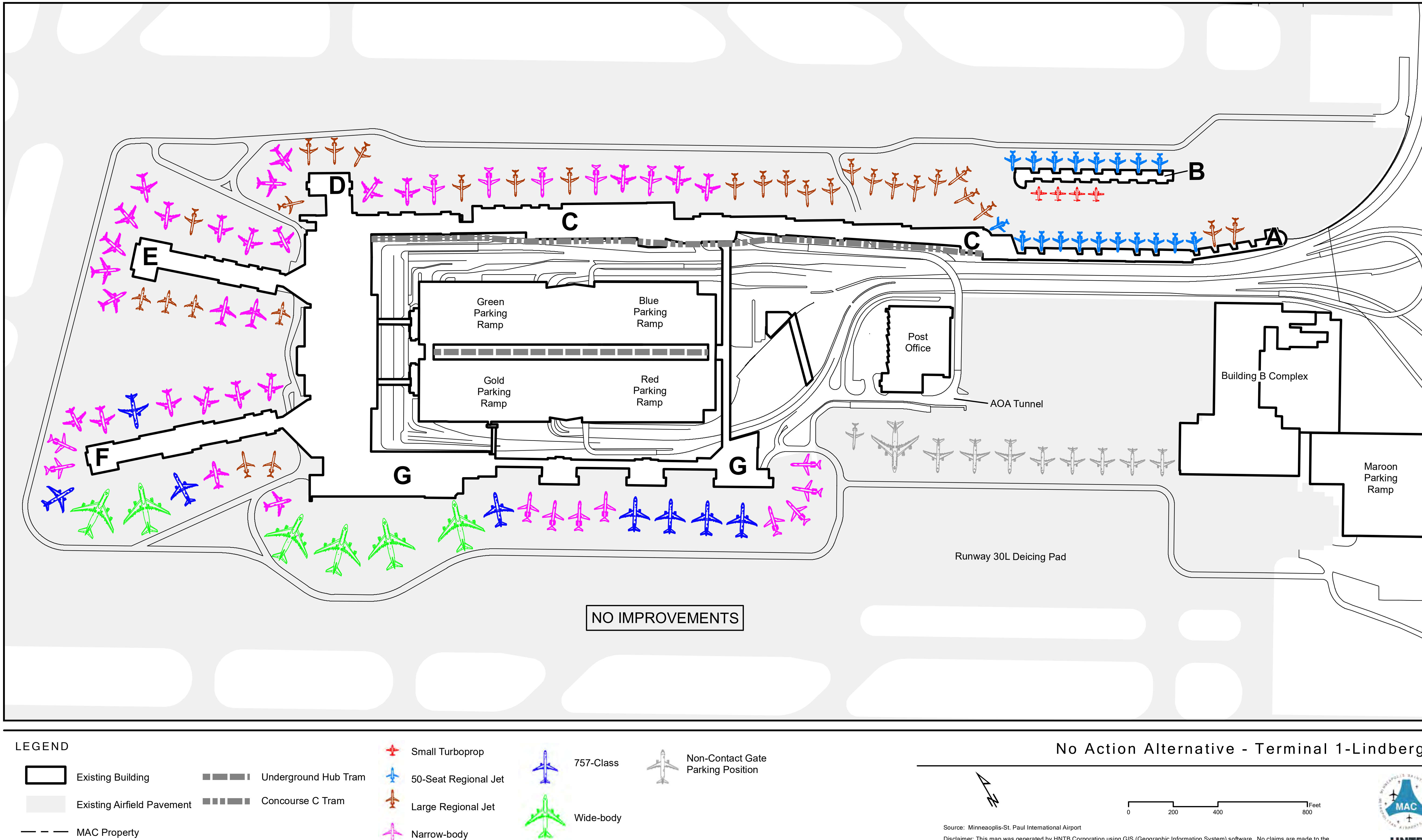
N

0 750 1,500 3,000 Feet

Source: Minneapolis-St. Paul International Airport

Disclaimer: This map was generated by HNTB Corporation using GIS (Geographic Information System) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitablity for a particular use. The scale and location of all mapped data are approximate.

HNTB



No Action Alternative - Terminal 1-Lindbergh

Source: Minneaoplis-St. Paul International Airport

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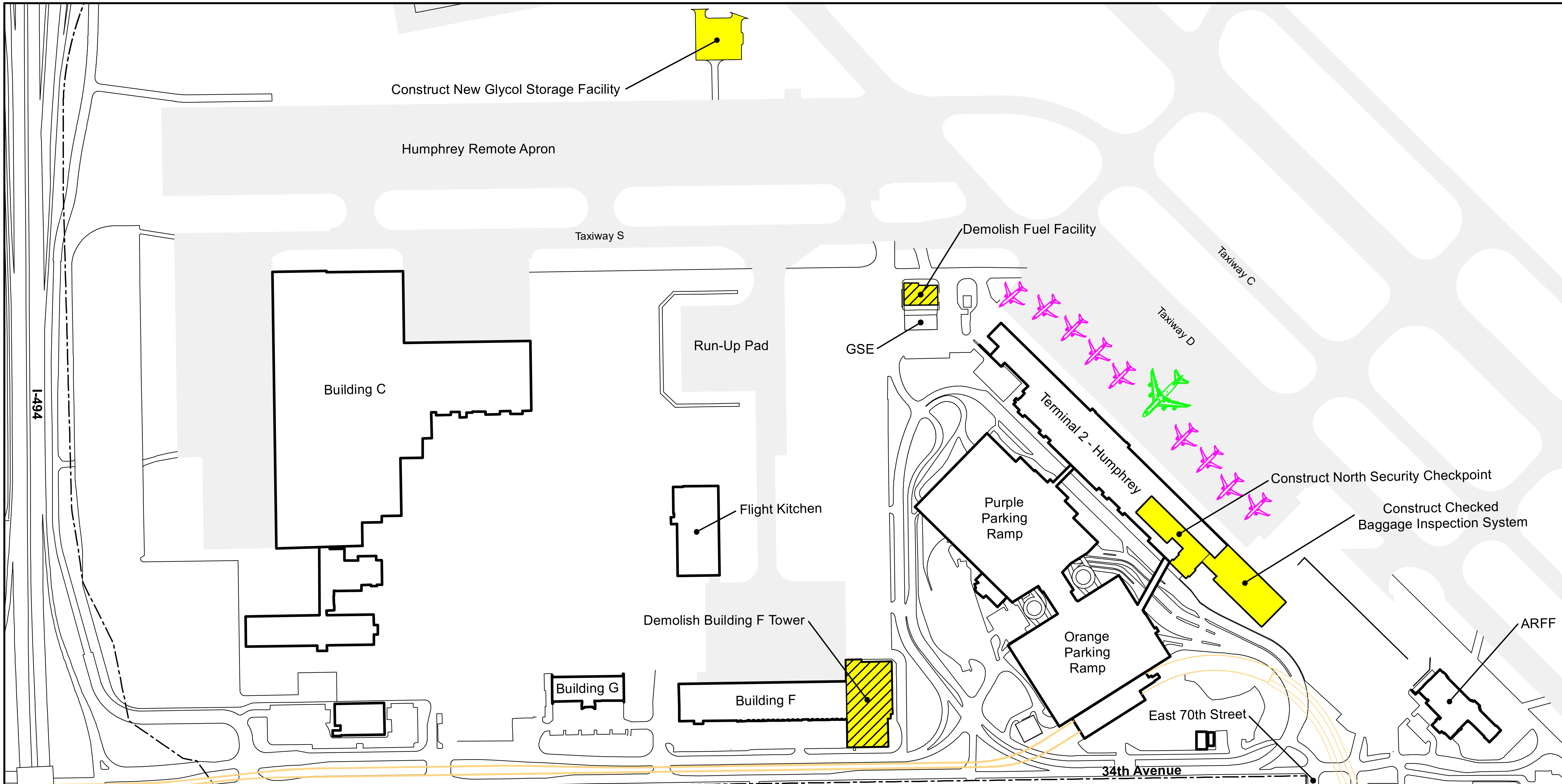
Minneapolis-St. Paul International Airport 2020 Improvements EA

FIGURE 3.3-3



LEGEND

Existing Building
Existing Airfield Pavement
Projects that are Underway
Demolish
MAC Property
LRT Tracks
Small Turboprop
50-Seat Regional Jet
Large Regional Jet
Narrow-body
757-Class
Wide-body

No Action Alternative - Terminal 2-Humphrey

0 200 400 800 Feet

Source: Minneaoplis-St. Paul International Airport

Disclaimer: This map was generated by HNTB Corporation using GIS (Geographic Information System) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitablity for a particular use. The scale and location of all mapped data are approximate.

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When compared to Airlines Remain and Airlines Relocate Alternatives, the No Action Alternative represents a much more crowded condition with increased airline operating burdens, especially when schedule disruptions occur. However, the projected daily and annual demand could be accommodated, albeit at a reduced level of service. The No Action Alternative design day flight schedule and associated airfield simulation analysis demonstrate that the airlines would need to make some changes in their scheduled flight times to accommodate projected demand with existing terminal facilities through 2025. Therefore, the induced aviation activity (difference between project and no-action activity) resulting from the proposed terminal facility improvements consists of a redistribution of existing activity rather than creation of new activity. As such, the No Action Alternative represents a reasonable estimate of how the Airport and the airlines would attempt to accommodate demand if the proposed terminal facilities were not built.

3.4 Alternatives Retained for Further Consideration

Only the No Action Alternative and those alternatives that would meet the purpose and need (the Airlines Remain and the Airlines Relocate Alternatives) are retained for further consideration. The following paragraphs briefly describe each of these Alternatives and summarize how each addresses the overall Purpose and Need. **Tables 3.4.1** and **3.4.2** list the specific airport, landside and roadway needs identified in Chapter 2 and how each alternative meets those specific needs.

Table 3.4.1

Do Alternatives Meet the Needs Identified in Chapter 2? - Airport and Landside Facilities

	Current Need (2010)	Future Need (2020)	No Action Alternative		Alternative 1 - Airlines Remain		Alternative 2 - Airlines Relocate	
			Meets Needs?	Improvement(s) that Address the Identified Needs	Meets Needs?	Improvement(s) that Address the Identified Needs	Meets Needs?	Improvement(s) that Address the Identified Needs
Gates								
	Additional Gates at Terminal 2-Humphrey	15,000 feet of additional gate frontage to accommodate future fleet	No	N/A	Yes	• Expand Terminal 1-Lindbergh Concourse G • Expand Terminal 2-Humphrey	Yes	• Expand Terminal 1-Lindbergh Concourse G • Expand Terminal 2-Humphrey
Terminals								
	Refurbish Concourse E at Terminal 1-Lindbergh		No	N/A	Yes	• Remodel Terminal1-Lindbergh Concourse E	Yes	• Remodel Terminal1-Lindbergh Concourse E
	Additional 17,000 square feet of waiting area for the ticket counter in Terminal 1-Lindbergh	Additional 26,000 square feet of waiting area for the ticket counter in Terminal 1-Lindbergh	No	N/A	Yes	• Remodel and reconfigure the Terminal 1-Lindbergh lobby	Yes	• Remodel and reconfigure the Terminal 1-Lindbergh lobby
		Additional 6,000 square feet of area at security check points in Terminal 1-Lindbergh	No	N/A	Yes	• Remodel and reconfigure the Terminal 1-Lindbergh lobby	Yes	• Remodel and reconfigure the Terminal 1-Lindbergh lobby
	Additional 14,000 square feet at baggage claim in Terminal 1-Lindbergh	Additional 20,000 square feet at baggage claim in Terminal 1-Lindbergh	No	N/A	Yes	• Reconfigure and expand the Terminal-1 Lindbergh baggage facilities	Yes	• Reconfigure and expand the Terminal-1 Lindbergh baggage facilities
	International facilities, passenger processing and baggage claim overstressed at daily peak demand	Additional 11,000 square feet of area for international processing at Terminal 1-Lindbergh and 16 additional processing stations	No	N/A	Yes	• Construct a new International Facility within Concourse G of Terminal-1 Lindbergh	Yes	• Construct a new International Facility within Concourse G of Terminal 1-Lindbergh
Landside								
	Additional 100 feet of arrival curb roadway at Terminal 1-Lindbergh	Additional 400 feet of arrival curb at Terminal 1-Lindbergh	No	N/A	Yes	• Expand terminal arrivals curb at Terminal 1-Lindbergh	Yes	• Expand terminal arrivals curb at Terminal 1-Lindbergh • Expand curb at Terminal 2-Humphrey(1)
		14 additional commercial vehicle loading spaces, 13 at Terminal 1-Lindbergh and 1 at Terminal 2-Humphrey	No	N/A	Yes	• Relocate and expand Commercial GTC at Terminal 1-Lindbergh	Yes	• Relocate and expand Commercial GTC at Terminal 1-Lindbergh • Construct new parking ramp at Terminal 2-Humphrey (includes additional GTC spaces)
		8,500 additional parking stalls at Terminal 1-Lindbergh	No	N/A	Yes	• Construct a new parking ramp at Terminal 1-Lindbergh	Yes	• Construct a new parking ramp at Terminal 1-Lindbergh • Expand existing and construct new parking ramps at Terminal 2-Humphrey(1)
		150 and 350 new rental car spaces at Terminal 1-Lindbergh and Terminal 2-Humphrey, respectively 81,900 square feet of new QTA areas with 79,800 square feet of that area at Terminal 2-Humphrey	No	N/A	Yes	• Reconfigure rental car spaces at Terminal 1-Lindbergh and continue to provide QTA services for Terminal 2-Humphrey rental cars at Terminal 1-Lindbergh	Yes	• Expand existing and construct new parking ramps at Terminal 2-Humphrey(2)

Note:
(1) Although the identified need is at Terminal 1-Lindbergh it is addressed by constructing improvements at both Terminals. This is because the analysis of future need conducted for Chapter 2 is based on the airlines remaining at their current terminal while the specific Airline Relocate Alternative improvements are based on relocating the non-SkyTeam airlines to Terminal 2-Humphrey.
(2) Although the identified need is at both Terminals it is addressed by constructing improvements at Terminal 2-Humphrey. This is because the analysis of future need conducted for Chapter 2 is based on the airlines remaining at their current terminal while the specific Airline Relocate Alternative improvements are based on relocating the non-SkyTeam airlines to Terminal 2-Humphrey.

Source: *Purpose and Need Technical Report*, MAC and HNTB, 2012, *Landside Facilities Technical Report*, MAC and HNTB, 2011.

Table 3.4.2

Do Alternatives Meet the Needs Identified in Chapter 2? - Regional Roadways

Current Need	Future Need (2020)	Future Need 2030	No Action Alternative		Alternative 1 - Airlines Remain		Alternative 2 – Airlines Relocate	
			Meets Needs?	Improvement(s) that Address the Identified Needs	Meets Needs?	Improvement(s) that Address the Identified Needs	Meets Needs?	Improvement(s) that Address the Identified Needs
Increased capacity at the I-494 and 34th Avenue South Interchange	Increased capacity at the I-494 and 34th Avenue South Interchange	Increased capacity at the I-494 and 34th Avenue South Interchange	No	N/A	Yes	• Reconstruct 34th Avenue South interchange at I-494 • Additional expansion of 34th Avenue South interchange at I-494 (Post 2020)	Yes	• Reconstruct 34th Avenue South interchange at I-494 • Additional expansion of 34th Avenue South interchange at I-494 (Post 2020)
	Increased capacity at the TH 5 and Post Road Interchange		No	N/A	Yes	• Construct new Trunk Highway (TH) 5 and Post Road Interchange	Yes	• Construct new Trunk Highway (TH) 5 and Post Road Interchange
Improved traffic operations on I-494	Improved traffic operations on I-494	Improved traffic operations on I-494	No	N/A	Yes	• Construct a dual lane exit from eastbound I-494 to 34th Avenue South • Construct a dual lane exit from westbound I-494 to 24th Avenue South • Construct auxiliary lane improvement on westbound I-494 between 24th Avenue South and the exit to southbound TH 77 (Post 2020) • Construct bridge braid for 34th Avenue South entrance ramp to westbound I-494 and exit ramp to 24th Avenue South from westbound I-494 (Post 2020)	Yes	• Construct a dual lane exit from eastbound I-494 to 34th Avenue South • Construct a dual lane exit from westbound I-494 to 24th Avenue South • Construct auxiliary lane improvement on westbound I-494 between 24th Avenue South and the exit to southbound TH 77 • Construct bridge braid for 34th Avenue South entrance ramp to westbound I-494 and exit ramp to 24th Avenue South from westbound I-494 (Post 2020)
	Increased capacity on 34th Avenue South		No	N/A	Yes	• Reconfigure the intersections of 34th Avenue South / East 70th Street and Humphrey Drive / East 70th Street	Yes	• Add lane to northbound 34th Avenue South • Improve intersection of East 72nd Street and 34th Avenue South • Reconfigure the intersections of 34th Avenue South / East 70th Street and Humphrey Drive / East 70th Street
	Increased capacity at the TH 5 and Glumack Drive Interchange	Increased capacity at the TH 5 and Glumack Drive Interchange	No	N/A	Yes	• Add dual lanes to the outbound ramps of Glumack Drive at TH 5	Yes	• Add dual lanes to the outbound ramps of Glumack Drive at TH 5 (Post 2020)
	Increased capacity on East 70th Street		No	N/A	Yes	• Reconfigure East 70th Street east of 34th Avenue South	Yes	• Reconfigure East 70th Street east of 34th Avenue South

Source: *Appendix C*, MSP Area Roadway Improvements Project Memos, KHA and SRF, 2012.

The No Action Alternative includes some airport improvements that will be implemented prior to the completion of the EA. The No Action Alternative would not meet the purpose and need for the Proposed Action as it does not accommodate expected demand at an acceptable level of service through the year 2020. Regardless, the No Action Alternative was retained for detailed environmental analysis and comparison as required by CEQ Regulations.

The Airlines Remain Alternative includes the improvements needed through 2020 presuming that the airlines remain in their current terminals. The improvements included in the Airlines Remain Alternative are listed in Table 3.2.1 and an illustration of the Airlines Remain Alternative is presented on Figure 3.2-1. The specific improvements that make up this alternative consist of those necessary to accommodate the airlines' forecasted growth within their current terminal. The improvements were specifically designed to provide an acceptable level of service. Therefore, the Airlines Remain Alternative meets the purpose and need and is retained for detailed environmental analysis.

The Airlines Relocate Alternative includes the improvements needed through 2020 presuming that the non-SkyTeam airlines currently located in Terminal 1-Lindbergh are relocated to Terminal 2-Humphrey. The improvements included in the Airlines Relocate Alternative are listed in Table 3.2.2 and an illustration of the Airlines Relocate Alternative is presented on Figure 3.2-4. The improvements that make up this alternative were specifically designed to provide an acceptable level of service through 2020. Therefore, the Airlines Relocate Alternative meets the purpose and need and is retained for detailed environmental analysis. Additionally, the Airlines Relocate Alternative was identified as the Sponsor's Preferred Alternative.

All improvements included in the Sponsor's Preferred Alternative will be designed and constructed in a manner that will not affect the safety of aircraft operations nor require changes to established air traffic procedures. For instance, the relocated Delta Air Lines Flight Kitchen must be designed and constructed to avoid any adverse impact on the Runway 12R CATIII approach procedure.

3.4.1 Comparison of Alternatives

A comparison of the alternatives retained for further consideration is provided in **Table 3.4.3**. The alternatives were compared based on a variety of criteria including potential environmental impacts. The criteria selected for comparison reflect the analyses conducted for the EA as well as other information that decision makers typically consider in reviewing alternatives.

Table 3.4.3

Comparison of Alternatives Retained for Further Consideration

Comparison Criteria	**Alternative**		
	No Action	**Airlines Remain**	**Airlines Relocate**
Airfield/ Airspace Simulation	Airfield and airspace analysis was conducted for all of the alternatives by using the airport and airspace simulation model (SIMMOD). SIMMOD is a standard analysis tool used by the airport industry and accepted by FAA to develop detailed simulations of current and proposed airport and airspace operations. Based on the simulation, all of the Alternatives would result in about the same level of annual delay per aircraft operation in 2020 and in 2025. This was to be expected given that the Alternatives do not include changes to the runways and they include only minor changes to taxiways. Information regarding the simulation analysis is provided in ***Appendix D,*** *MSP Airfield Simulation Analysis*.		
Construction Phasing	N/A	Phasing of projects at Terminal 1-Lindbergh would be difficult because many of the facilities are already operating at or over their design capacities. As a result construction will likely be more difficult to schedule, take longer and cost more. Although the MAC would strive to maintain an adequate LOS it would be very difficult to avoid negatively impacting the passengers' experience during construction.	Phasing of projects at Terminal 1-Lindbergh would be facilitated by the movement of the non-SkyTeam Airlines to Terminal 2-Humphrey. After the move, demand on strained facilities would be reduced and abandoned space could be renovated or temporarily used while other facilities are being renovated/constructed. In addition, the expansion of facilities at Terminal 2-Humphrey would be generally outside the confines of the existing terminal and could be accomplished with minimal disruption to passengers.
Order of Magnitude Cost	Minor	$1.3 billion dollars Because this is a rough estimate of cost based on conceptual/preliminary planning it does not include the added cost attributed to the difficulty of phasing construction at Terminal 1-Lindbergh. Detailed planning would be required to determine the magnitude of cost associated with phasing the construction at Terminal-1 Lindbergh with this alternative.	$1.5 billion dollars Part of the reason that the Airlines Relocate Alternative is more expensive than the Airlines Remain Alternative is that the Airlines Relocate provides for more capacity. By virtue of building out the full footprint of some of the facilities at Terminal 1-Lindbergh, the Airlines Relocate Alternative provides more capacity albeit at a higher cost. Though the airport will be able to handle more capacity as a result of this alternative, the additional capacity is not needed as part of this project and will occur as a secondary benefit. All applicable environmental documentation will be completed in the future when additional capacity is necessary.
Customer Service	Customer service would deteriorate as aircraft operations and the number of passengers grows.	Once construction is complete, customer service with the Airlines Remain Alternative would be improved when compared to the customer service with the No Action Alternative. However, during construction customer service would suffer because construction would impact facilities that are already operating at or over their design capacities.	The primary reason to move all of the non-SkyTeam Airlines to Terminal 2-Humphrey is to improve customer service. With this Alternative, the traveling public would be able to easily determine the "correct terminal," the terminal they need to go to depart or drop off/pick-up passengers: Terminal 1-Lindbergh for Delta/SkyTeam Airlines and Terminal 2-Humphrey for everyone else. In addition, customer service would be less impacted by construction than with the Airlines Remain Alternative because the renovation/expansion could be completed with minimal disruption to passengers.
Post 2020	Poor LOS and potential near grid lock of some facilities.	Additional capacity would be needed particularly in terms of gates almost immediately post-2020 to accommodate any growth in passengers without a deterioration in service.	Though the intent of this project is to improve the level of service at terminal facilities, this Alternative would result in adequate capacity to handle growth at Terminal 1-Lindbergh without the need for additional facilities.
Potential Environmental Impact	No potential environmental impacts that would exceed the thresholds of significance were identified for any of the Alternatives. There would be little or no difference in the potential environmental impacts associated with the Airlines Remain and the Airlines Relocate Alternatives.		

Source: MAC Analysis, 2011.

Endnotes

[1] Minnesota Department of Transportation, *Tier 2 Air Service Study: Minnesota in Partnership with Wisconsin Technical Report*, June 2003.

[2] Minnesota Department of Transportation, *Minnesota Comprehensive Statewide Freight and Passenger Rail Plan*, February 2010, p. ES.1.

[3] Ibid., p.ES.4.

[4] Transportation Economics & Management Systems, Inc., *Midwest Regional Rail System Executive Report*, September 2004, p. 5.

[5] US Department of Transportation, Wisconsin Department of Transportation and the Minnesota Department of Transportation, *Milwaukee-Twin Cities High-Speed Rail Corridor Program Fact Sheet*, 2010.

[6] America 2050, *High Speed Rail in America*, January 2011, p. 10.

[7] Steer Davies Gleave for the European Commission Directorate General for Energy and Transport, *Air and Rail Competition and Complementarity*, August 2006, p.30.

[8] Transportation Research Board of the National Academies, *Innovative Approaches to Addressing Aviation Capacity Issues in Coastal Mega-regions*, *ACRP Report 31*, 2010, p. 35.

[9] America 2050, *High Speed Rail in America*, January 2011, p. 11.

[10] Northern Lights Express Passenger Rail Project, NLX, http://www.northernlightsexpress.org/joomla/ (accessed 9/14/11).

[11] Southeast Minnesota Rail Alliance, Zip Rail, Frequently Asked Questions, http://www.goziprail.com/the-project/faqs/ (accessed 8/25/11).

[12] Federal Aviation Administration (FAA), *Dual Track Airport Planning Process Twin Cities Metropolitan Area, Minnesota Final Environmental Impact Statement*, May 1998, Executive Summary, p. iii.

[13] Architectural Alliance and Lea + Elliot, with assistance from TKDA, MBJ, and Kraus Anderson, *G Concourse Tram Study*, Sept. 18, 2006.

[14] Federal Highway Administration (FHWA), TECHBRIEF, *Double Crossover Diamond Interchange*, FHWA Publication No.: FHWA-HRT-09-054, October 2009, p. 2.

[15] Architectural Alliance and Lea + Elliot, with assistance from TKDA, MBJ, and Kraus Anderson, *G Concourse Tram Study*, Sept. 18, 2006.

Chapter 4: AFFECTED ENVIRONMENT

This chapter provides an overview of the environment at and within the vicinity of MSP. Specific information related to each environmental impact category listed below is presented in Chapter Five, *Environmental Consequences*.

- Air Quality (including Odors)
- Climate
- Coastal Resources
- Compatible Land Use
- Construction Impacts
- Department of Transportation Act: Section 4(f)
- Farmlands
- Fish, Wildlife and Plants
- Floodplains
- Hazardous Materials, Pollution Prevention and Solid Waste
- Historical, Architectural, Archaeological and Cultural Resources
- Light Emissions and Visual Effects
- Natural Resources and Energy Supply
- Noise
- Secondary (Induced) Impacts
- Socioeconomic Impacts, Environmental Justice and Children's Health and Safety Risks
- Water Resources
- Wetlands
- Wild and Scenic Rivers
- Cumulative Effects

MSP is located in an urban area between the Twin Cities of Minneapolis and St. Paul, Minnesota and is surrounded by the suburban cities of Bloomington, Eagan, Mendota Heights and Richfield. Minneapolis is located to the northwest of the airport, St. Paul to the northeast, Bloomington to the southwest, Eagan to the southeast, Mendota Heights directly east and Richfield directly west of MSP. **Figure 4.0-1** depicts features of the environment around MSP, as discussed in this Chapter.

The land surrounding MSP includes residential, industrial, institutional, commercial and cultural uses. Land to the west and northwest is primarily residential use, and land to the south and east consists of a mix of commercial and industrial land use with pockets of residential use throughout. The Mall of America is located adjacent to the southwest corner of MSP.

There are many state and regional parks within the vicinity of MSP, including Fort Snelling State Park located just beyond Runways 30R/30L, Pike Island Park,

LEGEND

494 Interstate
5 Trunk Highway
Secondary Road
Parks
Water

Environment Around MSP

N

0 4,000 8,000 16,000 Feet

Source: ESRI Data

Disclaimer: This map was generated by HNTB Corporation using GIS (Geographic Information System) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitablity for a particular use. The scale and location of all mapped data are approximate.

Washington Park, Wilson Park, Veterans Memorial Park, Taft Park and Morris Park. The Minnesota Valley National Wildlife Refuge is adjacent to MSP, located just south of Interstate 494 (I-494) in Bloomington.

Additionally, there are many historic sites at or nearby MSP. Historic sites include Fort Snelling beyond the northeast corner of the airport, and the Original Wold-Chamberlain Terminal Historic District on airport property.

The Minnesota River runs along the east side of MSP from the northeast corner and continuing south. The majority of stormwater from the airport drains via storm sewers to retention ponds prior to discharge to the Minnesota River. There are also many lakes within the vicinity of MSP, including Mother Lake at the northwest corner of the airport and Snelling Lake to the southeast.

Chapter 5: ENVIRONMENTAL CONSEQUENCES

This chapter presents the environmental consequences of the alternatives retained for further consideration: the No Action Alternative, the Airlines Remain Alternative and the Airlines Relocate Alternative. As discussed in Chapter 3, *Alternatives*, the Airlines Relocate Alternative is the Sponsor's Preferred Alternative.

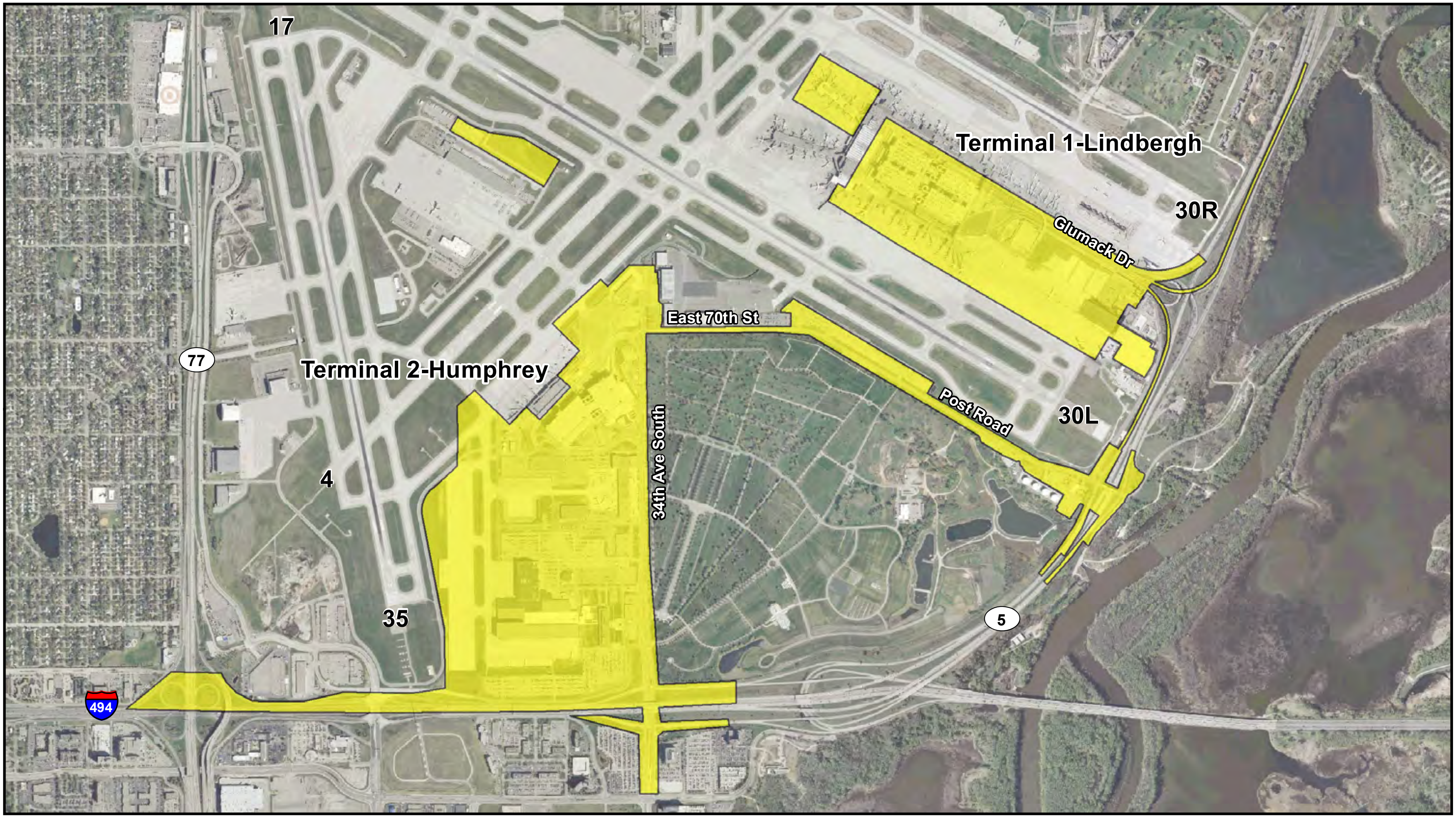
Environmental consequences were assessed in accordance with Federal Aviation Administration (FAA) Orders 1050.1E and 5050.4B and the Federal Highway Administration (FHWA) National Environmental Policy Act (NEPA) regulations. In addition, this chapter addresses all impact categories in the Minnesota Environmental Assessment Worksheet (EAW).

The impacts of the Action Alternatives were determined by comparing the projected future conditions of the Action Alternatives with the corresponding future conditions of the No Action Alternative.

Environmental consequences were analyzed within the geographic area where the Alternatives would cause impacts. This area is known as the study area. The extent of the study area depends upon the environmental resource being evaluated. For many resource categories the geographic area of interest includes areas of ground disturbance. Therefore, the general Study Area for this EA was established based on the combined limits of construction for all of the Alternatives. The location of this general Study Area is illustrated in **Figure 5.0-1**. For resource categories such as noise and traffic, the study area would not be related to the limits of construction. For these types of resources, the applicable study area is described in the section addressing that specific resource category.

Table 5.0.1 provides an overview of the impact categories evaluated and the associated impacts for each of the Alternatives. Additional information regarding the analysis of the impact categories is provided in the following sections.

FIGURE 5.0-1



LEGEND

Study Area

Study Area

N

0 1,000 2,000 4,000 Feet

Source: ESRI Data

Disclaimer: This map was generated by HNTB Corporation using GIS (Geographic Information System) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitablity for a particular use. The scale and location of all mapped data are approximate.

Table 5.0.1

Environmental Consequences Summary

Environmental Impact Category	Environmental Impact		
	No Action Alternative	**Alternative 1 – Airlines Remain**	**Alternative 2 – Airlines Relocate**
Air Quality	MSP is within a carbon monoxide (CO) maintenance area	- Operational and construction-related emissions do not exceed *de-minimis* levels. - CO concentrations are below the NAAQS/MAAQS.	
	- 2030 Mobile Source Air Toxic emissions are not expected to differ substantially between alternatives and no impacts are anticipated under any of the alternatives.		
Climate	No Impact	- Greenhouse gas emissions increase slightly compared to the No Action Alternative	
Coastal Resources	n/a		
Compatible Land Use	No impact	- No noise changes to noise sensitive land uses exceed the threshold of significance. - No change in land use compatibility related to safe aircraft operations or wildlife hazards.	
Construction Impacts	Minimal construction	- Air emissions conform to SIP. - Construction stormwater permit needed.	
Department of Transportation: Section 4(f)	No impact	- No use of a Section 4 (f) resource would be anticipated.	
Farmlands	n/a		
Fish, Wildlife and Plants	No impact	- No listed endangered or threatened species in Study Area. - No adverse impacts to biotic resources would be expected.	
Floodplains	n/a		
Hazardous Materials, Pollution Prevention and Solid Waste	No impact	- No solid/hazardous waste facilities disturbed at MSP, but hazardous materials could be encountered during construction.	
Historical, Architectural, Archaeological and Cultural Resources	No impact	- There may be an archaeological site in the area NW of the Post Road/TH 5 interchange. Both Action Alternatives include construction at this interchange. More detailed design information and potentially a site investigation are required to determine if there is potential to impact the archaeological site.	
Light Emissions and Visual Effects	No impact	- Additional apron and parking facility lighting not anticipated to cause adverse impacts.	
Natural Resources and Energy Supply	- Minimal differences in energy consumption between No Action and Action Alternatives.		
Aircraft Noise	No impact	- No noise changes at noise sensitive land uses exceed the threshold of significance (an increase of 1.5 dB DNL or above at the 65 DNL exposure). - Minor variations in contours between alternatives.	

Table 5.0.1

Environmental Consequences Summary

Environmental Impact Category	Environmental Impact		
	No Action Alternative	**Alternative 1 – Airlines Remain**	**Alternative 2 – Airlines Relocate**
Vehicular Noise	There are 35 daytime and 25 nighttime modeled receptors that approach or exceed state or federal standards.	- None of the modeled receptor locations are projected to experience a substantial increase in traffic noise levels - Noise levels would approach or exceed federal noise abatement criteria at 24 modeled receptor in 2030 - The 2030 vehicular noise analysis found that noise barriers were not reasonable because they did not meet the federal noise reduction design goal or cost effectiveness criteria	
Secondary (Induced) Impacts	- No significant impacts in other categories, therefore no secondary impacts expected.		
Socioeconomic Impacts, Environmental Justice and Children's Health and Safety Risks (including Traffic and Circulation)	No impact	- Requires relocation of SuperAmerica, but no anticipated loss in businesses or employment. - In terms of traffic and circulation, the Airlines Remain and Airlines Relocate Alternatives would generally operate significantly better than the No Action Alternative.	
Water Quality	No impact	- 6.5 acres net increase of impervious surface. (of which 3.7 acres are associated with roadway improvements)	- 28.4 acres net increase of impervious surface. (of which 1.1 acres are associated with roadway improvements)
		- Insignificant changes relative to surface water discharges as all projects will meet construction NPDES permit and Lower Minnesota River Watershed District (LMRWD) requirements. - Potential increase in deicing fluid collection efficiencies.	
Wetlands	n/a		
Wild and Scenic Rivers	n/a		
Cumulative Effects	The impacts associated with the Alternatives are minor. No single impact: even when considered with past, present and future actions; represents a substantial impact that cannot be mitigated. Therefore, none of the Alternatives would result in significant cumulative impacts.		

Note: n/a = No impact to Environmental Impact Category and/or category not applicable to MSP area.
NAAQS = National Ambient Air Quality Standard; MAAQS= Minnesota Ambient Air Quality Standard

Source: HNTB analysis, 2011.

5.1 Air Quality

This section provides an overview of the methodologies and results of air quality impact analyses.

5.1.1 Regulatory Background

NEPA and the Federal Clean Air Act of 1970 (CAA) are the primary regulations that apply in the consideration of air quality impacts.

5.1.1.1 NEPA

NEPA requires disclosure of the proposed project's impact on the human environment including air quality.

5.1.1.2 Clean Air Act

The CAA requires the US Environmental Protection Agency (USEPA) to establish and periodically review National Ambient Air Quality Standards (NAAQS),[1] to protect public health, welfare and the environment. These standards have been established for the following "criteria" air pollutants: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter equal to or less than 10 micrometers (coarse particulates or PM_{10}), particulate matter equal to or less than 2.5 micrometers (fine particulates or $PM_{2.5}$), and lead (Pb). The Minnesota Pollution Control Agency (MPCA) has adopted these standards or in some cases, adopted its own standards (Minnesota AAQS or MAAQS). The national and state standards are shown in **Table 5.1.1**.

Table 5.1.1
National and Minnesota Ambient Air Quality Standards

Pollutant	Averaging Period	Ambient Air Quality Standards	
		National	Minnesota
Carbon monoxide (CO)	1-hour	35 ppm ($40\ mg/m^3$)	30 ppm ($35\ mg/m^3$)
	8-hour	9 ppm ($10\ mg/m^3$)	9 ppm ($10\ mg/m^3$)
Ozone (O_3)	8-hour	0.075 ppm ($147\ \mu g/m^3$)	0.075 ppm ($147\ \mu g/m^3$)
Nitrogen dioxide (NO_2)	1-hour	0.10 ppm ($188\ \mu g/m^3$)	NA
	Annual	0.053 ppm ($100\ \mu g/m^3$)	0.053 ppm ($100\ \mu g/m^3$)
Sulfur dioxide (SO_2)	1-hour	0.075 ppm ($196\ \mu g/m^3$)	0.5 ppm ($1300\ \mu g/m^3$)
	3-hour	0.5 ppm ($1300\ \mu g/m^3$)	0.5 ppm ($1300\ \mu g/m^3$)
	24-hour	0.14 ppm ($365\ \mu g/m^3$)	0.14 ppm ($365\ \mu g/m^3$)
	Annual	0.03 ppm ($80\ \mu g/m^3$)	0.02 ppm ($60\ \mu g/m^3$)
Particulate matter (PM_{10})[1]	24-hour	$150\ \mu g/m^3$	$150\ \mu g/m^3$
	Annual	NA	$50\ \mu g/m^3$
Particulate matter ($PM_{2.5}$)	24-hour	$35\ \mu g/m^3$	NA
	Annual	$15\ \mu g/m^3$	NA
Lead (Pb)	3-month[2]	$0.15\ \mu g/m^3$	NA
	Quarterly	$1.5\ \mu g/m^3$	$1.5\ \mu g/m^3$

Notes:
(1) USEPA revoked the annual PM_{10} standard in 2006.
(2) Rolling average.
NA = not applicable
ppm = parts per million
$\mu g/m^3$ = micrograms/cubic meter
mg/m^3 = milligrams/cubic meter

Source: USEPA, 2010 and Minnesota Pollution Control Agency (MPCA) 2000.

States must identify geographic areas that do not meet the NAAQS for each criteria pollutant. These areas are designated as nonattainment areas for the applicable criteria pollutant(s). States must then develop State Implementation Plan(s) (SIP) for nonattainment areas. The SIP includes a variety of emission control measures that will result in attainment of the applicable standard(s) in the future.

An area previously designated as nonattainment and subsequently re-designated as attainment, is termed a maintenance area. A maintenance area must have a maintenance plan as a revision to the SIP to ensure attainment of the air quality standards is maintained.

In summary:

- An attainment area is any area that meets the air quality standard for a given criteria pollutant,
- A nonattainment area is any area that does not meet the air quality standard for a given criteria pollutant, and
- A maintenance area is any area previously designated nonattainment and subsequently re-designated as attainment.

Hennepin County, including the area surrounding MSP, is currently designated as attainment for all NAAQS (Pb, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and the current 8-hour standard for O_3), with the exception of CO. Hennepin County is designated as a CO maintenance area. The designation signifies that violations of the NAAQS for CO have occurred in the past but that the area is currently in attainment. Because of this status, a CO Maintenance Plan was developed.

The CO Maintenance Plan establishes area-wide emission budgets, control strategies and timeframes for maintaining the attainment status. The CO Maintenance Plan is periodically updated as part of the SIP for the Minneapolis-St. Paul area.

General Conformity

The General Conformity Rule of the federal CAA prohibits federal agencies (including the FAA) from permitting or funding projects that do not conform to an applicable SIP. The General Conformity Rule applies only to nonattainment or maintenance areas.

Under the General Conformity Rule, project-related emissions of the applicable non-attainment/maintenance pollutants are compared to *de-minimis* level thresholds. If the emissions exceed the thresholds, a formal Conformity Determination is required to demonstrate that the action conforms to the applicable SIP.

Transportation Conformity

Under the Transportation Conformity Rule, federally-funded roadway projects of regional significance are shown to conform to the SIP by inclusion into the Transportation Improvement Plan (TIP).

The federal transportation bill, Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users requires that all federally-funded transportation projects within the seven-county metropolitan area be included in the four-year TIP. The TIP is prepared by the Metropolitan Council (MC) with assistance from the Minnesota Department of Transportation. It represents a fiscally-constrained four-year program of project delivery. The most recent adopted TIP is for the period 2012 through 2015.

5.1.2 Approach and Methodology

The assessment of air quality impacts attributable to the planned improvements to MSP includes analyses to address both FAA and FHWA NEPA and CAA requirements.

To address FAA requirements, the air quality impact assessment was conducted following the guidelines contained in FAA Order 1050.1E, FAA Order 5050.4B and the FAA's *Air Quality Procedures for Civilian Airports and Air Force Bases*.[2]

To address FHWA requirements, the following items were addressed in the 2030 air quality analysis of the regional roadway improvements:

- A hot-spot analysis if USEPA approved screening thresholds are exceeded.

- That regionally significant projects are part of a conforming Long Range Transportation Policy Plan (LRTPP) and four-year TIP. The USEPA issued final rules on transportation conformity (40 CFR 93, Subpart A) which describe the methods required to demonstrate SIP compliance for transportation projects.

- A Mobile Source Air Toxics (MSAT) analysis as required by FHWA's, *Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA*.

The following sub-sections discuss the analyses approach and methodology. **Table 5.1.2** provides a summary of the analyses and the basis for inclusion in the air quality assessment. Detailed methodologies, assumptions, data, and results (by emission source) associated with the air quality assessment are provided in ***Appendix E,*** *Air Quality Technical Report* and ***Appendix P,*** *Vehicular Air Quality Analysis Memorandum*.

The air quality assessment considered a comprehensive list of sources of airport-related air emissions, including: aircraft; auxiliary power units (APU); ground support equipment (GSE); motor vehicles traveling to, from and moving about the Airport; and stationary sources such as boilers, generators, snowmelters and fuel storage tanks.

Table 5.1.2

Summary Matrix of Air Quality Impact Analyses

Analysis	Purpose	Applicable Regulations or Guidelines
Criteria Pollutant Emissions Inventory	To identify the sources and types, and quantify the amounts of air emissions associated with the operation/construction of the alternatives. The results are also used to compare future-year emissions associated with each alternative, used in support of the General Conformity Rule Applicability Analysis.	▪ FAA Order 1050.1E, Change 1, *Environmental Impacts: Policies and Procedures* ▪ FAA Order 5050.4B *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Projects* ▪ FAA *Air Quality Procedures for Civilian Airports & Air Force Bases* including the *Addendum*
General Conformity Rule Applicability Analysis	To determine if project-related emissions exceed the CAA General Conformity Rule *de- minimis* levels and if a formal determination is needed to demonstrate that the alternatives will conform to the applicable SIP.	▪ FAA Order 1050.1E, Change 1, *Environmental Impacts: Policies and Procedures*, Section 2. *Air Quality* ▪ 40 CFR Part 93, Subpart B, *Determining Conformity of General Federal Actions to State or Federal Implementation Plans* ▪ FAA, EPA *General Conformity Guidance for Airports - Questions & Answers*
CO Macroscale Dispersion Analysis	To predict existing and future-year ambient (i.e., outdoor) levels of CO both on and off the airport site and ensure that the project-related emissions do not cause or contribute to violations of the NAAQS/MAAQS.	▪ FAA *Air Quality Procedures for Civilian Airports and Air Force Bases including Addendum*
CO Roadway Intersection Analysis	To predict existing and future-year ambient levels of CO in the vicinities of roadway intersections both on and off the airport, and to ensure that the project-related traffic emissions do not cause or contribute to violations of the NAAQS/MAAQS. To demonstrate State Implementation Plan compliance for transportation projects.	▪ USEPA, *Guideline for Modeling Carbon Monoxide from Roadway Intersection* ▪ 40 CFR 93, Subpart A, *Conformity to State or Federal Implementation Plans of Transportation Plans, Programs, and Projects Developed, Funded or Approved Under Title 23 U.S.C. or the Federal Transit Laws*

Source: Wenck Associates, Inc., KB Environmental Sciences, Inc., and David Braslau Associates, Inc., 2011.

5.1.2.1 Criteria Pollutant Emission Inventories

The criteria pollutant emissions inventories are used to disclose and compare the action alternatives to the future no-action alternative and determine the air quality impacts for purposes of NEPA. Emissions inventories are also used to compare the project-related emissions to the General Conformity thresholds.

In general terms, an emissions inventory is a quantification of the amount of pollutants emitted from a source over a period of time. The amount is calculated by applying emission factors (i.e., grams of pollutant/operation) to source activity levels (i.e., number of aircraft operations). The results are provided in tons by pollutant (i.e., CO, NO_x, and SO_x), emission source (i.e., aircraft, motor vehicles, and stationary sources) and analysis year.

For this assessment, the emissions inventory includes CO, NO_x, PM_{10}, $PM_{2.5}$ and SO_x. Because emissions of O_3 cannot be calculated directly, volatile organic compounds (VOCs) and NO_x (the primary precursors to O_3 formation) are used as surrogates for this pollutant.

Operational Emissions

Operational emission inventories are developed for baseline conditions and each of the Action Alternatives. Operational emissions include emissions from aircraft, airport equipment, motor vehicles and stationary sources associated with the airport. The FAA's *Emissions and Dispersion Modeling System* (EDMS), the FAA-required and USEPA-preferred model, was used to calculate emissions from aircraft and airport equipment such as GSE and APU.[3] For motor vehicles, the USEPA MOBILE6.2 emissions model is used.[4] For stationary sources such as heating/cooling plants and emergency generators, the emissions are based on the approximated amount of annual fuel use.

To identify potential air quality impacts, the operational emissions inventory for the No Action Alternative are compared to the operational inventory for each of the Action Alternatives. In addition, the differences between the No Action and Action Alternatives CO emissions are compared to the CO *de-minimis* level of 100 tons per year to determine if a General Conformity Determination would be required.

Pb emissions are not typically considered in emission inventories for commercial service airports because they are primarily from piston engine aircraft. However, Pb emissions are quantified for this analysis for comparison to the air monitoring requirement threshold of 1.0 ton per year.

Construction Emissions

Construction emissions were also quantified for the Action Alternatives. The emission sources included on- and off-road construction vehicles, machinery and equipment. The construction schedules and requirements (i.e., work crews, equipment types, etc.) for each Action Alternative were estimated. The construction schedules were then used to estimate hours of operation for non-road equipment and miles driven for on-road vehicles. Emission factors obtained from USEPA NONROAD2008[5] and MOBILE6.2 models were applied to obtain estimates of annual emissions of CO, NO_x, VOC, SO_x PM_{10}, and $PM_{2.5}$.

As with the operational emissions, the quantity of CO construction emissions was compared to the CO *de-minimis* level to determine if a General Conformity Determination would be required.

5.1.2.2 CO Concentrations

CO concentrations were estimated on both the macroscale and roadway intersection levels in order to determine if project related emissions would cause or contribute to violations of the air quality standards. CO concentrations included contributions from both background and project emissions sources.

Ambient monitoring data was used to conservatively approximate background concentrations. The MPCA operates several air quality monitoring stations in the Minneapolis-St. Paul area as part of its permanent, state-wide air monitoring program. Pollutant monitoring data for 2008 through 2010 from the nearest air monitoring stations was reviewed. The maximum concentrations from the 1088 West University Avenue station in St. Paul were selected to represent the background concentration, which were 4.4 ppm and 2.6 ppm for the 1-hour and 8-hour averaging periods respectively. These background concentrations account for other emission sources in the region and natural sources not accounted for in the project dispersion modeling analyses. Their inclusion along with the project impacts represents a conservative assessment of the potential total CO concentrations.

For the macroscale analysis, CO concentrations at locations on and around the airport were quantified using EDMS and USEPA AERMOD dispersion model.

For the roadway intersection analysis, CO concentrations near select roadway intersections were assessed. The 34th Avenue South at American Boulevard and the I-494 on- and off-ramp intersections at 34th Avenue South were analyzed because these are the most critical at-grade roadway intersections adjacent to the airport. The USEPA CAL3QHC[6] roadway dispersion model was used to quantify CO concentrations at the selected intersections.

Finally, the background plus project CO concentrations from both the macroscale and roadway intersection analyses were compared to the NAAQS/MAAQS.

All standard methods were used except where project-specific conditions and inputs were more appropriate and allowable under FAA and USEPA modeling conventions. Any non-standard approaches were coordinated with the FAA's Office of Environment and Energy through the use of an *Air Quality Assessment Protocol.*[7]

5.1.2.3 2030 Regional Roadway Analysis

Motorized vehicles affect air quality by emitting airborne pollutants. Changes in traffic volumes, travel patterns, and roadway locations affect air quality by changing the number of vehicles and the congestion levels in a given area. The air quality impacts from the project are analyzed by addressing criteria pollutants, a group of common air pollutants regulated by the U.S. EPA on the basis of criteria (information on health and/or environmental effects of pollution). Potential impacts resulting from these pollutants are assessed by comparing projected concentrations to the NAAQS.

In addition to the criteria air pollutants, the EPA also regulates air toxics. The FHWA provides guidance for the assessment of Mobile Source Air Toxic (MSAT) effects for transportation projects in the NEPA process. A quantitative evaluation of MSATs was performed for this project. The scope and methods of the analysis performed were developed in collaboration with the MnDOT, MPCA, and FHWA.

5.1.2.4 Transportation Conformity

Under Transportation Conformity, there are no project-specific quantitative criteria for determining if surface transportation or transit-related emissions comply with the SIP. Instead, the individual project(s) are listed as planned improvements to the area-wide roadway or transit systems in a conforming TIP.

5.1.2.5 Odors and Fugitive Dust

Odor is one of the items identified on the Minnesota Environmental Quality Board's (EQB) Environmental Assessment Worksheet. According to the EQB's guidance, one should "discuss both odors which have potential human health effects and also those which, although they do not pose health risks, may result in a loss of quality of life to surrounding neighbors due to nuisance or annoyance conditions."[8] Therefore, potential odor impacts are included in the air quality assessment.

Also, according to the EQB's guidance, fugitive dust i.e. wind-blown dust from construction, demolition, haul roads and other activities should be addressed. Therefore, potential fugitive dust is also included in the air quality assessment.

5.1.2.6 Hazardous Air Pollutant Emissions Inventory

In recent years, public and agency interest has increased regarding airport contributions to levels of hazardous air pollutants (HAPs).[9] HAPs comprise gaseous organic and inorganic chemicals and particulate matter with known or suspected potential to cause cancer (carcinogenic) or other serious health effects (non-carcinogenic). They are commonly emitted by a wide range of airport and non-airport sources, including aircraft, ground support equipment, motor vehicles, home furnaces, evaporating fuel and paints, wood burning, carpets, dry-cleaning of clothing, and industrial facilities.

The term HAPs refers to pollutants that do not have established Ambient Air Quality Standards (AAQS) but present potential adverse human health risks from short-term or long-term exposures. There are no Federal or state reporting requirements applicable to airports for these pollutants. However, a HAPs inventory was completed to disclose potential HAPs quantities for each of the Alternatives.

Annual emissions of specific air toxic compounds in tons per year were estimated from all activities at the Airport and from motor vehicles on the major roadways in the vicinity of the airport. Refer to *Appendix E* for more information regarding the methodology used to generate HAPs inventories.

5.1.3 Threshold of Significance

The applicable thresholds of significance for air quality are the NAAQS/MAAQS and the General Conformity Rule *de-minimis* thresholds, particularly as they apply to CO.

5.1.4 Affected Environment

Minnesota Pollution Control Agency (MPCA) operates several ambient ("outdoor") air quality monitoring stations in the Minneapolis/St. Paul area as part of its permanent, state-wide air monitoring program. These stations sample and record levels of the U.S. EPA criteria air pollutants. The closest of these air monitoring stations to MSP are located at H.C. Anderson School and Ramsey Health Center. All concentrations are within the National Ambient Air Quality Standards (NAAQS). Moreover, the concentrations decreased over the past three years. Also, in May of 2006, the MPCA published a study of ambient monitoring conditions near MSP[10]. The monitoring study included measurements of air toxics and criteria pollutants including $PM_{2.5}$ at two locations within MSP and at Wenonah School and Richfield Intermediate School. Overall, median and average concentrations of pollutants monitored near MSP were similar to concentrations monitored at other locations in the Twin Cities Metropolitan Area.

The extent of the air quality study area varies by emission source (i.e., aircraft, GSE, motor vehicles) and pollutant. Aircraft emissions during the approach and climb-out modes of a landing-takeoff cycle (LTO) extend up to the atmospheric mixing height (approximately 3,000 feet). Based upon the type of aircraft that use MSP, this altitude is reached approximately 1.5 miles beyond the runway ends. GSE emissions are mainly restricted to the airport main terminal aprons and cargo facilities. On-site motor vehicles emissions are mostly confined to the on-site roadways, terminal curbsides and parking facilities.

Airport-related motor vehicle traffic traveling to and from the airport also has the potential to affect air quality in the vicinity of off-site roadway intersections located near the airport. Therefore, the air quality study area includes several regional roadways around MSP. A regional roadway has a functional classification of principal arterial that is operated by MnDOT. A principal arterial is intended to provide mobility of the larger roadway network. Regional roadways that are adjacent to MSP are I-494, TH 77, TH 62, and TH 5. An evaluation of vehicular air quality for this project was completed using methods established in cooperation with MnDOT and FHWA.

To describe the affected environment within the air quality study area, the following sub-sections provides a summary of the baseline (2010) conditions. Baseline conditions reflect 2010 aircraft operations, airport activity and traffic volumes.

5.1.4.1 Emissions Inventory

Total baseline (2010) emissions were estimated to be approximately 5,818 tons per year of CO; 407 tons per year of VOC; 2,027 tons per year of NO_x; 177 tons per year of SO_2; 38.8 tons per year of PM_{10}; 36.2 tons per year of $PM_{2.5}$ and 0.04 tons per year of Pb.

5.1.4.2 CO Concentrations

Table 5.1.3 summarizes the baseline condition for the macroscale dispersion analysis. The maximum estimated 1-hour CO concentration of 28.4 ppm occurs at a location southeast of Terminal 1-Lindbergh. At this location the CO concentration is influenced mainly by GSE activity, taxiing aircraft and aircraft waiting to depart. The maximum-predicted concentration is less than the 1-hour CO standard of 30 ppm. The maximum 8-hour CO concentration of 8.0 ppm occurs in the same location as a result of the same activities. This concentration does not exceed the 8-hour CO standard of 9 ppm.

Table 5.1.4 summarizes the baseline concentrations from the CO roadway intersection analyses. The highest 1-hour CO concentration predicted at the National Cemetery near the 34th Avenue South and I-494 Interchange is estimated to be 6.2 ppm. The maximum 8-hour concentration of 4.4 ppm occurs at the same location. The 1-hour concentration at the Crown Plaza Hotel at the 34th Avenue South and American Boulevard intersection is estimated to be 5.8 ppm with an 8-hour concentration of 3.7 ppm. All of the estimated maximum 1-hour and 8-hour CO concentrations are within the applicable standards of 35/30 and 9 ppm, respectively.

Table 5.1.3

2010 Baseline Condition CO Macroscale Dispersion Modeling Results

(ppm)

Averaging Time	Maximum Modeled Concentration	Background Concentration	Total Predicted Concentration	NAAQS/ MAAQS	Exceeds NAAQS/MAAQS
1-hour	24.0	4.4	28.4	35/30	No
8-hour	5.4	2.6	8.0	9/9	No

Notes:
NAAQS = National Ambient Air Quality Standard
MAAQS = Minnesota Ambient Air Quality Standard

Source: Wenck Associates, Inc., KB Environmental Sciences, Inc., and David Braslau Associates, Inc., 2011.

Table 5.1.4

2010 Baseline Condition CO Roadway Intersection Analysis Results

(ppm)

Intersection	Averaging Time	Maximum Modeled Concentration	Background Concentration	Total Predicted Concentration	NAAQS/ MAAQS	Exceeds NAAQS/ MAAQS
34th Ave S and I-494 Interchange	1-hour	1.8	4.4	6.2	35/30	No
	8-hour	1.8	2.6	4.4	9/9	No
34th Ave S and American Boulevard	1-hour	1.4	4.4	5.8	35/30	No
	8-hour	1.1	2.6	3.7	9/9	No

Notes:
NAAQS = National Ambient Air Quality Standard
MAAQS = Minnesota Ambient Air Quality Standard

Source: Wenck Associates, Inc., KB Environmental Sciences, Inc., and David Braslau Associates, Inc., 2011.

5.1.4.3 2030 Regional Roadway Analysis

Ozone levels in the Twin Cities metropolitan area currently meet state and federal standards, and reductions in ozone levels have been observed between 2007 and 2010. Additionally, the State of Minnesota is classified by the EPA as an "ozone attainment area," which means that Minnesota has been identified as a geographic area that meets the national health-based standards for ozone levels. Because of these factors, a quantitative ozone analysis was not conducted for this project.

The entire State of Minnesota has been designated as an unclassifiable/ attainment area for PM. This means that Minnesota has been identified as a geographic area that meets the national health based standards for PM levels, and therefore is exempt from performing PM qualitative hot-spot analyses.

Within the project area, it is unlikely that NO_2 standards will be approached or exceeded based on the relatively low ambient concentrations of NO_2 in Minnesota and on the long-term trend toward reduction of NO_x emissions. Because of these factors, a specific analysis of NO2 was not conducted for this project.

Emissions of sulfur oxides from transportation sources are a small component of overall emissions and continue to decline due to the desulphurization of fuels. Additionally, the State of Minnesota is classified by the EPA as a "sulfur dioxide attainment area," which means that Minnesota has been identified as a geographic area that meets the national health-based standards for sulfur dioxide levels. Because of these factors, a quantitative analysis for sulfur dioxide was not conducted for this project.

Due to the phase out of leaded gasoline, lead is no longer a pollutant associated with vehicular emissions.

5.1.4.4 Transportation Conformity

Only funded and approved projects are included in the TIP and evaluated for Transportation Conformity. At this time, the I-494 and 34th Avenue Interchange improvement is listed in the MC 2012 – 2015 Transportation Improvement Program for the Twin Cities Metropolitan Area.

5.1.5 Impact Analysis

This section provides the results of the air quality impact assessment for the No Action Alternative and the two Action Alternatives.

5.1.5.1 Emissions Inventories

Operational Emissions

Tables 5.1.5 and **Table 5.1.6** present a comparison of the No Action and Action Alternatives operational emissions for 2020 and 2025, respectively. In 2020 and 2025 there are only minor differences between the No Action Alternative emissions and the Action Alternatives emissions. The differences are the result of varying operating conditions between the Alternatives. For instance, airplane taxiing distances to and from the runways differs for some airlines because they are operating out of a different terminal.

Table 5.1.5

2020 Operational Emissions Inventory

(tons per year)

Alternative	CO	VOC	NO_x	SO_x	PM_{10}	$PM_{2.5}$	Pb
No Action	4,705	387	2,241	218	39	36	0.04
Airlines Remain	4,707	387	2,241	218	39	36	0.04
Airlines Relocate	4,706	381	2,230	214	39	36	0.04

Note: Off-airport roadways include airport-related motor vehicles only.

Source: Wenck Associates, Inc., KB Environmental Sciences, Inc., and David Braslau Associates, Inc., 2011.

Table 5.1.6

2025 Operational Emissions Inventory

(tons per year)

Alternative	CO	VOC	NO_x	SO_x	PM_{10}	$PM_{2.5}$	Pb
No Action	5,256	436	2,545	249	43	39	0.04
Airlines Remain	5,174	429	2,531	244	42	39	0.04
Airlines Relocate	5,285	438	2,545	248	43	39	0.04

Note: Off-airport roadways include airport-related motor vehicles only.

Source: Wenck Associates, Inc., KB Environmental Sciences, Inc., and David Braslau Associates, Inc., 2011.

The differences in CO emissions between each Action Alternative and the No Action Alternative comprise the Project-related emissions. Importantly, these values are below the General Conformity *de-minimis* threshold of 100 tons per year. Therefore, a General Conformity Determination is not required.

Lastly, Pb emissions for all the Alternatives are less than the monitoring requirement threshold of 1.0 ton per year.

Construction Emissions

Table 5.1.7 presents the estimated project-related emissions during the nine-year construction period. The construction emissions inventory results reflect that the Airlines Relocate Alternative involves greater amounts of excavation, terminal expansion and parking facility construction. Thus, the Airlines Relocate Alternative construction-related emissions are greater than the Airlines Remain Alternative. However, the CO emissions associated with construction activities for both Action Alternatives are below the *de-minimis* threshold of 100 tons per year. Therefore, a Conformity Determination is not required.

Table 5.1.7
Construction Emissions Inventory
(tons per year)

Alternative	Pollutant	Construction Year 2012	2013	2014	2015	2016	2017	2018	2019	2020
Airlines Remain	CO	1.08	15.9	11.4	12.2	13.9	13.5	11.1	5.74	5.72
Airlines Relocate		1.23	12.6	20.1	22.2	25.2	16.4	5.39	5.22	5.20
Airlines Remain	VOC	0.23	3.02	2.28	2.39	2.84	2.68	2.13	0.98	0.98
Airlines Relocate		0.26	2.49	4.01	4.48	5.08	3.23	0.93	0.89	0.88
Airlines Remain	NO_x	1.31	28.7	19.5	21.5	24.1	24.8	22.1	13.3	13.3
Airlines Relocate		1.66	21.5	35.8	38.8	44.9	31.3	11.4	12.0	12.0
Airlines Remain	SO_x	0.03	0.64	0.44	0.49	0.57	0.59	0.51	0.29	0.29
Airlines Relocate		0.04	0.48	0.82	0.90	1.04	0.73	0.25	0.26	0.26
Airlines Remain	PM_{10}	0.17	2.45	1.79	1.91	2.24	2.18	1.77	0.86	0.86
Airlines Relocate		0.19	1.97	3.19	3.56	4.03	2.63	0.81	0.78	0.78
Airlines Remain	$PM_{2.5}$	0.17	2.38	1.73	1.86	2.18	2.12	1.71	0.84	0.83
Airlines Relocate		0.19	1.91	3.09	3.45	3.91	2.55	0.78	0.76	0.76

Source: Wenck Associates, Inc., KB Environmental Sciences, Inc., and David Braslau Associates, Inc., 2011.

5.1.5.2 CO Concentrations

Table 5.1.8 presents a comparison of the No Action and Action Alternatives CO macroscale dispersion results. These are the maximum predicted concentrations (including background levels of 4.4 and 2.6 ppm for 1-hour and 8-hour, respectively) over the entire receptor network. That is, the value represents the highest concentration throughout the year at any receptor.

In 2020, the Airlines Remain Alternative and the Airlines Relocate Alternative CO concentrations are lower than the No Action Alternative CO concentrations. In 2025, the Airlines Remain Alternative CO concentrations are higher than the No Action Alternative while the Airlines Relocate Alternative CO concentrations are lower than the No Action Alternative. Regardless, all CO concentrations are below the NAAQS/MAAQS. Therefore, the action does not cause or contribute to violations of the air quality standards for CO concentrations.

The CO roadway intersection dispersion results for the No Action Alternative and the Action Alternatives are presented in **Table 5.1.9**. All CO concentrations are below the NAAQS/MAAQS. Therefore, the action does not cause or contribute to violations of the air quality standards for CO concentrations.

Table 5.1.8
2020 and 2025 CO Macroscale Dispersion Results
(ppm)

	2020		2025	
	Maximum Concentration		Maximum Concentration	
Alternative	**1 hour**	**8 hour**	**1 hour**	**8 hour**
No Action	11.9	4.8	11.4	4.4
Airlines Remain	11.5	4.8	11.9	4.5
Airlines Relocate	10.6	4.5	10.7	4.4

Source: Wenck Associates, Inc., KB Environmental Sciences, Inc., and David Braslau Associates, Inc., 2011.

Table 5.1.9
2020 and 2025 CO Intersection Dispersion Results
(ppm)

	2020		2025	
	Maximum Concentration		Maximum Concentration	
Alternative/Intersection	**1 hour**	**8 hour**	**1 hour**	**8 hour**
No Action				
34th Ave South & I-494 Interchange	7.3	5.5	7.3	5.5
34th Ave South & American Blvd.	5.8	3.7	5.7	3.6
Airlines Remain Alternative				
34th Ave South & I-494 Interchange	6.4	4.6	6.7	4.9
34th Ave South & American Blvd.	6.5	4.3	6.4	4.2
Airlines Relocate Alternative				
34th Ave South & I-494 Interchange	7.3	5.5	7.7	5.9
34th Ave South & American Blvd.	6.3	3.6	6.4	4.2

Source: Wenck Associates, Inc., KB Environmental Sciences, Inc., and David Braslau Associates, Inc., 2011.

5.1.5.3 2030 Regional Roadway Analysis

An evaluation of vehicular air quality for this project was completed using methods established in cooperation with MnDOT and FHWA. The FHWA typically requires a 20 year forecast horizon be reviewed for the air quality analysis as a part of its NEPA guidance. This analysis reviewed the regional roadway conditions in 2030 to satisfy FHWA requirements. Regardless of whether the Airlines Remain or Airlines Relocate Alternative is selected, the proposed regional roadway improvements are the same by 2030. Therefore, analysis was conducted by comparing air quality conditions with the unimproved regional roadways to those with the 2030 regional roadway improvements. . This evaluation is documented in ***Appendix P***, *Vehicle Air Quality Analysis Memorandum*.

A carbon monoxide (CO) evaluation is performed by evaluating the worst-operating (hot-spot) intersections in the project area. The EPA has approved a screening method to determine which intersections need hot-spot analysis. The hot-spot screening method uses a traffic volume threshold of 79,400 entering vehicles per day. Entering traffic volumes at all intersections in the project area are forecast to be less than this threshold, as shown in **Table 5.1.10**. The results of the screening procedure indicate that the intersections do not require a hot-spot analysis.

The FHWA was consulted to determine the appropriate level of MSAT analysis for the proposed roadway improvements. This consultation resulted in the following response:

Although the projected 2030 ADT on I-494 exceeds the 140,000 to 150,000 ADT threshold outlined in FHWA guidance that would [require] a quantitative assessment, the anticipated scope of work appears to (1) primarily improve highway operations without adding substantial new capacity, and (2) result in a facility that is not likely to meaningfully increase MSAT emissions.

As such, it was concluded that a qualitative MSAT analysis is adequate for the proposed roadway improvements in the Minneapolis-St. Paul International Airport 2020 Improvements EA.

In summary, 2030 Mobile Source Air Toxic emissions are not expected to differ substantially between alternatives and no impacts are anticipated under any of the alternatives.

Table 5.1.10
Project Area Intersection Volumes

Intersection	Year 2030 Volume
34th Ave & I-494 Westbound Ramps	77,550
34th Ave & I-494 Eastbound Ramps	61,450
Post Rd & TH 5 Westbound Ramps	39,100
Post Rd & TH 5 Eastbound Ramps	18,400

Source: Wenck Associates, Inc., KB Environmental Sciences, Inc., and David Braslau Associates, Inc., 2011.

5.1.5.4 Transportation Conformity

The EPA issued final rules on transportation conformity (40 CFR 93, Subpart A) which describe the methods required to demonstrate SIP compliance for transportation projects. It requires that transportation projects must be part of a conforming Long Range Transportation Policy Plan (LRTPP) and four-year Transportation Improvement Program (TIP).

Only funded and approved projects are included in the TIP and evaluated for Transportation Conformity. Although the FAA and MAC are not directly responsible for Transportation Conformity determinations, any required transportation conformity analyses and determinations in the future will be coordinated with the appropriate federal, state, and local agencies. At this time, the I-494 and 34th Avenue Interchange improvement is listed in the MC 2012 – 2015 Transportation Improvement Program for the Twin Cities Metropolitan Area. When funding for the other roadway improvements becomes available, the MAC will request that these roadway improvements are included in the TIP. If necessary, the MAC will provide additional analysis as part of the request to demonstrate conformance with the TIP.

5.1.5.5 Odors and Fugitive Dust

Generally, operations of airports do not generate significant odor impacts. Odors generated during construction are expected to be minor and temporary and would be mitigated by maintaining construction equipment to the manufacturer's specifications. Thus, none of the Alternatives is expected to result in significant odors.

Fugitive dust generated by heavy equipment during construction would be minimized by enforcing Best Management Practices during construction including: limit the time periods and extent of exposed and/or graded areas; watering disturbed areas during periods of high winds or high levels of construction activity; and minimizing the use of vehicles on unpaved surfaces.

5.1.5.6 HAPs Emissions Inventory

A summary of the HAPs emissions inventory is presented in **Table 5.1.11.** Generally, the HAPs emissions for the Airlines Remain Alternative and the Airlines Relocate Alterative are less than the No Action Alternative due to lower aircraft taxi times and other airfield improvements. The differences in emission totals between 2020 and 2025 are attributable to the forecasted increases in airport operations, changes in ground-based aircraft taxi times, and changes in on- and off-site surface traffic volumes over this time period. However, some of these increases are offset by the reductions in HAPs emissions factors due to regulated improvements in GSE and motor vehicle engine exhaust.

Table 5.1.11
Summary of HAPs Emissions Inventory (tons)

	No Action		Airlines Remain		Airlines Relocate	
Pollutant	**2020**	**2025**	**2020**	**2025**	**2020**	**2025**
1,3-butadiene	3.92	4.58	3.93	4.45	3.80	4.58
2,2,4-trimethylpentane	0.28	0.23	0.28	0.23	0.28	0.23
2-methylnaphthalene	0.43	0.51	0.44	0.50	0.42	0.51
Acetaldehyde	9.92	11.6	9.95	11.3	9.61	11.6
Acetone	0.88	1.02	0.88	0.99	0.85	1.02
Acrolein	5.27	6.18	5.29	6.01	5.08	6.18
Benzaldehyde	1.03	1.20	1.03	1.17	0.99	1.20
Benzene	7.23	8.14	7.24	8.00	7.21	8.22
Chlorobenzene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cyclohexane	0.02	0.02	0.03	0.03	0.03	0.03
Ethylbenzene	0.85	0.94	0.85	0.92	0.83	0.93
Formaldehyde	27.7	32.4	27.8	31.5	26.8	32.4
Isopropylbenzene (cumene)	0.03	0.04	0.03	0.04	0.03	0.04
M & P-xylene	1.92	2.19	1.92	2.17	1.90	2.19
Methyl alcohol	3.80	4.47	3.81	4.34	3.66	4.47
M-xylene	0.34	0.29	0.34	0.29	0.34	0.30
Naphthalene	1.23	1.44	1.23	1.40	1.18	1.44
N-heptane	0.49	0.52	0.50	0.52	0.49	0.52
N-hexane	0.77	0.78	0.77	0.78	0.77	0.78
O-xylene	1.08	1.18	1.08	1.17	1.06	1.18
Phenol (carbolic acid)	1.54	1.81	1.54	1.75	1.48	1.80
Propionaldehyde	1.62	1.90	1.63	1.84	1.57	1.89
Styrene	0.68	0.79	0.68	0.77	0.65	0.79
Toluene	3.32	3.64	3.33	3.60	3.28	3.64

Source: Wenck Associates, Inc, KB Environmental Sciences, Inc, and David Braslau Associates, Inc., 2011.

5.1.6 Permitting

The MAC facility currently operates under an Option D Registration Permit for its air emissions. Under an Option D Registration Permit the facility can make changes and not require a permit action as long as its actual air emissions do not exceed any of the Registration Permit thresholds. Based on projected emissions, the MAC is not expected to exceed any of the permit thresholds for any of the Alternatives and under applicable rules will not be required to submit an application for any other type of air permit.

In addition, the State of Minnesota does not administer an indirect source permitting program applicable to projects which indirectly cause mobile source activity resulting in air emissions. Therefore, the Action Alternatives do not require an indirect source permit.

5.1.7 Summary

The differences in emissions between Alternatives are minimal. A General Conformity Determination is not required and CO concentrations for the Alternatives do not exceed air quality standards.

Similarly, the MSAT emissions are not expected to change for either alternative. Therefore, the air quality impacts associated with the proposed improvements to MSP do not exceed the thresholds of significance.

5.2 Climate

Although there are no federal standards for aviation-related GHG emissions, it is well-established that GHG emissions can affect climate.[11] The Council on Environmental Quality (CEQ) has indicated that climate should be considered in NEPA analyses. As noted by CEQ, however, "it is not currently useful for the NEPA analysis to attempt to link specific climatological changes, or the environmental impacts thereof, to the particular project or emissions; as such direct linkage is difficult to isolate and to understand".[12]

5.2.1 Approach and Methodology

Greenhouse gases were inventoried in accordance with Airport Cooperative Research Program (ACRP) Guidebook on Preparing Airport Greenhouse Gas Emission Inventories (ACRP Report 11),[13] MPCA's General Guidance for Carbon Footprint Development in Environmental Review,[14] and FAA guidance.[15]

GHGs are defined as including carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). GHG emissions were reported using the carbon dioxide equivalents (CO_2e) metric which accounts for Global Warming Potentials (GWP) based on the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report,[16] which range from 1 for CO_2 to 25 for CH_4 to 298 for N_2O. Based on these CO_2e factors, 1 ton of CH_4 is 24 times more potent than 1 ton of CO_2 and is weighted, as such, in the GHG emissions inventory.

GHG emissions were calculated in much the same way as criteria air pollutants. Input data included activity levels or material throughput (i.e., fuel use, vehicle miles traveled, electrical consumption, etc.). Appropriate emission factors were applied to the input data (i.e., in units of GHG emissions per gallon of fuel).

The inventories were summed to provide total GHG emissions in metric tons (MT) CO_2e for each Alternative in 2020 and 2025. The incremental differences between the No Action Alternative MT CO_2e and the Action Alternatives were compared. In addition, the incremental differences were considered in the context of US and global MT CO_2e emissions.

Detailed methodologies, assumptions, data, and results (by ownership and scope) associated with the GHG assessment are provided in *Appendix E*.

5.2.2 Threshold of Significance

At this time, there are no federal standards for GHGs.

5.2.3 Affected Environment

Research has shown there is a direct correlation between fuel combustion and GHG emissions. In terms of U.S. contributions, the General Accounting Office reports that "domestic aviation contributes about 3 percent of total CO_2 emissions, according to USEPA data," compared with other industrial sources including the remainder of the transportation sector (20 percent) and power generation (41 percent).[17] The International Civil Aviation

Organization estimates that GHG emissions from aircraft account for roughly 3 percent of all anthropogenic GHG emissions globally.[18] Climate change due to GHG emission is a global phenomenon, so the affected environment is the global climate.[19]

The scientific community is continuing efforts to better understand the impact of aviation emissions on the global atmosphere. The FAA is leading and participating in a number of initiatives intended to clarify the role that commercial aviation plays in GHG emissions and climate. The FAA, with support from the U.S. Global Change Research Program and its participating federal agencies (e.g., NASA, NOAA, EPA and DOE), has developed the Aviation Climate Change Research Initiative (ACCRI) in an effort to advance scientific understanding or regional and global climate impacts of aircraft emissions. FAA also funds the Partnership for AiR Transportation Noise & Emissions Reduction (PARTNER) Center of Excellence research initiative to quantify the effects of aircraft exhaust and contrails on global and U.S. climate and atmospheric composition. Similar research topics are being examined at the international level by the International Civil Aviation Organization.

5.2.4 Impact Analysis

FAA guidance states that estimated levels of GHG emissions can serve as a reasonable proxy for assessing potential climate change impacts, and provide decision makers and the public with useful information for a reasoned choice among alternatives.[20]

Thus, GHG emission inventories were completed for the No Action Alternative and the Action Alternatives.

Tables 5.2.1 and 5.2.2 present a comparison of the No Action and Action Alternatives GHG emissions in 2020 and 2025, respectively.

Table 5.2.1
2020 GHG Emissions Comparisons

Alternative	**GHG Emissions** ($MT\ CO_2e$)	**Difference from No Action**	**% Difference from No Action**	**% of U.S. Emissions(1)**	**% of Global Emissions(2)**
No Action	3,910,933	-	-	-	-
Airlines Remain	3,928,321	17,388	0.44	< 0.0003	< 0.00004
Airlines Relocate	3,929,648	18,715	0.48	< 0.0003	< 0.00004

Notes:
(1) National GHGs in 2009 at 6,633.2 million MT CO_2e, EPA*, Inventory of U.S. Greenhouse Gas Emissions and Sinks*, 1990-2009, 2011, Executive Summary, p. 4.

(2) Global GHGs in 2004 at 49,000 million MT CO_2e, Intergovernmental Panel on Climate, Technical Summary In: *Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, 2007, p. 27.

Source: Wenck Associates, Inc., KB Environmental Sciences, Inc., and David Braslau Associates, Inc., 2011.

Table 5.2.2
2025 GHG Emissions Comparisons

Alternative	**GHG Emissions** (MT CO_2e)	**Difference from No Action**	**% Difference from No Action**	**% of U.S. Emissions**[(1)]	**% of Global Emissions**[(2)]
No Action	4,305,163	-	-	-	-
Airlines Remain	4,312,261	7,098	0.16	< 0.0002	< 0.00002
Airlines Relocate	4,329,787	24,624	0.57	< 0.0004	< 0.00006

Notes:
(1) National GHGs in 2009 at 6,633.2 million MT CO_2e, EPA*, Inventory of U.S. Greenhouse Gas Emissions and Sinks*, 1990-2009, 2011, Executive Summary, p. 4.
(2) Global GHGs in 2004 at 49,000 million MT CO_2e, Intergovernmental Panel on Climate, Technical Summary In: *Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, 2007, p. 27.

Source: Wenck Associates, Inc., KB Environmental Sciences, Inc., and David Braslau Associates, Inc., 2011.

With the implementation of the Airlines Remain Alternative, total GHG emissions are expected to increase by 17,388 and 7,097 MT CO2e for 2020 and 2025 respectively, over the No Action Alternative. This change equates to a 0.44 and 0.16 percent increase over the No Action Alternative. The increase is largely due to increases in expected electrical consumption due to proposed terminal improvements.

With the implementation of the Airlines Relocate Alternative, total GHG emissions are expected to increase by 18,715 and 24,624 metric tons for 2020 and 2025, respectively, over the No Action Alternative. This change equates to a 0.48 and 0.57 percent increase over the No Action Alternative. Again, the increase is largely due to increases in expected electrical consumption due to proposed terminal improvements.

The incremental increases in MT CO_2e emissions were considered in the context of US and global MT CO_2e emissions. For the Airline Remain Alternative, the increases would comprise less than 0.0003 percent of U.S.-based GHG emissions and less than 0.00004 percent of global GHG emissions. For the Airline Relocate Alternative, the increases would comprise less than 0.0004 percent of U.S.-based GHG emissions and less than 0.00006 percent of global GHG emissions.

The cumulative impact of this proposed action on the global climate when added to other past, present, and reasonably foreseeable future action is not currently scientifically predictable. Aviation has been calculated to contribute approximately 3 percent of the global CO_2 emissions; this contribution may grow to 5 percent by 2050. Actions are underway within the US and by other nations to reduce aviation's contribution through such measures as new aircraft technologies to reduce emissions and improve fuel efficiency, renewable alternative fuels with lower carbon footprints, more efficient air traffic management, market-based measures and environmental regulations including an aircraft CO_2 standard.

The US has ambitious goals to achieve carbon-neutral growth for aviation by 2020 compared to a 2005 baseline, and to gain absolute reductions in GHG emissions by

2050. At present there are no calculations of the extent to which measures individually or cumulatively may affect aviation's CO_2 emissions. Moreover, there are large uncertainties regarding aviation's impact on climate. The FAA, with support from the U.S. Global Change Research Program and its participating federal agencies, has developed the ACCRI in an effort to advance scientific understanding or regional and global climate impacts of aircraft emissions, with quantified uncertainties for current and projected aviation scenarios under changing atmospheric conditions.[21]

5.3 Coastal Resources

The Coastal Zone Management Act (CZMA) of 1972 ensures the effective management, beneficial use, protection, and development of the coastal zone. Coastal Zone Management Programs (CZMPs), prepared by states are designed to address issues affecting coastal areas. In July 1999, Minnesota approved the Lake Superior Coastal Program. MSP is not within the coastal boundary as defined by the program. Consequently, analysis of alternatives with respect to an approved CZMP is not required.

The Coastal Barriers Resources Act of 1982 prohibits federal financing for development within the Coastal Barrier Resources System, which consists of undeveloped coastal barriers along the Atlantic and Gulf coasts. The legislation was amended by the Coastal Barrier Improvement Act of 1990 to include undeveloped coastal barriers along the shores of the Great Lakes including one in Minnesota; the Minnesota Point unit in Lake Superior. Since MSP is not in or near this area, none of the alternatives would impact a Coastal Barrier Resource and no further analysis is required.

In summary, the Alternatives would not impact coastal resources.

5.4 Compatible Land Use

This section discusses land use and potential land use impacts.

5.4.1 Regulatory Background

FAA Orders 1050.1E, "Environmental Impacts: Policies and Procedures" and 5050.4B, "National Environmental Policy Act Implementing Instructions for Airport Actions," as well as FAA 14 C.F.R. Part 150 "Airport Noise Compatibility Planning" and the Metropolitan Council's Land Use Compatibility Guidelines for Aircraft Noise are the guiding criteria for compatible land use evaluation.

5.4.2 Approach and Methodology

In accordance with FAA Order 1050.1E, the Alternatives were evaluated to determine if they would be compatible with existing and future land uses. An alternative would be compatible with land uses if the following apply:

- The noise analysis conducted for the Proposed Action and/or its alternatives concludes that there is no significant impact;
- The airport sponsor is taking appropriate action to the extent reasonable to restrict the use of land adjacent to or in the immediate vicinity of the airport to activities and purposes compatible with normal airport operations in accordance with 49 USC 47107(a)(10) of the 1982 Airport Act;

- The state authorized public planning agency finds that the proposed action is consistent with plans (existing at the time the project is approved) for development of the area in which the airport is located to comply with 49 USC 47106(a)(1); and
- The alternative does not result in changed conditions in land use compatibility related to safe aircraft operations and wildlife.

5.4.3 Threshold of Significance

The threshold of significance for noise and land use compatibility is exceeded if the proposed action would cause an increase of 1.5 dB DNL or greater for a sensitive land use at or above the 65 DNL noise exposure when compared to the No Action Alternative.

5.4.4 Affected Environment

Since impacts to land use are normally the results of changes in noise, the existing and future land uses within the Noise Study Area are described.

The extent of the Noise Study Area was established based on the FAA's primary metric for aircraft noise exposure; yearly Day/Night Average Sound Level (DNL). For this EA, the 2025 (future year of analysis) 60+dB DNL noise exposure contour was used to define the Noise Study Area. Information related to the development of the 2025 noise exposure contours is provided in Section 5.14. As illustrated in **Figure 5.4-1**, the Noise Study Area includes portions of the cities of Minneapolis, Richfield, Bloomington, Eagan and Mendota Heights.

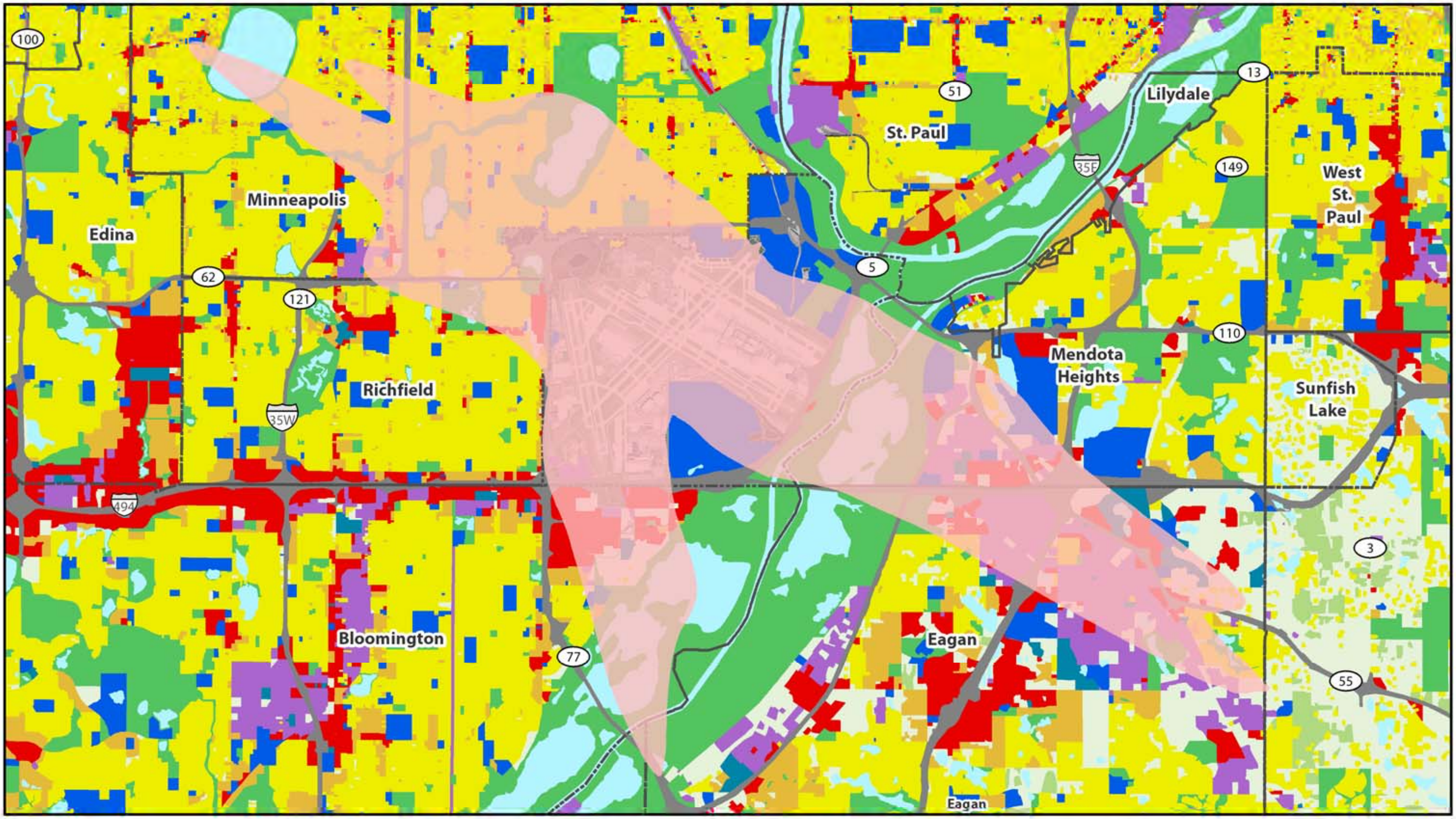
Figure 5.4-1 illustrates the existing 2010 land use within the Noise Study Area. The following paragraphs discuss the existing and future land use for each city/region within the Noise Study Area. It is noted that with the exception of 35 residential units, all residential properties within the 2010 60+ DNL noise contours have been, or will be, provided noise mitigation by virtue of the residential noise mitigation program at MSP that will be completed by 2014. The 35 unmitigated residential units are located at the furthest extent of the Runway 12R arrival lobe. **Table 5.4.1** provides the count of noise sensitive sites located within the 2010 noise contours.

5.4.4.1 Minneapolis

Minneapolis is located to the northwest of the airport in Hennepin County. The portion of Minneapolis within the Noise Study Area is primarily residential. A number of lakes and parks are also located in the area. Although the area is primarily residential, there are small pockets of commercial, public/institutional and cultural/ entertainment uses.

The portions of Minneapolis that are within the Noise Study Area are fully developed. There are no significant future land use changes planned in these areas that would change the degree of compatibility. Anticipated development over the next 10 years would be primarily in-fill development, which would be consistent with the existing land use designations.

FIGURE 5.4-1



EA Noise Study Area and 2010 Existing Land Use

LEGEND

Land Use

- Single Family Residential
- Multifamily Residential
- Institutional
- Commercial
- Industrial
- Mixed Use
- Park and Recreation
- Agricultural
- Undeveloped/Open Space
- Major Highway
- Water
- Noise Study Area

N

0 4,000 8,000 Meters

Disclaimer: This map was generated by the Metropolitan Airports Commission using GIS (Geographic Information System) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitability for a particular use. The scale and location of all mapped data are approximate.

MAC

HNTB

Table 5.4.1
Noise Sensitive Uses within the 2010 DNL Contours

Use	Number of Noise Sensitive Uses within DNL Contours				
	60-64	65-69	70-74	75+	Total
Historic Site	120	18	5	0	143
Nursing Home	0	0	0	0	0
Preschool	4	1	0	0	5
Place of Worship	11	1	0	0	12
School	3	1	0	0	4
*Residential	7942	1604	23	0	9569
Total	**8080**	**1625**	**28**	**0**	**9733**

Note:
*All residential units within the 65+ DNL noise contours have been provided noise mitigation and, as such, are considered a mitigated incompatible land use.

Source: MAC analysis, 2012.

5.4.4.2 Richfield

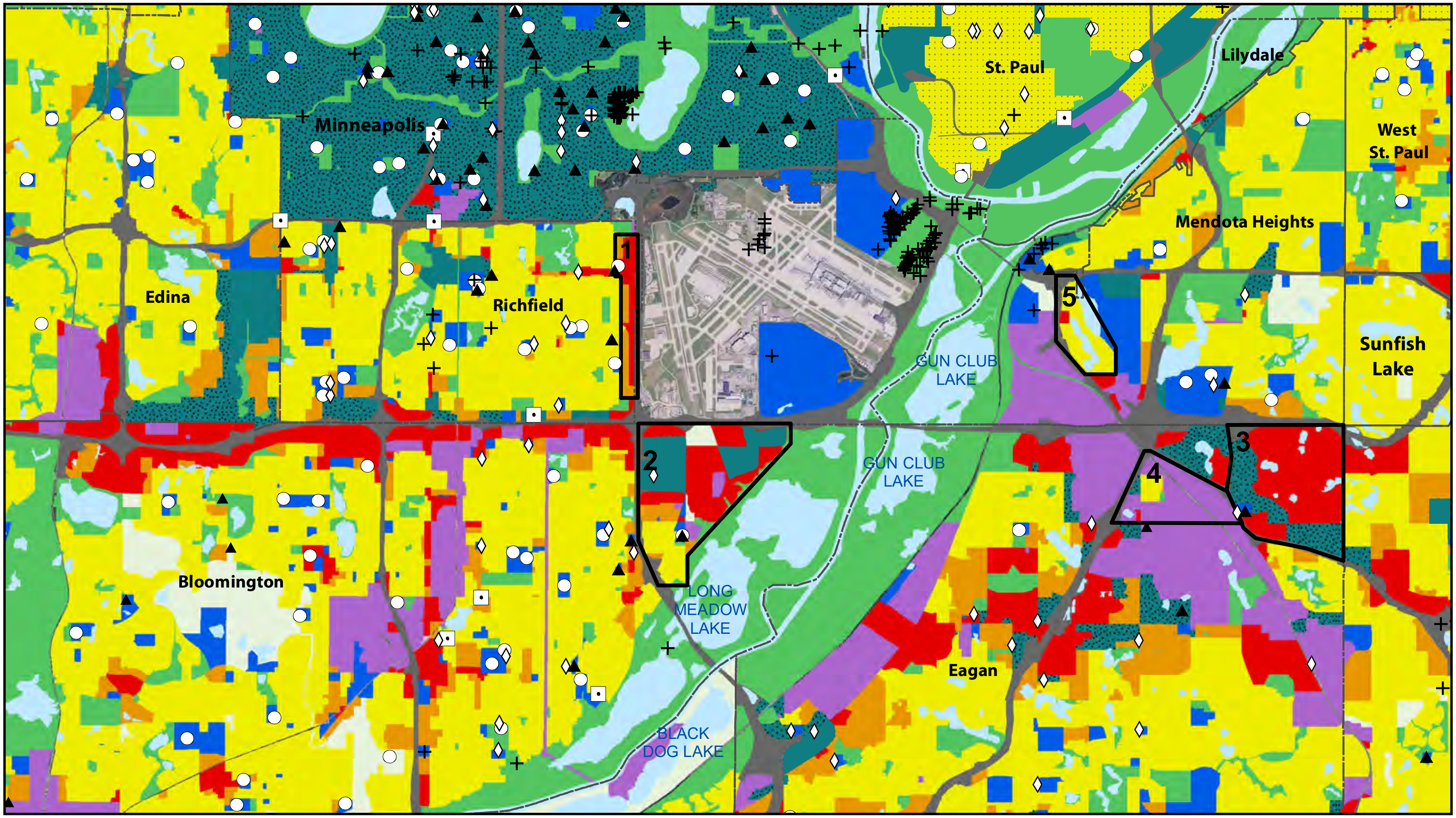
Richfield is located directly west of the airport in Hennepin County. The predominant existing land use within the Noise Study Area is residential. Commercial, park and institutional uses also exist within the Noise Study Area.

Area 1 on **Figure 5.4-2** details the area of planned development in the City of Richfield within the Noise Study Area. The Redevelopment Master Plan for the Cedar Avenue Corridor provides the long-term vision of the eastern border of the city. The plan focuses on an area north of 72nd Street to TH 62 (Crosstown) outlining the development of multi-family, office and retail uses. In 2007 the first phase of this development was completed north of 66th Street just west of Cedar Avenue and included the development of two large retail stores and a number of smaller retail sites.

5.4.4.3 Bloomington

The center of Bloomington is located southwest of the airport in Hennepin County. However, a sizeable portion of the northeast portion of the city, located east of TH 77 (Cedar Avenue) and south of MSP is located in the Noise Study Area. The predominant land use in this area is commercial, mixed use and undeveloped. There are small pockets of multi-family and single-family residential uses in the area.

There is significant opportunity for growth within the portion of Bloomington in the Noise Study Area. This area located south of Interstate Highway 494 (I-494), east of TH 77 (Cedar Avenue) and north of the Minnesota River Valley is known as the “South Loop District”. The South Loop District is Area 2 on Figure 5.4-2. The South Loop development includes the Lindau Link, Mall of America Phase 2, Bloomington Central Station and new residential neighborhoods. The development focuses on providing quality transit options and creating a walkable district with enhanced access to the Minnesota Valley National Wildlife Refuge. By 2020 the development is planned to notably increase the amount of office, retail, hotel and residential building square footage in the area.



Forecast Land Use Changes Around MSP from 2010 to 2030

LEGEND

Land Use

- St. Paul Residential
- Single Family Residential
- Multifamily Residential
- Multi-Optional Development
- Institutional
- Commercial
- Industrial
- Mixed Use
- Park and Recreation
- Agricultural
- Undeveloped/Open Space
- Vacant or Unknown
- Major Highway
- Water

Existing Uses

- + Historic Site
- Nursing Home
- ◊ Preschool
- ▲ Place of Worship
- ○ School

Land Use Changes

1. Richfield Cedar Ave Corridor
2. Bloomington South Loop
3. Eagan Northeast Area
4. Eagan North Lexington Commons
5. Mendota Heights Development

N

0 4,100 8,200 Meters

Source: Metropolitan Council

Disclaimer: This map was generated by the Metropolitan Airports Commission using GIS (Geographic Information System) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitablity for a particular use. The scale and location of all mapped data are approximate.

5.4.4.4 Eagan

Eagan is located southeast of the airport in Dakota County. The predominant land use types within the Noise Study Area are industrial and commercial with pockets of residential. There is also an expanse of parkland within the Minnesota River floodplain.

Areas 3 and 4 on Figure 5.4-2 depict the locations of planned development within the Noise Study Area. The Northeast Area (Area 3 on Figure 5.4-2) is 740 acres in size. The plan for this area outlines the conversion of agricultural, residential, vacant and underutilized uses to employment and commercial uses. The North Lexington Commons (Area 4 on Figure 5.4-2) is in an area where land values are anticipated to rise due to the area's visibility and accessibility. As this occurs, it is anticipated that desire to redevelop to newer, higher income-generating uses will increase. The area is envisioned to be an attractive gateway and employment center for the community that would include an employment-based Transit Oriented Development. The existing residential neighborhood would remain, although it is anticipated to transition to other uses over the long-term. No new resident land uses are planned in the area.

5.4.4.5 Mendota Heights

Mendota Heights is located to the east of the airport in Dakota County. The predominant land uses within the Noise Study Area are industrial, commercial and business. Only limited changes to land use within the Noise Study Area are anticipated. Area 5 on Figure 5.4-2 details a small area where future development is anticipated to change to residential.

5.4.5 Impact Analysis

5.4.5.1 Noise

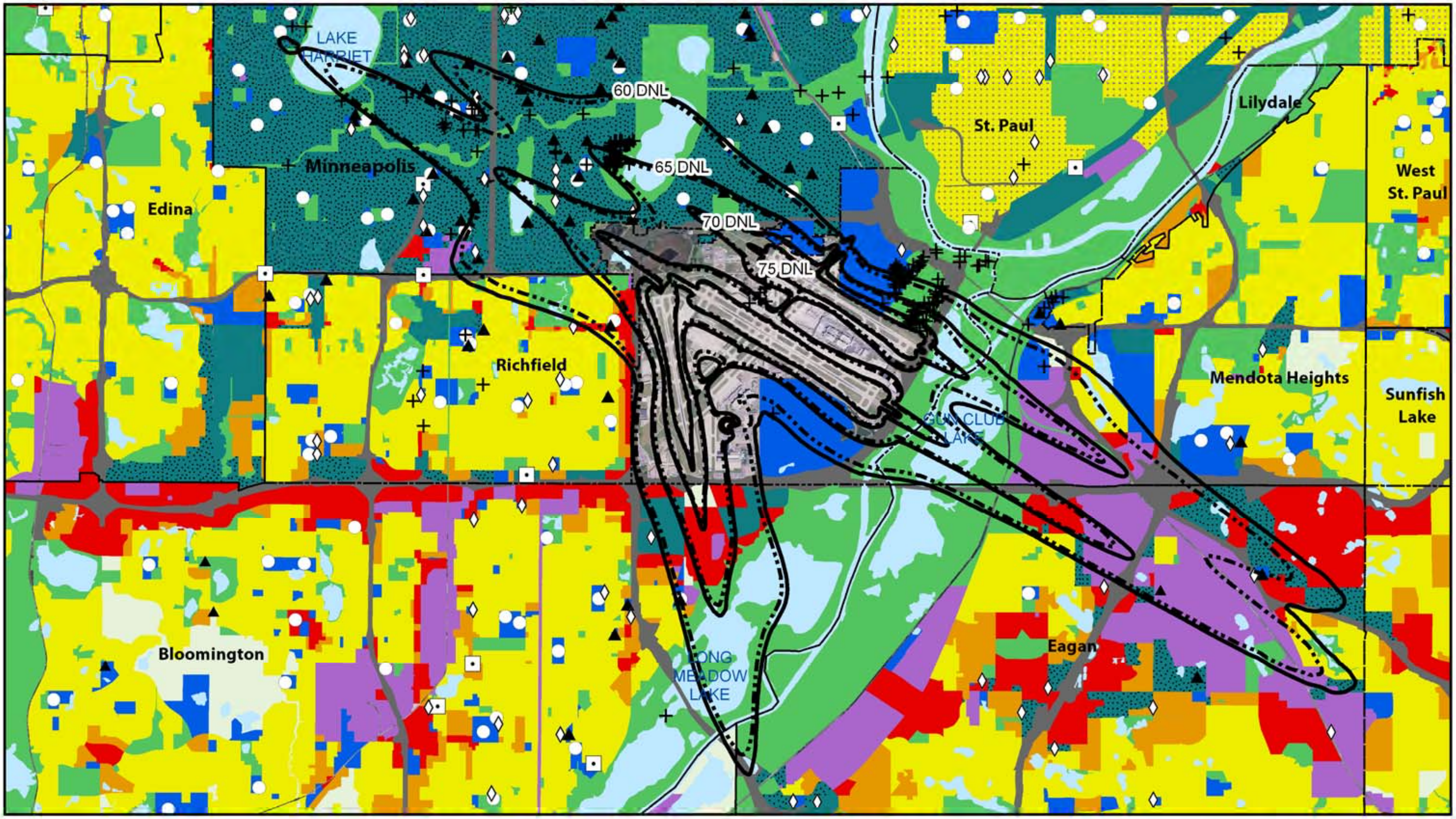
This section discusses noise in the context of land use planning and zoning in the vicinity of MSP. Noise analysis was conducted for 2020 and 2025. The analysis and results described in this section did not include the proposed PBN procedures (see Section 2.2.3 for more information). The PBN procedures were considered in this EA in the context of cumulative impacts. See Section 5.21.4.2 *Cumulative Effects: Aircraft Noise.*

The results of the noise analysis are summarized in the following paragraphs for the purposes of evaluating compatible land use. Details regarding the noise analysis and results are presented in Section 5.14.

Figure 5.4-3 provides the 2030 forecasted land use around the airport within the 2020 and 2025 No Action Alternative DNL noise contours; **Figure 5.4-4** provides the 2030 forecasted land use around the airport with the 2020 and 2025 Airlines Remain Alternative DNL noise contours; and **Figure 5.4-5** provides the 2030 forecasted land use around the airport with the 2020 and 2025 Airlines Relocate Alternative DNL noise contours. The maps include the location of historic sites, nursing homes, preschools, places of worship and schools. **Table 5.4.2 and Table 5.4.3** provide the count of sensitive sites located within the noise contours.

Minneapolis-St. Paul International Airport 2020 Improvements EA

FIGURE 5.4-3



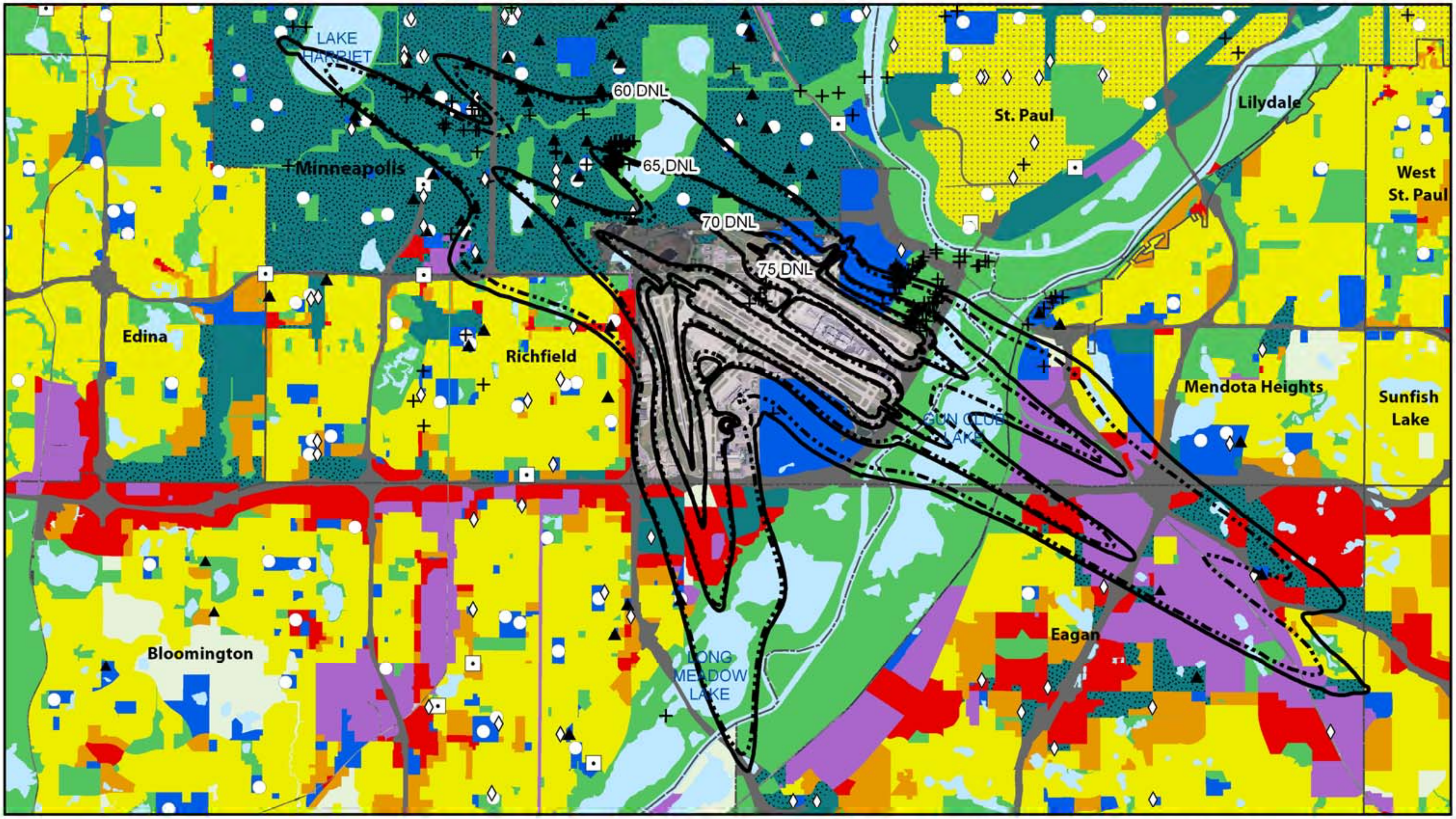
LEGEND

No Action Alternative 2020 and 2025 Forecast DNL Noise Contours and 2030 Forecast Land Use

Source: Metropolitan Council

Disclaimer: This map was generated by the Metropolitan Airports Commission using GIS (Geographic Information System) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitability for a particular use. The scale and location of all mapped data are approximate.

FIGURE 5.4-4



LEGEND

Land Use

- St. Paul Residential
- Single Family Residential
- Multifamily Residential
- Multi-Optional Development
- Institutional
- Commercial
- Industrial
- Mixed Use
- Park and Recreation
- Agricultural
- Undeveloped/Open Space
- Vacant or Unknown
- Major Highway
- Water

Existing Uses

- Historic Site
- Nursing Home
- Preschool
- Place of Worship
- School

Noise Contours

- 2020 Alternative 1 - Airlines Remain
- 2025 Alternative 1 - Airlines Remain

Alternative 1 - Airlines Remain 2020 and 2025 Forecast DNL Noise Contours and 2030 Forecast Land Use

N

0 4,000 8,000 Meters

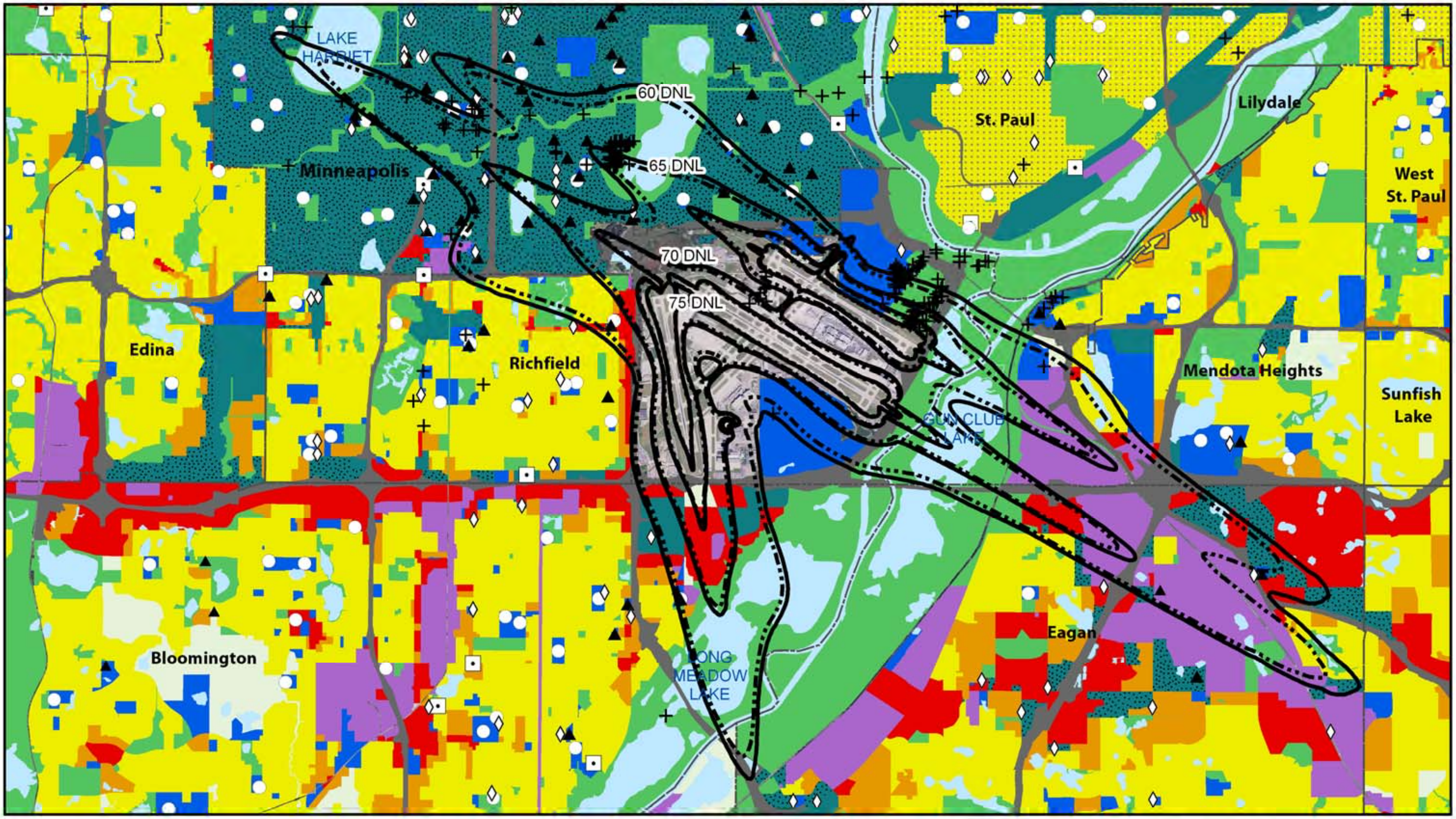
Source: Metropolitan Council

Disclaimer: This map was generated by the Metropolitan Airports Commission using GIS (Geographic Information System) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitablity for a particular use. The scale and location of all mapped data are approximate.

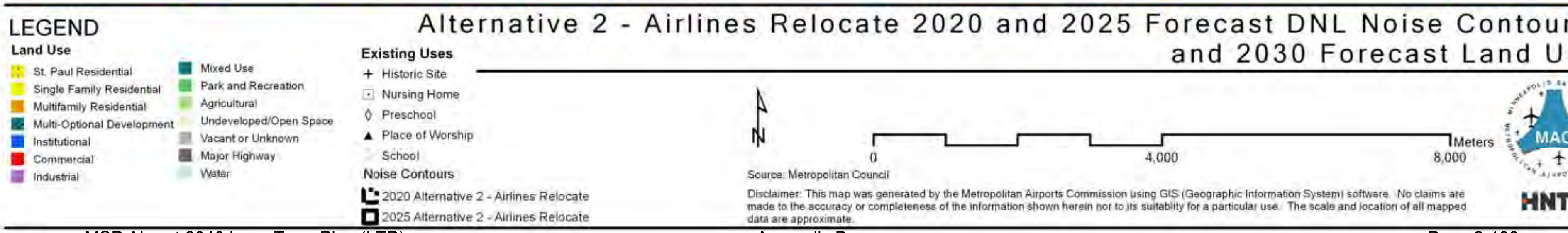
HNTB

Minneapolis-St. Paul International Airport 2020 Improvements EA

FIGURE 5.4-5



Alternative 2 - Airlines Relocate 2020 and 2025 Forecast DNL Noise Contours and 2030 Forecast Land Use



Source: Metropolitan Council

Disclaimer: This map was generated by the Metropolitan Airports Commission using GIS (Geographic Information System) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitability for a particular use. The scale and location of all mapped data are approximate.

Table 5.4.2

Noise Sensitive Uses within 2020 Forecast DNL Contours

2020 DNL Noise Contours	Use	Number of Noise Sensitive Uses within DNL Contours				
		60-64	65-69	70-74	75+	Total
2020 No Action Alternative	Historic Site	102	44	9	0	155
	Nursing Home	0	0	0	0	0
	Preschool	5	1	0	0	6
	Place of Worship	14	1	0	0	15
	School	4	1	0	0	5
	*Residential	10236	2115	47	0	12398
	Total	**10361**	**2162**	**56**	**0**	**12579**
2020 Airlines Remain Alternative	Historic Site	101	45	9	0	155
	Nursing Home	0	0	0	0	0
	Preschool	5	1	0	0	6
	Place of Worship	14	1	0	0	15
	School	4	1	0	0	5
	*Residential	10257	2124	48	0	12429
	Total	**10381**	**2172**	**57**	**0**	**12610**
2020 Airlines Relocate Alternative	Historic Site	115	30	9	0	154
	Nursing Home	0	0	0	0	0
	Preschool	5	1	0	0	6
	Place of Worship	14	1	0	0	15
	School	4	1	0	0	5
	*Residential	10106	2133	33	0	12272
	Total	**10244**	**2166**	**42**	**0**	**12452**

Note:
*All residential units within the 65+ DNL noise contours have been provided noise mitigation and, as such, are considered a mitigated incompatible land use.

Source: MAC Analysis, 2012.

Table 5.4.3

Noise Sensitive Uses within 2025 Forecast DNL Contours

2025 DNL Noise Contours	Use	Number of Noise Sensitive Uses within DNL Contours				
		60-64	65-69	70-74	75+	Total
2025 No Action Alternative	Historic Site	92	60	11	0	163
	Nursing Home	0	0	0	0	0
	Preschool	6	2	0	0	8
	Place of Worship	18	3	0	0	21
	School	6	1	0	0	7
	*Residential	11396	2657	85	0	14138
	Total	**11518**	**2723**	**96**	**0**	**14337**
2025 Airlines Remain Alternative	Historic Site	94	58	11	0	163
	Nursing Home	0	0	0	0	0
	Preschool	7	1	0	0	8
	Place of Worship	18	3	0	0	21
	School	5	1	0	0	6
	*Residential	11410	2583	78	0	14071
	Total	**11534**	**2646**	**89**	**0**	**14269**
2025 Airlines Relocate Alternative	Historic Site	96	60	11	0	167
	Nursing Home	0	0	0	0	0
	Preschool	6	2	0	0	8
	Place of Worship	18	3	0	0	21
	School	8	1	0	0	9
	*Residential	11873	2747	85	0	14705
	Total	**12001**	**2813**	**96**	**0**	**14910**

Note:
*All residential units within the 65+ DNL noise contours have been provided noise mitigation and, as such, are considered a mitigated incompatible land use.

Source: MAC Analysis, 2012.

The figures show that there is little difference between the 65 DNL contours for the Action Alternatives when compared to the No Action Alternative. The number of non-residential noise sensitive uses within the 65 DNL contour varies only slightly between the various alternatives. In 2020 the lowest number of residential units in the 65+ DNL noise contours is provided by the No Action Alternative. There are 10 more residential units in the Airlines Remain Alternative and 4 more residential units in the Airlines Relocate Alternative within the 65+ DNL noise contours. In 2025 the lowest number of residential units in the 65+ DNL noise contour is provided by the Airlines Remain Alternative. There are 81 more residential units in the No Action Alternative and 171 more residential units in the Airlines Relocate Alternative. However, in both 2020 and 2025 all residential units within the 65+ DNL noise contours of the development alternatives being considered have been provided noise mitigation and, as such, are considered a mitigated incompatible land use.

In summary, the analysis determined that the threshold for significant noise impact was not exceeded for any of the alternatives considered.

5.4.5.2 Action to Restrict Land Use near MSP

The development and implementation of the MSP Zoning Ordinance is evidence that the MAC is complying with the required airport sponsor's assurance under 49 USC 47107(a)(10). An airport zoning ordinance has been in place since 1984 and has been adopted on a local level by the respective communities with land use control around the airport operations.

5.4.5.3 Consistent with Plans for Development

The completion and approval of the 2030 Long Term Comprehensive Plan (LTCP) for MSP validates that the Proposed Action is consistent with regional plans for the Twin Cities metropolitan area. The 2030 LTCP which includes the Proposed Action, was developed by the MAC in accordance with the regional planning authority's, the Metropolitan Council's (MC's), guidelines to integrate information pertinent to planning, developing and operating the region's airports in a manner compatible with their surrounding environs. The MC found the MSP 2030 LTCP to be consistent with its 2030 Transportation Policy Plan at their June 23, 2010 meeting. The minutes from this meeting are provided as Attachment 2 in ***Appendix G****, Noise Metrics, The Effects of Aviation Noise on People, Noise Guidelines for Compatibility and Noise Model Development*. Therefore, it is concluded that the Proposed Action is consistent with plans for development in the vicinity of MSP.

5.4.5.4 Safe Aircraft Operations

The potential for the Proposed Action to result in changed conditions in land use compatibility related to safe aircraft operations and wildlife hazards need to be considered as well.

Wildlife attractants are defined by the FAA as follows, "Any human-made structure, land-use practice, or human-made or natural geographic feature that can attract or sustain hazardous wildlife within the landing or departure airspace or the airport's AOA [air operations area]. These attractants can include architectural features, landscaping, waste disposal sites, wastewater treatment facilities, agricultural or aquaculture activities, surface mining or wetlands."[22]

The FAA provides guidance on how to assess and address wildlife hazards in AC 150/5200-33B, *Hazardous Wildlife Attractants on or Near Airports* including recommendations to prevent creating new attractants. Also, the MAC has a Wildlife Hazard Management Plan (WHMP) for MSP that focuses on identification and abatement of wildlife hazards within the airfield environment. The WHMP includes review of future projects to avoid an inadvertent increase in wildlife hazards resulting from architectural or landscape changes. The Action Alternatives would be designed in accordance with both AC 150/5200-33B and the MAC's WHMP, and therefore would not generate new wildlife attractants.

Conditions relative to the wildlife attractants and safe aircraft operations could also change if the Proposed Action would result in a change to aircraft approach or departure procedures. The Action Alternatives do not include changes in runways or changes in departure or approach paths. Additionally, while operations would increase from existing conditions, the number of operations is the same for all of the alternatives and runway use is forecasted to be similar for all alternatives. Therefore, it is concluded that none of the Alternatives would result in changed conditions in land use compatibility related to safe aircraft operations and wildlife hazards.

5.4.6 Permitting

There are no permits required related to land use.

5.4.7 Summary

None of the Alternatives would result in a significant noise impact and all of the Alternatives would be compatible with surrounding land uses.

5.5 Construction Impacts

Implementation of the Action Alternatives requires construction, which may create some unavoidable temporary impacts to surrounding communities such as noise, fugitive dust and degraded water quality. These impacts would be minimized by implementing best management practices (BMPs).

The following sub-sections present a summary of the impacts that may be expected to result from typical construction activities associated with the Action Alternatives.

5.5.1 Air Quality

Fugitive dust pollution from excavated areas and construction equipment emissions can result in temporary impacts to air quality. Fugitive dust would be minimized by enforcing BMPs during construction, including minimizing the periods and extent of exposed and/or graded areas, watering disturbed areas during periods of high winds or high levels of construction activity, and minimizing the use of vehicles on unpaved surfaces. As a result of implementing these BMPs, it is concluded that minimal temporary fugitive dust impacts would result from either Action Alternative.

Construction equipment emissions are accounted for in the air quality analysis. It was determined that the construction-related emissions associated with the Action Alternatives would be within the *de-minimis* levels. Therefore, these emissions would conform to the SIP and no further analysis was required. See section 5.1 for more information regarding the analysis of construction emissions.

5.5.2 Noise

The construction activities associated with implementation of the Action Alternatives will result in increased noise levels relative to existing conditions. There are no anticipated changes to aircraft noise during construction as the runway use is not expected to change. Therefore, these impacts will primarily be associated with construction equipment and pile driving.

Table 5.5.1 shows peak noise levels monitored at 50 feet from various types of construction equipment. This equipment is primarily associated with site grading and site preparation, which is generally the roadway construction phase associated with the greatest noise levels.

Elevated noise levels are, to a degree, unavoidable for this type of project. MnDOT and the MAC will require that construction equipment be properly muffled and in proper working order. While MnDOT and its contractor(s) are exempt from local noise ordinances, it is the practice to require contractor(s) to comply with applicable local noise restrictions and ordinances to the extent that is reasonable. Advanced notice will be provided to affected communities of any planned abnormally loud construction activities. It is anticipated that night construction may sometimes be required to minimize traffic impacts and to improve safety. However, construction will be limited to daytime hours as much as possible. The duration of structure and roadway construction activities will be identified with future preliminary design and engineering studies.

Any associated high-impact equipment noise, such as pile driving, pavement sawing, or jack hammering, will be unavoidable with construction of the proposed project. Pile-driving noise is associated with any bridge construction and sheet piling necessary for retaining wall construction. While pile-driving equipment results in the highest peak noise level, as shown in Table 5.5.1, it is limited in duration to the activities noted above (e.g., bridge construction). The use of pile drivers, jack hammers, and pavement sawing equipment will be prohibited during nighttime hours, to the extent possible.

Table 5.5.1
Typical Construction Equipment Noise Levels At 50 Feet

Equipment Type	Manufacturers Sampled	Total Number of Models in Sample	Peak Noise Level (dBA)	
			Range	Average
Backhoes	5	6	74-92	83
Front Loaders	5	30	75-96	85
Dozers	8	41	65-95	85
Graders	3	15	72-92	84
Scrapers	2	27	76-98	87
Pile Drivers	N/A	N/A	95-105	101

Source: United States Environmental Protection Agency and Federal Highway Administration

5.5.3 Water

Construction can cause temporary impacts to water quality such as increased turbidity. BMPs would be implemented in order to protect against these temporary impacts. Additionally, water quality would be protected by complying with construction permit requirements.

Implementation of appropriate erosion and sediment control BMPs, typically included:

- silt fences
- temporary sediment basins
- stormwater inlet filters
- check-dams in ditches (rock, bio-rolls, etc.)
- silt curtains

Additional BMPs would be implemented to prevent and recover minor leaks and spills from equipment fueling and maintenance operations.

Construction stormwater permits are required when the project disturbs more than one acre of soil. Permitting requirements will include:

- the creation of a Construction Stormwater Pollution Prevention Plan (SWPPP)
- BMP inspection (weekly, and within 24 hours after each runoff event) and final stabilization area inspection (monthly)

As a result of implementing BMPs and complying with permit requirements, it is concluded that only minimal temporary water quality would result from either Action Alternative.

5.5.4 Hazardous Materials

Construction activities associated with either the Airlines Remain Alternative or the Airlines Relocate Alternative will require excavation, construction dewatering, and building renovation and demolition. Hazardous materials are present at the Airport and may be encountered during these types of construction activities. See Section 5.10, Hazardous Materials, Pollution Prevention and Solid Waste for information about the potential locations of hazardous materials at the Airport.

Construction activities would follow all applicable standards, rules, regulations, and protocols related to hazardous materials. Excavated materials would be managed in accordance with the Soil Management Plan. Construction dewatering would be done in accordance with appropriate permits. Renovation and demolition would be conducted in accordance with MPCA Regulations for Renovation and Demolition (Minn. R. 7035.0805). Impacted and contaminated soil, asbestos-containing material, demolition debris, and other regulated materials would be re-used, recycled, or disposed in accordance with applicable regulations.

Hazardous materials would be encountered during construction of all of the Alternatives. All contaminated soil, asbestos-containing material and other regulated materials will be handled and disposed of in accordance with applicable regulations. Therefore, none of the Alternatives would be expected to result in hazardous materials impacts that would exceed the threshold of significance.

5.5.5 Traffic

Temporary road/lane closures are likely unavoidable during construction of the roadway improvements included in the Action Alternatives. A Temporary Traffic Control Plan would be developed to maintain traffic flow during construction. As a result, road/lane closures would be minimized particularly during rush hours. The Temporary Traffic Control Plan would also include signage to notify drivers of closures and direct them to alternative routes. Therefore, since a Temporary Traffic Control plan would be developed to maintain traffic flow during construction, the Action Alternative would not be expected to cause temporary traffic impacts that would exceed the threshold of significance.

5.6 Department of Transportation Act: Section 4(f)

This section discusses potential impacts to Department of Transportation Act Section 4(f) resources such as parks and wildlife refuges.

5.6.1 Regulatory Background

Section 303(c), Title 49 USC, commonly referred to as Section 4(f) of the Department of Transportation Act of 1966, states that the "…Secretary of Transportation will not approve a project that requires the use of any publicly-owned land from a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance or land from a historic site of national, state, or local significance as determined by the officials having jurisdiction thereof, unless there is no feasible and prudent alternative to the use of such land…and [unless] the project includes all possible planning to minimize harm resulting from the use."[23]

5.6.2 Approach and Methodology

The term "use" as it applies to 4(f) properties encompasses both physical use, as well as constructive use. In determining whether there is a physical use, the FAA must establish whether the project requires Section 4(f) property to be acquired or altered in any way. In determining whether there is a constructive use, the FAA must consider whether impacts such as noise would substantially impair the property. A Section 4(f) property is determined to be substantially impaired when the activities, features, or attributes of the site that contribute to its significance or enjoyment are substantially diminished.

5.6.3 Affected Environment

There are several 4(f) resources near the airport; however, the only Section 4(f) resource within the limits of construction (the general Study Area) is a potentially eligible National Register archaeological site. The site is located northwest of the existing TH 5/Post Road interchange. See section 5.11, *Historical, Architectural, Archaeological, and Cultural Resources* for additional information.

The identification of 4(f) resources was limited to the extent of construction, because, although, the alternatives would cause changes in noise around MSP, the noise impacts would not exceed the threshold of significance. Therefore, it was concluded that the alternatives would not impact the use of 4(f) resources outside the limits of construction.

5.6.4 Impact Analysis

The Action Alternatives at MSP may require a physical use of one 4(f) property, the potential archaeological site. Archaeological sites may be protected under Section 4(f) only if the sites warrant preservation in place and not in the value of the data it contains.[24] Based on preliminary information it is unlikely that the subject site would warrant preservation in place. However, additional study and coordination will be required. See section 5.11, *Historical, Architectural, Archaeological, and Cultural Resources* for additional information. If it is determined that the archeological resources should be preserved in place, a Section 4(f) evaluation would be completed as required.

Potential noise impacts were reviewed to determine if they would result in a constructive use of a 4(f) resource. Section 5.14 of this EA describes the potential noise effects due to the Action Alternatives when compared to the No Action Alternative. The analysis showed that there would be no noise changes that would cause a noise sensitive area to experience an increase in noise of DNL 1.5 dB or more at or above DNL 65 dB. Additionally, there are only small differences between the future DNL 65 dB contours for the Action Alternatives as compared to the No Action Alternative. Therefore, it is concluded that the increase in noise would not substantially impair a Section 4(f) property.

The Action Alternatives include construction of a new TH 5 and Post Road interchange. Post Road serves as the park entrance access road to Fort Snelling State Park. Therefore, coordination with the Minnesota Department of Natural Resources will be conducted prior to construction to ensure safe vehicular access for park visitors during interchange construction. As a result, it is concluded that construction would not impair the use of Fort Snelling State Park.

5.6.5 Summary

The No Action Alternative would not impact Section 4(f) resources. Both the Airlines Remain and Airlines Relocate Alternatives would result in the use of a Section 4(f) resource only if the potential archaeological site warrants preservation in place. Preliminary information indicates that this would not be likely.

5.7 Farmlands

The Farmland Protection Policy Acts (FPPA) of 1980 and 1995 regulates the conversion of important farmland to non-agricultural uses. The purpose of the FPPA is "to minimize the extent to which Federal programs contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses…"[25] The term "farmland," as defined by the US Department of Agriculture (USDA) in the FPPA "does not include land already in or committed to urban development or water storage (i.e., airport developed areas), regardless of its importance as defined by NRCS [Natural Resource Conservation Service]."[26]

All proposed development is within airport property or existing road right-of-way; i.e. land already committed to urban development. Therefore, no farmlands would be converted to nonagricultural uses and none of the Alternatives would impact farmlands.

5.8 Fish, Wildlife and Plants

This section presents the potential impacts to fish, wildlife and plants otherwise referred to as biotic resources. Biotic resources include flora (plants), fauna (fish, birds, reptiles, amphibians, mammals, etc.) and their habitat areas such as lakes, streams, wetlands, forests and upland environments.

5.8.1 Regulatory Background

Section 7 of the Endangered Species Act (ESA), sets forth requirements for consultation regarding federally listed threatened or endangered species and their critical habitat. If a proposed project would potentially impact a federally listed species or habitat, the FAA must consult with the US Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service (NMFS), to ensure that the proposed action does not jeopardize the continued existence of the affected species.

The Bald and Golden Eagle Protection Act prohibits actions that take a bald or golden eagle or their nests or eggs without a permit.

The Fish and Wildlife Conservation Act encourages all federal departments and agencies to conserve and promote conservation of non-game fish and wildlife and their habitats.

The Migratory Bird Treaty Act provides for federal protection of migratory birds including their nests and eggs.

5.8.2 Approach and Methodology

Regulatory agencies were consulted to identify any known federal or state-listed endangered, threatened, or special concern species or critical habitat areas. Potential impacts to other biotic resources in or adjacent to the Study Area were also considered.

5.8.3 Affected Environment

Biotic resources in the Study Area are limited because the area is fully developed with paved areas and buildings associated with MSP and adjoining public roadways. There are no native plant communities, forests, fish, wetlands or other aquatic biotic resources in the Study Area. Vegetation is generally limited to mowed turf grass areas between existing impervious surfaces.

Wildlife does exist on the Airport and thus may be found in the Study Area. Several bird species including swallows, doves, crows, terns, sparrows, hawks, eagles, blackbirds, geese and ducks have been observed at MSP. Mammals such as gophers, ground squirrels, bats, muskrats, raccoons, red fox, deer, rabbits and woodchucks also reside at or visit MSP.

5.8.3.1 Threatened and Endangered Species

Coordination was conducted to determine whether any of the biotic resources found in the Study Area are federal or state listed species. A Minnesota Department of Natural Resources (MNDNR) Natural Heritage Information System (NHIS) data review was requested. The MNDNR NHIS review, dated June 10, 2011 (see MNDNR NHIS response in ***Appendix K,*** *Biotic Resources)*, identified known federal and state-listed endangered, threatened and special concern species as well as critical habitat areas on or within one-mile of the Study Area. Also, the USFWS; US Army Corps of Engineers (USACE); US Department of Agriculture Natural Resource

Conservation Service; and the MNDNR were contacted directly for additional information regarding listed species and critical habitat areas.

In addition, a habitat review was conducted for one state listed threatened flora species, the kittentail, in a small portion of the Study Area. *Besseya bullii* (kittentail) is a native perennial found primarily in oak savanna communities, often along bluffs near major rivers in the State. The area near the TH 5 and Glumack Drive was reviewed for potential prime habitat for the kittentail. The potential for kittentail habitat within the area near TH 5 and Glumack Drive was determined to be minimal. No kittentail was observed during the area review. The landscape position, coverage with non-native vegetation, previous disturbance and on-going maintenance activities reduce the chance for kittentail to be present. Refer to the technical memorandum Habitat Review for Besseya bullii (kittentail) in *Appendix K* for further information.

Based on review of the MNDNR NHIS response and coordination with regulatory agencies, there are no known federal-listed endangered or threatened species located in or adjacent to the Study Area. There are also no state-listed endangered, threatened or special concern species, critical habitat, natural plant communities or other natural features reported to exist in or adjacent to the Study Area.

5.8.3.2 Bald Eagles

The USFWS commented on the possibility that there are bald eagle nests near MSP in the Fort Snelling National Cemetery. Therefore, a visual survey for bald eagle nests was conducted in the Fort Snelling National Cemetery and areas adjacent to the Study Area in December 2011. The visual survey focused on areas favorable to bald eagle nesting as identified in the USFWS *National Bald Eagle Management Guidelines* (May 2007). No bald eagle nests were sited in Fort Snelling National Cemetery or within sight of the Study Area.

5.8.4 Impact Analysis

5.8.4.1 Threatened and Endangered Species

No federal or state listed species, critical habitat, natural plant communities or other natural features were reported in or adjacent to the Study Area. Therefore, none of the Alternatives would impact threatened or endangered species.

5.8.4.2 Other Biotic Resources

The Action Alternatives generally consist of expanding existing buildings, pavements and roadways in areas of currently impervious surfaces. Therefore, impacts to biotic resources in and adjacent to the Study Area would be negligible.

Impacts to biotic species outside the Study Area were also considered based on comments from the USFWS. Specifically, potential impacts to bald eagles and aquatic species were reviewed.

Bald Eagles

The USFWS expressed concern regarding bald eagle nests in Fort Snelling National Cemetery. The USFWS also indicated that increased flights may disrupt bald eagles.

While there were no bald eagles nests sited in or near the Study Area, new nests could be built prior to construction. Therefore, USFWS guidelines to avoid disturbing nesting bald eagles will be implemented during construction. The USFWS *National Bald Eagle Management Guidelines* (Guidelines) recommend a 100 meter buffer for roadway construction and a 200 meter buffer from building construction in excess of two stories provided the nests are not within sight of the construction. The Guidelines also recommend maintaining existing landscape buffers.

Aircraft traffic has long been present in and near the Study Area. Any existing and new nesting sites would be established in the presence of air traffic. Additionally, the number of flights projected under either Action Alternative is the same as the projected flights under the No Action Alternative.

<u>Aquatic Species</u>

During scoping, the USFWS commented that increased runoff may have an impact on aquatic vertebrate and invertebrate populations. Based on the MNDNR NHIS data review, potential impacts within one mile of the Study Area are limited to aquatic vertebrates downstream in the Minnesota and Mississippi Rivers.

Potential increases in runoff and changes in runoff water quality resulting from the No Action and Action Alternatives were assessed. (refer to Section 5.18). Under the No Action Alternative, there would be minimal new construction and a very small increase in impervious surface. The volume of runoff would not measurably change. The amount of impervious area would increase by 6.5 acres under the Airlines Remain Alternative and would increase by 28.4 acres under the Airlines Relocate Alternative. These changes are insignificant relative to the approximately 1,880 acres of impervious surface currently draining to the Minnesota River from MSP.

Section 5.18 also includes an analysis of runoff water quality for each of the Alternatives. As discussed therein, there would be very little difference between the alternatives in regards to water quality. This is primarily because the number of aircraft operations and thus fuel usage and aircraft deicing usage volumes are the same for all of the Alternatives.

The Alternatives would have little impact on the quantity or quality of runoff to the Minnesota River. Therefore, it was concluded that none of the Alternatives would impact downstream aquatic invertebrates or vertebrates.

5.8.5 Mitigation

The Alternatives would not adversely impact biota and/or natural habitats; therefore no mitigation is needed.

5.8.6 Permitting

Based on the information available, no known permits are necessary for implementation of the improvements as related to the biological resources at MSP. A permit from the USFWS would be required if there were bald eagles nesting in Fort Snelling National Cemetery concurrent with construction activities. However, as previously identified, no bald eagle nests are known to exist in the area.

5.8.7 Summary

None of the Alternatives would impact biotic resources including threatened and endangered species.

5.9 Floodplains

Executive Order No. 11988 was enacted in order to avoid, to the extent possible, the long and short-term adverse impacts associated with the occupancy and modification of floodplains, including the avoidance of direct and indirect support of floodplain development wherever there is a practical alternative. The order was issued in furtherance of NEPA, the National Flood Insurance Act of 1968, and the Flood Disaster Protection Act of 1973.

The term floodplain in Executive Order No. 11988 is interpreted to mean the 100-year floodplain and is defined as lowland and flat areas adjoining waters that are subject to a one percent or greater chance of flood in any given year, i.e., a 100 year flood event.

Potential floodplain impacts were evaluated by comparing the location of the Action Alternatives with floodplain mapping data obtained from the MNDNR. As shown on **Figure 5.8-1** all of the proposed development would be in areas outside the 100-year floodplain. It is noted that the limits of the 100-year floodplain are very near TH 5 where the lanes would be added to the outbound ramps of Glumack Drive and in the vicinity of where the new Post Road and TH 5 Interchange would be constructed. Since these improvements would be constructed within existing right-of-way, it was presumed that they would not encroach upon the 100-year floodplain. Therefore, none of the Alternatives would impact floodplains.

5.10 Hazardous Materials, Pollution Prevention and Solid Waste

This section discusses hazardous materials, pollution prevention and solid waste.

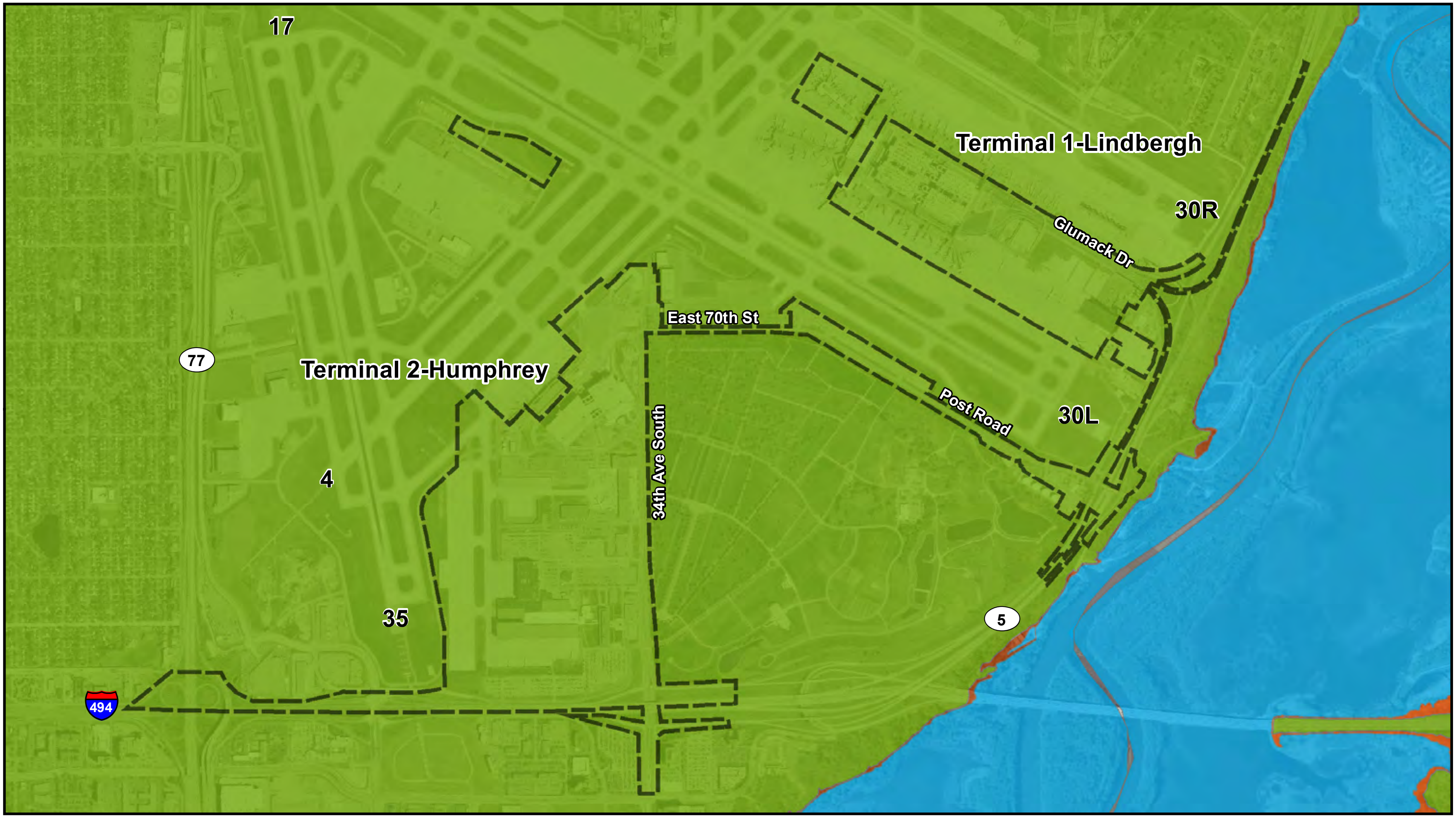
5.10.1 Regulatory Background

Relevant hazardous materials statutes include the Resource Conservation and Recovery Act (RCRA, as amended by the Federal Facilities Compliance Act of 1992), the Minnesota Hazardous Waste Rules and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended. RCRA and the Minnesota Hazardous Waste Rules govern the generation, treatment, storage and disposal of hazardous wastes. CERCLA provides remedies for uncontrolled and abandoned hazardous materials.

For buildings and structures, the USEPA National Emission Standards for Hazardous Air Pollutants (*NESHAP 40 CFR 61*) and MPCA Regulations for Renovation and Demolition (*Minn. R. 7035.0805*) provide the standards for the identification, handling and management of regulated materials. These rules outline the requirements imposed upon building and structure owners to inspect and properly decommission recognized hazards. Included within these standards are the means for submitting notifications and obtaining permits from each applicable agency.

The Pollution Prevention Act of 1990 declared that pollution should be reduced at the source whenever possible. Under this law, "Pollution prevention includes practices that increase efficiency in the use of energy, water, or other natural resources, and protect our resource base through conservation."[27] The CEQ *Memorandum on*

FIGURE 5.8-1



LEGEND

Study Area

Flood Zone

100-Year Floodplain

500-Year Floodplain

Area Outside 100 and 500-Year Floodplains

100-Year Floodplain

Source: Minnesota Department of Natural Resources, ESRI Data

N

0 1,000 2,000 4,000 Feet

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Pollution Prevention and the National Environmental Policy Act encourages federal agencies to consider future opportunities for pollution prevention and to include pollution prevention in NEPA documents.

5.10.2 Approach and Methodology

The potential for the Alternatives to use, generate or disturb hazardous materials was assessed. The Alternatives involve construction activities that could disturb hazardous materials such as building demolition, soil disturbance and de-watering. Therefore, potential hazardous materials sites were identified in and near the limits of construction. Each Alternative was then evaluated to determine potential impacts related to these sites.

Pollution prevention and solid waste impacts were also considered. The opportunities for pollution prevention were identified. Solid waste impacts in terms of relative amounts and disposal were reviewed.

5.10.3 Threshold of Significance

Impacts related to hazardous materials may exceed the threshold of significance if:

- A National Priority List (NPL) site is involved, or
- It would be difficult to meet federal, Tribal, state or local applicable laws/regulations, or
- There is an unresolved issue regarding hazardous materials.

5.10.4 Affected Environment

Potential locations of hazardous materials were identified within the Study Area.

The buildings and structures located within the Study Area are listed in **Table 5.10.1** and identified by the corresponding number on **Figure 5.10-1**. The potential for these building and structures to contain hazardous materials was identified based upon prior surveys, previous discoveries or date of construction. The construction date can be used to narrow the likelihood for certain regulated material to be present. However, it cannot be used as the definitive and exclusive tool for the determination of regulated material presence. Refer to ***Appendix I,*** *Buildings and Structures Subject to Renovation, Demolition, and/or Material Alteration,* for more information.

Table 5.10.1
Buildings and Structures Located Within the Study Area

Terminal 1-Lindbergh		**Terminal 2 -Humphrey**	
#	**Building Name**	**#**	**Building Name**
1	Terminal 1-Lindbergh Concourse E	32	Terminal 2-Humphrey
2	Glycol Tanks by Gate E8	33	Terminal 2-Humphrey Purple Parking Ramp
3	Glycol Tanks by Gate E4	34	Terminal 2-Humphrey Orange Parking Ramp
4	Glycol Tanks by Gate E9	35	Terminal 2-Humphrey PMO
5	Glycol Tanks by Gate E5	36	Terminal 2-Humphrey Snow Melters
6	Trash Compactors – Northwest Corner of Concourse D	37	Terminal 2-Humphrey LRT Building
7	Terminal 1-Lindbergh Concourse G	38	Terminal 2-Humphrey LRT Maintenance Buildings
8	Trash Compactors by Gate G14	39	Servisair Office Building
9	Electrical Vault - West of G17	40	Servisair Fueling Station
10	Terminal 1-Lindbergh Green Parking Ramp	41	Integrated De-Icing Services Maintenance Building
11	Terminal 1-Lindbergh Gold Parking Ramp	42	Terminal 2-Humphrey Fuel Farm Tanks and Piping
12	Terminal 1-Lindbergh Blue Parking Ramp	43	Skychef Building
13	Terminal 1-Lindbergh Red Parking Ramp	44	Skychef Fuel Tank
14	Terminal 1-Lindbergh PMO	45	MAC Storage Building
15	Guard Shack by Gate 113 - East of Concourse G	46	U.S. Customs & Border Protection Shack
16	Post Office Maintenance Building	47	Delta Parking Lot Employee Pick-up Booth - North of Delta Building C
17	Post Office Building	48	Delta Building F
18	Delta Building B	49	Delta Building F – Generators, Transformers, AC units
19	Delta Hangers 7 & 8	50	Delta Building G
20	Delta Boiler Building	51	Delta Building H Employee West Bus Shelters - South of Humphrey Fuel
21	Maroon Parking Ramp - East of Delta Building B	52	Delta Building H Employee East Bus Shelters - South of Humphrey Fuel
22	Delta Reservoir Building - East of Delta Building B	53	Delta Employee East Bus Shelters - North of Delta Hangers
23	Electric Substation - East of Delta Building B	54	Transformers & Shed - Northeast Corner of Delta Building G Parking Lot on East Side of Building
24	Fueling Station by Delta Parking Ramp - East of Delta Hangars 7 and 8	55	Shed - East of Delta Building G Adjacent to 34th Avenue
25	Pipeline Receiving Station	56	Shed - East of Delta Building G Adjacent to 34th Avenue
26	Pipeline Receiving Station Shed	57	Delta Office Complex
27	VMF/Swissport Office Building	**Outlying Improvement Area**	
28	Swissport Storage Shed	58	SuperAmerica Convenience Complex
29	Swissport Maintenance Building		
30	Swissport Tank - West of Maintenance Building		
31	Pipe Line building - Building in AOA south of VMF		

Source: Liesch Associates, Inc. 2011.

LEGEND

Hazardous Materials Study Area

Structures Within The Hazardous Materials Study Area

0 700 1,400 2,800 4,200 Feet

N

Source: Data compiled and maintained by Liesch Associates, Inc. Base Map provided by MDNR

Disclaimer: This map was generated by Liesch Associates, Inc. using GIS (Geographic Information System) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitability for a particular use. The scale and location of all mapped data are approximate.

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Potentially contaminated soil and groundwater were identified by reviewing and mapping the locations of historic leak sites, spill sites and previously identified contaminated soils. **Figure 5.10-2** illustrates the locations of these sites. None of the sites are on or eligible to be on the NPL. Refer to ***Appendix J,*** *Impacted and Contaminated Soil and Groundwater Management,* for more information.

No NPL sites were identified within the Study Area. One NPL site was identified just outside of the Study Area. The site is at the Air Force Firing Range, near the Minnesota River and east of MSP as shown on Figure 5.10-2. The NPL site is located down gradient from airport property and thus hazardous materials from the site would not be transported to the airport via storm or ground water.

5.10.5 Impact Analysis

5.10.5.1 Hazardous Materials

Hazardous materials would be encountered under the No Action Alternative and the Action Alternatives.

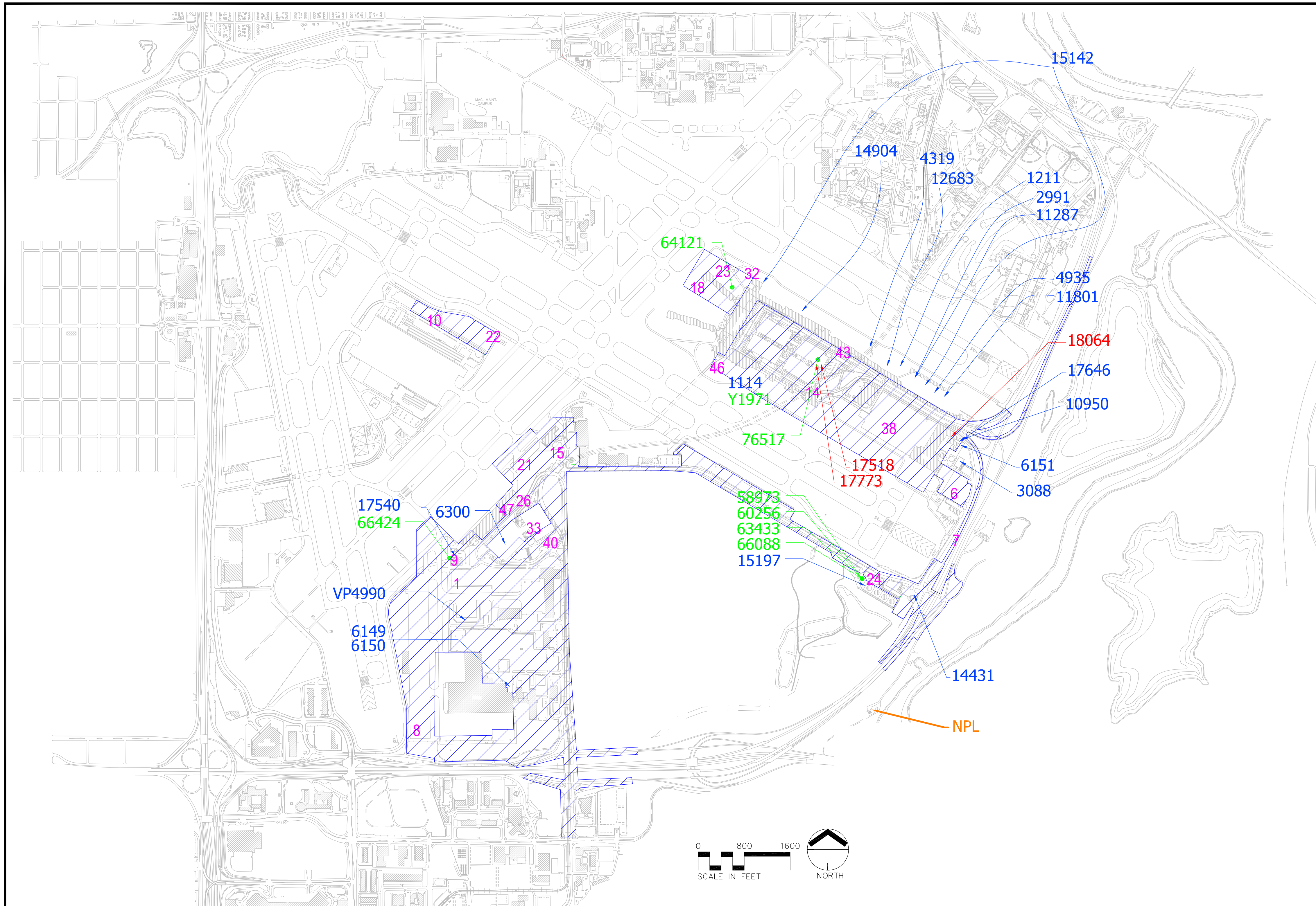
The No Action Alternative includes the demolition of the Terminal 2-Humphrey Fuel Facility and the Building F Tower. Hazardous materials are known to exist in both. Additionally, contaminated soil has been encountered near the Fuel Facility.

The Airlines Remain Alternative includes the demolition of the Building B Hangar Complex, Building G and a portion of the Post Office. This Alternative also involves renovating Terminal 1-Lindbergh, including Concourses E and G. All of these buildings are known or deemed likely to contain hazardous materials. Also, contaminated soil has been encountered at the Building B Hangar Complex.

The Airlines Relocate Alternative includes the demolition of the Delta Air Lines Flight Kitchen and the remainder of Building F. Renovation of Terminal 1-Lindbergh, including Concourses E and G, is also part of the Airlines Relocate Alternative. All of these buildings are known or deemed likely to contain hazardous materials. Also, contaminated soil has been encountered near the Terminal 2-Humphrey Fuel Facility, the Orange Ramp expansion location and the former Northwest Airlines Building B complex.

Potentially impacted buildings will be subject to a thorough inspection prior to disturbing any components of the subject buildings. These inspections will likely include destructive sampling to determine whether hazardous materials are in any of the building components. Based upon the findings of the inspections, corrective action will be implemented to remove and decommission identified hazards prior to demolition, renovation or building material alteration.

Contaminated soil, asbestos-containing material and other regulated materials will be handled and disposed of in accordance with applicable regulations. Excavated materials will be managed in accordance with the MPCA approved Soil Management Plan for MAC projects. Construction dewatering will be accomplished in accordance with the MAC's Construction Dewatering National Pollution Discharge Elimination System (NPDES) permit and/or its Metropolitan Council Environmental Services (MCES) permit. Renovation and demolition will be conducted in accordance



LEAK SITES
1114 MAC GATE 1 (1989)
1211 NATIONAL CAR RENTAL (1989))
2991 HERTZ RENT A CAR (1990)
3088 NWA BUILDING B MAINTENANCE FACILITY (1990)
4319 USPS AIRMAIL FACILITY (1991)
4935 AVIS RENT A CAR (1991)
6149 (NWA BUILDING C - MINERAL SPIRIT) (1993)
6150 (NWA) (1993)
6151 NWA BUILDING B (1993)
6300 SIGNATURE FLIGHT SUPPORT (1988)
10950 BUILDING B TEST CELL AREA MSP (1997)
11287 HERTZ RENT A CAR (1998)
11801 ALAMO CAR RENTAL (1998)
12683 BUDGET RENT A CAR (1999)
14431 SUPERAMERICA NO. 4369 (2001)
14904 ENERGY MANAGEMENT CENTER (2002)
15142 MSP AIRPORT - LINDBERGH TERMINAL (2003)
15197 MSP AIRPORT POST ROAD TANK FARM (2003)
17518 MPLS/ST. PAUL CAR RENTAL QTA (2009)
17540 HHH BULK FACILITY RELEASE (2009)
17646 NWA AIRLINES BUILDING B (2009)
17773 MSP AIRPORT HERTZ RENTAL CAR SERVICE (2009)
18064 DELTA AIRLINES BUILDING B (2010)

VIC PROGRAM SITES
VP - 4990 NWA (1994)

SELECTED SPILL SITES (Spill ID#)
58973 MFC VESSEL #6 POST ROAD FUEL FARM (2003)
60256 MFC POST ROAD FUEL FARM (2003)
63433 MFC RECLAIM TANK (2005)
64121 GATE E-4 CONSTRUCTION (2005)
66424 ASIG FUEL TRUCK AT HHH FUEL FARM (2006)
66088 MAGELLAN PIPELINE - MSP STATION (2006)
76517 HERTZ RENTAL CAR (2009)

Y1971 - 1971 HYDRANT RELEASE* (1971)

NPL - AIR FORCE FIRING RANGE NPL SITE

SITES WHERE SOIL MANAGEMENT WAS REQUIRED
1. SIGNATURE GROUND SERVICES BUILDING (2000)
6. MAC PARKING REPLACEMENT PROJECT (2000)
7. NORTHWEST DRIVE AND POST ROAD PROJECT (2000)
8. SUN COUNTRY APRON EXPANSION (2000)
9. HUBERT H. HUMPHREY TERMINAL FUELING PROJECT (2000)
10. MAC FEDERAL EXPRESS CARGO BUILDING (2001)
14. LRT SOUTH SHAFT (2001)
15. MAC LRT SOUTH PORTAL (2001)
18. 2004 PAVEMENT REHABILITATION (2004)
21. 2005 HUMPHREY FUEL LINE INSTALLATION (2005)
22. RWY 4-22 TUNNEL (PHASE 2) (2005)
23. 2005 PAVEMENT REHABILITATION (2005)
24. MSP FUEL CONSORTIUM MODIFICATIONS/IMPROVEMENTS (2005)
26. HUMPHREY PARKING ENTRANCE P.O. (2005)
32. 2006 PAVEMENT REHABILITATION (2006)
33. HUMPHREY ORANGE RAMP (2006-08)
38. CONCOURSE G EXPANSION SITE PREPARATION - BID PACKAGE #2 (2008)
40. HUMPHREY TERMINAL EXPANSION B.P.R.4 - EXIT ROADWAYS (2009)
43. TRANSIT CENTER VALVE VAULT (2009)
46. LINDBERGH TERMINAL SOUTH BAGGAGE SCREENING (2010)
47. HUMPHREY TERMINAL SKYWAY EXPANSION (2010)

(XXXX) - YEAR IN WHICH THE PROJECT WAS INCLUDED IN THE ANNUAL SOIL MANAGEMENT REPORT

LEGEND

XXXX - Spill Site (Closed)
XXXX - Active Site (Open)
XXXX - Closed Site
NPL - National Priority List Site
XX - Site Where Soil Management Was Conducted

Study Area

* Y1971 is a reference to a hydrant fuel release that occurred in 1971. The release occurred at the G Concourse, no specific location provided.

Soil Management and Release Sites

Source: Data compiled and maintained Liesch Associates, Inc. Base Map provided by TKDA.

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with MPCA Regulations for Renovation and Demolition (Minn. R. 7035.0805).

The only identified NPL site is outside of the Study Area. Since the Study Area was delineated based on the limits of construction, it is concluded that none of the Alternatives would impact an NPL site.

5.10.5.2 Pollution Prevention

Pollution prevention is an integral part of MAC's culture of sustainability. MAC's environmental goals include reducing waste disposal through their recycling and composting programs. Other environmental goals include reducing the use of hazardous materials and decreasing energy consumption.

Both Action Alternatives include the renovation of Concourses E in part to complete mechanical and technological upgrades as well as exterior modifications that would reduce energy consumption. Thus, the Action Alternatives include opportunities to prevent pollution.

5.10.5.3 Solid Waste

The same amount of post-construction solid waste would be generated for all Alternatives. The volume of waste generated is generally proportional to the number of passengers served. Since the number of passengers would be the same under all Alternatives, the amount of solid waste generated would also be the same. Therefore, when compared to the No Action Alternative, the Action Alternatives would not impact post construction solid waste.

Waste materials generated during construction activities are generally handled by the project's contractor. Deconstruction and salvaging of reusable building materials is done whenever appropriate. It is standard practice to maximize the recovery of recyclable construction and demolition (C&D) wastes such as concrete and metal. Recycling of these materials is driven by financial incentives, including avoidance of taxes and fees in addition to the value as a commodity in secondary markets. To the extent possible, large volumes of concrete are crushed and reused on site. C&D wastes that are not recyclable are transported to a local landfill for disposal. Hazardous and otherwise regulated wastes are managed at permitted local disposal facilities in accordance with all applicable rules and regulations. The processing facilities and disposal sites that receive these wastes have adequate capacity to accommodate construction waste from the Action Alternatives.

5.10.6 Permitting

Construction will be accomplished in accordance with existing permits including the MAC's Construction Dewatering NPDES permit and its Metropolitan MCES permit.

5.10.7 Summary

Hazardous materials would be encountered during construction of all of the Alternatives. None of the Alternatives would impact a site on the NPL. All contaminated soil, asbestos-containing material and other regulated materials will be handled and disposed of in accordance with applicable regulations. Therefore, none of the Alternatives would be expected to result in hazardous materials impacts that would exceed the threshold of significance.

Pollution prevention is incorporated into the Action Alternatives. When compared to the No Action Alternative, the Action Alternatives would not impact post construction solid waste.

5.11 Historical, Architectural, Archaeological, and Cultural Resources

This section provides an overview of the analysis conducted to address potential impacts to historical, architectural, archaeological and cultural resources.

5.11.1 Regulatory Background

The National Historic Preservation Act of 1966 (as amended) (NHPA) and the Archaeological and Historic Preservation Act of 1974 (AHPA) are the primary acts that govern the evaluation of potential impacts to historic or cultural resources. A historic or cultural resource is defined as one that is listed, or eligible for listing, on the National Register of Historic Places (NRHP), the official list of the nation's cultural resources.

The NHPA established the National Historic Preservation Program which includes elements for identification and protection of historic properties. The Act also authorizes the maintenance and expansion of the NRHP. Section 106 of the Act requires federal agencies to consider the impacts of a proposed action on historic resources.

The AHPA provides for the survey, recovery and preservation of significant scientific, prehistoric, historic or archaeological data that may be destroyed or irreparably lost due to a federally-funded or-licensed project.

5.11.2 Approach and Methodology

The Section 106 process, as defined in 36 CFR Part 800, Protection of Historic Properties, was used to evaluate impacts to historical, architectural, archaeological and cultural resources. The Section 106 process includes the following basic steps:

- Initiate the Section 106 process
  - Determine whether the proposed action is an undertaking
  - Begin consultation
- Identify historic properties
  - Establish the area of potential effect (APE)
  - Review APE for properties on or eligible to be on the NRHP
- Assess adverse effects
- Resolve adverse effects

5.11.3 Threshold of Significance

A determination of adverse effect does not necessarily constitute a significant impact in terms of NEPA. In the event of an adverse effect determination, consultation with the State Historic Preservation Office (SHPO) and the associated Tribes will be conducted to determine the significance of the impact and if the impact could be avoided or minimized.

5.11.4 Affected Environment

5.11.4.1 Initiate the Section 106 Process

The first step in initiating the Section 106 process is to determine if the Sponsor's Proposed Action would be considered an undertaking and whether it has the potential to effect historic resources. The Proposed Action at MSP would be considered an undertaking because it involves federal funding and approval. The Proposed Action also has the potential to affect historic resources because it requires demolition of buildings and ground disturbance.

Once it was determined that the Proposed Action would be an undertaking, consulting parties were identified. The following consulting parties were identified:

- Minnesota State Historic Preservation Office (SHPO);
- State of Minnesota Indian Affairs Council (the liaison between the State and the tribal Governments); and
- Lower Sioux, Mendota Mdewakanton Dakota, Shakopee Mdewakanton Sioux and Prairie Island Tribes.

The FAA invited the consulting parties to participate in the Section 106 process and advised them that Section 106 requirements would be addressed as part of the NEPA process.

5.11.4.2 Identify Historic Properties

The first step in identifying historic resources is to establish the APE. The APE is the study area for historical, architectural, archaeological and cultural resources. As such, it includes the area where the alternatives may cause changes in the character or use of a historic resource. The potential impacts of the alternatives are considered in determining the boundaries of the APE.

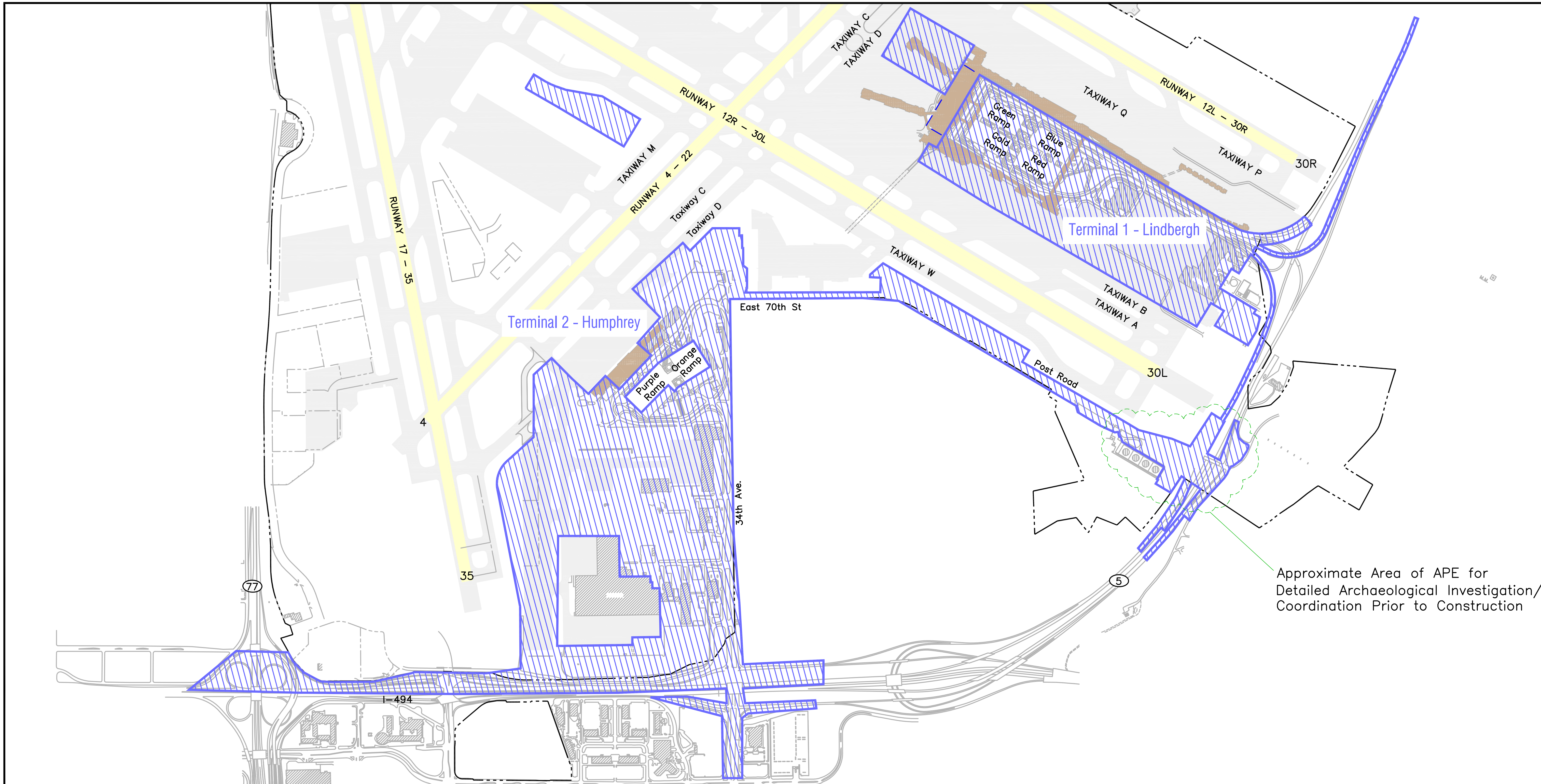
The Airlines Remain and Airlines Relocate Alternatives would cause ground disturbance and, therefore, at a minimum the APE must include the limits of construction. Although the alternatives would also cause changes in noise around MSP, the noise impacts resulting from the alternatives would not exceed the threshold of significance. Therefore, it was concluded that the alternatives would not impact the character or use of historic properties outside the limits of construction. The proposed APE was limited to areas of potential disturbance.

The SHPO concurred with the proposed APE on February 8th, 2011 and agreed with the FAA's assertion that the APE should not include the area that would be impacted by noise unless the noise impacts are found to be significant. The SHPO also confirmed that the visual impacts to historic resources would be minimal and thus need not be considered in defining the extent of the APE.

The original APE was altered due to expansion of the limits of construction and inclusion of additional regional roadway projects. On October 19, 2011 the FAA sent a letter to the SHPO requesting concurrence with a revised APE that encompassed the expanded limits of construction. The SHPO concurred with the revised APE on November 16, 2011.

In June of 2012, regional roadway improvements were added to the Alternatives to satisfy FHWA requirements. The proposed APE was revised to include these regional roadway improvements. Therefore, the FAA is coordinating with the SHPO to obtain concurrence with the updated APE illustrated in **Figure 5.11-1**. The FAA continues to endorse an APE that is bounded by the limits of construction for this undertaking.

FIGURE 5.11-1



LEGEND

Area of Potential Effect (APE)

Runways

Terminals

Section 106 Area of Potential Effect

N

0 1,300' 2,600'

Source: Data compiled and maintained by MAC, HNTB, TKDA

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A reconnaissance assessment and an archaeological assessment were completed to determine if there are any resources within the APE that are listed on or eligible for listing on the NRHP. Both of these assessments were completed by individuals who meet the Secretary of Interiors Professional Qualification Standards.

The reconnaissance assessment included review of historic data and a windshield survey. Facilities within the APE were reviewed to assess whether they would be eligible for listing on the NRHP. Based on the findings of the reconnaissance assessment, it was concluded that alterations have compromised the historic integrity of the facilities in the APE such that they would not qualify for listing on the NRHP. For additional information refer to the reconnaissance assessment report in ***Appendix F***, *Historic Resources*.

The archaeological assessment included a review of previous archaeological investigations for areas within and adjacent to the APE. Areas not covered by previous investigation were visually inspected. Results of the records search along with the visual inspection indicated that decades of construction and landscaping have caused deep and far- reaching disturbance around Terminal 1-Lindbergh and Terminal 2-Humphrey as well as the intersection of I-494 and 34th Avenue South. Therefore, it was concluded that NRHP eligible archaeological resources would not be present in these areas. However, archaeological evidence associated with Native Americans may be present in the area northwest of the Post Road/TH 5 interchange. Additional information regarding archaeological resources is provided in the Archaeological Assessment included in *Appendix F.*

5.11.5 Impact Analysis (Assess Adverse Effects)

The only potentially eligible NRHP site identified in the APE was the archaeological site in the area northwest of the Post Road/TH 5 interchange. Since the No Action Alternative would not include construction in the vicinity of the TH 5 and Post Road interchange, it would not result in an adverse effect. However, both the Airlines Remain and Airlines Relocate Alternatives include construction of a new TH 5/Post Road interchange and therefore may result in an impact to the potential archaeological resource, if present. According to 36 CFR Part 800, "An adverse effect is found when an undertaking may alter, directly or indirectly, any of characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association."[28]

Additional design to define the limit of construction and additional archaeological investigations to determine if resources are present are necessary to determine if either Action Alternative will result in an adverse effect. However, additional design will not be completed until after the completion of this EA. Therefore, this project has been broken down into two separate phases to allow portions of the project to move forward while still meeting the requirements of the NHPA.

Phase I will include the entire project area except for the area around the Post Road/Trunk Highway (TH) 5 intersection. Phase II will include the Post Road/TH 5 intersection and all associated work (relocation of Northwest Drive and Post Road intersection, relocation of SuperAmerica, and construction of new Post Toad/TH 5 bridge and intersection).

Phase I and Phase II will be considered separate undertakings for the purposes of Section 106 consultation. Each phase will include efforts to identify and evaluate historic and archaeological resources, in consultation with the SHPO. In addition, each phase will conclude with its own Section 106 finding.

The reconnaissance assessment and archaeological assessment did not identify any resources listed on or eligible for listing on the NRHP for Phase I. Therefore, the FAA has determined that a No Historic Properties Affected finding is adequate for Phase I. This finding was submitted to the SHPO and the Tribes with the Draft EA. After reviewing the documentation provided by the FAA, the SHPO concurred with the FAA's finding for Phase I. The finding and related correspondence are included in *Appendix F*.

Phase II will occur after the EA process is complete. However, the FAA and MAC will have flexibility to consider alternatives outside the preferred alternative approved in the EA to avoid or minimize impacts. If an alternative is selected that is different from what was approved in the EA, the FAA and MAC will complete additional work, as required, to comply with the NEPA.

5.11.6 Mitigation

Phase I will not require any mitigation. If archaeological resources are identified during Phase II, the FAA and MAC will work with the SHPO and Tribes to identify ways to minimize impacts. If impacts cannot be avoided, the FAA and MAC will work with the SHPO and Tribes to mitigate the impacts through a Memorandum of Agreement.

5.11.7 Summary

The No Action Alternative will not impact historic or cultural resources. In addition, Phase I of the proposed project (including both Action Alternatives) will not impact any historic or cultural resources. Additional information is needed to determine if Phase II will result in an adverse effect. The impacts associated with Phase II will be determined prior to any construction activities in consultation with the SHPO and the Tribes.

5.12 Light Emissions and Visual Effects

This section discusses potential impacts related to changes in light emissions and aesthetics.

5.12.1 Regulatory Background

There are no Federal regulations for airport related light emissions or visual effects.

5.12.2 Approach and Methodology

The primary sources of light emissions from airports are the FAA required lighting for security, obstruction clearance, and navigation. An analysis of the impact of light emissions on the surrounding environment is required when proposed projects introduce new lighting that may affect residential or other sensitive land uses. To evaluate the potential for light emissions impact, the FAA considers the extent to which any lighting associated with an action would create an annoyance among people or interfere with their normal activities.

Visual, or aesthetic, impacts are inherently more difficult to define than light emission impacts because of the subjectivity involved. Aesthetic impacts deal more broadly with the extent that the development contrasts with the existing environment and whether the community's jurisdictional agency considers this contrast objectionable. Therefore, the Alternatives are assessed by considering their potential to contrast with the surrounding environment and consulting with appropriate agencies.

5.12.3 Threshold of Significance

There are no established thresholds of significance.

5.12.4 Impact Analysis

The potential new light sources associated with the Action Alternatives would primarily include apron lighting and parking facility lighting. Apron lighting would be installed on the new/expanded aprons near Terminal 2-Humphrey. Since there is already apron lighting in these areas and the nearest residents are south of I-494 and west of TH 77, it is not anticipated that the new apron lights would interfere with residents' normal activities. Parking facility lighting would be added to the new/expanded parking structures. Again, this lighting would be adjacent to existing lighted parking structures. Therefore, it is not anticipated that the lighting on the new parking structures would impact residents.

Since the Action Alternatives essentially amount to expansion of aviation related facilities on the airport and road improvements within existing right-of-way, the aesthetic character at MSP would not change. The SHPO also confirmed that the visual impacts to historic resources would be minimal. Therefore, it is not anticipated that the Alternatives would disturb the visual integrity of the area.

5.12.5 Summary

In summary, none of the Alternatives would be expected to introduce lighting that would create an annoyance or interfere with normal activities. Additionally, none of the Alternatives would disturb the visual integrity of the Airport area.

5.13 Natural Resources and Energy Supply

This section discusses the potential impacts to natural resources and energy supply.

5.13.1 Regulatory Background

CEQ Regulations require that the analysis of environmental consequences include a discussion of each alternative's potential energy requirements and energy conservation, as well as their potential to require the use of natural and depletable resources.

5.13.2 Approach and Methodology

The FAA requires the environmental analysis of proposed airport projects to include an evaluation of the project's effect on natural resources and energy supply. The analysis takes into account the project's energy consumption, energy conservation, and the use of natural and consumable resources to construct and maintain the airport facilities and operations.

In accordance with Order 1050.1E, the Alternatives were examined to identify any resulting measurable effect on local supplies of energy or natural resources.

Energy consumption for each of the Action Alternatives was calculated and compared to the energy consumption for the No Action Alternative. Additionally, anticipated construction materials were considered to determine if any involved natural resources that are in short supply.

5.13.3 Threshold of Significance

An impact would exceed the threshold of significance if the construction, operation or maintenance of a proposed action would cause demands that exceed future supplies. Factors to consider include whether the proposed action would require use of a rare natural resource or would cause a substantial demand on energy or natural resources.

5.13.4 Impact Analysis

Anticipated energy consumption by source for each of the Alternatives in 2020 and 2025 is shown in **Table 5.13.1**. The information in Table 5.13.1 was used to generate comparisons of anticipated energy consumption by fuel type in 2020 and 2025.

Table 5.13.1
Energy Consumption by Source

Source	2020			2025		
	No Action	Alternative 1	Alternative 2	No Action	Alternative 1	Alternative 2
Aircraft within LTO (gallons)						
Jet A(1)	49,867,789	49,847,276	48,950,768	56,773,514	55,792,465	56,556,498
Avgas(1)	2,927	2,869	2,822	2,915	2,876	2,869
Ground Support Equipment (gallons)						
Diesel(1)	1,104,633	1,080,503	1,080,483	1,243,800	1,225,234	1,209,042
Gasoline(1)	2,489,830	2,500,134	2,497,137	2,828,063	2,799,972	2,785,024
Propane(1)	9,164	9,171	9,171	9,164	9,171	9,171
Electrical Consumption (kwh)						
Electrical(2)	164,080,243	190,979,243	202,301,243	164,080,243	190,979,243	202,301,243
Stationary Sources – Boilers and snowmelters (therms)						
Natural Gas(2)	4,782,150	5,051,016	5,113,309	4,782,150	5,051,016	5,113,309
Stationary Sources - Boilers (gallons)						
Jet A(2)	4,012	4,295	4,236	4,012	4,295	4,236
Propane(2)	1,168	1,168	1,168	1,168	1,168	1,168
Stationary Sources - Generators (gallons)						
Diesel(2)	5,140	5,361	6,958	5,140	5,361	6,958

Notes:
(1) Future year fuel usage based on forecasted aircraft operations and fleet mix as well as ground-based taxi/delay and aircraft/gate positioning.
(2) Future year usage based on estimated energy needs for the terminal expansion.

Source: Wenck Associates, Inc., KB Environmental Sciences, Inc., and David Braslau Associates, Inc., 2011.

Table 5.13.2 compares the estimated energy consumption by fuel type in 2020. As can be seen from this table, the anticipated Jet A, Avgas and diesel consumption would be less with the Action Alternatives than with the No Action Alternative. Gasoline and propane consumption would be slightly higher with the Action Alternatives. Natural gas consumption would be approximately 6 and 7 percent higher with the Airlines Remain Alternatives and the Airlines Relocate Alternative, respectively. Electrical consumption would be approximately 16 and 23 percent greater with the Airlines Remain Alternative and the Airlines Relocate Alternative, respectively. This larger increase in electrical consumption is expected because both Action Alternatives provide for expanded terminal facilities.

Table 5.13.2
2020 Energy Consumption by Fuel Type

Fuel Type	No Action	Alternative 1	Difference (1)	Alternative 2	Difference (2)
Jet A (gallons)					
Aircraft with LTO	49,867,789	49,847,276	-20,513	48,950,768	-917,021
Boilers	4,012	4,295	283	4,236	224
Total			-20,230		-916,797
Avgas (gallons)					
Aircraft with LTO	2,927	2,869	-58	2,822	-105
Diesel (gallons)					
GSE	1,243,800	1,225,234	-18,566	1,209,042	-34,758
Generators	5,140	5,361	221	6,958	1,818
Total			-18,345		-32,940
Gasoline (gallons)					
GSE	2,489,830	2,500,134	10,304	2,497,137	7,307
Propane (gallons)					
GSE	9,164	9,171	7	9,171	7
Boilers	1,168	1,168	0	1,168	0
Total			7		7
Natural Gas (therms)					
Boilers and Snowmelters	4,782,150	5,051,016	268,866	5,113,309	331,159
Electrical Consumption (kwh)	164,080,243	190,979,243	26,899,000	202,301,243	38,221,000

Notes:
(1) Difference between Alternative 1 and the No Action Alternative. Negative number indicates decrease.
(2) Difference between Alternative 2 and the No Action Alternative. Negative number indicates decrease.

Source: Wenck Associates, Inc., KB Environmental Sciences, Inc., and David Braslau Associates, Inc., 2011.

Table 5.13.3 compares the estimated energy consumption by fuel type in 2025. This table shows that the anticipated Jet A, Avgas, diesel and gasoline consumption would be less with the Action Alternatives than with the No Action Alternative in 2025. Propane consumption would be slightly higher with the Action Alternatives. Natural gas consumption would be approximately 6 and 7 percent higher with the Airlines Remain Alternatives and the Airlines Relocate Alternative, respectively. Electrical consumption would be approximately 16 and 23 percent greater with the Airlines Remain Alternatives and the Airlines Relocate Alternative, respectively. Again, this larger increase in electrical consumption is expected because both Action Alternatives provide for expanded terminal facilities.

Table 5.13.3
2025 Energy Consumption by Fuel Type

Fuel Type	No Action	Alternative 1	Difference (1)	Alternative 2	Difference (2)
Jet A (gallons)					
Aircraft with LTO	56,773,514	55,792,465	-981,049	56,556,498	-217,016
Boilers	4,012	4,295	283	4,236	224
Total			-980,766		-216,792
Avgas (gallons)					
Aircraft with LTO	2,927	2,869	-58	2,822	-105
Diesel (gallons)					
GSE	1,104,633	1,080,503	-24,130	1,080,483	-24,150
Generators	5,140	5,361	221	6,958	1,818
Total			-23,909		-22,332
Gasoline (gallons)					
GSE	2,828,063	2,799,972	-28,091	2,785,024	-43,039
Propane (gallons)					
GSE	9,164	9,171	7	9,171	7
Boilers	1,168	1,168	0	1,168	0
Total			7		7
Natural Gas (therms)					
Boilers and Snowmelters	4,782,150	5,051,016	268,866	5,113,309	331,159
Electrical Consumption (kwh)	164,080,243	190,979,243	26,899,000	202,301,243	38,221,000

Notes:
(1) Difference between Alternative 1 and the No Action Alternative. Negative number indicates decrease.
(2) Difference between Alternative 2 and the No Action Alternative. Negative number indicates decrease.

Source: Wenck Associates, Inc., KB Environmental Sciences, Inc., and David Braslau Associates, Inc., 2011.

With the exception of electrical consumption, the Action Alternatives would decrease or only minimally increase energy consumption. Even with an anticipated increase of 23 percent over the No Action Alternative, the electrical consumption is not anticipated to result in energy demand that would exceed supply.

Additionally, based on anticipated construction materials, no unusual materials or those in short supply would be used to construct of the Action Alternatives.

Finally, in terms of conservation, environmental sustainability is integral to the MAC's mission. "[The] MAC is committed to developing green buildings and to operating its facilities in ways that conserve energy, water resources, and other natural resources. From the new Humphrey Terminal at MSP, to an extensive recycling and alternative fuels program, MAC continues to focus on best practices to improve and operate its airport system in a resource-efficient and sustainable manner."[29]

5.14 Aviation Noise

The following sub-sections provide the regulatory background, methodology, thresholds of significance, analysis and potential mitigation for noise impacts.

5.14.1 Regulatory Background

In addition to FAA Order 1050.1E, Environmental Impacts: Policies and Procedures and FAA Order 5050.4B, National Environmental Policy Act Implementing Instructions for Airport Actions, FAA 14 C.F.R. Part 150, Airport Noise Compatibility Planning" and the Metropolitan Council's Land Use Compatibility Guidelines for Aircraft Noise are the guiding criteria for airport noise impact evaluation in this EA. See *Appendix G*, for additional information on FAA and local noise guidance.

5.14.2 Methodology

For aviation noise analysis, the FAA has determined that the cumulative noise exposure to individuals resulting from aviation activities must be established in terms of yearly Day/Night Average Sound Level (DNL). Typically the FAA uses the 65+ DNL contour for land use compatibility. For this EA, in addition to the 65+ DNL contour, the MAC is using the 60+ DNL contour for analysis and evaluation consistent with the mitigation program defined by the Consent Decree, see Sub-section 5.14.4.1 for history and description of the Consent Decree.

The FAA-established mechanism for quantifying airport DNL noise impacts is the Integrated Noise Model (INM). The INM is used to assess the noise impact of aircraft operations. INM Version 7.0c was used to develop the existing, 2020 and 2025 noise contours.

The INM uses input files consisting of information relative to runway use, flight track use, aircraft fleet mix, aircraft performance and thrust settings, topography information and atmospheric conditions to generate noise exposure contours. The contours are typically represented in five DNL increments that depict an annualized average day of aircraft noise impacts.

The noise impact analysis was conducted using a Geographic Information System (GIS). The GIS facilitated a detailed, comprehensive analysis of the type and number of residential structures, as well as the total population, in the respective noise contours. MetroGIS provided the most current data available for this study; the parcel data are current as of August 2011. Multi-family and single-family dwelling unit population multipliers were provided by MetroGIS on a city-by-city basis. Parcel unit count data were developed through a combination of field work done by MAC staff and data from the cities and counties neighboring MSP as a part of previous and current residential noise mitigation program efforts around the airport.

The total population living on each parcel was estimated by multiplying the number of dwelling units by the population multiplier for that respective city. For instance, according to MetroGIS data, a residential multi-family parcel with four units in the City of Richfield has a 2.02 person multiplier per unit. Multiplying 2.02 people by four dwelling units results in an estimated 8.08 people that live on that parcel of land. This procedure was completed for all affected communities and provided the final information needed to perform the population estimate for noise impacts.

5.14.3 Threshold of Significance

The threshold of significance for noise is triggered if the action alternative will cause an increase of 1.5 dB DNL or greater for a noise sensitive land use at or above the 65 DNL noise exposure when compared to the No Action Alternative.

5.14.4 Affected Environment

Because the existing noise environment around MSP is significantly influenced by the aggressive noise mitigation programs at MSP, it is appropriate to begin this section with a description of the history of noise mitigation at MSP.

5.14.4.1 History of Noise Mitigation

Since 1992 the MAC has been mitigating and acquiring noise sensitive land uses around MSP. With completion of the final phase of this program in 2014, over 15,000 properties will be mitigated at a total cost approaching $500 million.

In the mid-1990s, as part of the Dual-Track Airport Planning Process, the MAC made a policy decision to provide some level of noise mitigation out to the 60 DNL noise contour, which is more inclusive than the federally-recognized mitigation threshold of 65 DNL. During the Dual-Track Airport Planning Process, the MSP Noise Mitigation Committee was tasked with developing a noise mitigation plan to be considered in conjunction with the 2010 MSP expansion plan.

Following completion of the Dual-Track Airport Planning Process Final Environmental Impact Statement (Dual–Track FEIS), the intent of the MSP Noise Mitigation Committee's recommendation regarding mitigation outside the 65 DNL contour was a topic of detailed discussion and debate. During the course of a Part 150 Update process the MAC formulated a number of mitigation proposals, culminating in a final MAC position on mitigation outside the 65 DNL contour. In the November 2004 Part 150 Update, the MAC's recommendation for mitigation in the 64 to

60 DNL contours called for providing central air-conditioning to single-family homes that did not have it, with a homeowner co-pay based on the degree of noise impact. The MAC based eligibility for the mitigation proposal on the 2007 forecast mitigated noise contour using the block intersect eligibility methodology.

The cities located around MSP expressed dissatisfaction with the MAC's proposal, asserting that the MSP Noise Mitigation Committee recommended that the 5 dB package previously offered to homeowners in 65+ DNL was to be expanded to all properties in the 64 to 60 DNL noise contours. The MAC countered that the MSP Noise Mitigation Committee recommendations did not specify the mitigation package elements to be offered in the 64 to 60 DNL noise contour area and that, because homes in Minnesota have higher than the national average pre-existing noise attenuation characteristics, the full 5 dB package was not necessary outside the 65 DNL contour to ensure an interior noise level less than 45 dB.

In early 2005, the Cities of Minneapolis, Eagan and Richfield filed suit in Hennepin County District Court claiming the MAC violated the Minnesota Environmental Rights Act (MERA) by failing to provide a 5 dB package to single-family homes in the 64 to 60 DNL contours. In September 2005, plaintiffs seeking class action certification filed a separate action against the MAC alleging breach of contract claims associated with mitigation in the 64 to 60 DNL contours.

On October 19, 2007, prior to completion of trial on all counts, Judge Stephen Aldrich approved a Consent Decree entered into by the MAC and the cities of Minneapolis, Eagan and Richfield that settled the cities' litigation. The Decree provides that approximately 433 homes in the forecast 2007 64 to 63 DNL noise contours are eligible to receive the same level of noise mitigation that the MAC provided in the 1996 65 DNL and greater contours. The 2007 64 to 63 DNL noise contour mitigation program is designed to achieve 5 dB of noise reduction on average, with mitigation measures that may include the following, depending upon the home's existing condition: central air-conditioning; exterior and storm window repair or replacement; prime door and storm door repair or replacement; wall and attic insulation; and baffling of roof vents and chimney treatment. The Decree required that the MAC complete construction of mitigation in the 2007 64 and 63 DNL noise contours by December 31, 2009.

In addition, under the Decree, owners of the approximately 5,394 single-family homes in the 2007 62 to 60 DNL noise contours are eligible for one of two mitigation packages: 1) an estimated 2,852 homes that did not have central air-conditioning as of September 1, 2007 will receive it and up to $4,000 (including installation costs) in other noise mitigation products and services they could choose from a menu provided by the MAC; or 2) owners of homes that already had central air-conditioning installed as of September 1, 2007 or who choose not to receive central air-conditioning will be eligible for up to $14,000 (including installation costs) in noise mitigation products and services they could choose from a menu provided by the MAC. The mitigation menu includes upgrades such as: exterior and storm window repair or replacement; prime door and storm door repair or replacement; wall and attic insulation; and baffling of roof vents and chimney treatment. The Decree requires that the MAC complete construction of mitigation in the 2007 62 to 60 DNL contours by December 1, 2012.

Single-family homes in the 2007 64 and 63 DNL contours and in the 2007 62 to 60 DNL contours whose earlier owners opted out of the previously completed MAC noise mitigation program for the 1996 65 and greater DNL contours but that had new owners on September 1, 2007 are eligible to "opt in" and receive noise mitigation. If the total cost to the MAC of the opt-in mitigation is less than $7 million, any remaining funds will be used to reimburse owners of single-family homes between the 2005 mitigated 60 DNL contour and the 2007 forecast mitigated 60 DNL contour for purchase and installation of products included on a menu provided by the MAC. The amount each homeowner receives will be determined by subtracting dollars spent for the opt-in program from the total $7 million budget, and then dividing the remainder among the total number of single-family homes within the 2005 60 DNL and 2007 60 DNL contours. The MAC has begun to issue reimbursements and will complete them by July 31, 2014. The total cost of the "opt-in" mitigation and the 2005 mitigated 60 DNL contour reimbursement mitigation program is capped at $7 million.

The MAC began implementing the Noise Mitigation Program in October 2007 following the terms and conditions of the Consent Decree that settled the noise mitigation lawsuit. As of June 2012, the MAC has completed noise mitigation for all of the single-family homes in the 2007 63-64 DNL contours. (401 homes participated in the program.) In addition, the MAC has completed 5,463 homes in the 2007 60-62 DNL and has another 32 homes in the design and construction phases. A total of 1,082 homes have been provided reimbursements for approved noise mitigation enhancements in the 2007 60 DNL to 2005 60 DNL contour area. With regard to the multi-family noise mitigation program, the MAC has installed acoustical covers on the air-conditioners in 1,724 living units and completed the installation of new air-conditioning units in 255 living units in 2010 that are within the 2007 60 DNL forecast mitigated noise contour.

5.14.4.2 Noise Study Area

The Noise Study Area includes areas within the cities of Minneapolis, Richfield, Bloomington, Eagan and Mendota Heights located within the 60 DNL noise contour.

5.14.4.3 Existing (2010) Conditions

Existing noise conditions were evaluated by using INM. Several inputs are required by INM. The following sub-sections describe the necessary inputs.

<u>*INM Inputs*</u>

2010 AIRCRAFT OPERATIONS AND FLEET MIX

The MAC derived total 2010 MSP operations numbers for this EA from MAC Noise and Operations Monitoring System (MACNOMS) data. The MACNOMS total operations number was 0.8 percent lower than the FAA Air Traffic Activity Data System (ATADS) number. To rectify the numbers, the MAC adjusted the MACNOMS data upward to equal the total 2010 FAA ATADS number. **Table 5.14.1** provides the total number of 2010 aircraft operations at MSP by operational category.

The 2010 total operations number of 435,583 is up slightly from the 2009 number of 432,604 (0.6 percent increase).

Table 5.14.1

2010 Total Operations Numbers

Operations Category	Number of Operations
Scheduled Passenger Air Carrier[a]	394,407
Cargo	12,049
Charter	103
GA	26,185
Military	2,839
TOTAL	**435,583**

Notes:
(a) Includes both air carrier and regional carrier operations

Source: Based on actual 2010 MACNOMS data adjusted to match FAA ATADS data (to account for unavailable MACNOMS operations data).

The detailed fleet mix for 2010 is provided in *Appendix G* **(**see Table G.4.2). In summary for 2010, the average daily number of total nighttime operations was 94.3 with overall total average daily operations of 1,193.4.

2010 RUNWAY USE

Runway use throughout the year for arrival and departure operations at MSP has a notable effect on the noise impact around the airport. The number of people and dwellings impacted by noise is a direct result of the number of operations on a given runway and the land uses off the end of the runway. *Appendix G* (see Table G.4.6) provides the 2010 runway use percentages.

2010 FLIGHT TRACKS

In large part, the INM flight tracks used to develop the 2010 actual noise contour are consistent with those used previously to develop the noise litigation Consent Decree 2007 forecast noise contour, with the exception of Runways 17, 35 and 4 departure tracks. The INM departure tracks were updated to conform to actual radar flight track data for Runway 17 and Runways 35 and 4 as used during the 2009 reconstruction of Runway 12L/30R. *Appendix G* includes figures that provide the INM departure and arrival flight tracks and specific track use information used to develop the 2010 actual noise contour, see Figures G-4-1 through G-4-16.

2010 ATMOSPHERIC CONDITIONS

Atmospheric data from the National Weather Service (NWS) was gathered for the development of the 2010 actual noise contours. The NWS 2010 annual average temperature of 49.9 degrees Fahrenheit and 2010 average annual wind speed of 8.2 Knots was used in the INM modeling process. The 2010 average annual pressure of 29.98 inches and a 2010 annual average relative humidity of 63.9 percent were also used.

2010 Noise Contours

Based on the 435,583 total operations in 2010, approximately 3,903 acres are in the 65 DNL noise contour and approximately 9,494 acres are in the 60 DNL noise contour. **Table 5.14.2** contains the count of single-family and multi-family dwelling units and population in the 2010 existing noise contours. The counts are based on parcels that are within or are intersected by the respective DNL contour lines. Parcels with one dwelling unit are counted as single-family and parcels with more than one dwelling unit are counted as multi-family.

There are 35 residential units located at the furthest extent of the Runway 12R arrival lobe within the 2010 60 DNL noise contour that will not be provided noise mitigation as part of the existing residential noise mitigation program. However, all remaining residential units within the actual 2010 60+ DNL noise contours have been, or will be, provided noise mitigation by virtue of previous noise mitigation programs and the completion of the existing program in 2014 as defined by the Consent Decree.

A depiction of the unmitigated residential parcels, blocks that have been mitigated, and those that will be provided noise mitigation by 2014 per the noise litigation Consent Decree, and the 2010 actual noise contours are provided in **Figure 5.14-1.** See *Appendix G,* for additional details on the development of the 2010 actual noise contours.

Table 5.14.2

Summary of 2010 Actual DNL Noise Contour Single-Family and Multi-Family Unit and Population Counts

City	Count	Single-Family					Multi-Family				
		60-64	65-69	70-74	75+	Total	60-64	65-69	70-74	75+	Total
Minneapolis	Units	5478	1083	19	0	6580	1184	511	4	0	1699
	Population	13969	2761	49	0	16779	2425	900	9	0	3334
Bloomington	Units	3	1	0	0	4	618	2	0	0	620
	Population	7	3	0	0	10	995	4	0	0	999
Richfield	Units	468	6	0	0	474	54	0	0	0	54
	Population	1221	16	0	0	1237	90	0	0	0	90
Eagan	Units	131	0	0	0	131	0	0	0	0	0
	Population	368	0	0	0	368	0	0	0	0	0
Mendota Heights	Units	6	1	0	0	7	0	0	0	0	0
	Population	16	3	0	0	19	0	0	0	0	0
All Cities	Units	6086	1091	19	0	7196	1856	513	4	0	2373
	Population	15581	2783	49	0	18413	3510	904	9	0	4423

Notes:
- Parcel Intersect Methodology; Single-Family=1 Unit, Multi-Family>1 Unit
- Population Reflects Estimation Based on Multipliers Provided by Met Council

Source: MAC analysis, 2012.

5.14.5 Impact Analysis

The forecast noise impacts and any potential mitigation in this EA are defined by the forecast 2020 noise contours. The analysis focuses on forecast 2020 noise contours in the context of existing residential structures within the Noise Study Area. A future year (2025) analysis is also included.

The 2020 and 2025 aircraft noise exposure levels were assessed in INM using output data from the SIMMOD simulation analysis as well as existing flight track locations and usage trends at MSP where appropriate. The forecast flight tracks used in this EA include operational assumptions based on recent FAA ATC implementation of increased heading dispersion for northbound departure operations off

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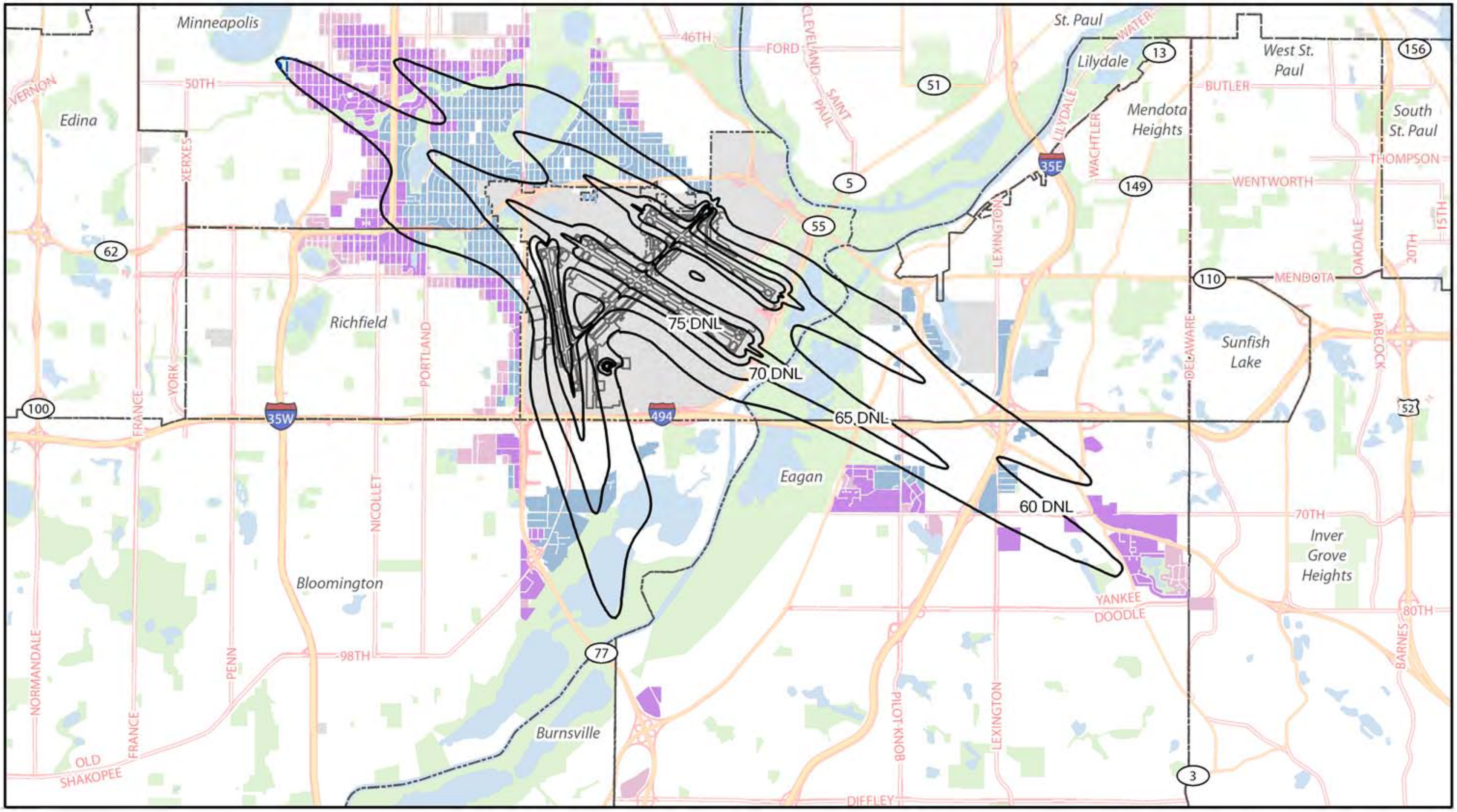
FIGURE 5.14-1



Legend

MAC Existing Noise Mitigation Packages

- Reimbursement
- Central AC & $4K or $14K
- -5 dBA Modifications
- 2010 Actual Noise Contours
- Parcels in 2010 60 DNL outside Mitigation Area

MAC Existing Noise Mitigation Program and 2010 Actual Noise Contours

N

0 4,400 8,800 Meters

Disclaimer: This map was generated by the Metropolitan Airports Commission using GIS (Geographic Information System) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitability for a particular use. The scale and location of all mapped data are approximate.

HNTB

Runway 30R as requested by the City of Minneapolis, the MSP Noise Oversight Committee (NOC) and the MAC. Additionally, the HESTN ONE and SLAYR ONE Area Navigation (RNAV) Standard Instrument Departures (SIDs) off Runway 17, as implemented on November 30, 2012 by FAA ATC, per the request of the NOC and MAC, are modeled in the forecast flight tracks in this EA. See ***Appendices D***, *MSP Airfield Simulation Analysis*, and ***G*** for more details on the simulation analysis and noise model development respectively.

The noise analysis and results described in this section did not include the proposed PBN procedures (see Section 2.2.3 for more information). The RNAV/RNP procedures were considered a separate action as they are independent of the Alternatives. However, the RNAV/RNP procedures were considered in this EA in the context of cumulative impacts. See Section 5.21.4.2 *Cumulative Effects: Aircraft Noise.*

The small variation between the runway use for the various alternatives is a function of FAA air traffic control procedures during low-demand time periods and the different geographic locations of new gate additions at MSP that are provided with the various development options.

5.14.5.1 No Action Alternative Noise Impacts

Based on the 484,879 total forecast operations in 2020, approximately 4,388 acres are in the 65+ DNL noise contour and approximately 11,240 acres are in the 60+ DNL noise of the No Action Alternative. **Table 5.14.3** contains the count of single-family and multi-family dwelling units and population in the 2020 and 2025 No Action Alternative DNL noise contours. The counts are based on parcels that are within or are intersected by the respective DNL contour lines. Parcels with one dwelling unit are counted as single-family and parcels with more than one dwelling unit are counted as multi-family.

Figure 5.14-2 provides the 2020 and 2025 No Action Alternative DNL noise contours and the parcels within the respective contours.

Table 5.14.3

Summary of 2020 and 2025 DNL No Action Alternative Noise Contour Single-Family and Multi-Family Unit and Population Counts by Parcel

	City	Count	Single-Family					Multi-Family				
			60-64	65-69	70-74	75+	Total	60-64	65-69	70-74	75+	Total
2020 DNL Noise Contours	Minneapolis	Units	6867	1441	43	0	8351	1748	655	4	0	2407
		Population	17511	3674	110	0	21295	3467	1195	9	0	4671
	Bloomington	Units	37	1	0	0	38	702	2	0	0	704
		Population	94	3	0	0	97	1130	4	0	0	1134
	Richfield	Units	571	15	0	0	586	69	0	0	0	69
		Population	1491	39	0	0	1530	116	0	0	0	116
	Eagan	Units	199	0	0	0	199	0	0	0	0	0
		Population	559	0	0	0	559	0	0	0	0	0
	Mendota Heights	Units	40	1	0	0	41	3	0	0	0	3
		Population	109	3	0	0	112	4	0	0	0	4
	All Cities	Units	7714	1458	43	0	9215	2522	657	4	0	3183
		Population	19764	3719	110	0	23593	4717	1199	9	0	5925
2025 DNL Noise Contours	Minneapolis	Units	7362	1872	79	0	9313	2108	706	6	0	2820
		Population	18773	4774	201	0	23748	4161	1306	14	0	5481
	Bloomington	Units	46	1	0	0	47	747	2	0	0	749
		Population	117	3	0	0	120	1202	4	0	0	1206
	Richfield	Units	692	74	0	0	766	69	0	0	0	69
		Population	1806	193	0	0	1999	116	0	0	0	116
	Eagan	Units	312	1	0	0	313	0	0	0	0	0
		Population	877	3	0	0	880	0	0	0	0	0
	Mendota Heights	Units	57	1	0	0	58	3	0	0	0	3
		Population	156	3	0	0	159	4	0	0	0	4
	All Cities	Units	8469	1949	79	0	10497	2927	708	6	0	3641
		Population	21729	4976	201	0	26906	5483	1310	14	0	6807

Note: Parcel Intersect Methodology; Single-Family=1 Unit, Multi-Family>1 Unit; Population Reflects Estimation Based on Multipliers Provided by Met Council.

Source: MAC analysis, 2012.

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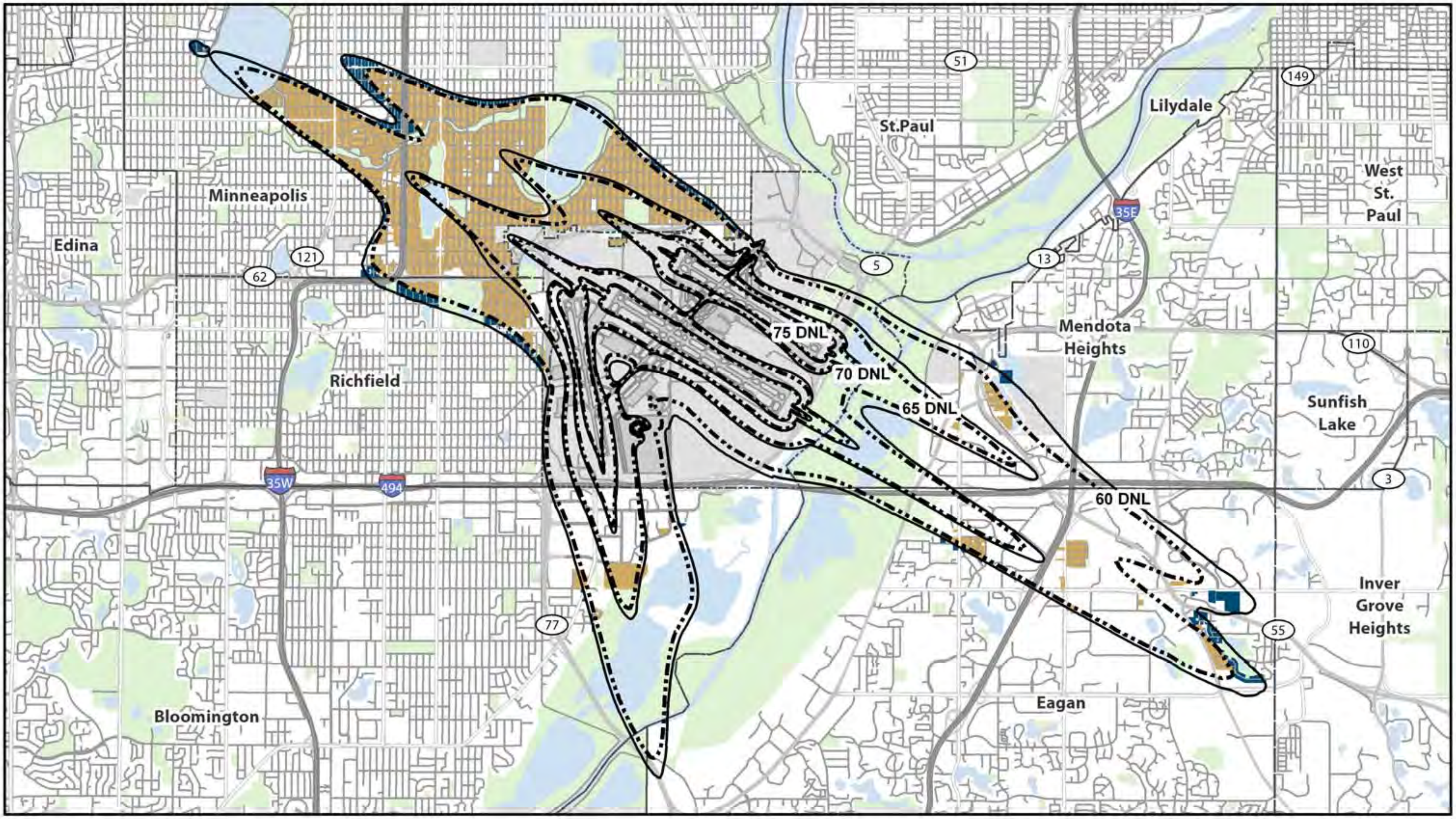
FIGURE 5.14-2



2020 and 2025 No Action Alternative DNL Noise Contours and Affected Parcels

LEGEND

Affected Parcels

Inside 2020 60 DNL

Between 2020 and 2025 60 DNL

Noise Contours

2020 No Action

2025 No Action

0 4,000 8,000 Meters

Disclaimer: This map was generated by the Metropolitan Airports Commission using GIS (Geographic Information System) software. No claims are made to the accuracyor completeness of the information shown herein nor to its suitablity for a particular use. The scale and location of all mapped data are approximate.

MAC

HNTB

5.14.5.2 Airlines Remain Alternative Noise Impacts

Based on the 484,879 total forecast operations in 2020, approximately 4,386 acres are in the 65 DNL noise contour and approximately 11,234 acres are in the 60 DNL contour of the Airlines Remain Alternative. **Table 5.14.4** contains the count of single-family and multi-family dwelling units and population in the 2020 and 2025 Airlines Remain Alternative DNL noise contours. The counts were completed using the same methodology used for the No Action Alternative.

Figure 5.14-3 provides the 2020 and 2025 Airlines Remain Alternative DNL noise contours and the parcels within the respective contours.

There are no areas of sensitive land uses that experience a 1.5 dB, or greater, increase in the 65 DNL noise contour when comparing the 2020 and 2025 Airlines Remain Alternative contours to the respective No Action DNL noise contours. The FAA's impact threshold of significance is not met with the Airlines Remain Alternative. Therefore, no adverse impacts to sensitive land uses would be expected.

Table 5.14.4

Summary of 2020 and 2025 DNL Alternative 1 – Airlines Remain Noise Contour Single-Family and Multi-Family Unit and Population Counts by Parcel

	City	Count	Single-Family					Multi-Family				
			60-64	65-69	70-74	75+	Total	60-64	65-69	70-74	75+	Total
2020 DNL Noise Contours	Minneapolis	Units	6890	1450	44	0	8384	1750	655	4	0	2409
		Population	17569	3698	112	0	21379	3472	1195	9	0	4676
	Bloomington	Units	37	1	0	0	38	702	2	0	0	704
		Population	94	3	0	0	97	1130	4	0	0	1134
	Richfield	Units	569	15	0	0	584	69	0	0	0	69
		Population	1485	39	0	0	1524	116	0	0	0	116
	Eagan	Units	198	0	0	0	198	0	0	0	0	0
		Population	556	0	0	0	556	0	0	0	0	0
	Mendota Heights	Units	39	1	0	0	40	3	0	0	0	3
		Population	107	3	0	0	110	4	0	0	0	4
	All Cities	Units	7733	1467	44	0	9244	2524	657	4	0	3185
		Population	19811	3743	112	0	23666	4722	1199	9	0	5930
2025 DNL Noise Contours	Minneapolis	Units	7312	1816	72	0	9200	2156	699	6	0	2861
		Population	18646	4630	184	0	23460	4239	1289	14	0	5542
	Bloomington	Units	40	1	0	0	41	747	2	0	0	749
		Population	102	3	0	0	105	1202	4	0	0	1206
	Richfield	Units	687	63	0	0	750	69	0	0	0	69
		Population	1794	164	0	0	1958	116	0	0	0	116
	Eagan	Units	341	1	0	0	342	0	0	0	0	0
		Population	958	3	0	0	961	0	0	0	0	0
	Mendota Heights	Units	55	1	0	0	56	3	0	0	0	3
		Population	150	3	0	0	153	4	0	0	0	4
	All Cities	Units	8435	82	72	0	10389	2975	701	6	0	3682
		Population	21650	4803	184	0	26637	5561	1293	14	0	6868

Note: Parcel Intersect Methodology; Single-Family=1 Unit, Multi-Family>1 Unit; Population Reflects Estimation Based on Multipliers Provided by Met Council.

Source: MAC analysis, 2012.

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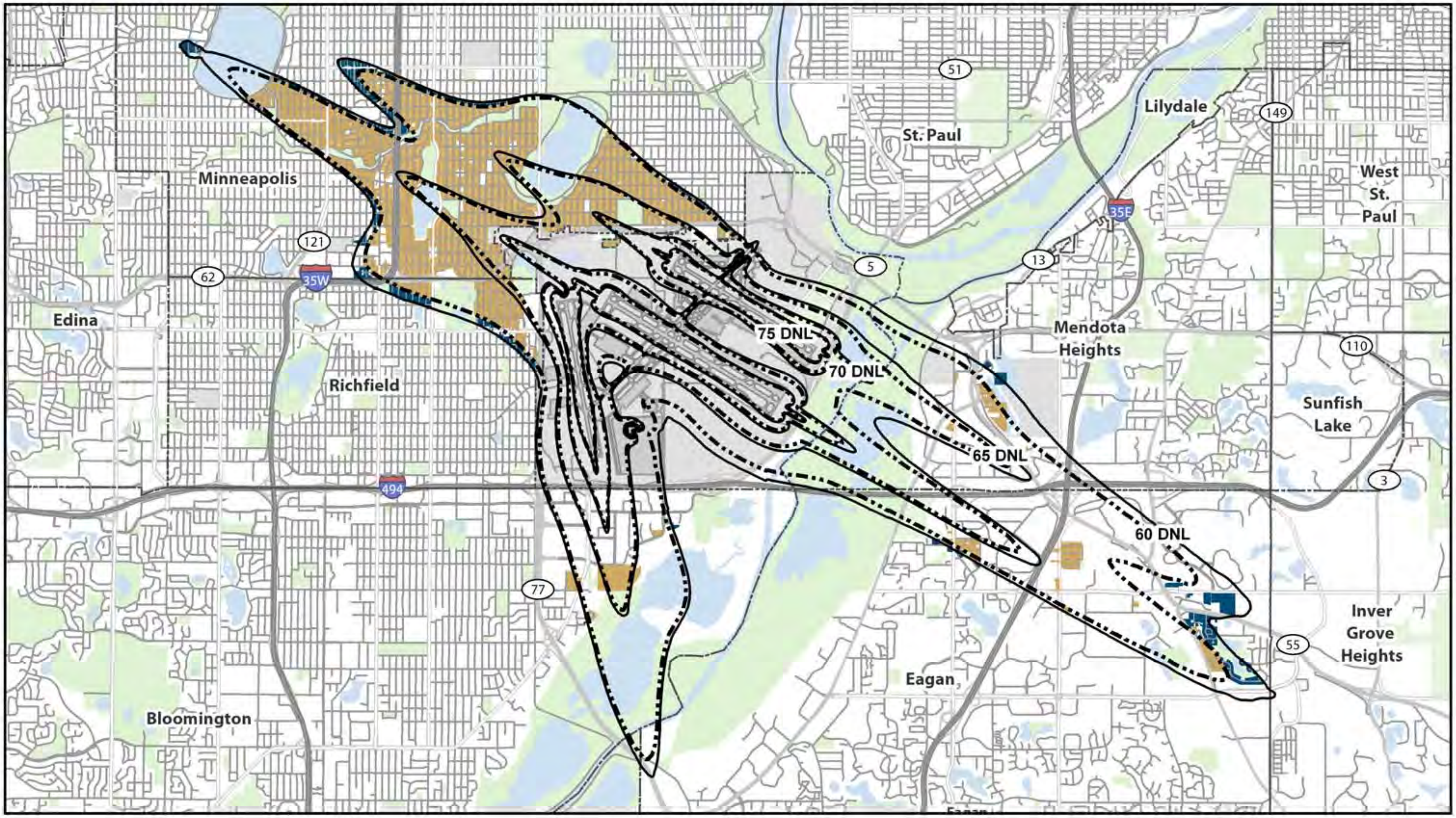
FIGURE 5.14-3



2020 and 2025 Alternative 1 - Airlines Remain DNL Noise Contours and Affected Parcels

LEGEND

Affected Parcels

- Inside 2020 60 DNL
- Between 2020 and 2025 60 DNL

Noise Contours

- 2020 Alternative 1
- 2025 Alternative 1

N

0 4,000 8,000 Meters

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HNTB

5.14.5.3 Airlines Relocate Alternative Noise Impacts

Based on the 484,879 total forecast operations in 2020, approximately 4,387 acres are in the 65 DNL noise contour and approximately 11,230 acres are in the 60 DNL noise contour of the Airlines Relocate Alternative (Sponsor's Preferred Alternative). **Table 5.14.5** contains the count of single-family and multi-family dwelling units and population in the 2020 and 2025 Preferred Alternative DNL noise contours. The counts were completed using the same methodology used for the No Action Alternative.

Figure 5.14-4 provides the 2020 and 2025 Airlines Relocate Alternative (Sponsor's Preferred Alternative) DNL noise contours and the parcels within the respective contours.

There are no areas of sensitive land uses that experience a 1.5 dB, or greater, increase in the 65 DNL noise contour when comparing the 2020 and 2025 Airlines Relocate Alternative (Sponsor's Preferred Alternative) contours to the respective No Action Alternative DNL noise contours. The FAA's impact threshold of significance is not met with the Airlines Relocate Alternative (Sponsor's Preferred Alternative). Therefore, no adverse impacts to sensitive land uses would be expected.

Table 5.14.5

Summary of 2020 and 2025 DNL Alternative 2 - Airlines Relocate Noise Contour
Single-Family and Multi-Family Unit and Population Counts by Parcel

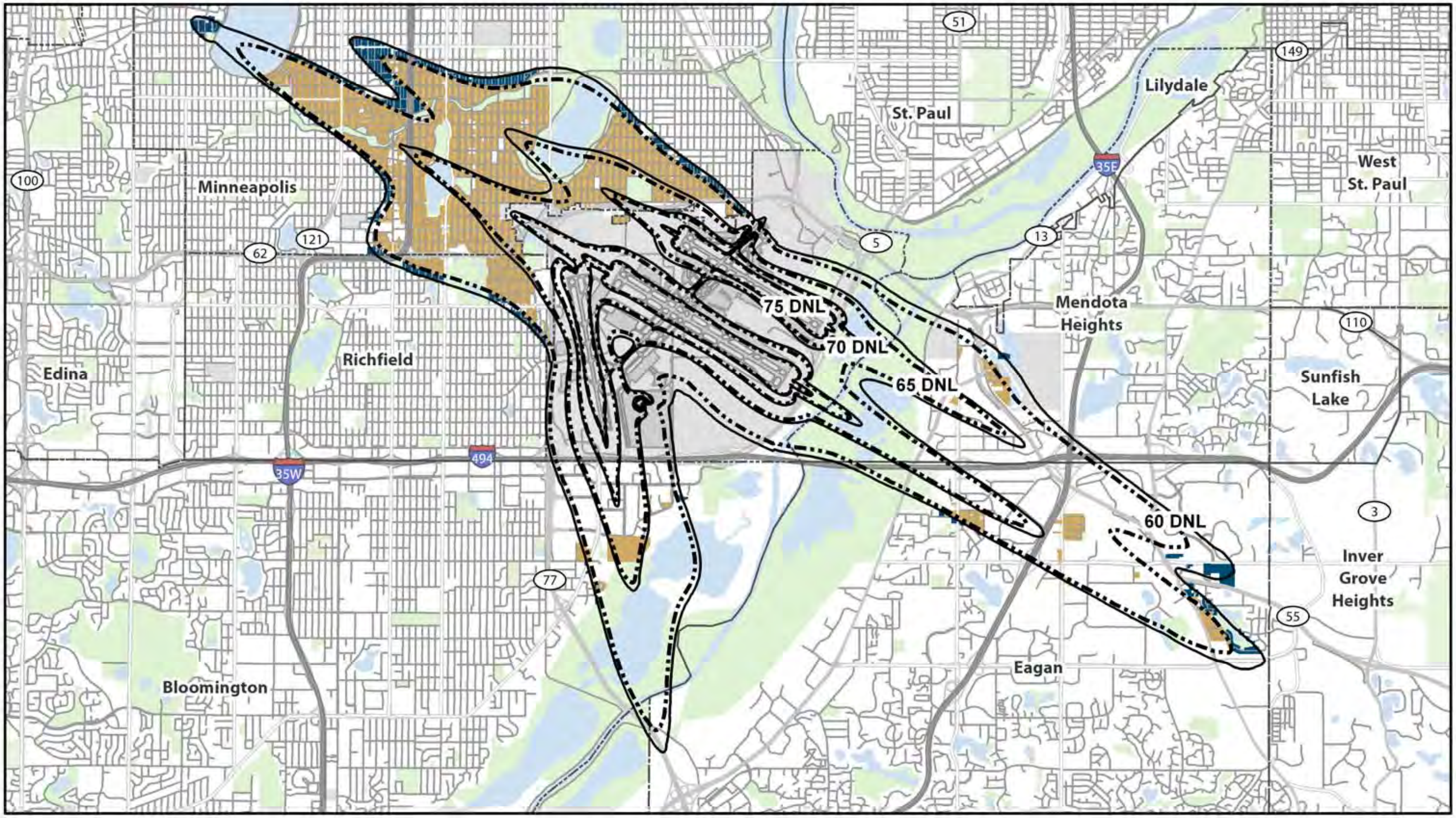
	City	Count	Single-Family					Multi-Family				
			60-64	65-69	70-74	75+	Total	60-64	65-69	70-74	75+	Total
2020 DNL Noise Contours	Minneapolis	Units	6718	1457	29	0	8204	1744	653	4	0	2401
		Population	17131	3715	74	0	20920	3445	1190	9	0	4644
	Bloomington	Units	38	1	0	0	39	702	2	0	0	704
		Population	97	3	0	0	100	1130	4	0	0	1134
	Richfield	Units	583	19	0	0	602	69	0	0	0	69
		Population	1521	50	0	0	1571	116	0	0	0	116
	Eagan	Units	210	0	0	0	210	0	0	0	0	0
		Population	590	0	0	0	590	0	0	0	0	0
	Mendota Heights	Units	39	1	0	0	40	3	0	0	0	3
		Population	107	3	0	0	110	4	0	0	0	4
	All Cities	Units	7588	1478	29	0	9095	2518	655	4	0	3177
		Population	19446	3771	74	0	23291	4695	1194	9	0	5898
2025 DNL Noise Contours	Minneapolis	Units	7580	1964	79	0	9623	2392	716	6	0	3114
		Population	19330	5008	201	0	24539	4632	1329	14	0	5975
	Bloomington	Units	46	1	0	0	47	747	2	0	0	749
		Population	117	3	0	0	120	1202	4	0	0	1206
	Richfield	Units	684	62	0	0	746	69	0	0	0	69
		Population	1785	162	0	0	1947	116	0	0	0	116
	Eagan	Units	308	1	0	0	309	0	0	0	0	0
		Population	865	3	0	0	868	0	0	0	0	0
	Mendota Heights	Units	44	1	0	0	45	3	0	0	0	3
		Population	120	3	0	0	123	4	0	0	0	4
	All Cities	Units	8662	2029	79	0	10770	3211	718	6	0	3935
		Population	22217	5179	201	0	27597	5954	1333	14	0	7301

Note: Parcel Intersect Methodology; Single-Family=1 Unit, Multi-Family>1 Unit; Population Reflects Estimation Based on Multipliers Provided by Met Council.

Source: MAC analysis, 2012.

Minneapolis-St. Paul International Airport 2020 Improvements EA

FIGURE 5.14-4



2020 and 2025 Alternative 2 - Airlines Relocate DNL Noise Contours and Affected Parcels

LEGEND

Affected Parcels

- Inside 2020 60 DNL
- Between 2020 and 2025 60 DNL

Noise Contours

- 2020 Alternative 2
- 2025 Alternative 2

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MAC

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5.14.5.4 Comparison of Development Alternative Noise Impacts

There are no areas of sensitive land uses that would experience a 1.5 dB, or greater, increase in the 65 DNL noise contour and/or a 3.0 dB, or greater, increase in the 60 DNL noise contour when comparing the 2020 and 2025 Airlines Remain Alternative and the Airlines Relocate Alternative noise contours to the respective No Action Alternative DNL noise contours. When comparing the Action Alternatives DNL noise contours in 2020 and 2025 to the respective No Action Alternatives DNL noise contours the range of DNL change is minor. Specifically, when comparing the 2020 Airlines Remain Alternative 60+ DNL noise contour to the 2020 No Action Alternative 60+ DNL noise contour, the range of DNL change is -0.2 dB DNL to 0.2 dB DNL. In the case of the 2020 Airlines Relocate Alternative 60+ DNL noise contour the range of change when compared to the 2020 No Action Alternative 60+ DNL noise contour is -0.2 dB DNL to 0.3 dB DNL. Similarly, when comparing the 2025 Airlines Remain Alternative 60+ DNL noise contour to the 2025 No Action Alternative 60+ DNL noise contour the range of DNL change is -0.6 dB DNL to 0.6 dB DNL. In the case of the 2025 Airlines Relocate Alternative 60+ DNL noise contour the range of change when compared to the 2025 No Action Alternative 60+ DNL noise contour is -0.4 dB DNL to 0.6 dB DNL.

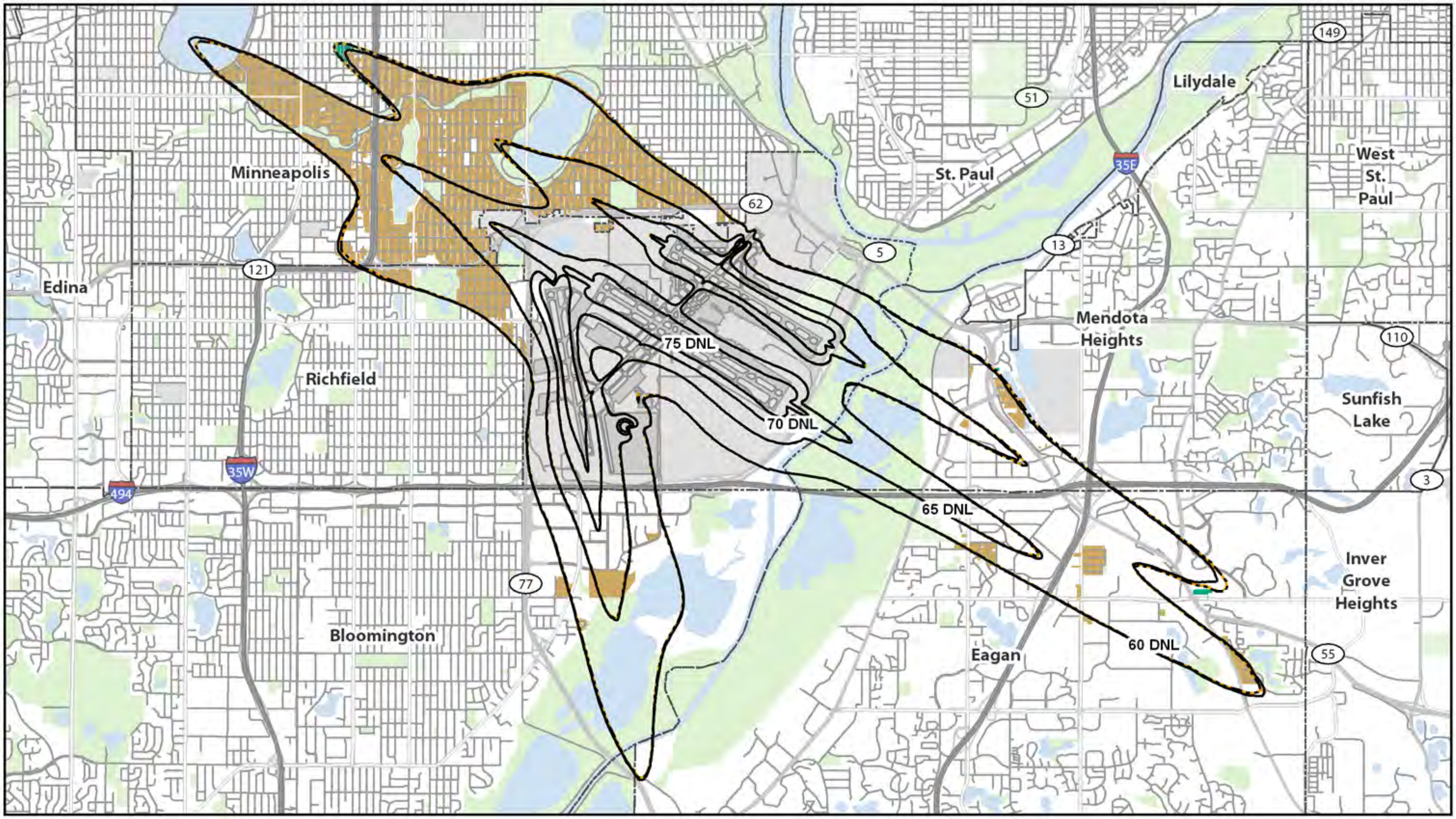
In 2020 the lowest number of residential units in the 65+ DNL noise contours is provided by the No Action Alternative. There are 10 more residential units in the Airlines Remain Alternative and 4 more residential units in the Airlines Relocate Alternative within the 65+ DNL noise contours. In 2025 the lowest number of residential units in the 65+ DNL noise contour is provided by the Airlines Remain Alternative. There are 81 more residential units in the No Action Alternative and 171 more residential units in the Airlines Relocate Alternative. However, for both 2020 and 2025 all residential units within the 65+ DNL noise contours of the development alternatives being considered have been provided noise mitigation. **Figure 5.14-5** provides a comparison of the 2020 No Action Alternative, the Airlines Remain Alternative, and the Airlines Relocate Alternative noise contours. **Figure 5.14-6** provides a comparison of the 2025 No Action Alternative, Airlines Remain Alternative, and the Airlines Relocate Alternative noise contours.

As is detailed in **Table 5.14.6** and **Table 5.14.7** there are only minor variations in 2020 and 2025 between the No Action Alternative and the Action Alternatives when looking at noise contour acreages, and the unit and population counts within each contour.

The small variation between the forecast impacts for the various alternatives is a function of FAA air traffic control procedures during low-demand time periods in conjunction with the RUS and the different geographic locations of new gate additions at MSP that are provided with the various development options.

Minneapolis-St. Paul International Airport 2020 Improvements EA

FIGURE 5.14-5



2020 Forecast DNL Noise Contour Comparison and Affected Parcels

LEGEND

Noise Contours
- No Action
- Alternative 1
- Alternative 2

Affected Parcels
- Inside Alternative 2 60 DNL
- Between No Action 60 DNL and Alternative 2
- Between Alternative 1 60 DNL and Alternative 2

N

0 3,700 7,400 Meters

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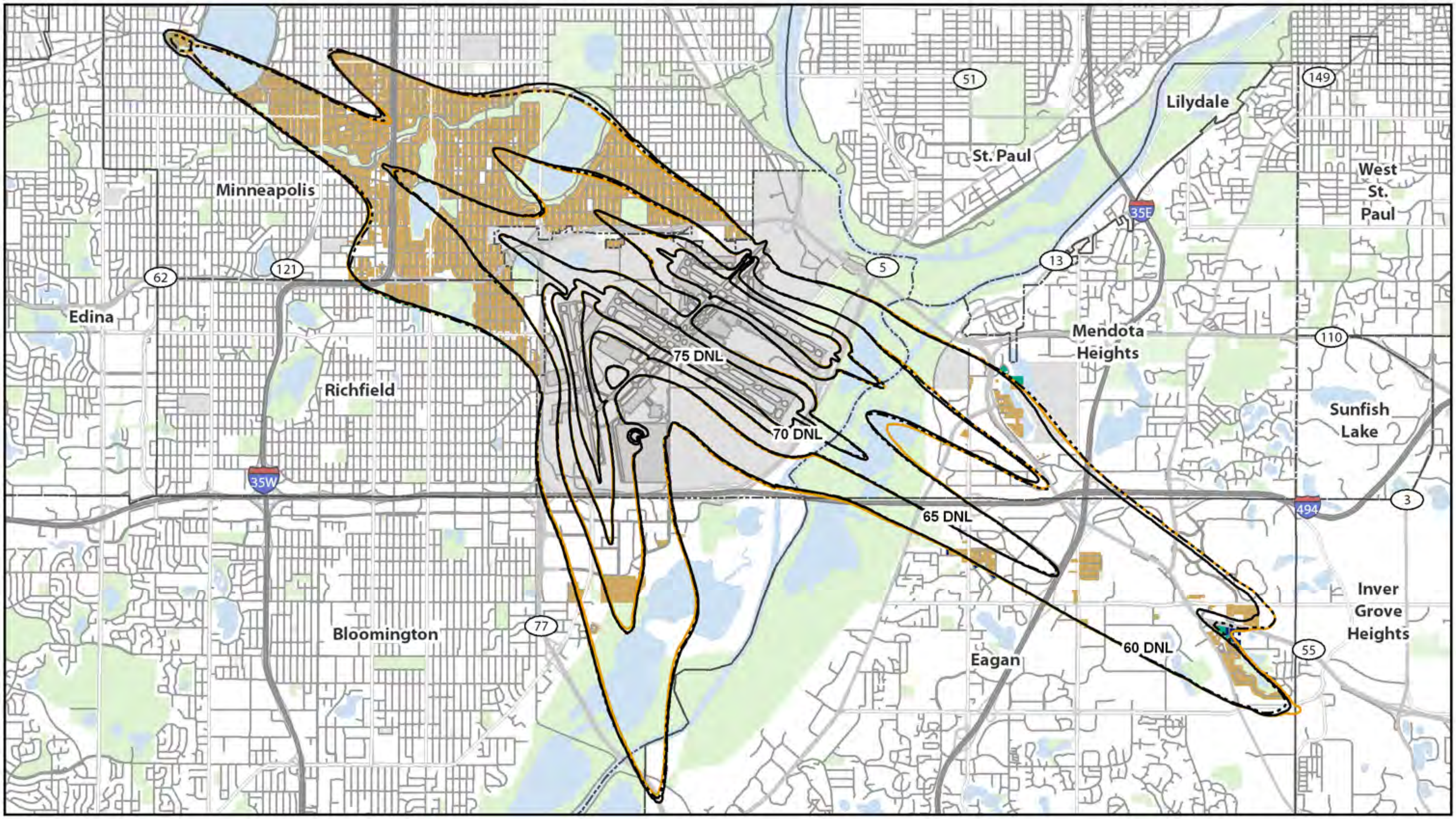

2025 Forecast DNL Noise Contour Comparison and Affected Parcels

LEGEND

Noise Contours
- No Action
- Alternative 1
- Alternative 2

Affected Parcels
- Inside Alternative 2 60 DNL
- Between No Action 60 DNL and Alternative 2
- Between Alternative 1 60 DNL and Alternative 2

0 3,900 7,800 Meters

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Table 5.14.6

2020 Comparison of DNL Noise Contour
Acreage and Affected Units and Population by Parcel

	Count	60-64	65-69	70-74	75+	Total
2020 No Action DNL Noise Contours	Acreage	6852	2795	928	665	**11240**
	Units	10236	2115	47	0	**12398**
	Population	24481	4918	119	0	**29518**
2020 Alternative 1 - Airlines Remain DNL Noise Contours	Acreage	6848	2793	928	665	**11234**
	Units	10257	2124	48	0	**12429**
	Population	24534	4941	121	0	**29596**
2020 Alternative 2 – Airlines Relocate DNL Noise Contours	Acreage	6843	2793	928	666	**11230**
	Units	10106	2133	33	0	**12272**
	Population	24141	4965	83	0	**29189**

Note:
Parcel intersect methodology; unit count reflects single-family and multi-family; population reflects estimation based on multipliers provided by Met Council.

Source: MAC analysis, 2012.

Table 5.14.7

2025 Comparison of DNL Noise Contour
Acreage and Affected Units and Population by Parcel

	Count	60-64	65-69	70-74	75+	Total
2025 No Action DNL Noise Contours	Acreage	7837	3188	1078	740	**12843**
	Units	11396	2657	85	0	**14138**
	Population	27212	6286	215	0	**33713**
2025 Alternative 1 – Airlines Remain DNL Noise Contours	Acreage	7796	3205	1074	739	**12814**
	Units	11410	2583	78	0	**14071**
	Population	27211	6096	198	0	**33505**
2025 Alternative 2 – Airlines Relocate DNL Noise Contours	Acreage	7834	3181	1081	740	**12836**
	Units	11873	2747	85	0	**14705**
	Population	28171	6512	215	0	**34898**

Note:
Parcel intersect methodology; unit count reflects single-family and multi-family; population reflects estimation based on multipliers provided by Met Council.

Source: MAC analysis, 2012.

5.14.6 Mitigation

The FAA's impact threshold of significance was not met with the Airlines Remain Alternative nor the Airlines Relocate Alternative, the Sponsor's Preferred Alternative.

As is detailed in Section 5.14.4.1, the MAC has been aggressively mitigating residential structures around MSP since 1992.

Table 5.14.8 contains the count of single-family dwelling units and population in the 2020 Sponsor's Preferred Alternative noise contours and **Table 5.14.9** contains the count of multi-family dwelling units and population within the 2020 Sponsor's Preferred Alternative noise contours. The counts are based on the block intersect methodology which is different from the impact analysis required by NEPA. This methodology counts all structures that are on parcels located on the blocks that are within or intersected by the respective DNL contour lines. Parcels with one to three dwelling units are counted as single-family and parcels with more than three dwelling units are counted as multi-family. This is the same methodology used since 1992 at MSP to determine mitigation eligibility around the airport. The counts in Tables 5.14.8 and 5.14.9 detail the 2020 Sponsor's Preferred Alternative counts in relation to previously mitigated areas and the 2020 Sponsor's Preferred Alternative noise contours.

Table 5.14.8

Summary of 2020 DNL Alternative 2 – Airlines Relocate Noise Contour Single-Family Unit and Population Counts by Block

City	Mitigation	Count	60-62	63-64	65-69	70-74	75+	Total
Minneapolis	In 2020 Forecast Contours previously mitigated under existing noise mitigation program	Units	4699	2021	2224	96	-	**9040**
		Population	11864	5124	5628	244	-	**22860**
2020 Forecast Changes	In 2020 63-64 DNL previously in 2007 60-62 DNL	Units	-	404	-	-	-	**404**
		Population	-	1020	-	-	-	**1020**
	In 2020 60-62 DNL previously between 2005 and 2007 60 DNL	Units	279	-	-	-	-	**279**
		Population	704	-	-	-	-	**704**
	In 2020 60-62 DNL previously outside 2005 and 2007 60 DNL	Units	448	-	-	-	-	**448**
		Population	1141	-	-	-	-	**1141**
	Total	Units	5426	2425	2224	96	-	**10171**
		Population	13709	6144	5628	244	-	**25725**
Bloomington	In 2020Forecast Contours previously mitigated under existing noise mitigation program	Units	39	51	3	0	-	**93**
		Population	100	130	6	0	-	**236**
Richfield	In 2020 Forecast Contours previously mitigated under existing noise mitigation program	Units	534	193	43	0	-	**770**
		Population	1388	504	112	0	-	**2004**
Eagan	In 2020 Forecast Contours previously mitigated under existing noise mitigation program	Units	179	63	0	0	-	**242**
		Population	503	177	0	0	-	**680**
Mendota Heights	In 2020 Forecast Contours previously mitigated under existing noise mitigation program	Units	45	0	1	0	-	**46**
		Population	119	0	3	0	-	**122**
All Cities	In 2020 Forecast Contours previously mitigated under existing noise mitigation program	Units	5496	2328	2271	96	-	**10191**
		Population	13974	5935	5749	244	-	**25902**
2020 Forecast Changes *(All Minneapolis)*	In 2020 63-64 DNL previously in 2007 60-62 DNL	Units	-	404	-	-	-	**404**
		Population	-	1020	-	-	-	**1020**
	In 2020 60-62 DNL previously between 2005 and 2007 60 DNL	Units	279	-	-	-	-	**279**
		Population	704	-	-	-	-	**704**
	In 2020 60-62 DNL previously outside 2005 and 2007 60 DNL	Units	448	-	-	-	-	**448**
		Population	1141	-	-	-	-	**1141**
	Total	Units	6223	2732	2271	96	-	**11322**
		Population	15819	6955	5749	244	-	**28767**

Note: Block Intersect Methodology; Single-Family=1-3 Units; Population Reflects Estimation Based on Multipliers Provided by Met Council.

Source: MAC analysis, 2012.

Table 5.14.9

Summary of 2020 DNL Alternative 2 – Airlines Relocate Noise Contour Multi-Family Unit and Population Counts by Block

City	Mitigation	Count	60-64	65-69	70-74	75+	Total
Minneapolis	In 2020 Forecast Contours previously mitigated under existing noise mitigation program	Units	872	520	-	-	**1392**
		Population	1639	869	-	-	**2508**
	Additional	Units	98	-	-	-	**98**
		Population	159	-	-	-	**159**
	Total	Units	1083	520	-	-	**1603**
		Population	1798	869	-	-	**2667**
Bloomington	In 2020 Forecast Contours previously mitigated under existing noise mitigation program	Units	1065	-	-	-	**1065**
		Population	1715	-	-	-	**1715**
Richfield	In 2020 Forecast Contours previously mitigated under existing noise mitigation program	Units	69	-	-	-	**69**
		Population	116	-	-	-	**116**
Eagan	In 2020 Forecast Contours previously mitigated under existing noise mitigation program	Units	-	-	-	-	**0**
		Population	-	-	-	-	**0**
Mendota Heights	In 2020 Forecast Contours previously mitigated under existing noise mitigation program	Units	-	-	-	-	**0**
		Population	-	-	-	-	**0**
All Cities	In 2020 Forecast Contours previously mitigated under existing noise mitigation program	Units	2119	520	-	-	**2639**
		Population	3470	869	-	-	**4339**
	Additional *(All Minneapolis)*	Units	98	-	-	-	**98**
		Population	159	-	-	-	**159**
	Total	Units	2217	520	-	-	**2737**
		Population	3629	869	-	-	**4498**

Note: Block Intersect Methodology; Multi-Family>3 Units; Population Reflect Estimation Based on Multipliers Provided by Met Council.

Source: MAC analysis, 2012.

As detailed in Table 5.14.8, there are 404 single-family homes that may move from the 60-62 DNL noise contour under the Consent Decree program to the 63 DNL noise contour in the 2020 Sponsor's Preferred Alternative noise contours. (Under the terms of the Consent Decree homes in the 63 and greater 2007 DNL noise contour received the full 5 dB noise mitigation package.)

There are 279 single-family homes that were, or will be, provided an estimated $2,900 in reimbursements for approved mitigation enhancements under the existing Consent Decree program that may move from the 2005 60 DNL noise contour under the Consent Decree to the 60 DNL in the 2020 Sponsor's Preferred Alternative noise contours. As stated above, under the terms of the Consent Decree homes in the 2007 60-62 DNL noise contours received air-conditioning and $4,000 for approved mitigation upgrades, or $14,000 for approved mitigation upgrades. Additionally, there are 448 single-family homes that were not eligible for mitigation under the terms of the Consent Decree that may move into the 60 DNL noise contour for the 2020 Sponsor's Preferred Alternative. The same mitigation program features would be available for homes that become eligible in the future. All of the single-family homes added to the DNL noise contours are located in the City of Minneapolis.

As is provided in Table 5.14.9, there are 98 multi-family units that were previously not included in the Consent Decree that would fall within the 2020 Preferred Alternative 60 DNL noise contour. Again, this estimate assumes the same multi-family mitigation program would be applied to the 2020 Preferred Alternative noise contour. All of the multi-family units added to the DNL noise contours are located in the City of Minneapolis.

A depiction of the residential blocks that have been mitigated, and those that will be provided noise mitigation by 2014 per the noise litigation Consent Decree, and the changes in eligibility relative to the 2020 Sponsor's Preferred Alternative noise contours are provided in **Figure 5.14-7**.

In consideration of the circumstances unique to MSP by virtue of past mitigation activities, the terms of the Consent Decree, and the local land use compatibility guidelines defined by the Metropolitan Council, mitigation is proposed. The proposed mitigation in the Draft EA/EAW was based on the 2020 Sponsor's Preferred Alternative 60+ DNL noise contour and included a trigger for when mitigation would begin (484,879 annual ops or the year 2020, whichever came first).

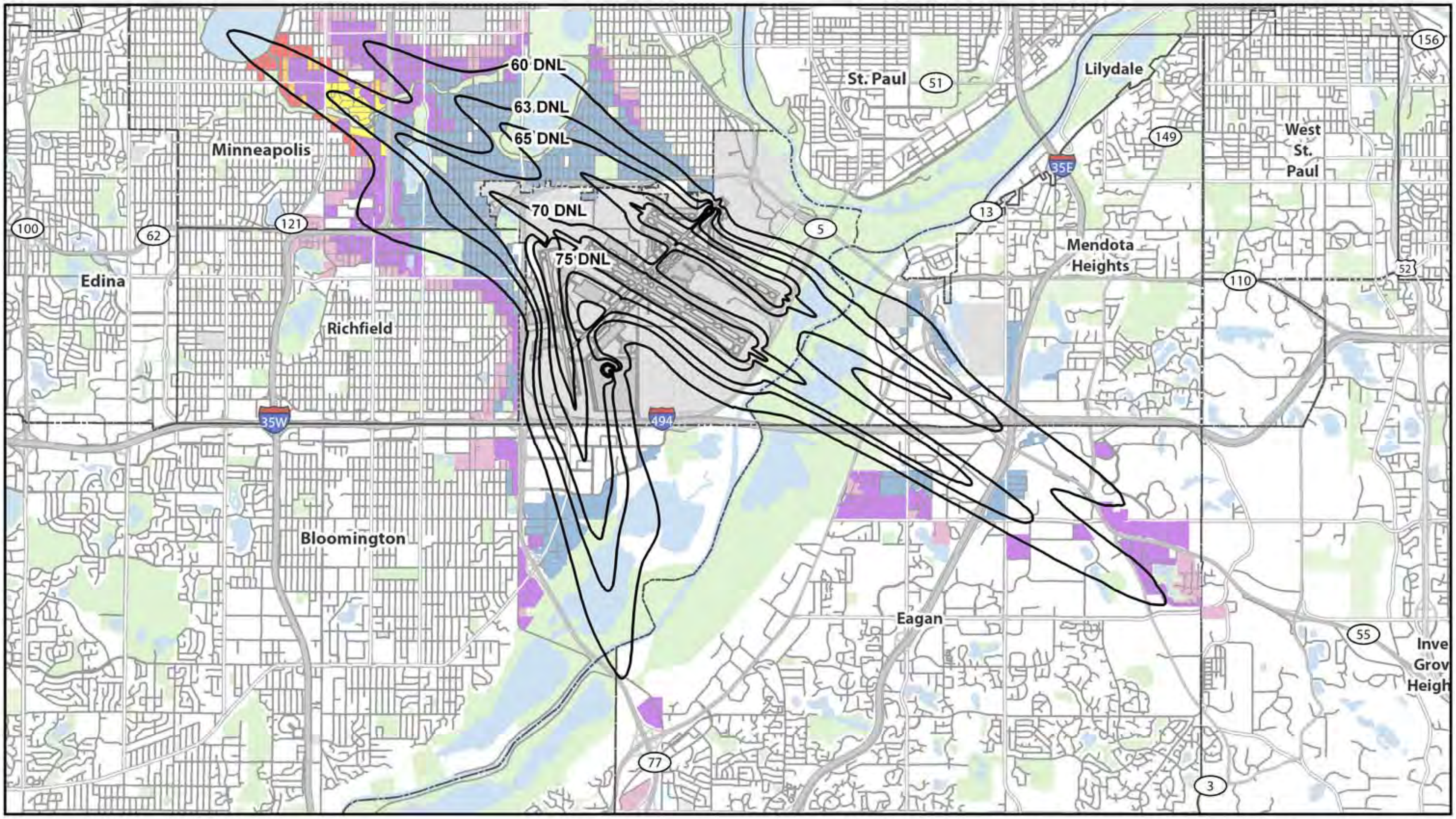
The proposed noise mitigation program in the Draft EA/EAW was revised during the development of the Final EA/EAW based on public comment. The mitigation program was revised to provide a more flexible framework that accounts for actual noise impacts in the context of future airport development scenarios and FAA operational initiatives.

The revised program eligibility and timing is based on annually-developed actual noise contours as opposed to the 2020 Sponsor's Preferred Alternative 60+ DNL noise contour and a 484,879 annual operations level. An outline of the proposed mitigation program follows:

- Mitigation eligibility would be assessed annually based on the actual noise contours for the previous year.

Minneapolis-St. Paul International Airport 2020 Improvements EA

FIGURE 5.14-7



MAC Existing Noise Mitigation Program and 2020 Alternative 2 - Airlines Relocate DNL Noise Contours

LEGEND

MAC Existing Noise Mitigation Packages

- Reimbursement
- Central AC & $4K or $14K
- -5 dBA Modifications

2020 Alternative 2 - Airlines Relocate Changes

- 2020 Alternative 2 Noise Contours
- Blocks in 2020 63 DNL previously in 2007 60-62 DNL
- Blocks in 2020 60 DNL previously between 2005 and 2007 60 DNL
- Blocks in 2020 60 DNL previously outside 2005 and 2007 60 DNL

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- The annual mitigation assessment would begin with the actual noise contour for the year in which the ROD was approved.
- For a home to be considered eligible for mitigation it must be located in the actual 60+ DNL noise contour, within a higher noise impact mitigation area when compared to its status relative to the Consent Decree noise mitigation program, for a total of three consecutive years, with the first of the three years beginning no later than 2020.
- The noise contour boundary would be based on the block intersect methodology.
- Homes would be mitigated in the year following their eligibility determination.

5.14.7 Permitting

There are no permits required related to noise.

5.14.8 Summary

There are no areas of sensitive land uses that would experience a 1.5 dB, or greater, increase in the 65 DNL noise contour and or a 3.0 dB, or greater, increase in the 60 DNL noise contour when comparing the 2020 and 2025 Airlines Remain Alternative and the Airlines Relocate Alternative noise contours to the respective No Action Alternative DNL noise contours. In 2020 the lowest number of residential units in the 65+ DNL noise contours is provided by the No Action Alternative. There are 10 more residential units in the Airlines Remain Alternative and 4 more residential units in the Airlines Relocate Alternative within the 65+ DNL noise contours. In 2025 the lowest number of residential units in the 65+ DNL noise contour is provided by the Airlines Remain Alternative. There are 81 more residential units in the No Action Alternative and 171 more residential units in the Airlines Relocate Alternative. However, in both 2020 and 2025 all residential units within the 65+ DNL noise contours of the development alternatives being considered have been provided noise mitigation and, as such, are considered a mitigated incompatible land use.

However, in consideration of the circumstances unique to MSP by virtue of past mitigation activities, the terms of the Consent Decree, and the local land use compatibility guidelines defined by the Metropolitan Council, this EA/EAW proposes mitigation based on the annually-developed actual noise contours in a manner consistent with the provisions of the Consent Decree.

5.15 Vehicular Noise

The following sub-sections provide the regulatory background, methodology, thresholds of significance, existing conditions, impact analysis and potential mitigation for vehicular noise impacts.

5.15.1 Regulatory Background

A separate noise analysis was conducted for the vehicular traffic changes that would result from the proposed airport alternatives to satisfy FHWA requirements. The FHWA typically requires a 20 year forecast horizon be reviewed for the noise analysis as a part of its NEPA guidance. A vehicular noise impact analysis must be completed for all Federal or Federal-aid Type I projects (construction of a highway meeting one or more of eight criteria defined in 23 CFR 772.5). The planned auxiliary lane on westbound I-494 between 24th Avenue

South and the ramp to southbound TH 77 makes this a Type I project.

5.15.2 Methodology

This analysis reviewed the 2030 vehicular noise with and without the proposed regional roadway improvements. The Airlines Remain and Airlines Relocate Alternatives are two different development scenarios that result in different development plans in 2020 and 2025. However, regardless of whether the Airlines Remain or Airlines Relocate Alternative is selected, the development plan by 2030 is the same. Therefore, consistent with the 2030 MSP LTCP, only one Action Alternative was evaluated for the traffic noise analysis. The details of this analysis can be found in ***Appendix Q***, *Traffic Noise – Proposed Roadway Improvements technical memorandum*.

Noise is defined as any unwanted sound. For highway traffic noise, an adjustment, or weighting, of the high- and low- pitched sound is made to approximate the way that an average person hears sound. The adjusted sound levels are stated in units of “A-weighted decibels” (dBA). A sound increase of 3 dBA is barely noticeable by the human ear, a 5 dBA increase is clearly noticeable, and a 10 dBA increase is heard as twice as loud. For example, if the sound energy is doubled (i.e., the amount of traffic doubles), there is a 3 dBA increase in noise, which is just barely noticeable to most people. On the other hand, if traffic increases by a factor of ten times, the resulting sound level will increase by about 10 dBA and be heard to be twice as loud.

In Minnesota, traffic noise impacts are evaluated by measuring and modeling the traffic noise levels that are exceeded 10 percent and 50 percent of the time during the hours of the day and/or night that have the loudest traffic scenario. These numbers are identified as the L_{10} and L_{50} levels, respectively. The L_{10} value is the noise level that is exceeded for a total of 10 percent, or 6 minutes, of an hour. The L_{50} value is the noise level that is exceeded for a total of 50 percent, or 30 minutes, of an hour.

5.15.3 Thresholds of Significance

A traffic noise impact analysis is completed for all Federal or Federal-aid Type I projects. Noise impacts are determined based on land use activities and predicted worst hourly L_{10} noise levels under future conditions. Land use activities in the vicinity of MSP include industrial, hotel, commercial, business, office, recreational, cemeteries and parks. The federal noise abatement criterion are described for these land uses below:

- For parks, cemeteries, and recreational areas (Activity Category C), the federal noise abatement criterion is 70 dBA (L_{10}).
- For hotels, motels, and commercial/business/office land uses (Activity Category E), the federal noise abatement criterion is 75 dBA (L_{10}).
- There is no impact criterion for developed lands that are not sensitive to highway traffic noise (e.g., industrial land uses) (Activity Category F).

The MPCA is the state agency responsible for enforcing state noise rules. Minnesota state noise standards have been established for daytime and nighttime periods. The MPCA defines daytime as 7:00 a.m. to 10:00 p.m. and nighttime from 10:00

p.m. to 7:00 a.m. Minnesota state noise standards are described below:

- For residential land uses (Noise Area Classification 1), the state daytime standard is 65 dBA (L_{10}) and 60 dBA (L_{50}). The state nighttime standard is 55 dBA (L_{10}) and 50 dBA (L_{50}).
- For commercial land uses (Noise Area Classification 2), the state daytime and nighttime standard is 70 dBA (L_{10}) and 65 dBA (L_{50}).
- For industrial land uses (Noise Area Classification 3), the state daytime and nighttime standard is 80 dBA (L_{10}) and 75 dBA (L_{10}).

Receptor locations where noise levels are "approaching" or exceeding the federal criterion level, or exceeding state noise standards must be evaluated for noise abatement feasibility and reasonableness. A noise impact is defined as a "substantial increase" in the future modeled noise levels over the existing modeled noise levels. In Minnesota, "approaching" is defined as 1 dBA or less below the Federal noise abatement criteria. For example, 69 dBA (L_{10}) is defined as "approaching" the Federal noise abatement criterion for parkland uses (Activity Category C). A "substantial increase" is defined as an increase of 5 dBA or greater from existing to future conditions. Traffic noise levels were modeled at a total of 108 representative receptor locations along the I-494 and TH 5 project corridor.

5.15.4 Existing Conditions

Existing (2010) daytime modeled noise levels range from 55.7 dBA (L_{10}) to 77.1 dBA (L_{10}), whereas nighttime modeled noise levels range from 53.5 dBA (L_{10}) to 75.4 dBA (L_{10}). Modeled daytime traffic noise levels for existing conditions exceed state daytime L_{10} standards at 29 modeled receptor locations. Modeled nighttime traffic noise levels for existing conditions exceed state nighttime L_{10} standards at 22 modeled receptor locations. Modeled L_{10} noise levels are projected to approach or exceed federal noise abatement criteria at 11 modeled receptor locations for existing conditions.

5.15.5 Impact Analysis

Increases in forecast traffic volumes and construction of the proposed roadway improvements are projected to result in increases in traffic noise levels compared to existing conditions.

Modeled daytime traffic noise levels are predicted to increase by 0.9 dBA to 2.6 dBA under the No Action Alternative compared to existing conditions. Daytime modeled noise levels are predicted to range from 56.7 dBA (L_{10}) to 78.3 dBA (L_{10}) with the future No Action Alternative. Nighttime modeled noise levels are predicted to range from 54.6 dBA (L_{10}) to 76.6 dBA (L_{10}). Modeled daytime traffic noise levels are predicted to exceed State daytime L_{10} standards at 35 modeled receptor locations with the No Action Alternative. Modeled nighttime traffic noise levels are predicted to exceed state nighttime L_{10} standards at 25 modeled receptor locations with the No Action Alternative. Modeled L_{10} noise levels are projected to approach or exceed federal noise abatement criteria at 24 modeled receptor locations with the No Action Alternative.

Modeled daytime traffic noise levels are predicted to increase by 0.9 dBA to 2.7 dBA under the future (2030) Action Alternative compared to existing conditions. Daytime modeled noise levels are predicted to range from 56.8 dBA (L_{10}) to 78.3 dBA (L_{10}) with the future Action Alternative. Nighttime modeled noise levels are predicted to range from 54.6 dBA (L_{10}) to 76.6 dBA (L_{10}) with the future Action Alternative. Modeled daytime traffic noise levels are predicted to exceed state daytime L_{10} standards at 35 modeled receptor locations with the 2030 Action Alternative, whereas modeled nighttime traffic noise levels are predicted to exceed state nighttime L_{10} standards at 25 modeled receptor locations with the Action Alternative. Modeled L_{10} noise levels are projected to approach or exceed federal noise abatement criteria at 24 modeled receptor locations within the project area under the future Action Alternative.

Noise barriers were evaluated at modeled receptor locations where traffic noise levels were predicted to exceed state standards or approach/exceed federal noise abatement criteria. None of the modeled noise barriers were found to be reasonable (i.e. meet the noise reduction design goal of 7 dBA or the cost effectiveness criteria of $43,500/ benefited receptor).

5.15.6 Summary

There was no change in the number of modeled receptors that approach or exceed state standards or federal noise abatement criteria under the 2030 Action Alternative when compared to the 2030 No Action Alternative. None of the modeled receptor locations are projected to experience a substantial increase in traffic noise levels from existing conditions to the future Action Alternative. The 2030 vehicular noise analysis found that noise barriers were not reasonable because they did not meet the noise reduction design goal or cost effectiveness criteria.

5.16 Secondary (Induced) Impacts

Secondary impacts include shifts in patterns of population movement and growth, changes in demand for public services, and changes in business and economic activity that are influenced by airport development. It is not anticipated that the Alternatives would result in shifts in population movement or growth, changes in demands for public services or changes in business and economic activity. Furthermore, according to Order 1050.1E secondary impacts would not normally be significant except where there is also a significant impact to another category; particularly noise, compatible land use, or social impact. Since none of the Alternatives would result in impacts exceeding the threshold of significance in any impact category, secondary impacts would not be expected.

5.17 Socioeconomic Impacts, Environmental Justice, and Children's Health and Safety Risks

This section discusses the potential for socioeconomic, environmental justice, and Children's Health and Safety Risks impacts.

5.17.1 Socioeconomic Impacts (Except Vehicular Traffic)

Socioeconomic impacts may result from relocation of residences and businesses, alteration of surface transportation, division of established communities, disruption of orderly planned development, or changes in employment.

The potential for the alternatives to result in socioeconomic impacts related to all of these circumstances except alteration of surface transportation would be minimal and is addressed in this sub-section. Because of the nature of the Proposed Action, extensive analysis was conducted to evaluate the potential for surface transportation impacts. Therefore, the potential for the Alternatives to result in changes in surface transportation is addressed separately in the next sub-section, *Vehicular Traffic and Circulation*.

The No Action Alternative does not include property acquisition and includes minimal construction entirely on airport property. Therefore, the No Action Alternative would not result in the relocation of residences or businesses, division of communities, disruption of planned development, or appreciable changes in employment.

Neither of the Action Alternatives would require the relocation of residences. Both would require the relocation of one business, the SuperAmerica located at the intersection of Post Road and Trunk Highway (TH) 5. As the SuperAmerica would be relocated just to the south of its current location for both Action Alternatives, the relocation would not be considered a socioeconomic impact in relation to loss of businesses or employment. The Action Alternatives only require construction on existing airport property or within existing road right-of-way. Therefore, neither alternative would result in division of communities or disruption of planned development.

5.17.2 Socioeconomic Impacts - Vehicular Traffic and Circulation

Potential impacts to traffic and circulation are addressed to satisfy both NEPA and Minnesota's Environmental Assessment Worksheet requirements.

5.17.2.1 Regulatory Background

No known laws establish criteria for vehicular traffic operations on or off the airport. The focus of the analysis was on any potential impacts of on-airport and off-airport traffic that might disrupt or substantially reduce the quality of circulation and traffic movement in the vicinity of the airport.

5.17.2.2 Approach and Methodology

On- and off-airport ground transportation facilities were evaluated for impacts from the No Action, Airlines Remain and Airlines Relocate Alternatives in 2020 and 2025. Additionally, regional roadway improvements out to 2030 were assessed to satisfy FHWA NEPA traffic evaluation requirements. The potential vehicular traffic impacts were determined by comparing the operating conditions under each alternative. The following paragraphs briefly describe the evaluation methodology for each of the components of the ground transportation system.

<u>*Parking Facilities*</u>

The operating conditions of parking facilities were evaluated by determining if the demand for parking would exceed the available parking supply. More detailed information regarding the evaluation of parking facilities is provided in ***Appendix H***, *Landside Facilities Technical Report*.

<u>*Curb Roadways*</u>

Curb roadways operations were evaluated based on the ratio of volume to capacity (v/c). Terminal curb roadway capacity is considered a function of the through capacity, or number of lanes, the service capacity, or length of curb available to load and unload passengers and the ideal capacity balance of those activities. The volume to capacity (v/c) ratio represents the level of congestion on the curb as measured against the through capacity and service capacity. A v/c ratio of 1.0 represents the capacity of the roadway in a gridlock situation. A v/c ratio of 0.70 during peak periods represents an adequate LOS where conditions are busy but have not reached a gridlock scenario. More detailed information regarding the evaluation of curb roadways is provided in ***Appendix H***.

<u>*On and Off Airport Roadways*</u>

Operational conditions of roadways are qualitatively expressed in LOS. "Letters designate each level, from A to F, with LOS A representing the best operating conditions and LOS F the worst. Each LOS represents a range of operating conditions and the driver's perspective of those conditions."[30] For planning purposes LOS D or better (LOS A-D) is typically recognized by transportation agencies as satisfactory operations.

Different measures of effectiveness such as density of traffic or delay are used to determine the LOS for different elements of a transportation system. For instance, the LOS for basic freeway segments is based on the vehicle density expressed in passenger cars per mile per lane. General definitions of basic freeway service levels and the associated densities are presented in **Table 5.17.1.**

Table 5.17.1

Freeway Service Levels

LOS	**Description**	**Density Range (pc/mi/ln)[(1)]**
A	Free-flow operations; free-flow speeds prevail; vehicles are almost completely unimpeded	0-11
B	Reasonably free-flow operations, free-flow speeds are maintained; only slight restriction in ability to maneuver freely; a high level of physical and psychological comfort exists	>11-18
C	Speeds are at or near free-flow; there is noticeable restriction in the freedom to maneuver; lane change require more care; minor incidents may be absorbed but local deterioration in level of service may be significant	>18-26
D	Speeds begin to decline from free-flow speeds; flows and density increase; freedom to maneuver is limited and the physical and psychological comfort level is reduced; minor incidents can be expected to create queuing	>26-35
E	Operations are at capacity; operations are volatile because there are virtually no gaps in the traffic stream; vehicles are closely spaced; an incident can be expected to cause serious breakdown and queuing; physical and psychological comfort level is poor	>35-45
F	Breakdown in vehicular flow; demand exceeds capacity; significant queuing behind breakdown locations; speeds are often considerably below free-flow speeds	>45

Note:
(1) pc/ln/mi = passenger cars per lane per mile.

Source: Highway Capacity Manual.

ON-AIRPORT ROADWAYS

Determining the LOS for on-airport roadways is more complex than for basic freeway segments. On-airport roadways function differently than freeway segments. There are higher proportions of unfamiliar motorists and large vehicles, and a large number of complex directional signs.[31] As a result, the methodology and measures of effectiveness used to determine the LOS are also different.

The LOS for the on-airport roadway segments was determined using a number of factors and resources including:

- Measures of Effectiveness - Traffic models for the Terminal 1-Lindbergh and Terminal 2-Humphrey roadway networks were built using VISSIM micro-simulation software. This simulation tool was used to estimate the measures of effectiveness including density, speed and delay.

- Nature of the traffic function (merging, diverging, weaving, or none of these) on the roadway segment

- Animations of the traffic simulations used to generate the above measures of effectiveness

- Reference guidance from the *2010 Highway Capacity Manual* and Airport Cooperative Research Program (ACRP) Report 40: *Airport Curbside and Terminal Area Roadway Operations*

More detailed information regarding the evaluation of on-airport roadways is provided in *Appendix H.*

OFF-AIRPORT ROADWAYS

To evaluate the operating conditions of off-airport roadways the LOS of the intersections and freeway segments were determined. For intersections, the LOS of the overall intersections as well as the LOSs of the individual turning or thru movements were considered.

The LOS was determined by comparing the vehicle delay for intersections and the vehicle density for freeway segments to the LOS criteria in the Highway Capacity Manual. The delay and density data were obtained from VISSIM simulations of the roadway network. **Tables 5.17.2** and **5.17.3** list the LOS thresholds for signalized intersections and unsignalized intersections, respectively. The freeway service levels, descriptions and associated densities are shown in Table 5.17.1.

Table 5.17.2

LOS Criteria for Signalized Intersections

LOS	Control Delay per Vehicle (sec/veh)(1)
A	≤ 10
B	> 10-20
C	> 20-35
D	> 35-55
E	> 55-80
F	> 80

Notes:
(1) sec/veh = seconds per vehicle

Source: *Highway Capacity Manual*, Chapter 16.

Table 5.17.3

LOS Criteria for Unsignalized Intersections

LOS	Control Delay per Vehicle (sec/veh)(1)
A	≤ 10
B	> 10-15
C	> 15-25
D	> 25-35
E	> 35-50
F	> 50

Notes:
(1) sec/veh = seconds per vehicle

Source: *Highway Capacity Manual*, Chapter 17.

5.17.2.3 Thresholds of Significance

Parking Facilities

For parking facilities, an impact may be considered significant if:

- The requirement for parking facilities exceeded the available supply under that alternative,
- That deficit would not exist under the No Action Alternative, and
- The deficit had secondary adverse impacts of significance on transportation system operations in the vicinity of the airport.

Curb Roadways

For terminal curb roadways an impact would be considered significant if:

- The alternative caused a curb roadway currently operating at an acceptable LOS, defined by a v/c ratio of less than or equal to 0.70, to deteriorate to a failing level (>1.0), or
- The alternative caused a curb roadway currently operating at a failing LOS, to deteriorate further and caused secondary adverse impacts to off-airport roadways.

On-Airport Roadways

For on-airport roadways, an impact would be considered significant if:

- The alternative caused a roadway currently operating at an acceptable LOS, defined as LOS D or better, to deteriorate to a failing level when the No Action Alternative for the same year of analysis operated at an acceptable LOS, or
- The alternative caused a roadway currently operating at an unacceptable LOS to deteriorate further and caused secondary adverse impacts to off-airport roadways.

Off-Airport Roadways

For overall intersections and intersection movements, an impact would be considered significant if:

- The alternative caused an intersection currently operating at an acceptable LOS to deteriorate to an E or F
  - and the No Action Alternative for the same year of analysis operated at an acceptable LOS,
  - and the alternative caused substantial secondary adverse impacts to nearby roadways,

or

- The alternative caused an intersection LOS to deteriorate to an F
    - and the No Action Alternative for the same year of analysis operated at an LOS E,
    - and the alternative caused substantial secondary adverse impacts to nearby roadways.

For freeway segments, an impact would be considered significant if:

- The alternative caused a freeway segment currently operating at an acceptable LOS, to deteriorate to an E or F
    - and the No Action Alternative for the same year of analysis operated at an acceptable LOS,
    - and the increase in airport traffic on the subject freeway link would be more than 10% of the total traffic on that link,

or

- The alternative caused a freeway segment to deteriorate to an LOS F
    - and the No Action Alternative for the same year of analysis operated at an LOS E,
    - and the increase in airport traffic on the subject freeway link would be more than 10% of the total traffic on that link.

5.17.2.4 Affected Environment

The Traffic and Circulation Study Area was identified by determining the limit of where the Alternatives would alter traffic patterns. The Traffic and Circulation Study Area shown in **Figure 5.17-1** includes all on-airport vehicle facilities as well as 34th Avenue South, Post Road, Glumack Drive, and segments of I-494, TH 5 and TH 77 (Cedar Avenue).

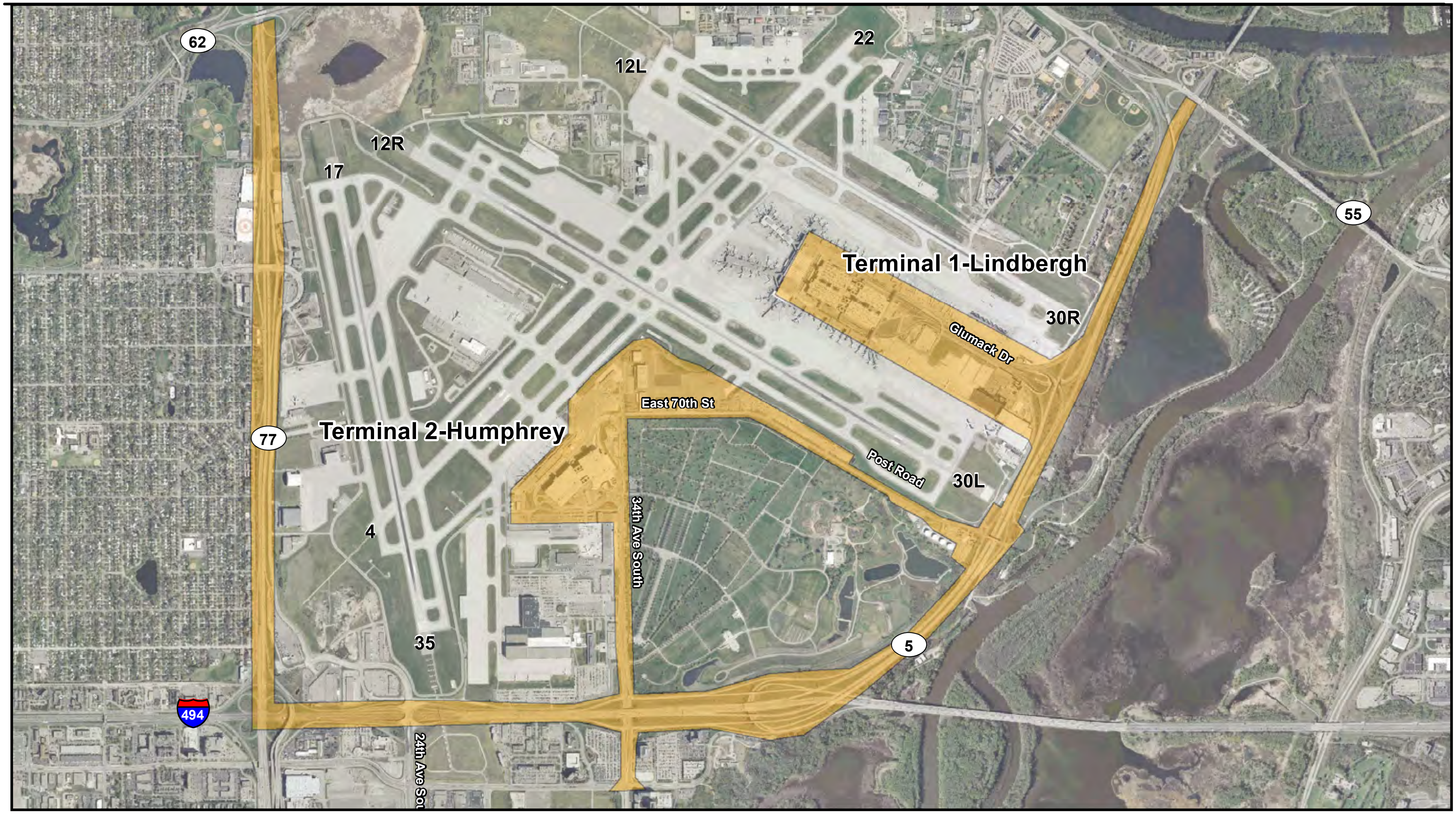
The existing ground transportation facilities within the Traffic and Circulation Study Area include parking facilities, terminal curb roadways, and access roads. Each of these facilities and its current (2010) operating conditions are summarized in the following sub-sections.

Parking Facilities

There are 12,870 and 9,110 public parking spaces available at Terminal 1-Lindbergh and Terminal 2-Humphrey, respectively. Of these spaces, 967 at Terminal 1-Lindbergh and 505 at Terminal 2-Humphrey are designated for short-term parking while the remainder are designated for general or long-term parking. A portion of the general parking spaces at Terminal 2-Humphrey are used by airport employees.

According to the operating conditions analysis, the parking facilities at both terminals provided a sufficient capacity in 2010. However, it was noted that on occasion during peak periods busier than the average day of the peak month, the demand for parking in the Terminal 1-Lindbergh parking ramps exceeds the capacity and vehicles are forced to park at the Terminal 2-Humphrey parking ramps.

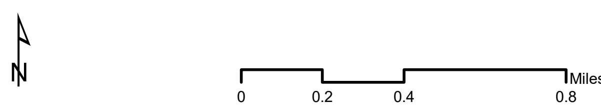
FIGURE 5.17-1



LEGEND

Traffic and Circulation Study Area

Traffic and Circulation Study Area



Source: ESRI Data

Disclaimer: This map was generated by HNTB Corporation using GIS (Geographic Information System) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitablity for a particular use. The scale and location of all mapped data are approximate.

Curb Roadways

Terminal 1-Lindbergh has a two-level terminal curb roadway with the upper level (ticketing) serving departing passengers and the lower level (baggage claim) serving arriving passengers. The upper level departures roadway has an inner curb which is used as the primary curb for passenger drop off. There is also an outer curb which has two through lanes and three left lane curb pockets for drop-off. The lower level arrivals roadway has an inner curb and five lanes used for passenger pick up by private vehicles. The outer curb is separated by a barrier and is used as a ground transportation center.

At Terminal 2-Humphrey the curb is four lanes wide. The first half of the curb located adjacent to airline ticketing facilities is used for passenger drop-off. The second half located adjacent to baggage claim facilities is used for passenger pick-up.

The 2010 operating conditions of the Terminal 1-Lindbergh and Terminal 2-Humphrey curbs were assessed. With the exception of the Terminal 1-Lindbergh arrivals curb, all curbs operated with a v/c ratio less than 0.70 in 2010. The v/c ratio for the Terminal 1-Lindbergh arrivals curb was 0.80 in 2010.

On-Airport Roadways

All inbound traffic enters the Terminal 1-Lindbergh campus from eastbound and westbound TH 5 via inbound Glumack Drive. Parking, rental car return, transit center and commercial vehicle traffic exit on the left side of Glumack Drive prior to the curbside roadways. All exiting traffic from Terminal 1-Lindbergh uses outbound Glumack Drive to TH 5. The Terminal 1-Lindbergh on-airport roadway segments are shown on **Figure 5.17-2**.

At Terminal 2-Humphrey, the majority of traffic uses 34th Avenue South to access the terminal facilities. Only taxis and a small portion of other traffic use Post Road and 70th Street to access Terminal 2-Humphrey. The majority of outbound traffic exits via 34th Avenue South. The Terminal 2-Humphrey on-airport roadway segments are shown on **Figure 5.17-3**.

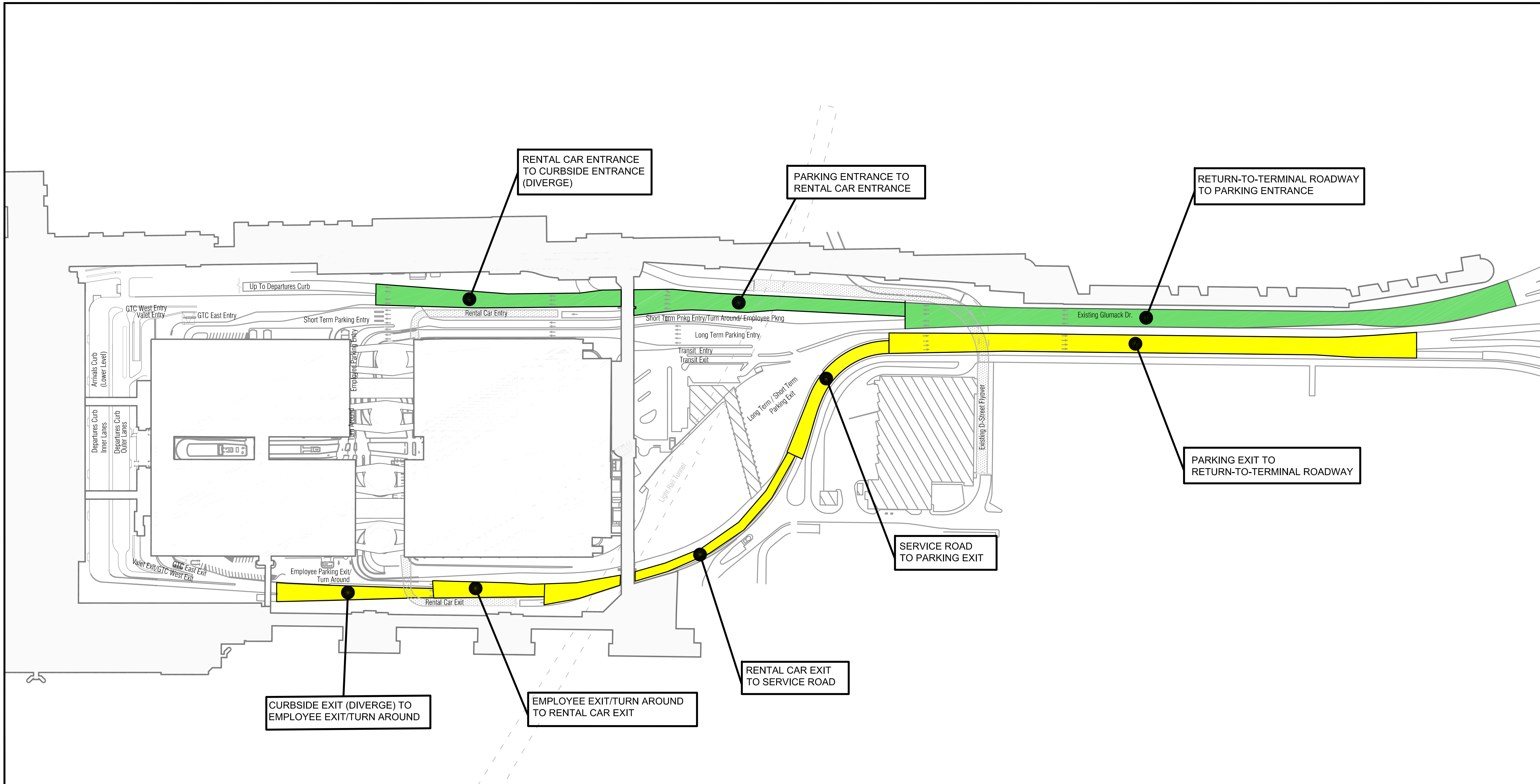
According to the analysis and modeling, all on-airport roadway segments at both terminals operate at an acceptable LOS C or better during the 2010 peak hour.

Off-Airport Roadways

The off-airport roadways within the Traffic and Circulation Study Area include 34th Avenue South, Post Road, East 70th Street, I-494, TH 5 and TH 77 (Cedar Avenue). **Table 5.17.4** shows a summary of general characteristics of these roadways including the posted speed, number of lanes and the 2010 average daily traffic (ADT) volumes. Descriptions of additional features are provided in the following sub-sections.

34TH AVENUE SOUTH

34th Avenue South follows a north/south alignment and provides access from I-494 to Terminal 2-Humphrey, Fort Snelling National Cemetery, and several Delta Air Lines Facilities. The portion of 34th Avenue South located north of I-494 is owned and maintained by the MAC. Five through-lanes are provided south of East 72nd Street with two lanes for northbound traffic and three lanes for southbound traffic. Traffic flow along 34th Avenue South is influenced by the Hiawatha LRT line which runs in the median. All left-turn movements across the LRT tracks have exclusive left-turn lanes where turns are permitted only when the traffic signal shows a green arrow.



LEGEND

Inbound

Outbound

Terminal 1-Lindbergh
On-Airport Roadways

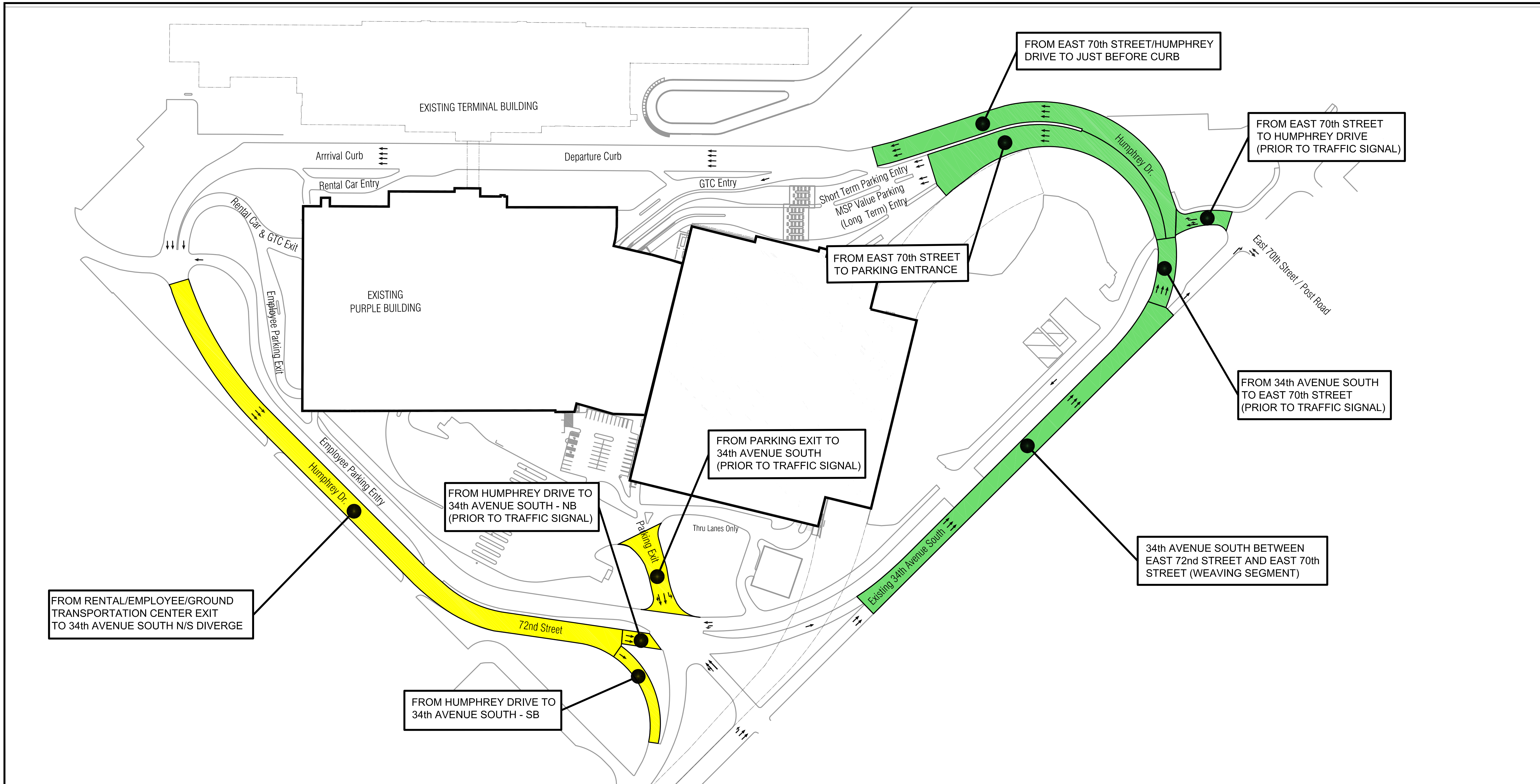
N

0 200' 400'

Source: Data compiled and maintained by MAC, HNTB, TKDA

Disclaimer: This map was generated by HNTB Corporation based off of CAD files supplied by other parties. No claims are made to the accuracy or completeness of the information shown herein nor to its suitability for a particular use. The scale and location of map are approximate.

HNTB



LEGEND

Inbound

Outbound

Terminal 2-Humphrey
On-Airport Roadways

N

0 200' 400'

Source: Data compiled and maintained by MAC, HNTB, TKDA

Disclaimer: This map was generated by HNTB Corporation based off of CAD files supplied by other parties. No claims are made to the accuracy or completeness of the information shown herein nor to its suitability for a particular use. The scale and location of map are approximate.

Table 5.17.4

Off-Airport Roadways Characteristics

Roadway	Posted Speed (mph)	Thru Lanes	2010 Average Daily Traffic	
			Location	Vehicles per Day
34th Avenue South	35	5	north of I-494 south of East 72nd Street	26,000 14,000
Post Road/East 70th Street	35	2	west of TH 5 east of 34th Avenue South	15,000 7,000
I-494	60	6 to 8	between TH 5 and TH 77	150,000
TH 5	55	6	between I-494 and TH 55	68,000
TH 77	55	4	between I-494 and TH 62	72,000

Source: Kimley-Horn and Associates, Inc. analysis, 2012.

POST ROAD/EAST 70TH STREET

Post Road/East 70th Street provides access from TH 5 to Terminal 2-Humphrey and several other businesses and parking lots. The businesses and parking lots are primarily associated with the airport. Post Road/East 70th Street follows a northwest/southeast alignment from TH 5 prior to curving to an east/west alignment immediately east of 34th Avenue South. The east/west portion is named East 70th Street while the northwest/southeast portion is named Post Road. Although Post Road can be used to reach Terminal-2 Humphrey from TH 5, the current signing directs travelers to 34th Avenue South.

I-494

I-494 follows an east/west alignment along the southern boundary of the Traffic and Circulation Study Area and is the only interstate facility located in the Traffic and Circulation Study Area. Approximately two miles of I-494 is within the Traffic and Circulation Study Area including the interchanges with TH 5, 24th Avenue South, 34th Avenue South and TH 77.

TH 5

The approximately 2.5 mile segment of TH 5 between I-494 and TH 55 is within the Traffic and Circulation Study Area. TH 5 follows a southwest/northeast alignment and forms the southeast boundary of the Traffic and Circulation Study Area. TH 5 is classified as a principal arterial by MnDOT.

TH 77

TH 77 (Cedar Avenue) follows a north/south alignment and forms the western boundary of the Traffic and Circulation Study Area. TH 77 is classified as a principal arterial by Mn/DOT. TH 77 intersects with the Study Area boundary roadways of I-494 on the south and TH 62 (Crosstown) on the north. The length of TH 77 located within the Traffic and Circulation Study Area is about 2.3 miles.

The 2010 operating conditions of the off-airport roadways were assessed. Peak hour analyses were completed using VISSIM to assess existing roadway intersection and freeway operating conditions.

Existing conditions at the roadway intersections were analyzed during the AM, airport and PM peak hours. The results are presented in **Table 5.17.5.**

In the AM peak hour (7:30 AM - 8:30 AM), all overall intersections operate at LOS D or better.

In the airport peak hour (1:30 PM - 2:30 PM), during the shift change for airport employees, all intersections operate at LOS C or better.

In the PM peak hour (4:30 PM - 5:30 PM.), all intersections operate at LOS C or better except for the Post Road/SuperAmerica East Driveway intersection. During the PM peak, this intersection operates at LOS F due insufficient gaps in Post Road traffic for vehicles leaving SuperAmerica East Driveway.

The operating conditions of the freeway segments were also assessed using VISSIM. Peak hour analyses were completed to assess freeway operations during the AM, airport and PM peak hours. **Table 5.17.6** shows the results of the analysis for each freeway segment.

Table 5.17.5
Intersection Level of Service – Existing Conditions (2010)

Intersection	**Control**	**AM Peak LOS**	**Airport Peak LOS**	**PM Peak LOS**
34th Ave South & American Blvd	Signal	B	B	C
34th Ave South & EB I-494 Ramps	Signal	B	B	B
34th Ave South & WB I-494 Ramps	Signal	D	B	B
34th Ave South & Airport Lane	Signal	A	A	A
34th Ave South & East 75th St	Signal	B	B	B
34th Ave South & East 73rd St	Signal	A	A	A
34th Ave South & East 72nd St NB	Signal	A	A	A
34th Ave South & East 72nd St SB	Signal	B	B	B
34th Ave South & East 70th St	All Way Stop	A	B	B
34th Ave South & Humphrey Dr	Signal	A	A	A
Post Rd & West Employee Lot Entrance	Side Street Stop	A	A	A
Post Rd & East Employee Lot Entrance	Side Street Stop	A	A	A
Post Rd & Taxi Staging Middle Exit	Side Street Stop	A	A	A
Post Rd & Taxi Staging East Exit	Side Street Stop	A	A	B
Post Rd & SuperAmerica West Driveway	Side Street Stop	A	A	C
Post Rd & SuperAmerica East Driveway	Side Street Stop	A	C	F
Post Rd & Northwest Dr/SB TH 5 Ramps	Signal	B	B	B
Post Rd & NB TH 5 Ramps	Side Street Stop	A	A	A

Notes
EB = east bound SB = south bound
NB = north bound WB = west bound

Source: Kimley-Horn and Associates, Inc. analysis, 2012.

Table 5.17.6
Freeway Segments Level of Service – Existing Conditions (2010)

Freeway Segment	AM Peak Hour		Airport Peak Hour		PM Peak Hour	
I-494	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**
TH 77 to 24th Ave South	B	F	B	C	B	F
24th Ave South to 34th Ave South	B	C	B	B	C	D
34th Ave to TH 5	B	C	B	B	C	D
TH 5	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**
I-494 to Post Rd	A	B	A	B	B	B
Post Rd to Glumack Dr	B	B	B	B	B	B
Glumack Dr to TH 55	A	B	B	B	B	B
TH 77	**NB**	**SB**	**NB**	**SB**	**NB**	**SB**
I-494 to Diagonal Rd	D	B	B	B	C	B
Diagonal Rd to 66th St	D	B	B	B	C	C
66th St to TH 62	C	B	B	B	B	B

Notes:
EB = east bound WB = west bound
SB = south bound NB = north bound

Source: Kimley-Horn and Associates, Inc. and SRF Consulting Group, Inc. analysis, 2012

Under 2010 existing conditions the freeway segment between TH 77 and 24th Avenue South along I-494 westbound operates at an unacceptable LOS of F during the AM and PM peak hours. This LOS is not directly attributable to traffic from MSP. The poor operations identified on westbound I-494 are caused by the weave between the northbound I-35W on-ramp loop and southbound I-35W off-ramp loop. This operational problem is compounded due to the traffic congestion caused by the interaction between the entering volume from southbound I-35W and the entering volume from Penn Avenue located over 3 miles west of the I-494 and 24th Avenue South interchange. Additional information about the evaluation of off-airport roadways is provided in ***Appendix C,*** *MSP Area Roadway Improvements Project Memos*.

5.17.2.5 Impact Analysis

Parking Facilities

NO ACTION ALTERNATIVE

Under the No Action Alternative, Terminal 1-Lindbergh would have a deficiency of over 8,500 parking stalls by 2020, increasing to a deficiency of more than 11,000 by 2025. At Terminal 2-Humphrey sufficient parking capacity would exist to accommodate requirements for public and employee parking through 2020, but in 2025 there would be a deficiency of more than 1,800 spaces. In 2020 there would be total airport deficit of over 8,000 parking spaces, increasing to approximately 13,000 by 2025.

AIRLINES REMAIN ALTERNATIVE

The Airlines Remain Alternative includes a 10,000 space parking ramp at Terminal 1-Lindbergh. It was assumed these improvements would be in place when analyzing future parking facilities sufficiency.

With this added parking in place, the Airlines Remain Alternative would provide sufficient parking spaces in 2020 to accommodate all of the public and 73 percent of the Terminal 1-Lindbergh employees. The remaining Terminal 1-Lindbergh employees would use the Terminal 2-Humphrey parking ramps and access Terminal 1-Lindbergh on the light rail train. Even with additional parking at Terminal 1-Lindbergh, there would be a deficit of approximately 2,700 parking spaces in 2025. Employee parking would need to be relocated to an alternate site to provide all the available walkable parking spaces for Terminal 1-Lindbergh passengers. This would decrease the deficit to approximately 1,000 spaces for the public.

No new parking facilities would be provided At Terminal 2- Humphrey as part of the Airlines Remain Alternative. The existing Terminal 2-Humphrey parking ramps would accommodate the parking requirements for the public and employees through 2020. By 2025 there would be a deficit of approximately 500 spaces. Employee parking would need to be relocated to accommodate the passenger demand for walkable parking spaces at Terminal 2-Humphrey.

Future projects may include additional parking facilities to meet the projected 2025 demand for public and employee parking spaces. These projects have not yet been identified and are not addressed in this EA. When these projects are ready for decision, they will be assessed for environmental impacts.

AIRLINES RELOCATE ALTERNATIVE

Additional parking facilities would be provided at both terminals under the Airlines Relocate Alternative. A new approximately 4,700-space structure would be constructed at Terminal 1-Lindbergh. At Terminal 2-Humphrey, the Purple and Orange ramps would be expanded and new ramp would be constructed to provide a total of 6,900 new parking spaces. It was assumed these improvements would be in place when analyzing future parking facilities sufficiency.

With the additional parking facilities, the parking ramps at Terminal 1-Lindbergh would provide sufficient parking spaces in 2020 to accommodate all of the public and Terminal 1-Lindbergh employees. However, by 2025 there would be a deficit of approximately 1,200 parking spaces. Employees parking would need to be relocated to an alternate site to provide sufficient walkable parking spaces for Terminal 1-Lindbergh passengers.

At Terminal 2-Humphrey, the added parking facilities included in the Airlines Relocate would provide sufficient parking through 2020. However, by 2025 there would be a deficit of approximately 2,400 spaces. Employees parking would need to be relocated to accommodate the passenger demand for walkable parking spaces at Terminal 2-Humphrey. This would reduce the deficit of public spaces to approximately 1,000 spaces.

Future projects may include additional parking facilities to meet the projected 2025 demand for public and employee parking spaces. These projects have not yet been identified and are not addressed in this EA. When these projects are ready for decision, they will be assessed for environmental impacts.

Terminal Curb Roadways

NO ACTION ALTERNATIVE

The Terminal 1-Lindbergh departures curb roadway would operate at or under capacity through 2025. The Terminal 1-Lindbergh arrivals curb roadway, which is over capacity today, would operate over capacity in 2020, requiring additional curb (lanes and/or length) to operate at an acceptable volume to capacity ratio. At Terminal 2-Humphrey, the single level curb roadway would operate at or under capacity through 2020. However, by 2025 the Terminal 2-Humphrey curb roadway would operate over capacity and would require an additional lane to operate at an acceptable volume to capacity ratio.

AIRLINES REMAIN ALTERNATIVE

The Airlines Remain Alternative includes improvements to the arrival curb at Terminal 1–Lindbergh. Additional arrival curb would be provided by relocating the commercial ground transportation center from the outer curb of the lower level. Also, curb roadway would be added at the new International Facility at Terminal 1-Lindbergh. The analysis of future curb roadway conditions under the Airlines Remain Alternative accounts for the added arrival curb at Terminal 1-Lindbergh.

With the reconfiguration of the arrivals curb (an outer curb is added) and the addition of the international curb, the Terminal 1-Linbergh arrivals curb would operate at or under capacity through 2025 with a volume to capacity (v/c) ratio of 0.70 or better. The Terminal 1-Lindbergh departures curb roadway would also operate at or under capacity through 2025. The Terminal 1-Lindbergh international curb would operate at a v/c ratio of 0.70 or better in 2020 increasing to 0.73 for departures by 2025. The Terminal 2-Humphrey curb would also operate at a v/c ratio of 0.70 or better in 2020 increasing to 0.76 for departures by 2025. Thus, with the Airlines Remain Alternative, all curb roadway v/c ratios would be under the significance threshold of 1.

AIRLINES RELOCATE ALTERNATIVE

The Airlines Relocate Alternative includes curb roadway improvements at both Terminals. At Terminal 1-Lindbergh additional arrival curb would be provided by relocating the commercial ground transportation center from the outer curb of the lower level. Also, curb roadway would be added at the new International Facility. At Terminal 2-Humphrey, two additional curb lanes along with an additional 840 linear feet of curb would be provided. The analysis of future curb roadway conditions under the Airlines Relocate Alternative accounts for the added curb roadway at both terminals.

With the reconfiguration of the arrivals curb and the addition of the international curb at Terminal 1 Lindbergh, the arrivals curbs would operate at or under capacity through 2025 with a volume to capacity (v/c) ratio of 0.70 or better. The Terminal 1-Lindbergh departures curb roadway would also operate at or under capacity through 2025.

With the additional curb at Terminal 2-Humphrey, the curb roadway would operate at a v/c ratio of 0.70 or better in 2020. However, the v/c ratio for the arrivals curb at Terminal 2-Humphrey would increase to 0.84 by 2025. Regardless, all curb roadway v/c ratios would be under the threshold of significance of 1.

On-Airport Roadways

NO ACTION ALTERNATIVE

Under the No Action Alternative, the on-airport roadways would operate at an acceptable LOS D or better in 2020. However, by 2025 the Terminal 1-Lindbergh outbound roadway operations would deteriorate to an unacceptable LOS F.

AIRLINES REMAIN ALTERNATIVE

Under the Airlines Remain Alternative the on-airport roadways would operate at an acceptable LOS D or better through 2020. However, in 2025, Terminal 1-Lindbergh outbound roadway operations would deteriorate to an unacceptable LOS F similar to the No Action Alternative.

While the LOS on the outbound segments of Glumack Drive would deteriorate from an acceptable LOS under current conditions, it would be the same as the LOS for the 2025 No Action Alternative. Also, there would be no external impacts on other roadways in the airport vicinity because the deteriorated LOS would only occur on outbound segments of Glumack. The degree of degradation of LOS from the No Action Alternative to the Airlines Remain Alternative would be modest, with the various measures of effectiveness in the same range of driver perception. Thus, it was determined that the impact would not exceed the threshold of significance.

AIRLINES RELOCATE ALTERNATIVE

All on-airport roadways would operate at an acceptable LOS D or better in 2020 and 2025.

Off-Airport Roadways

NO ACTION ALTERNATIVE

Off-airport intersection and freeway operations were analyzed using year 2020 and 2025 No Action Alternative traffic volumes. Signal timings were optimized in the model. The only roadway improvement included in the modeling of the No Action Alternative was the addition of an auxiliary lane on westbound I-494 from the northbound I-35W on-ramp loop to the west to TH 100. This improvement was included because it is programmed to be constructed prior to 2020 by MnDOT.

Overall 2020 and 2025 intersection LOSs are provided in **Table 5.17.7**. As expected, the 2025 No Action Alternative intersection LOSs would be worse than the 2020 No Action Alternative LOSs.

Table 5.17.7
No Action Alternative Overall Intersection LOS

Intersection	Control	2020			2025		
		AM Peak	Airport Peak	PM Peak	AM Peak	Airport Peak	PM Peak
34th Ave South & American Blvd	Signal	C	B	D	D	C	E
34th Ave South & EB I-494 Ramps	Signal	B	C	D	C	D	E
34th Ave South & WB I-494 Ramps	Signal	F	C	D	F	C	E
34th Ave South & Airport Lane	Signal	A	B	C	A	B	D
34th Ave South & East 75th St	Signal	A	B	C	A	B	E
34th Ave South & East 73rd St	Signal	A	A	B	A	A	E
34th Ave South & East 72nd St NB	Signal	A	A	A	A	A	A
34th Ave South & East 72nd St SB	Signal	C	B	B	B	A	E
34th Ave South & East 70th St	All Way Stop	C	B	B	D	A	A
34th Ave South & Humphrey Dr	Signal	A	A	B	A	B	B
Post Rd & West Employee Lot Entrance	Side Street Stop	A	A	A	A	A	A
Post Rd & East Employee Lot Entrance	Side Street Stop	A	A	A	A	A	A
Post Rd & Taxi Staging Middle Exit	Side Street Stop	E	C	A	E	D	A
Post Rd & Taxi Staging East Exit	Side Street Stop	A	E	A	B	E	B
Post Rd & SA West Driveway	Side Street Stop	B	E	B	C	E	C
Post Rd & SA East Driveway	Side Street Stop	B	E	D	C	E	E
Post Rd & Northwest Dr/SB TH 5 Ramps	Signal	B	D	C	B	C	C
Post Rd & NB TH 5 Ramps	Side Street Stop	B	F	F	B	F	F

Notes:
S = South SB = South Bound SA = SuperAmerica
E = East NB = North Bound

Source: Kimley-Horn and Associates, Inc. analysis, 2012.

The 2020 No Action modeling results showed that seven overall intersections would operate at LOS E or F. The 2025 No Action modeling results showed that 14 overall intersections would operate at LOS E or F. Poor operating conditions at the TH 5/Post Road and I-494/34th Avenue South interchanges would cause the majority of the intersection movements to operate at an unacceptable LOS.

Freeway segments within the Traffic and Circulation Study Area were also evaluated for the 2020 and 2025 No Action Alternative. The LOS for each freeway segment is provided in **Table 5.17.8**.

Under the 2020 No Action Alternative, six freeway segments would operate at an LOS of E or F. By 2025, the regional roadway system becomes more congested and twelve freeway segments would operate at unacceptable LOSs.

Table 5.17.8

No Action Alternative Freeway Segment LOS

	2020						2025					
Freeway Segment	**AM Peak Hour**		**Airport Peak Hour**		**PM Peak Hour**		**AM Peak Hour**		**Airport Peak Hour**		**PM Peak Hour**	
I-494	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**
TH 77 to 24th Ave South	C	C	B	E	B	E	C	F	B	E	B	F
24th Ave South to 34th Ave South	B	C	B	B	C	D	C	B	C	C	C	F
34th Ave South to TH 5	B	C	B	B	C	D	B	C	B	B	C	E
TH 5	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**
I-494 to Post Rd	B	B	F	B	B	B	B	B	F	B	B	B
Post Rd to Glumack Dr	B	B	B	D	C	C	B	B	B	C	C	B
Glumack Dr to TH 55	B	B	B	B	C	B	B	B	B	D	C	B
TH 77	**NB**	**SB**	**NB**	**SB**	**NB**	**SB**	**NB**	**SB**	**NB**	**SB**	**NB**	**SB**
I-494 to Diagonal Rd	F	B	B	B	D	C	F	B	C	B	F	C
Diagonal Rd to 66th St	F	B	B	C	D	D	F	C	C	C	F	D
66th St to TH 62	E	B	B	B	B	C	E	B	B	B	F	C

Notes:

EB = east bound WB = west bound
SB = south bound NB = north bound

Source: Kimley-Horn and Associates, Inc. and SRF Consulting Group, Inc. analysis, 2012.

AIRLINES REMAIN ALTERNATIVE

Off-airport intersection and freeway operations were analyzed using year 2020 and 2025 Airlines Remain Alternative traffic volumes. The following Airlines Remain Alternative improvements were incorporated into the traffic analysis models:

Before 2020

- Reconstruct 34th Avenue South interchange at I-494 to a diverging diamond
- Reconfigure the intersections of 34th Avenue South/East 70th Street and Humphrey Drive/East 70th Street
- Reconfigure East 70th Street beginning at 34th Avenue South to a four lane roadway for about 750 feet
- Construct new TH 5 and Post Road interchange
  - Remove existing and construct new bridge over TH 5
  - Realign Post Road and Northwest Drive
  - Relocate the intersection of Northwest Drive and Post Road
- Construct a dual lane exit from eastbound I-494 to 34th Avenue South

- Construct a dual lane exit from westbound I-494 to 24th Avenue South

- Add lanes to the outbound ramps of Glumack Drive to TH 5

The final construction phasing of the various improvements will be determined as part of the FHWA interstate access request procedures.

Overall 2020 and 2025 intersection LOSs for the Airlines Remain Alternative are provided in **Table 5.17.9**. The 2020 Airlines Remain Alternative modeling results show that all intersections would operate at LOS C or better. For 2025, intersection operations were analyzed using year 2025 Airlines Remain Alternative traffic volumes. The intersection geometrics were the same as those for the 2020 Airlines Remain Alternative. The 2025 Airlines Remain Alternative modeling results showed that all overall intersections would operate at an LOS D or better.

Analysis of freeway segment operations under the Airlines Remain Alternative in 2020 and 2025 was conducted. The resulting LOSs for the freeway segments are provided in **Table 5.17.10.**

Table 5.17.9
Alternative 1 – Airlines Remain Overall Intersection LOS

Intersection	**Control**	**2020**			**2025**		
		AM Peak	**Airport Peak**	**PM Peak**	**AM Peak**	**Airport Peak**	**PM Peak**
34th Ave South & American Blvd	Signal	C	B	C	C	B	D
34th Ave South & EB I-494 Ramps	Signal	B	B	B	B	B	C
34th Ave South & WB I-494 Ramps	Signal	B	B	B	B	B	C
34th Ave South & Airport Lane	Signal	A	A	A	A	B	A
34th Ave South & East 75th St	Signal	B	B	B	B	B	B
34th Ave South & East 73rd St	Signal	A	A	A	A	A	A
34th Ave South & East 72nd St NB	Signal	A	A	A	A	A	A
34th Ave South & East 72nd St SB	Signal	C	C	B	B	C	B
34th Ave South & Humphrey Dr	Signal	C	B	B	C	B	B
Post Rd & North Taxi Lot	Side Street Stop	A	A	A	A	A	A
Post Rd & Northwest Dr	Side Street Stop	A	A	A	A	A	A
Post Rd & SB TH 5 Ramps	Signal	A	A	A	A	A	A
Post Rd & NB TH 5 Ramps	Signal	B	B	B	B	B	B

Notes
EB = east bound　　WB = west bound
SB = south bound　　NB = north bound

Source: Kimley-Horn and Associates, Inc. analysis, 2012.

Table 5.17.10

Alternative 1 – Airlines Remain Freeway Segment LOS

Freeway Segment	2020						2025					
	AM Peak Hour		Airport Peak Hour		PM Peak Hour		AM Peak Hour		Airport Peak Hour		PM Peak Hour	
I-494	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**
TH 77 to 24th Ave South	C	C	B	E	B	F	C	D	B	E	C	F
24th Ave South to 34th Ave South	B	B	B	B	B	C	B	B	B	B	C	D
34th Ave South to TH 5	B	C	B	B	C	D	B	C	B	B	C	D
TH 5	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**
I-494 to Post Rd	B	B	A	B	B	C	B	B	A	B	B	C
Post Rd to Glumack Dr	B	B	B	B	C	B	B	B	B	B	C	B
Glumack Dr to TH 55	B	B	B	B	B	B	B	B	B	E	C	C
TH 77	**NB**	**SB**	**NB**	**SB**	**NB**	**SB**	**NB**	**SB**	**NB**	**SB**	**NB**	**SB**
I-494 to Diagonal Rd	F	B	B	B	D	C	F	B	C	B	E	C
Diagonal Rd to 66th St	F	B	B	C	D	D	F	B	C	C	E	D
66th St to TH 62	D	B	B	B	B	C	E	B	B	B	C	C

Notes

EB = east bound WB = west bound
SB = south bound NB = north bound

Source: Kimley-Horn and Associates, Inc. and SRF Consulting Group, Inc. analysis, 2012.

Freeway segments that deteriorated from current conditions to an LOS of E or F with the Airlines Remain Alternative were compared to the No Action Alternative LOSs (Table 5.17.8) to determine whether further evaluation was required.

Daily traffic volumes on each freeway segment as well as the differences in airport related trips were identified. The total traffic volume and changes in airport trips on each freeway segment with the Airlines Remain Alternatives are provided in **Tables 5.17.11** and **5.17.12** for the 2020 and 2025 respectively. This data was used to determine whether the changes on the identified freeway segments would exceed the threshold of significance of a 10% increase in airport traffic.

Table 5.17.11

2020 Alternative 1 – Airlines Remain Change in Airport Trips

Freeway Segment	2020 Daily Volumes					
	No Action		Airlines Remain			
	Total	Airport Trips	Total	Airport Trips	Change in Airport Trips	Airport Trip % of Daily Trips
I-494						
TH 77 to 24th Ave South	163,000	53,100	163,000	52,800	-300	-0.2%
24th Ave South to 34th Ave South	184,000	54,400	184,000	54,100	-300	-0.2%
34th Ave South to TH 5	186,000	47,900	186,000	48,200	300	0.2%
TH 5						
I-494 to Post Rd	90,000	48,400	90,000	49,300	900	1.0%
Post Rd to Glumack Dr	95,000	54,800	95,000	55,800	1,000	1.1%
Glumack Dr to TH 55	85,000	44,500	85,000	44,200	-300	-0.4%
TH 77						
I-494 to Diagonal Rd	81,000	5,500	81,000	5,300	-200	-0.2%
Diagonal Rd to 66th St	82,000	5,000	82,000	4,800	-200	-0.2%
66th St to TH 62	87,000	3,500	87,000	3,200	-300	-0.3%

Source: Kimley-Horn and Associates, Inc. and SRF Consulting Group, Inc. analysis, 2012.

Table 5.17.12

2025 Alternative 1 – Airlines Remain Change in Airport Trips

Freeway Segment	2025 Daily Volumes					
	No Action		Airlines Remain			
	Total	Airport Trips	Total	Airport Trips	Change in Airport Trips	Airport Trip % of Daily Trips
I-494						
TH 77 to 24th Ave South	171,000	63,200	171,000	62,800	-400	-0.2%
24th Ave South to 34th Ave South	197,000	64,400	197,000	64,000	-400	-0.2%
34th Ave South to TH 5	198,000	57,700	198,000	58,100	400	0.2%
TH 5						
I-494 to Post Rd	97,000	57,400	97,000	58,500	1,100	1.1%
Post Rd to Glumack Dr	103,000	63,000	103,000	64,200	1,200	1.2%
Glumack Dr to TH 55	92,000	53,200	92,000	52,800	-400	-0.4%
TH 77						
I-494 to Diagonal Rd	84,000	6,800	84,000	6,600	-200	-0.2%
Diagonal Rd to 66th St	86,000	6,400	86,000	6,100	-300	-0.3%
66th St to TH 62	91,000	4,900	91,000	4,500	-400	-0.4%

Source: Kimley-Horn and Associates, Inc. and SRF Consulting Group, Inc. analysis, 2012.

Under the 2020 Airlines Remain Alternative there would be one segment that deteriorates from an LOS E to F. The westbound segment of I-494 between TH 77 and 24th Avenue South would have an LOS E during the PM peak hour with the No Action Alternative and an LOS F with the Airlines Remain Alternative.

The Airport's relative contribution to traffic on this segment of I-494 was reviewed. As shown in Table 5.17.11, there would be no increase in airport trips under the Airlines Remain Alternative when compared to the No Action Alternative. The change in LOS under the 2020 Airlines Remain Alternative is due to changes in traffic characteristics along this segment. Because this segment will operate under congested conditions under the No Action scenario, it is not unique that small changes in traffic characteristics would result in a change in the LOS. Since airport trips are not increasing with the Airlines Remain Alternative, the congested operations would not constitute an impact that would exceed the threshold of significance.

Under the 2025 Airlines Remain Alternative one segment would deteriorate from an acceptable LOS D to LOS E. The westbound segment of TH 5 between TH 55 and Glumack Drive would degrade from LOS D with the No Action Alternative to E with the Airlines Remain Alternative during the airport peak.

The Airport's relative contribution to traffic on the subject freeway segment was reviewed. As shown in Table 5.17.12, there would be no increase in airport trips on TH 5 between TH 55 and Glumack Drive under the Airlines Remain Alternative in 2025. The change in LOS under the 2025 Airlines Remain Alternative is due to changes in traffic characteristics along this segment. Because this segment will operate at LOS D under the No Action scenario, it is not unique that small changes in traffic characteristics would result in a change in the LOS. Since airport trips are not increasing along this freeway segment, the congested operations would not constitute an impact that would exceed the threshold of significance.

AIRLINES RELOCATE ALTERNATIVE

Off-airport intersection and freeway operations were analyzed using year 2020 and 2025 Airlines Relocate Alternative traffic volumes. The following Airlines Relocate Alternative improvements were incorporated into the traffic analysis models:

Before 2020

- Reconstruct 34th Avenue South interchange at I-494 to a diverging diamond
- Add lane to northbound 34th Avenue South
- Improve the intersection of East 72nd Street and 34th Avenue intersection
- Reconfigure the intersections of 34th Avenue South/East 70th Street and Humphrey Drive/East 70th Street
- Reconfigure East 70th Street beginning at 34th Avenue South to a four lane roadway for about 1,500 feet
- Construct new TH 5 and Post Road interchange
    - Remove existing and construct new bridge over TH 5

- Realign Post Road and Northwest Drive
- Relocate the intersection of Northwest Drive and Post Road

- Construct a dual lane exit from eastbound I-494 to 34th Avenue South
- Construct a dual lane exit from westbound I-494 to 24th Avenue South
- Construct auxiliary lane improvement on westbound I-494 between 24th Avenue South and the exit to southbound TH 77

Between 2020 and 2025

- Construct a bridge braid for the 34th Avenue South entrance ramp to westbound I-494 and exit ramp to 24th Avenue South from westbound I-494. This improvement allows traffic entering westbound I-494 from 34th Avenue South and traffic exiting from westbound I-494 to 24th Avenue South to cross via grade separation which reduces the weaving conflict on westbound I-494 improving freeway operations.

Additional expansion of the 34th Avenue South interchange at I-494 which will include:

- Modification of the southbound double right-turn lane to a triple right at the westbound I-494 ramps
- Modification of the eastbound left and right turn lanes from double to triple turn lanes at the eastbound I-494 ramps
- Modification of the northbound right to a triple right turn lane at the eastbound I-494 ramps
- Modification of the westbound left turn lane to southbound 34th Avenue from a double to a triple left at the westbound I-494 ramps

The final construction phasing of the various improvements will be determined as part of the FHWA interstate access request procedures.

Overall 2020 and 2025 intersection LOSs for the Airlines Relocate Alternative are provided in **Table 5.17.13**. The 2020 Airlines Relocate modeling results showed that all intersections would operate at LOS C or better.

For 2025, intersection operations were analyzed using year 2025 Airlines Relocate Alternative traffic volumes and the roadway improvements that are identified to be constructed between 2020 and 2025 under this Alternative. The 2025 Airlines Relocate modeling results showed that all intersections would operate at LOS C or better.

Analysis of freeway segment operations under the Airlines Relocate Alternative in 2020 and 2025 was conducted. The resulting LOSs are provided in **Table 5.17.14.** The total traffic volume and changes in airport trips on each freeway segment with the No Action Alternative and the Airlines Relocate Alternative are provided in **Tables 5.17.15** and **5.17.16** for 2020 and 2025, respectively.

Table 5.17.13

Alternative 2 – Airlines Relocate Overall Intersection LOS

Intersection	Control	2020			2025		
		AM Peak	Airport Peak	PM Peak	AM Peak	Airport Peak	PM Peak
34th Ave South & American Blvd	Signal	C	B	C	C	B	B
34th Ave South & EB I-494 Ramps	Signal	B	B	B	C	B	C
34th Ave South & WB I-494 Ramps	Signal	B	B	B	C	C	C
34th Ave South & Airport Lane	Signal	A	B	A	B	A	A
34th Ave South & East 75th St	Signal	B	B	B	B	B	B
34th Ave South & East 73rd St	Signal	A	A	A	A	A	A
34th Ave South & East 72nd St NB	Signal	A	B	B	A	B	B
34th Ave South & East 72nd St SB	Signal	B	C	B	B	B	B
34th Ave South & Humphrey Dr	Signal	B	C	C	B	C	C
Post Rd & North Taxi Lot	Side Street Stop	A	A	A	A	A	B
Post Rd & Northwest Dr	Side Street Stop	A	A	A	A	A	A
Post Rd & SB TH 5 Ramps	Signal	A	A	A	A	A	A
Post Rd & NB TH 5 Ramps	Signal	C	B	B	C	B	B

Notes
EB = east bound WB = west bound SB = south bound NB = north bound

Source: Kimley-Horn and Associates, Inc. analysis, 2011.

Table 5.17.14

Alternative 2 – Airlines Relocate Freeway Segment LOS

Freeway Segment	2020						2025					
	AM Peak Hour		Airport Peak Hour		PM Peak Hour		AM Peak Hour		Airport Peak Hour		PM Peak Hour	
I-494	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
TH 77 to 24th Ave South	C	C	B	C	B	C	C	D	B	C	C	C
24th Ave South to 34th Ave South	B	B	B	B	C	C	B	C	B	C	C	C
34th Ave South to TH 5	B	C	B	B	C	C	B	C	B	B	C	C
TH 5	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
I-494 to Post Rd	B	B	A	B	B	B	B	B	A	B	B	B
Post Rd to Glumack Dr	B	B	B	B	C	B	B	B	B	B	C	C
Glumack Dr to TH 55	A	B	B	B	B	B	B	B	B	B	C	B
TH 77	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
I-494 to Diagonal Rd	**F**	B	C	B	**E**	C	**F**	B	C	B	**F**	C
Diagonal Rd to 66th St	**F**	B	C	C	**E**	D	**F**	C	C	C	**F**	E
66th St to TH 62	**E**	B	B	B	D	C	**E**	B	B	B	**F**	C

Notes:
EB = east bound WB = west bound SB = south bound NB = north bound

Source: Kimley-Horn and Associates, Inc. and SRF Consulting Group, Inc. analysis, 2012.

Table 5.17.15

2020 Alternative 2 – Airlines Relocate Change in Airport Trips

Freeway Segment	2020 Daily Volumes					
	No Action		Airlines Relocate			
	Total	Airport Trips	Total	Airport Trips	Change in Airport Trips	Airport Trip % of Daily Trips
I-494						
TH 77 to 24th Ave South	163,000	53,100	168,000	57,400	4,300	2.6%
24th Ave South to 34th Ave South	184,000	54,400	188,000	58,500	4,100	2.2%
34th Ave South to TH 5	186,000	47,900	177,000	43,800	-4,100	-2.3%
TH 5						
I-494 to Post Rd	90,000	48,400	75,000	37,400	-11,000	-14.7%
Post Rd to Glumack Dr	95,000	54,800	84,000	42,700	-12,100	-14.4%
Glumack Dr to TH 55	85,000	44,500	79,000	47,800	3,300	4.2%
TH 77						
I-494 to Diagonal Rd	81,000	5,500	86,000	8,300	2,800	3.3%
Diagonal Rd to 66th St	82,000	5,000	86,000	7,700	2,700	3.1%
66th St to TH 62	87,000	3,500	92,000	7,400	3,900	4.2%

Source: Kimley-Horn and Associates, Inc. and SRF Consulting Group, Inc. analysis, 2012.

Table 5.17.16

2025 Alternative 2 – Airlines Relocate Change in Airport Trips

Freeway Segment	2025 Daily Volumes					
	No Action		Airlines Relocate			
	Total	Airport Trips	Total	Airport Trips	Change in Airport Trips	Airport Trip % of Daily Trips
I-494						
TH 77 to 24th Ave South	171,000	63,200	177,000	67,300	4,100	2.3%
24th Ave South to 34th Ave South	197,000	64,400	202,000	68,800	4,400	2.2%
34th Ave South to TH 5	198,000	57,700	187,000	53,400	-4,300	-2.3%
TH 5						
I-494 to Post Rd	97,000	57,400	80,000	46,000	-11,400	-14.3%
Post Rd to Glumack Dr	103,000	63,000	90,000	50,600	-12,400	-13.8%
Glumack Dr to TH 55	92,000	53,200	85,000	56,500	3,300	3.9%
TH 77						
I-494 to Diagonal Rd	84,000	6,800	90,000	9,800	3,000	3.3%
Diagonal Rd to 66th St	86,000	6,400	91,000	9,400	3,000	3.3%
66th St to TH 62	91,000	4,900	97,000	8,600	3,700	3.8%

Source: Kimley-Horn and Associates, Inc. and SRF Consulting Group, Inc. analysis, 2012.

Under the 2020 Airlines Relocate Alternative, two freeway segments would degrade from LOS D to E:

- Northbound TH 77 between I-494 and Diagonal Road (LOS would degrade from D to E). An additional 2,800 airport trips would be added with the 2020 Airlines Relocate Alternative when compared to the 2020 No Action Alternative. The difference in airport trips would be 3.3% of the daily forecast volume. Therefore, the reduction in LOS would not constitute an impact that would exceed the threshold of significance.
- Northbound TH 77 between Diagonal Road and East 66th Street (LOS would degrade from LOS D to E). An additional 2,700 airport trips would be added with the 2020 Airlines Relocate Alternative when compared to the 2020 No Action Alternative. The difference in airport trips would be 3.1% of the daily forecast volume. Therefore, the reduction in LOS would not constitute an impact that would exceed the threshold of significance.

Under the 2025 Airlines Relocate Alternative one freeway segment would degrade from an acceptable LOS to LOS E:

- Southbound TH 77 between Diagonal Road and East 66th Street that would change to an LOS E during the PM peak. The Airport's relative contribution to traffic on this segment of TH 77 would be 3,000 additional airport trips. The difference in airport trips would amount to 3.3% of the daily forecast volume. Therefore, the congested operations would not constitute an impact that would exceed the threshold of significance.

The results of the 2025 Airlines Relocate Alternative modeling suggest a continued degradation of traffic flow on northbound TH 77 would occur. This would be caused by design deficiencies in the current TH 77/TH 62 interchange. These deficiencies are well outside the immediate project area. The current traffic model indicates adverse traffic queuing extending the length of northbound TH 77 to the I-494 interchange then back to the current westbound ramp at the 34th Avenue South/I-494 Interchange. This queuing is anticipated to result in secondary adverse impacts to nearby roadways adjacent the 34th Avenue South/I-494 Interchange.

After a review of the 2025 traffic distribution and the unused capacity at the 34th Avenue South/I-494 interchange eastbound ramp and the revised TH 5/Post Road interchange eastbound ramp, it is expected that a natural redistribution of traffic would take place to the east during periods of congestion. This redistribution would mitigate traffic queuing at the 34th Avenue South westbound entrance ramp and would allow the 34th Avenue South interchange to function as previously detailed. This diversion would resolve the queuing at 34th Avenue South westbound ramp, and should occur naturally by driver behavior.

YEAR 2030 ANALYSIS (FHWA)

The FHWA typically requires a 20 year forecast horizon be reviewed for the traffic analysis as a part of its NEPA guidance. To meet the requirements of the FHWA, a 20-year forecast was developed for the off-airport arterial regional roadways and for freeway segments with the 2030 No Action Alternative and the 2030 Action Alternative. The Airlines Remain and Airlines Relocate Alternatives are two different development scenarios that result in different development plans in 2020 and 2025. However, regardless of whether the Airlines Remain or Airlines Relocate Alternative is selected, the development plan by 2030 is the same. Therefore, consistent with the 2030 MSP LTCP, one 2030 Action Alternative was evaluated for the 2030 traffic analysis.

Off-airport roadway analysis was conducted at six ramp terminal intersections. There were no changes in geometrics between the 2025 Airlines Relocate and 2030 Action Alternative modeled except lanes were added to the outbound ramps of Glumack Drive to TH 5.

Overall 2030 No Action and 2030 Action intersection LOSs are shown in **Table 5.17.17**. The 2030 No Action modeling results showed that seven overall intersections will operate at LOS E or F. There would be impacts to adjacent intersections similar to those that would occur under the 2025 No Action scenario. For the 2030 Action Alternative, the modeling results show that all intersections would operate at LOS C or better.

For freeway operations, year 2030 No Action modeling results showed 13 segments with unacceptable operations (LOS E or F), as shown in **Table 5.17.18**. These results are similar to the 2025 No Action Alternative LOS.

The 2030 No Action results show that poor operations exist on westbound I-494 that will impact the operation of the I-494/34th Avenue South interchange. These are similar to the analysis results for the 2025 Airlines Relocate Alternative. This also causes poor operations on the northbound TH 77 to westbound I-494 regional flyover ramp. Poor operations were still identified on northbound TH 77 between I-494 and TH 62 and the queues spill back and impact the I-494/34th Avenue South interchange. These operational deficiencies located outside of the EA project area effect the ability to accurately test the proposed EA mitigation measures. Therefore, additional improvements were assumed to be completed “by others” and included in the traffic modeling. The alternative that includes these improvements is referred to as the 2030 No Action Improved Alternative. Additional information is provided in Appendix C, *MSP Area Roadway Improvements Project Memos*.

Table 5.17.17

2030 Overall Intersection LOS

Intersection	Control	2030 No Action			2030 Action		
		AM Peak	Airport Peak	PM Peak	AM Peak	Airport Peak	PM Peak
34th Ave S & EB I-494 Ramps	Signal	D	D	F	C	C	C
34th Ave S & WB I-494 Ramps	Signal	F	C	F	C	C	C
Post Rd & SA West Driveway	Side Street Stop	C	E	D	A	A	A
Post Rd & SA East Driveway	Side Street Stop	B	E	D	A	B	A
Post Rd & Northwest Dr/SB TH 5 Ramps	Signal	B	D	B	C	B	B
Post Rd & NB TH 5 Ramps	Signal	B	F	E	C	C	C

Notes
S = South SB = South Bound
E = East NB = North Bound

Source: Kimley-Horn and Associates, Inc. analysis, 2012.

Table 5.17.18

2030 No Action Freeway LOS

Freeway Segment	AM Peak Hour		Airport Peak Hour		PM Peak Hour	
I-494	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**
TH 77 to 24th Ave South	C	E	B	F	B	F
24th Ave South to 34th Ave South	C	B	C	C	C	F
34th Ave South to TH 5	B	B	B	B	C	F
TH 5	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**
I-494 to Post Rd	B	B	F	B	B	D
Post Rd to Glumack Dr	B	B	B	D	C	C
Glumack Dr to TH 55	B	B	B	C	B	B
TH 77	**NB**	**SB**	**NB**	**SB**	**NB**	**SB**
I-494 to Diagonal Rd	F	B	C	B	F	C
Diagonal Rd to 66th St	F	C	C	C	F	E
66th St to TH 62	F	B	B	B	F	C

Source: Kimley-Horn and Associates, Inc. and SRF Consulting Group, Inc. analysis, 2012.

The results of the operational analysis of the 2030 No Action Improved Alternative are provided in **Table 5.17.19**. For this alternative, the number of segments with unacceptable operations is reduced from 13 to six.

For the Year 2030 Action Alternative, only one freeway link has unacceptable results (LOS F), as shown in **Table 5.17.20**, which also operates at an LOS F under the Year 2030 No Action Improved Alternative. Therefore, the congested operations would not constitute change that would exceed the threshold of significance.

Table 5.17.19

2030 No Action Improved Alternative Freeway LOS

Freeway Segment	AM Peak Hour		Airport Peak Hour		PM Peak Hour	
I-494	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**
TH 77 to 24th Ave South	C	C	B	F	B	F
24th Ave South to 34th Ave South	C	B	C	C	C	F
34th Ave South to TH 5	B	B	B	B	C	F
TH 5	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**
I-494 to Post Rd	B	C	F	B	B	C
Post Rd to Glumack Dr	B	B	B	D	C	C
Glumack Dr to TH 55	B	B	B	C	C	B
TH 77	**NB**	**SB**	**NB**	**SB**	**NB**	**SB**
I-494 to Diagonal Rd	B	B	B	B	B	C
Diagonal Rd to 66th St	B	C	B	C	B	F
66th St to TH 62	B	B	B	B	D	C

Source: Kimley-Horn and Associates, Inc. and SRF Consulting Group, Inc. analysis, 2012.

Table 5.17.20

2030 Action Alternative Freeway LOS

Freeway Segment	AM Peak Hour		Airport Peak Hour		PM Peak Hour	
I-494	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**
TH 77 to 24th Ave South	C	B	B	C	C	C
24th Ave South to 34th Ave South	B	B	B	C	C	C
34th Ave South to TH 5	B	C	B	B	C	D
TH 5	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**
I-494 to Post Rd	B	B	A	B	B	B
Post Rd to Glumack Dr	B	B	B	B	C	B
Glumack Dr to TH 55	B	B	B	B	B	B
TH 77	**NB**	**SB**	**NB**	**SB**	**NB**	**SB**
I-494 to Diagonal Rd	B	B	B	B	C	C
Diagonal Rd to 66th St	B	C	B	C	C	F
66th St to TH 62	B	B	B	B	C	C

Source: Kimley-Horn and Associates, Inc. and SRF Consulting Group, Inc. analysis, 2012.

5.17.2.6 Permitting

FHWA approval of the Interstate Access Request(s) (IARs) will be required prior to any modifications to I-494. Metropolitan Council approval will also be obtained prior to constructing controlled access highway projects at Trunk Highway 5 or Interstate I-494 in accordance with MN Statute 473.166. FHWA, MnDOT, and the project sponsors are currently working on the IAR for the funded portions of the I-494 and 34th Avenue South Interchange. For other road improvements that may require FHWA involvement, an additional IAR would be required by FHWA prior to construction of those improvements. Supplemental NEPA review for FHWA approval may also be required for those improvements depending on timing, funding and changes in potential impacts.

5.17.2.7 Summary

Both on- and off-airport ground transportation facilities were evaluated to determine potential impacts to circulation and traffic. A comparison of the circulation and traffic impacts for the Alternatives in 2020 and 2025 is presented in **Table 5.17.21**. A summary of the 2030 regional roadway traffic analysis is shown in **Table 5.17.22**.

Table 5.17.21

Circulation and Traffic Impacts Comparison of Alternatives

	No Action		**Alternative 1 – Airlines Remain**		**Alternative 2 – Airlines Relocate**	
	2020	**2025**	**2020**	**2025**	**2020**	**2025**
Parking						
	8,000 Space Deficit	13,000 Space Deficit	Sufficient Parking Available	3,200 Space Deficit	Sufficient Parking Available	3,600 Space Deficit
Curb Roadways						
Terminal 1-Lindbergh Departure	At or Under Capacity	At or Under Capacity	At or Under Capacity	At or Under Capacity	At or Under Capacity	At or Under Capacity
Terminal 1-Lindbergh Arrival	Over Capacity	Over Capacity	At or Under Capacity	At or Under Capacity	At or Under Capacity	At or Under Capacity
Terminal 2-Humphrey	At or Under Capacity	Over Capacity	At or Under Capacity	At or Under Capacity	At or Under Capacity	At or Under Capacity
On Airport Roadways						
	LOS D or better	Outbound Glumack LOS F	LOS D or better	Outbound Glumack LOS F	LOS B or better	LOS D or better
Off-Airport Roadways (1)						
Intersection	7 at LOS E or F	14 at LOS E or F	All LOS C or better	All LOS D or better	All LOS C or better	All LOS C or better
Freeway Segments	6 at LOS E or F	12 at LOS E or F	4 at LOS E or F	8 at LOS E or F	5 at LOS E or F	7 at LOS E or F

Note:
(1) Total provided includes the sum of intersection, individual movements, or freeway segments for the AM, airport, and PM peak hours for each alternative (from Tables 5.17.7-16).

Source: Kimley-Horn and Associates, Inc., SRF Consulting Group, Inc. and HNTB analysis, 2012.

Table 5.17.22

2030 Regional Roadway Summary

	No Action	Improved No Action	Action
Off-Airport Roadways (1)			
Intersection	7 at LOS E or F	Not Applicable	All LOS C or better
Freeway Segments	13 at LOS E or F	6 at LOS E or F	1 at LOS E or F

Note:
(1) Total provided includes the sum of intersection, individual movements, or freeway segments for the AM, airport, and PM peak hours for each alternative.

Source: Kimley-Horn and Associates, Inc., and SRF Consulting Group, Inc., 2012.

The evaluation of on-airport ground transportation facilities included assessment of conditions of parking ramp, curb roadways and on-airport roadways. The conditions of the parking ramps and the curb roadways with the Action Alternatives would be better than or the same as the conditions with the No Action Alternatives for the same year of analysis. Additionally, nearly all of the on-airport roadways would operate at an acceptable LOS with all of the Alternatives. The only exception being outbound Glumack Drive which would operate at a LOS of F in 2025 with both the No Action and Airlines Remain Alternatives. Therefore, none of the Alternatives would result in impacts to on-airport ground transportation facilities that would exceed the threshold of significance.

For the off-airport ground transportation facilities within the Circulation and Traffic Study Area the modeling results show that both the Airlines Remain and Airlines Relocate Alternatives would operate significantly better than the No Action Alternative. Similarly, the 2030 analysis showed that the regional roadways would operate better with the proposed regional roadway improvements.

In summary, none of the Alternatives would result in impacts to off-airport ground transportation facilities that would exceed the threshold of significance.

5.17.3 Environmental Justice and Children's Health and Safety Risks

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations, regulates against federal actions that would result in high and adverse human health or environmental impacts that would disproportionately impact minority and low income population.

The FAA is also directed to identify and assess disproportionate impacts to children's environmental health and safety risks pursuant to Executive Order 13045 - Protection of Children from Environmental Health Risks and Safety Risks. The Executive Order states that, "'Environmental health risks and safety risks' mean risks to health or to safety that are attributable to products or substances that the child is likely to come in contact with or ingest (such as the air we breathe, the food we eat, the water we drink or use for recreation, the soil we live on, and the products we use or are exposed to)."

Since none of the Alternatives would result in impacts exceeding the thresholds of significance for any of the impact categories, it may be concluded that there would not be high and adverse human health or environmental impacts. Therefore, none of the Alternatives would disproportionately impact minority and/or low-income populations nor children's environmental health and safety risks.

5.18 Water Resources

This section describes water resources and potential water resource impacts. Water resources are divided into three categories: surface water, groundwater and drinking water for the purposes of this discussion.

5.18.1 Surface Water

This sub-section provides information about surface water related regulations, the affected environment and potential impacts.

5.18.1.1 Regulatory Background

The Federal Water Pollution Control Act (commonly referred to as the Clean Water Act or CWA) provides for: the establishment of water quality standards; control of discharges; development of wastewater treatment management plans and practices; prevention or minimization of the loss of wetlands; protection of aquifers and sensitive ecological areas; and the regulation of other issues concerning water quality.

Section 402 of the CWA provides for permitting of stormwater discharges to surface waters under the National Pollutant Discharge Elimination System (NPDES). Stormwater discharges originating from MSP are authorized under the Airport's NPDES permit.

5.18.1.2 Approach and Methodology

Nearly all stormwater from MSP is ultimately discharged to the Minnesota River. Therefore, to address surface water impacts, the Alternatives were evaluated for their potential to change the quantity or quality of MSP's stormwater.

To meet FAA requirements, the impacts to stormwater as a result of the 2020 proposed improvements were analyzed. To address FHWA requirements, 2030 conditions including the regional roadway improvements post 2020 were evaluated.

Potential stormwater quantity impacts were assessed by modeling and analyzing the storm water collection system. The potential changes in localized flooding on MSP and peak stormwater discharges for each Alternative were identified.

The conditions of the Minnesota River were considered in developing a methodology to evaluate the stormwater quality. The Minnesota River has been cited as one of the most polluted rivers in the state and the nation. The MPCA has designated the Minnesota River impaired under Section 303(d) of the CWA for dissolved oxygen, turbidity, mercury and polychlorinated biphenyls (PCBs).

Airport stormwater can include organic materials that lead to reduced dissolved oxygen in the receiving water. Microorganisms deplete oxygen in the receiving water during the process of breaking down organic materials. With less oxygen available, higher forms of aquatic life become stressed and ultimately suffocate and die.[32] Organic materials in airport stormwater are largely from aircraft deicing activities and to a lesser extent pavement deicing activities. Therefore, in order to determine if the Alternatives would potentially impact dissolved oxygen in the Minnesota River, the ability to capture aircraft deicing fluid (ADF) on the Airport was quantified for each Alternative.

Total suspended solids (TSS) are another pollutant of concern because the Minnesota River has very high TSS loads and is impaired for turbidity. The amount of TSS in the airport stormwater is related to the expanse of impervious surfaces, application of sand and periodic construction activities. Modeling was completed to determine the effectiveness of the MSP retention ponds in removing TSS from the stormwater for each of the Alternatives.

Potential petroleum/fuel discharges into airport stormwater are also of concern in terms of water quality in the Minnesota River. Therefore, the potential for the Alternatives to cause petroleum discharges was considered.

5.18.1.3 Threshold of Significance

Impacts may be considered significant if there is a potential to exceed water quality standards, there are water quality problems that cannot be avoided or mitigated, or there would be difficulty in obtaining necessary permits.

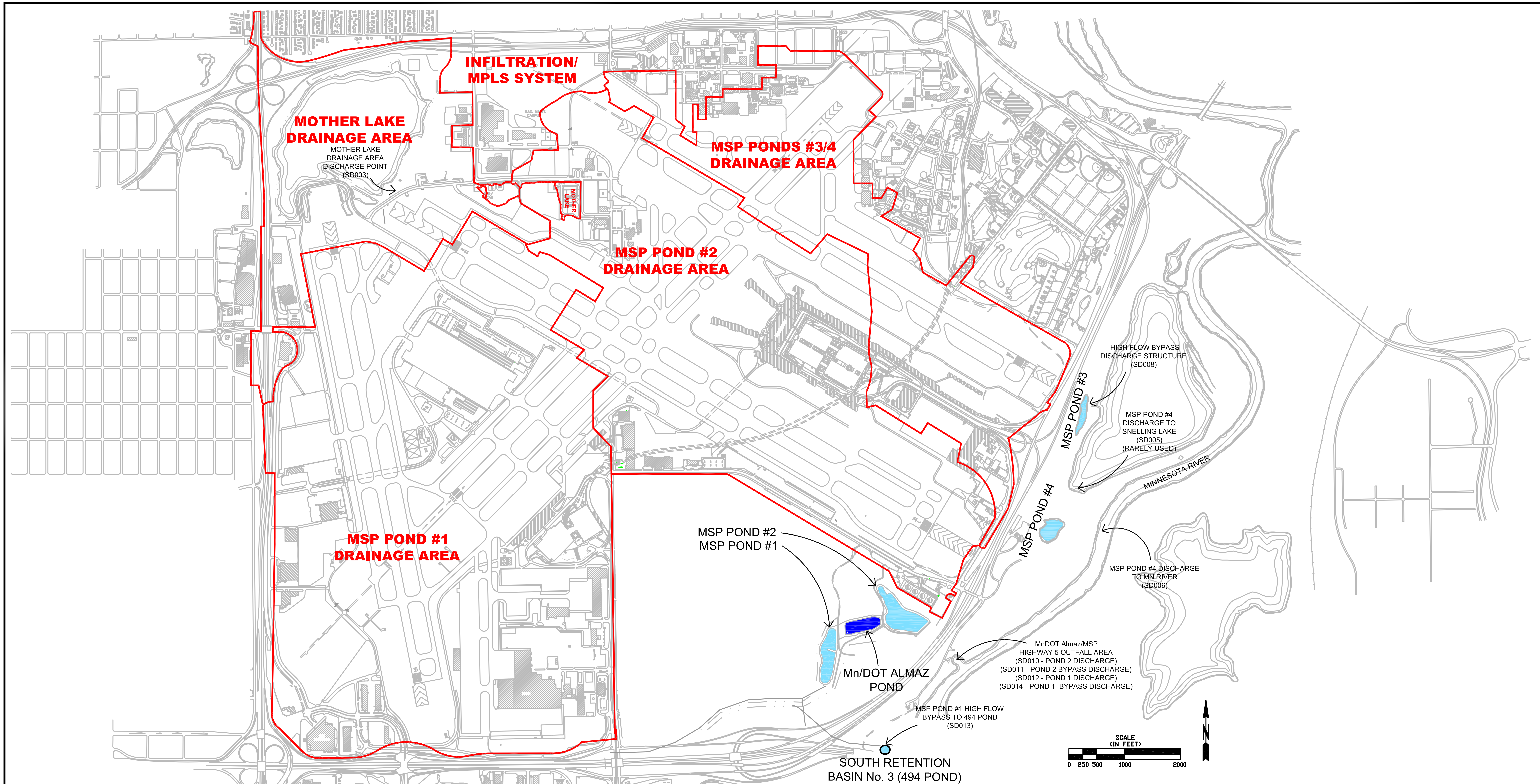
5.18.1.4 Affected Environment

The Study Area for surface water includes the storm sewer collection system, the MSP stormwater ponds, the 494 Bypass Pond, the Mn/DOT Almaz Pond and the Minnesota River. The drainage areas of these ponds on MSP property cover approximately 2,840 acres, of which approximately 1,880 acres are impervious surfaces. Nearly all stormwater from MSP drains via storm sewers to retention ponds prior to discharge to the Minnesota River. A small area of MSP drains to Mother Lake. Stormwater from MSP Pond 3 can overtop into Snelling Lake during peak storm events before entering the Minnesota River. **Figure 5.18-1** shows the drainage areas and the discharge locations to public waters.

The MSP Pond 1 Drainage Area receives stormwater discharges from virtually all airport activity on the west side of MSP, including Terminal 2-Humphrey, the cargo facilities and Runway 17-35. The MSP Pond 2 Drainage Area receives stormwater from the majority of airport activity at MSP, including most of Terminal 1-Lindbergh. MSP Ponds 1 and 2 were designed to reduce TSS discharges to the Minnesota River by approximately 80% and can contain fuel spills.

MSP Ponds 3 and 4 operate in series. They receive discharges from the portion of Terminal 1-Lindbergh servicing regional aircraft, portions of Runways 12L-30R and 4-22 and associated taxiways, inbound and outbound roadways, Post Office and Air Force Reserve and Air National Guard Airside Operations. The combined Ponds 3 and 4 system also reduces TSS discharges by 80% or more to the Minnesota River and can contain fuel spills.

In addition the Mn/DOT Almaz Pond serves portions of I-494, TH 77 and related roadways. It was designed to the same standards as MSP Ponds 1 and 2 to reduce annual TSS discharges by approximately 80%.



LEGEND

Drainage Area

MSP Stormwater Pond

Mn/DOT Almaz Stormwater Pond

Source: Data compiled and maintained Liesch Associates, Inc. Base Map provided by TKDA.

Disclaimer: This map was generated by HNTB Corporation based off of CAD files supplied by other parties. No claims are made to the accuracy or completeness of the information shown herein nor to its suitability for a particular use. The scale and location of map are approximate.

5.18.1.5 Impact Analysis

Impacts on surface water quality were assessed by considering storm sewer network hydrology; organic loadings, TSS removal; and petroleum/fuel discharges. The impact analysis for each of these considerations is briefly described in the following sections. See ***Appendix L****, Hydrology and Stormwater Pond Analysis*, for detailed information.

Storm Sewer Network

The Action Alternatives result in changes in the impervious surfaces which could in turn change the ability of the storm sewer system to convey stormwater. Where changes in impervious surfaces were more than minimal, hydrologic models were updated to assess system performance. The models were used to determine the ability of the existing storm sewer system to handle the 10-year storm event and changes in total stormwater discharges to the Minnesota River in the 100-year storm event.

The No Action Alternative includes minimal construction. Therefore, the No Action Alternative would have little or no impact on localized flooding and peak discharges to the Minnesota River.

The Airlines Remain Alternative includes the addition of 2.7 acres of net new impervious surface within the Pond 1 drainage area, and 3.7 acres associated with roadway improvements outside the Mn/DOT Almaz area. Pond 2 and combined Ponds 3 and 4 have negligible changes in net impervious surfaces, -0.2 and 0.3 acres, respectively. The net increase in impervious surface of 6.5 acres is insignificant relative to the existing approximately 1,880 acres of impervious surfaces. The Airlines Remain Alternative would have no significant impact on localized flooding and peak discharges to the Minnesota River.

The Airlines Relocate Alternative includes 27.5 acres of net new impervious surface proposed in the Pond 1 drainage area, and 1.1 acres of net new impervious surface associated with roadway improvements outside the Mn/DOT Almaz drainage area. Pond 2 and combined Ponds 3 and 4 have negligible change in net impervious surfaces, -0.2 and 0.0 acres, respectively. The existing Pond 1 drainage area model was updated to include the new impervious surface. Results show the existing storm system is capable of conveying the 10 year storm event without flooding pavements. Total peak discharges during the 100-year storm event at TH 5 (which include Pond 1, Pond 2 and MnDOT Pond discharges) increase by 6 cfs, less than 0.2% of the peak flow rate. Additionally, the net increase in impervious surfaces of 28.4 acres is insignificant relative to the existing approximately 1,880 acres of impervious surfaces.

The impacts on the stormwater network in 2030 were also assessed to address FHWA requirements. The post 2020 regional roadway improvements would increase the Mn/DOT Almaz Pond drainage area by 6.5 acres; 5.2 acres impervious and 1.3 acres pervious. Peak discharges from the MSP Pond 1, 2 and Almaz pond are not expected to increase measurably at TH 5 as a result of these drainage area increases. However, Mn/DOT reports that areas upstream of the proposed improvements overload the I-494 stormwater system in 5-year storm events. Prior to addition of new impervious areas to the Almaz pond, the project sponsor will investigate design options to address additional runoff to the system that will not create a wildlife hazard for the airport.

Organic Loading – Aircraft Deicing Fluid (ADF) Impacts

The potential impacts to organic loading in the Minnesota River were evaluated by quantifying the ability to capture aircraft deicing fluid (ADF). ADFs are applied by MSP tenants as required by FAA requirements and at the direction of the pilot. The airport operates a Glycol Recovery Program that collects spent ADF from various deicing locations around MSP and transports the spent fluid to the Glycol Management Facility where the glycol-impacted stormwater is either sent to treatment or recycled. The primary focus of the Glycol Recovery Program is to minimize the amount of glycol that discharges from MSP into the Minnesota River. Over the past five deicing seasons the Glycol Recovery Program has reduced the organic loadings to the Minnesota River by an average of 83%.

Spent glycol collection efficiencies can differ substantially based on the location the ADF is applied. The Action Alternatives would change the locations where aircraft deicing would occur. Therefore, modeling of ADF capture based on the aircraft deicing locations was conducted. The results of the modeling allowed for comparison of glycol collection efficiency between the alternatives.

Modeling results show that the No Action Alternative provides essentially the same glycol collection performance as is currently available.

Under the Airlines Remain Alternative, non-hub airlines remain at Terminal 1-Lindbergh and are assumed to continue deicing operations at the aircraft gates. The G Concourse will be expanded in this alternative, which includes constructing facilities to permit at-gate deicing as well as replacing the existing 30L Deicing Pad with a newly configured pad. Terminal 2-Humphrey will include the addition of three new gates under this alternative and it is assumed at-gate deicing would occur at those gates.

The modeling shows that the Airlines Remain Alternative would result in overall collection efficiencies increasing by 0.7%. This is due to the migration of deicing activities from older plug and pump (PnP) sites to the newer PnP pavements associated with the expanded G Concourse and the three new Terminal 2-Humphrey gates.

Under the Airlines Relocate Alternative, non-SkyTeam airlines are relocated to a newly expanded Terminal 2-Humphrey. This construction includes substantial areas of new pavement to service the new gates. It is assumed at-gate deicing will continue to be the preferred deicing option for Terminal 2-Humphrey tenants. Terminal 1-Lindbergh will have a new International Facility constructed at the end of the G Concourse. The new G Concourse gates include constructing new pavement facilities to permit at-gate deicing as well as replacing the existing Runway 30L Deicing Pad with a newly configured pad.

The results of the modeling show that the Airlines Relocate Alternative would result in overall collection efficiencies increasing by 1.7%. This is due largely from the migration of deicing activities from the E Concourse PnP to the new Terminal 2-Humphrey PnP systems. In addition, some deicing activity at Terminal 1-Lindbergh will migrate to the new Concourse G PnP areas associated with the new International Facility.

Therefore, it is concluded that the Action Alternatives would result in a small benefit to water quality in terms of organic loading. See ***Appendix M***, *Change in Surface Water Impacts from Aircraft Deicing and Fueling* for more information regarding the analysis of these impacts.

Total Suspended Solids

Analyses were conducted to demonstrate the effectiveness of the exiting stormwater ponds in removing TSS with each of the alternatives. Proposed changes in impervious surfaces under each alternative were input into stormwater detention pond models to determine the effect on TSS removal performance.

The No Action Alternative does not result in changes to the amount of impervious surface. Therefore, there would be no change in TSS removal performance from existing conditions.

Under the Airlines Remain Alternative, the amount of new impervious surface in the drainage areas for Pond 2 and combined Ponds 3 and 4 is negligible. Therefore, neither Pond 2 nor combined Ponds 3 and 4 TSS treatment performance would be affected. The net impervious area within the Pond 1 drainage area increases by 2.7 acres. Model results show a decrease in Pond 1 treatment efficiency from 93.6% to 93.5% TSS removal. Additionally, 3.7 acres of net new impervious surface will be constructed outside the Mn/DOT Almaz Pond drainage areas in association with roadway improvements.

As with the Airlines Remain Alternative, the drainage areas associated with Pond 2 and combined Ponds 3 and 4 have negligible change in net new impervious surfaces under the Airlines Relocate Alternative. Therefore, neither Pond 2 nor combined Ponds 3 and 4 TSS treatment performance would be affected. The net impervious area within the Pond 1 drainage area increases by 27.5 acres. Model results show a decrease in Pond 1 treatment efficiency from 93.6% to 92.4% TSS removal with the Airlines Relocate alternative. Additionally, 1.1 acres of net new impervious surface would be constructed outside the Mn/DOT Almaz drainage areas in association with roadway improvements.

The change in TSS removal within the MSP drainage area between the No Action and Action Alternatives would be relatively small. For context, 1.2% of Pond 1 TSS discharge is approximately 400 lbs/year, or 0.4% of all MSP discharges to the Minnesota River. Also, the amount of new impervious surface outside the pond drainage area is small and would need to comply with construction NPDES and Lower Minnesota River Watershed District permit requirements. Therefore, it is concluded that the alternatives would have little impact on TSS loads in the Minnesota River.

The impacts on the TSS removal in 2030 were also assessed to address FHWA requirements. The post 2020 regional roadway improvements only impact the Mn/DOT Almaz Pond. Modeling shows that the TSS removal in the MnDOT Almaz Pond would be reduced from 84.60% to 84.30%. The TSS treatment efficiency is greater than 80% which is deemed acceptable.

Petroleum / Fuel Impacts

Factors that may change the collection of petroleum and fuel spills are considered to assess potential related impacts to water quality. None of the alternatives include major modifications to the stormwater conveyance systems near the end of pipe where the petroleum impact discharge prevention mechanisms are located. In addition, it is assumed that spill response, notification and clean-up will continue to be part of MSP operations regardless of the alternative selected. Lastly, the total number of operations does not change based on the alternative selected, therefore the total number of fueling operations and total volume of fuel is not expected to change.

It is expected that the location of fueling activities will be different based on the alternative selected, in particular if Airlines Relocate Alternative is selected and Terminal 2-Humphrey is considerably expanded. However, it is not anticipated that the relocation of fueling facilities would negatively impact petroleum surface water discharges. With the Airlines Relocate Alternative, the fueling activities move from the MSP Pond 2 drainage area to the MSP Pond 1 drainage area. The stormwater ponds serving these areas are equipped with essentially identical spill release prevention measures. Therefore, it is not expected there would be a material change in potential impacts from any of the alternatives.

5.18.1.6 Permitting

All projects must comply with the SWPPP and meet construction NPDES permit and Lower Minnesota River Watershed District permit requirements. Also, a Mn/DOT drainage permit will be obtained for projects that impact TH 5 and I-494 drainage.

5.18.1.7 Summary

Table 5.18.1 summarizes the results of the analyses and the impacts on surface water due to each alternative. The analysis shows that changes in stormwater runoff volume and runoff water quality discharged to the Minnesota River would be negligible for all of the Alternatives. In addition, all projects will comply with the SWPPP and meet construction NPDES permit and Lower Minnesota River Watershed District permit requirements. Therefore, the Alternatives would have minimal impacts on surface water quality.

See ***Appendix L*** and ***Appendix M*** for more information regarding the analysis of these impacts.

Table 5.18.1

Surface Water Impacts

	Storm Sewer Network Hydrology	Organic Loadings	Total Suspended Solids (TSS)	Petroleum/Fuel Discharges
No Action	- Minimal construction results in no impact on localized flooding and peak discharges to Minnesota River.	- Same glycol collection performance as is currently available.	- No changes in impervious surfaces, therefore no changes in impacts.	- Spill Response Plan and spill control mechanisms are currently in place. - The total number of operations does not change based on the alternative, therefore fueling operations and volume of fuel does not change. - Location of fueling operations may vary but is not expected to impact petroleum surface water discharges.
Airlines Remain	- Net increase of 6.5 acres of impervious surface - Insignificant relative to existing impervious surface of~1,880 acres. (increase equates to ~0.4%)	- Overall collection efficiencies would increase by 0.7%, due to the migration of deicing activities from older sites to newer pavements.	- Impervious areas for MSP Ponds 2 and combined Ponds 3 and 4 change minimally. - Pond 1 maximum increase in impervious area is 27.5 acres. - Pond 1 treatment maximum efficiency decrease from 93.6% to 92.4% TSS - 1.2% of Pond 1 TSS discharge is approximately 400 lbs/year, or 0.4% of all MSP discharges to the Minnesota River.	
Airlines Relocate	- Net increase of 28.4 acres of impervious surface - Insignificant relative to existing impervious surface of ~1,880 acres. (increase equates to ~1.5%)	- Overall collection efficiencies would increase by 1.7%, due to the migration of deicing activities from the E concourse to the new Terminal 2 systems.		
2030 Analysis	- Drainage area for the Mn/DOT Almaz Pond would increase by 6.5 acres; 5.2 acres impervious and 1.3 acres pervious. - Modeling shows no measureable increases in peak flow.	Not applicable – changes in organic loading are related to aircraft deicing.	- TSS removal in the Mn/DOT Almaz Pond would be reduced from 84.60 % to 84.30%. The TSS treatment efficiency is greater than 80% which is deemed acceptable.	Not applicable – petroleum/ fuel discharges are related to potential spills on the airport.

Source: Liesch Associates, Inc. 2012.

5.18.2 Groundwater

This sub-section provides information about groundwater related regulations, the affected environment and potential impacts.

5.18.2.1 Regulatory Background

The CWA also applies to groundwater. Additionally, the MPCA has broad authority to regulate activities that have the potential to contaminate groundwater. The Airport's NPDES/SDS (State Disposal System) permit can include groundwater as an aspect of the permit's authorization. The more typical (and more direct) regulatory jurisdiction is through the leaks/spills clean-up authority that the MPCA may use. The MPCA has historically reviewed cases of potential groundwater impacts on a case-by-case basis and responded appropriately given the potential severity of the impacts and the potential for those impacts to affect off-site receptors. This risk-based approach has served both the public and the airport well to maintain efficient and effective response to potential groundwater issues.

5.18.2.2 Approach and Methodology

Impacts to groundwater at MSP are largely associated with fuel spills/leaks and the potential vertical migration or exfiltration of aircraft deicing fluids. Therefore, the Alternatives were reviewed regarding their relative potential for fuel spills/leaks and capture of aircraft deicing fluids.

5.18.2.3 Threshold of Significance

The threshold of significance for surface water impacts also applies to groundwater impacts.

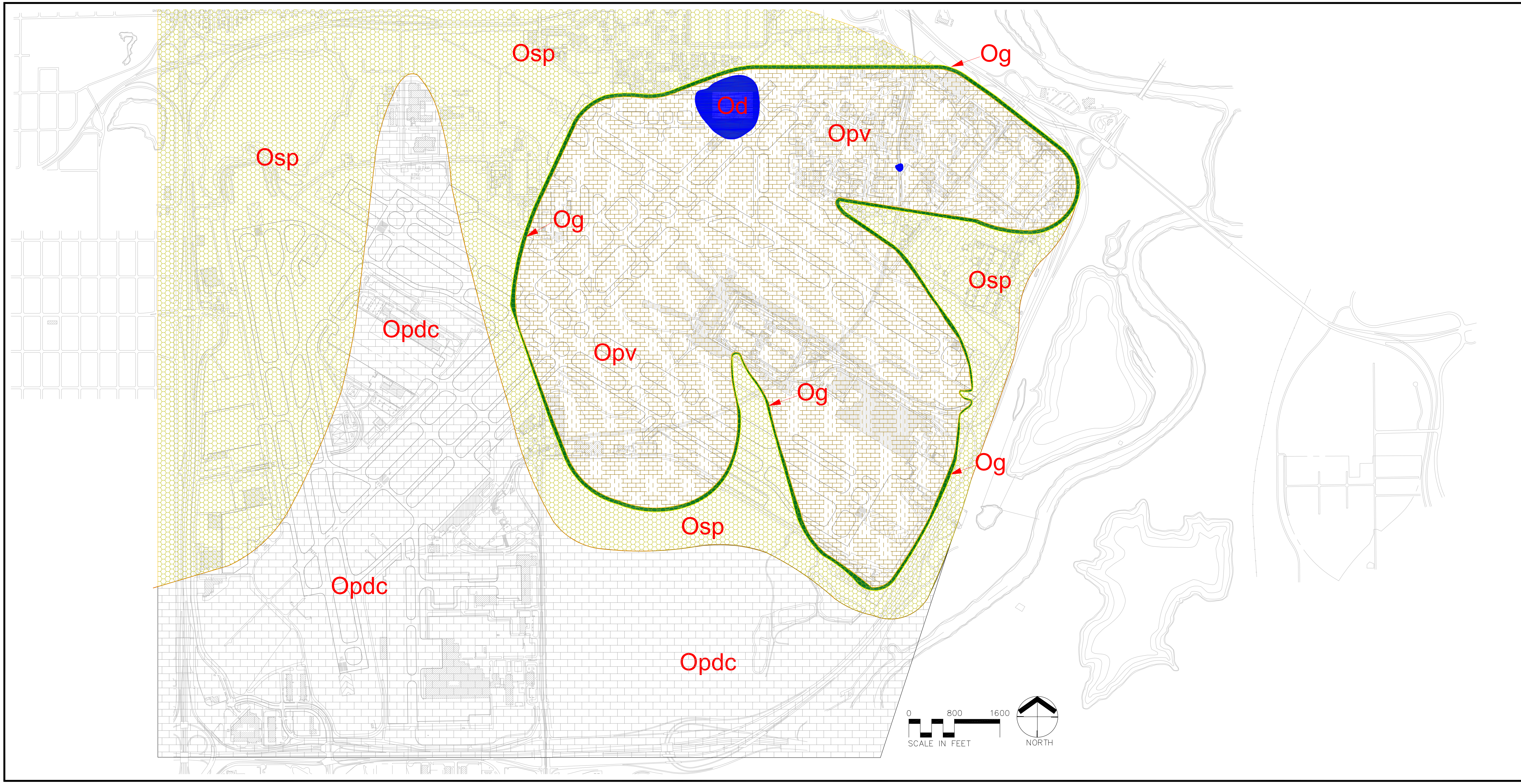
5.18.2.4 Affected Environment

Groundwater at MSP generally flows in an east/southeasterly direction towards the Minnesota River. All groundwater eventually flows into the Minnesota River basin. The Minnesota River and related Fort Snelling State Park water bodies are the only downstream receptors for MSP groundwater flows.

MSP is underlain by the complete section of Paleozoic bedrock units found in the Twin Cities Basin, which are overlain by a variety of glacial sediments. The bedrock topography is illustrated in **Figure 5.18-2**. The bedrock units include (from youngest to oldest) Decorah shale, Platteville limestone, Glenwood shale, St. Peter sandstone, Prairie du Chien formation, Jordan sandstone and the St. Lawrence formation. The Glenwood shale serves as a confining layer that prevents vertical migration of groundwater into the St. Peter sandstone. The base of the St. Peter sandstone also serves as a confining layer to prevent groundwater migration into the Prairie du Chien/Jordan aquifer system.

There is a perched water table in the Platteville limestone, a deeper water table in the St. Peter sandstone and, in the bedrock valleys, a water table in the unconsolidated glacial sediments.

The MAC has constructed a comprehensive well network (CWN) to monitor groundwater at MSP, and has regularly sampled and reported groundwater quality from the CWN since 2005. The primary contaminants of concern at MSP are petroleum-related impacts and residuals from aircraft deicing fluid (ADF) in the groundwater. **Figure 5.18-3** shows the location of the monitoring wells in the CWN.



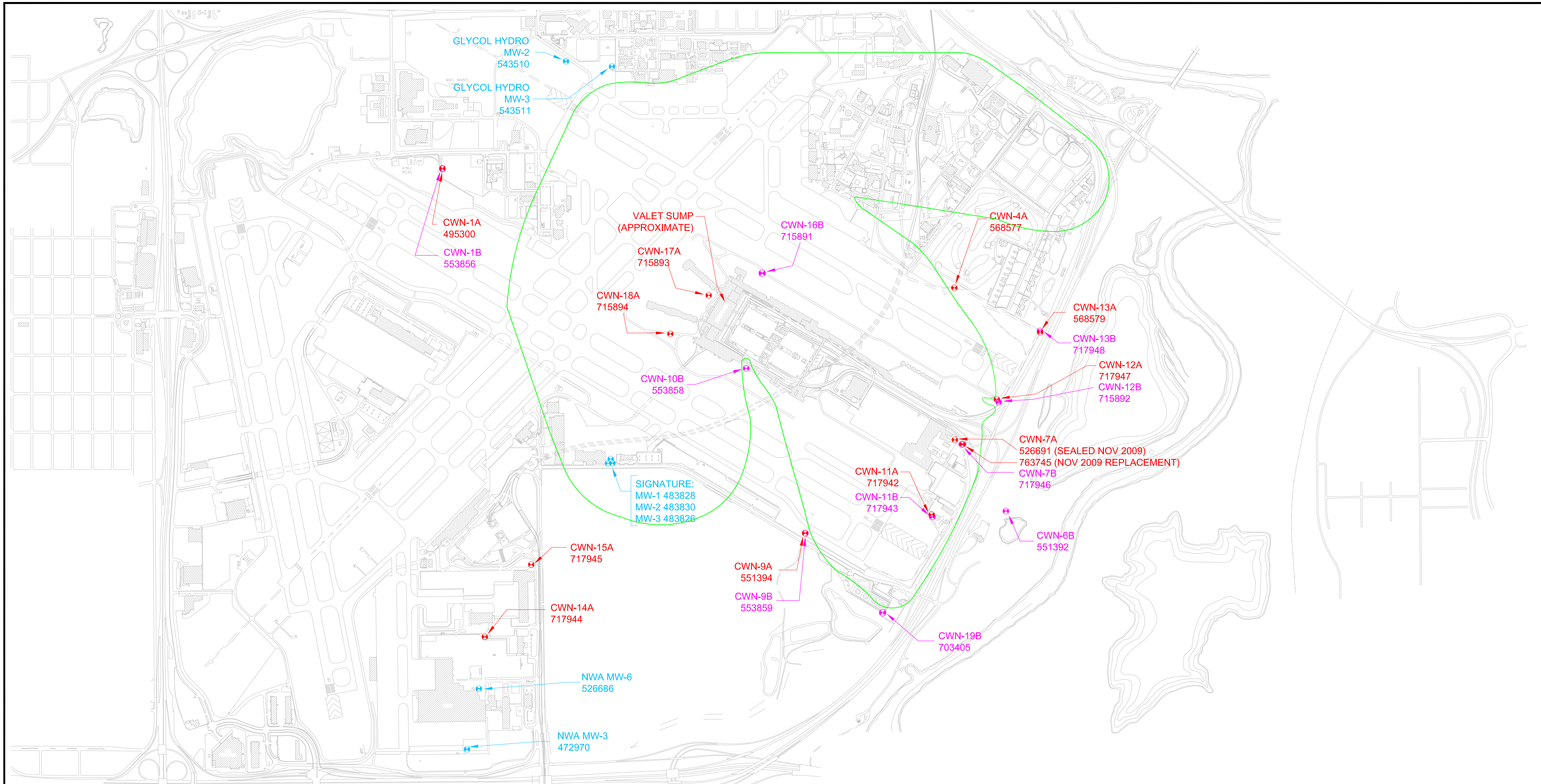
LEGEND

- Od — Ordovician Decorah Shale
- Opv — Ordovician Platteville Limestone
- Og — Ordovician Glenwood Shale
- Osp — Ordovician St. Peter Sandstone
- Opdc — Ordovician Prairie du Chien Dolomitic

Bedrock Topography

Source: Data compiled and maintained Liesch Associates, Inc. Base Map provided by TKDA.

Disclaimer: This map was generated by HNTB Corporation based off of CAD files supplied by other parties. No claims are made to the accuracy or completeness of the information shown herein nor to its suitability for a particular use. The scale and location of map are approximate.



LEGEND
- CWN WATER TABLE WELLS WITH ANALYTICAL
- CWN WATER TABLE WELLS WATER LEVEL ONLY
- CWN ST. PETER WELLS WITH ANALYTICAL
- ESTIMATED EXTENT OF SHALE CONFINING LAYER

Comprehensive Well Network (CWN) Monitoring Wells

Source: Data compiled and maintained Liesch Associates, Inc. Base Map provided by TKDA.

Disclaimer: This map was generated by HNTB Corporation based off of CAD files supplied by other parties. No claims are made to the accuracy or completeness of the information shown herein nor to its suitability for a particular use. The scale and location of map are approximate.

Groundwater monitoring in the St. Peter sandstone has resulted in a limited number of contaminant detections and the majority of detections that have been observed are transient in nature (i.e., they are not found in subsequent sampling events), with the exception of detections associated with known historic releases. In general, groundwater monitoring data have not identified free product or significant petroleum contamination at MSP outside of the known historical petroleum release sites. In addition, propylene glycol and chemical oxygen demand testing has indicated airport-wide subsurface glycol impacts are not present at MSP.

Two factors make the overall airport site an attractive hydrogeological setting in terms of natural protection of the deeper aquifers. First, the Prairie du Chien/Jordan Aquifer is protected by the basal St. Peter sandstone confining layer, and the St. Peter sandstone is protected by the Glenwood shale confining layer (in those locations where shale is present). These confining layers inhibit downward movement of fuel or other surface contaminants into the water resources below. Second, the Minnesota River system is believed to represent the regional groundwater discharge location, constraining the area of potential impact to the zone between MSP and the river system.

In addition to natural protection features, the MAC and its tenants have active programs in place to protect against groundwater contamination at MSP. These include fueling system and tank tightness testing; tanks and fueling systems in compliance with current regulations for secondary containment, corrosion protection and spill/overfill protection; an integrated spill plan (ISP); glycol collection systems at locations ADF is applied; and the extensive groundwater monitoring network.

5.18.2.5 Impact Analysis

The airport activities that have the greatest potential to result in groundwater impacts are fueling and to a lesser extent aircraft deicing. The total number of aircraft operations does not change between the Alternatives. Therefore the total fueling operations should remain similar. Given the accidental and unpredictable nature of fuel spills/leak, it is not anticipated that there would be a material difference in the potential for groundwater impacts from fueling activities between the Alternatives.

Aircraft deicing may have the potential to impact groundwater. The mechanism for the groundwater impacts from deicing is still under review; however it is believed that it is related to storm sewer pipe exfiltration and/or vertical migration through the surface pavement. Regardless of the potential pathway, the two Action Alternatives would be expected to reduce the overall potential for groundwater impacts because each alternative includes the construction of new pavements with storm sewer systems that will likely include design criteria to improve collection of glycol-impacted stormwater. If pipe exfiltration or vertical migrations are sources of groundwater impacts from deicing, these new systems would reduce the potential compared to the No Action Alternative. However, the reduction in potential will be fairly nominal as the vast majority of deicing activities will remain unchanged between the No Action Alternative and the Action Alternatives.

The MAC is not aware of significant groundwater contamination issues in the roadway improvement areas. Furthermore, the industrial activities of concern, primarily aircraft fueling and deicing, have not and will not occur in roadway improvement areas.

5.18.2.6 Summary

The potential for groundwater impacts from fueling and aircraft deicing activities would likely be similar for all Alternatives. Therefore, when compared to the No Action Alternative, the Action Alternatives would not result in an impact to groundwater quality.

5.18.3 Drinking Water

All of the potable water used on the MSP campus is supplied by the City of Minneapolis Water Department with the exception of the Runway 35 approach runway protection zone (RPZ) area which is serviced by the City of Bloomington.

There are no drinking water wells on MSP or down gradient between MSP and the groundwater discharge location at the Minnesota River. The Minnesota River is not a drinking water resource.

The nearest public water supply is the City of Richfield. All construction actions would take place at locations down-gradient of public wells and outside the limits of the City of Richfield wellhead protection area.

5.18.4 Wastewater

All wastewater generated on the MSP campus is treated by the Metropolitan Council Environmental Services (MCES) at its Metro Wastewater Treatment plant. The operating capacity of the Metro plant is 251 million gallons per day (MGD).

The amount of wastewater generated is related to the number of enplanements. Since the number of enplanements is the same for the No Action Alternative and the Action Alternatives, the wastewater generation would be expected to be the same. However, the amount of wastewater would be reduced by incorporating low-flow restroom facilities in expanded or remodeled locations as part of the Action Alternatives. Therefore, the Action Alternatives would generate less wastewater than the No Action Alternative.

5.19 Wetlands

Executive order 11990, Order DOT 5660.1A, *the Rivers and Harbors Act of 1899* and the *Clean Water* Act address activities within wetlands. Wetlands are also regulated under the Minnesota Wetland Conservation Act of 1991 (WCA).

The only location in the Study Area with wetland characteristics is a small area between the north- and south-bound lanes of TH 5. This location is not shown as a wetland on the National Wetland Inventory map. The Hennepin County Soil Survey identifies non-hydric soils at this location. A review of old aerial photographs and highway construction drawings shows this location to be a former upland that included a gravel roadway and was wooded with oak and maple trees. The wetland characteristics were man-induced, and therefore exempt from the WCA. Thus, there are no MNDNR-protected or WCA jurisdictional wetlands within the Study Area. Based on the same considerations, it is assumed that the subject area does not qualify as a wetland according to USACE criteria. Coordination with the USACE confirmed this assumption. Refer to Appendix F for related correspondence.

Therefore, it is concluded that there are no wetlands in the Study Area.

Since there are no wetlands within the Study Area, none of the Alternatives would directly impact wetlands.

The potential for indirect impacts outside the Study Area was also considered. None of the Alternatives would significantly alter drainage areas or runoff volumes beyond the Study Area. The Action Alternatives would result in minor increases in impervious surfaces. The minor changes in impervious surfaces are in locations were stormwater runoff is collected by storm sewers. The storm sewers discharge directly into stormwater ponds for quantity and quality control prior to release into the Minnesota River. Therefore, none of the Alternatives would cause indirect impacts to wetlands located outside of the Study Area.

5.20 Wild and Scenic Rivers

The *Wild and Scenic River Act* defines river areas eligible for protection under the legislation as those that are free flowing and have "outstanding remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, and similar values."[33] River segments that have been designated as Wild and Scenic are included in the National and Wild and Scenic Rivers System. River segments that potentially qualify for inclusion in the National Wild and Scenic River System are listed on the Nationwide Rivers Inventory (NRI), compiled by the US National Park Service.

The Proposed Action would have a significant impact if it would alter a river designated as Wild and Scenic pursuant to the federal *Wild and Scenic Rivers Act*. The closest designated Wild and Scenic River to MSP is the St. Croix River which is approximately 25 miles east of MSP. Due to its distance from MSP, the St. Croix River would not be altered or impacted by any of the Alternatives.

The only river segment listed on the Nationwide Rivers Inventory within five miles of the Airport is the Mississippi River between St. Croix and the USACE Lock and Dam #1 in Minneapolis. Since none of the Alternatives would physically alter this river segment and analysis shows that changes in stormwater runoff volume and runoff water quality discharged to the Minnesota River would be negligible for all Alternatives, it is concluded that the Alternatives would not alter an NRI river. Therefore, none of the Alternatives would impact Wild and Scenic Rivers.

5.21 Cumulative Effects

The following sub-sections describe the regulatory background for considering cumulative impacts, the other projects considered, and potential cumulative impacts.

5.21.1 Regulatory Background

The Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (40 CFR Parts 1500 – 1508) require that cumulative impacts are addressed as part of the NEPA process. The CEQ Regulations define a cumulative impact as "…the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."[34]

The Minnesota Administrative Rules also require that the Environmental Assessment Worksheets include the identification of cumulative potential effects.[35] The Minnesota Administrative Rules provide a definition for cumulative impacts that is very similar to that found in the CEQ Regulations. The Minnesota Administrative Rule 4410.0200 goes one step further and defines the term cumulative potential effects. ""Cumulative potential effects" means the effect on the environment that results from the incremental effects of a project in addition to other projects in the environmentally relevant area that might reasonably be expected to affect the same environmental resources, including future projects actually planned or for which a basis of expectation has been laid, regardless of what person undertakes the other projects or what jurisdictions have authority over the projects. Significant cumulative potential effects can result from individually minor projects taking place over a period of time. In analyzing the contributions of past projects to cumulative potential effects, it is sufficient to consider the current aggregate effects of past actions."[36]

5.21.2 Approach and Methodology

Completed and anticipated projects at the airport and in the abutting communities, including the cities of Richfield, Bloomington and Minneapolis, were reviewed for inclusion in the list of projects to be considered in evaluating cumulative impacts. However, since the communities of Mendota Heights, St. Paul and Eagan do not abut the airport, projects in these communities were not considered in evaluating cumulative impacts.

The MAC reviewed available planning documents for projects in the Cities of Richfield, Bloomington and Minneapolis to develop a list of recent and potential projects near the airport. The MAC shared these lists with the subject cities and met with their planning representatives. The lists of projects were updated based on information provided at these meetings.

Once the projects were identified, the next step was to determine which of the environmental impact categories need to be considered. Cumulative effects analysis is resource specific and generally addresses environmental resources that would be affected by the Alternatives. The key question is "do the effects of the proposed action on a particular environmental resource, when added to effects on the same resource due to other nearby and near-term actions, adversely impact that resource."[37] Therefore, cumulative effects are assessed only for the environmental categories that would be impacted by the alternatives.

Based on the analysis in this Chapter, the Action Alternatives would not likely impact the following environmental categories: coastal resources; air quality, compatible land use; DOT Section 4(f) resources, farmlands; fish, wildlife and plants; floodplains; hazardous materials; historic resources, light emissions and visual effects; secondary impacts; socioeconomic impacts (except traffic), environmental justice, children's health and safety risks; wetlands; and wild and scenic rivers. The Alternatives would potentially result in construction, traffic and circulation, water quality and noise impacts. Therefore, these impact categories were considered in identifying the potential for cumulative effects.

It is noted that induced demand is not considered reasonably foreseeable and therefore not included in the assessment of cumulative impacts. The Action Alternatives are not expected to result in induced demand. In other words, the forecasted numbers of aircraft operations are the same for all alternatives. While the No Action Alternative represents a much more crowded condition, the projected daily and annual demand can be accommodated, albeit at a reduced level of service. The No Action Alternative design day flight schedule and associated airfield simulation analysis demonstrate that the airlines will need to make some changes in their scheduled flight times to accommodate projected demand with existing terminal facilities through 2025. Therefore, the induced aviation activity (difference between Action Alternatives and No Action Alternative activity) resulting from the proposed terminal facility improvements consists of a redistribution of existing activity rather than creation of additional demand from new aircraft operations.

5.21.3 Thresholds of Significance

The thresholds of significance are the thresholds noted previously for construction; traffic and circulation; water quality and noise.

5.21.4 Impact Analysis

The projects listed in **Table 5.21.1** were considered in the assessment of potential cumulative impacts.

Table 5.21.1

Projects Identified for Consideration of Cumulative Potential Effects

Project	Description	Construction Year
MSP		
Runway 17 Deicing Pad Construction	Constructed a deicing/holding pad for Runway 17. Included paving of adjacent Taxiways W, Y, K8 and Y3 and a snow melt pad associated with the glycol collection system. Also included construction of a support facility for deicing vehicles. The support facility has six 2000-gallon glycol tanks and pumps and supply piping for Type I glycol.	2005
Runway 17/35 Land Acquisition	Acquired off-airport land required to provide for the Runway 17/35 Protection Zone (RPZ). In addition, 29 single family residences and two apartment complexes with a total of 132 units located in Bloomington south and east of the Mall of America were acquired for noise mitigation purposes.	2005-2006
Taxiway Q Construction	Constructed Taxiway Q between Runway 4/22 and Taxiway C	2005
Residential Sound Insulation – 2007 DNL 65 contour	Completed the program to insulate single family residential houses within the certified 2007 DNL 65-noise contour.	2007
Taxiway C/D Complex	Reconstructed and reconfigured Taxiways C and D between Runway 12L/30R and Runway 12R/30L. This project relocated both taxiways further to the west which allowed unrestricted access of Group V aircraft around the west side of Concourses E and F.	2005-2010
34th Avenue Reconstruction – North of 70th Street	Reconstructed 34th Avenue north of 70th Street	2005
Taxiway M Extension	Extended Taxiway M to the south approximately 2,100 feet to connect with Taxiway S to provide an alternative taxi route for Runway 17 departures for the Lindbergh Terminal during low visibility conditions.	2006
Multi-family Sound Insulation (Inside 2007 65 DNL	Sound insulation of 575 multi-family units within the 2007 65 DNL contour.	2007
Humphrey Parking Structure Expansion	Expanded the Humphrey Parking Structure to provide an additional 4,550 parking spaces as well as vertical circulation to link the LRT to the new skyway to the Humphrey Terminal.	2007
Pavement Rehabilitation – Runway 12R/30L	Reconstructed the middle section of Runway 12R/30L located between Runway 4/22 and Taxiway A4.	2009
Residential Sound Insulation	Sound insulation program based on the 2007 Noise Exposure Map contained in the Part 150 Update consistent with the terms and conditions of the court ordered Consent Decree	2008-
Taxiway P Reconstruction	Realigned and reconstructed the section of Taxiway P from Taxiway C to Taxiway P4. This project provided for the mill and	2008-2009

Table 5.21.1

Projects Identified for Consideration of Cumulative Potential Effects

Project	Description	Construction Year
	overlay of the bituminous section on Runway 12L/30R from Runway 4/22 to Taxiway P6.	
Concourse G Extension – Site Preparation	Demolition of the Building B complex except for premises retained by Northwest Airlines.	2009
Airport Lane/34th Ave. Access Reconfiguration	Realigned the access from 34th Avenue and Airport to conform to standards for similar types of intersections	2009
Noise Mitigation Settlement	Continuation of the implementation of the noise mitigation program based on the Noise Exposure Map contained in the court ordered Consent Decree,	2011-2012
Data Center Facilities	Construct a new consolidated data center.	2012
Taxiway C Extension to Humphrey Remote	Extended Taxiway C between Taxiway S and the Humphrey Remote Apron to improve access to and from the Humphrey Remote Apron and Delta Air Lines Building C maintenance complex.	2011
North Side Storm Sewer Improvements	Improvements to the storm sewer system and Ponds 3 and 4 between Pond 3 and the Minnesota River.	2012-2013

Table 5.21.1

Projects Identified for Consideration of Cumulative Potential Effects

Project	Description	Construction Year
City of Richfield		
Metro Sewer/Regional Trail Project	Upgrade of a sanitary sewer line that serves Edina and Richfield. The project begins at 75th Street and Xerxes Avenue and extends east along 75th Street to I-35W. It crosses I-35W near the 76th Street bridge and extends east along 76th Street to 11th Avenue, where it turns north. It extends north along 11th Avenue to 72nd Street, turns east on 72nd, and extends east to Cedar Avenue on 72nd Street or on Diagonal Blvd. Project was completed in 2011.	2010
New Richfield City Hall	Construction of a new City Hall on Portland Avenue, near 67th Street began in 2010 and was completed in 2011.	2010
Portland Avenue Bridge over Crosstown	The Portland Avenue Bridge deck was replaced and the lighting and railings were replaced for enhanced safety. Completed in 2010.	2010
1120 East 66th Street	Build O'Reilly Auto Parts store in Richfield. Assuming the City Council approves variances for this project, construction should begin in late 2012.	2012
1600 East 78th Street	Rehabilitation of the Eco Smart store building. Project has not yet begun.	Not Available
77th Street Underpass	Extend 77th Street under TH 77 to connect to the 24th Avenue interchange of I-494. The project would improve I-494 by eliminating the need for frontage roads and allowing for expansion of I-494. Funding has not been identified for this project.	Likely after 2020
Taft Lake Improvements / Richfield Parkway Connection to Bloomington Avenue / Taft Lake and Legion Lake Active Treatment	This project demolishes the frontage road, creates pre-treatment (including treatment for water coming out of Mother Lake) for Taft Lake in its place and constructs a Richfield Parkway connection on the south side of Taft Park. This includes acquiring right-of-way and adding trails and open space to Taft Park. The project also includes construction of an active treatment system in the Legion/Taft Lake system to improve water quality within the Minnehaha Creek Watershed District. These projects are being funded by the Minnehaha Creek Watershed District.	2013

Table 5.21.1

Projects Identified for Consideration of Cumulative Potential Effects

Project	Description	Construction Year
North Richfield Parkway/Taft Lake Improvements	This project replaces the Cedar Avenue connection that was lost with the reconstruction of the 66th Street / TH 77 Interchange. It also reroutes the north-south collector between TH 62 and 66th Street along Bloomington Avenue. The new roadway includes two vehicular lanes, on-street bicycle lanes, green boulevards, a concrete walkway and an asphalt regional trail. Approximately three homes will need to be acquired for the new roadway. An additional 18 homes would be acquired for associated residential redevelopment. The proposed residential redevelopment consists of three to four story corridor accessed units with no decks or patios. The units are likely to be developed as senior housing with a care component as there is a need for senior housing in this area. However, low-income housing is not ruled out. The residential redevelopment is demand driven and therefore the associated year(s) of construction are difficult to predict. A total of 100 to 170 units will likely be developed. A noise study was also completed to define developer requirements to ensure noise compatibility.	Prior to 2020
South Richfield Parkway	This project replaces Cedar Avenue with the new Richfield Parkway. It will include redevelopment of area between 66th Street and 70th or 71st Street. The 2.5 blocks just west of TH 77 would be developed as light industrial and the remainder would be residential; all envisioned to be one- to two-story low-density development. However, the redevelopment is demand driven and right now there is not enough vacant land.	Prior to 2020
Bus Rapid Transit on Cedar Avenue	The current Transportation Policy Plan calls for continued development of two Bus Rapid Transit (BRT) corridors in the area, the Cedar Avenue BRT and I-35W BRT. These will provide high frequency express bus services running on dedicated lanes connecting the suburbs with downtown Minneapolis and other transit modes in the region. Transit stations at key points on these routes will offer park-and-ride facilities and bus transfers from local routes to expedite travel in the Metro area. These are Metropolitan Council and Metro Transit projects and, although they will run through Richfield, they will not stop in Richfield.	Prior to 2030*

Table 5.21.1

Projects Identified for Consideration of Cumulative Potential Effects

Project	Description	Construction Year
Nine Mile Creek Regional Trail	Nine Mile Creek Regional Trail will provide connections to the Minneapolis Park and Recreation Board's regional trail system near Lake Nokomis to the north, the Minnesota River Valley Wildlife Refuge Visitor Center to the south, and the Minnesota River Bluffs LRT Regional Trail to the west. The trail is planned to enter the City from Edina through a tunnel under York Avenue. The trail will continue east along 75th Street and over I-35W on the 76th Street bridge. The trail will follow 76th Street to 12th Avenue where it will split and provide both a northern and southern connection. The northern connection goes to the proposed Intercity Regional Trail and the southern connection goes to the Minnesota Valley Wildlife Refuge Visitor Center. The Three Rivers Park District will continue planning efforts to finalize the southern connection with the Minnesota Valley Wildlife Visitor Center. The route for Nine Mile Creek Regional Trail through the City of Edina was recently approved by the Edina City Council and Park District Board of Commissioners. This was a critical step in identifying a contiguous route between the Minnesota River Bluffs LRT Regional Trail in Hopkins and the Minnesota Valley National Wildlife Refuge Visitor Center in Bloomington.	2014
Intercity Regional Trail	The trail that follows Richfield Parkway is the Intercity Regional Trail. The Master Plan for this trail is to be completed in the Fall of 2011. "Most of the Intercity Regional Trail is not yet constructed. However, 3.8 miles between Lake Nokomis and the Mall of America, including a new pedestrian and bicyclist bridge over I-494, received a Federal Surface Transportation Program grant in the amount of $5.5 million. Construction may commence as early as 2014. Remaining unfunded gaps between Lake Nokomis and the Mall of America will be constructed as additional funding, right-of-way, and redevelopment opportunities occur".	2014
Ramp Entrance to Diagonal Boulevard	The ramp entrance from TH 77 may be eliminated post-2020.	Post 2020
Crosstown Highway Widening	This project would construct auxiliary lanes along the Crosstown Highway from Portland Avenue to TH 77. MnDOT is reviewing the corridor to determine if a lane(s) can fit within available width or whether bridge abutments will be impacted.	Prior to 2030*
Amphitheater	This project would construct a small amphitheater (100 people max) either at 66th and Portland or 66th and Lyndale Avenue. The City is aware of potential airport noise effects.	2012

Table 5.21.1

Projects Identified for Consideration of Cumulative Potential Effects

Project	Description	Construction Year
Bloomington		
Mall of America Phase II & South Pad Hotel	Mall of America (MOA) Phase II: • Framework for 5.6 million square feet in integrated mixed use center at the Met Center parcel, consisting of retail, hotel, office, residential and entertainment uses • Direct connection to existing MOA • Revised preliminary development plan approved 11/20/2006, but no development as occurred to date	Prior to 2030*
	South Pad Hotel • 2100 Killebrew Drive • 12-story hotel with 501 rooms built over a 3-level parking structure • Construction began Spring 2011, anticipated to open in Spring 2013	2011
Radisson Blu Hotel	500-room, 13-story hotel connected to the MOA. Construction began in early 2011 and is expected to be completed by late 2012.	2011
Bloomington Central Station	The project is transit oriented development centered around the Bloomington Central Station, an LRT station in the City of Bloomington. Phase I (Reflections) • 2.9 acre parcel, north and west of 34th Avenue and East Old Shakopee Road • Two 17-story residential towers (263 dwelling units) above an underground two level parking structure • Opened in 2006	2006
	Bloomington Central Station Park • 1.9 acre public park with seating areas, garden rooms, water walls and fountains, walkways and public art • Opened in June 2007	2007
South Loop District Plan – 4 Signature Elements	Lindau Link Signature Element includes: • Connecting the Mall of America and Bloomington Central Station • New office, hotel and retail uses along Lindau Lane • Building streetscape, squares and plazas • Complete street design accommodates pedestrians, bicyclists, automobiles and transit	Prior to 2030*
	A portion of the Lindau Link developments has been funded – Lindau Lane, located just north of Mall of America between TH-77 (Cedar Avenue) and 24th Avenue will be improved and extended east to 30th Avenue. The project includes: • Modification to intersection of Lindau Lane and TH 77 with an additional lane between south-bound TH 77 and the Mall of America	2012-2014

Table 5.21.1

Projects Identified for Consideration of Cumulative Potential Effects

Project	Description	Construction Year
	• Lower portion of Lindau Lane (adjacent to the Mall of America) to provide a ground level connection between the existing Mall of America and future phases of the Mall • Extension of Lindau Lane from 24th to 30th Avenue to create a development spine between the Mall of America and the Bloomington Central Station developments • Redesign of 30th Avenue between American Boulevard and East Old Shakopee Road to provide connections to Bloomington Central Station and the Mall of America	
	34th and American Boulevard Signature Element includes: • Mixed-Use Transit Oriented Development (TOD) • Compact development focused around LRT station • 1600 new dwellings combined with office, hotel and support retail • The area around the intersection of 34th Avenue and American Boulevard is envisioned as a new residential neighborhood with up to 3,500 multifamily dwellings in 2050	Prior to 2030*
	24th Avenue Gateway Signature Element includes: • Gateway features at the intersection of American Boulevard and 24th Avenue • Coordinated streetscape on the east and west side of 24th Avenue from American Boulevard to Killebrew Drive • New public plaza at Lindau Lane and 24th Avenue • Buffers along street with trees and rain gardens • Renovated Mall of America transit station	Prior to 2030*
	Bluff Edge Signature Element includes: • Low-impact sustainable development practices on property abutting bluff • Additional trail access to Minnesota Valley National Wildlife Refuge • New trails in the Minnesota Valley National Wildlife Refuge	Prior to 2030*
Nine Mile Creek Regional Trail	See Nine Mile Creek Regional Trail under City of Richfield	2014

Table 5.21.1

Projects Identified for Consideration of Cumulative Potential Effects

Project	Description	Construction Year
City of Minneapolis		
I-35W/Hwy 62 Crosstown Reconstruction	The I-35W/Highway 62 Reconstruction involved reconstruction of the major interchange between I-35W and Hwy 62, as well as segments of both freeways that lead into the interchange. The project extended from 42nd Street to 66th Street on I-35W, and from Penn Avenue to Portland Avenue on Highway 62. The project was completed in 2010.	2007-2010
Riverview Senior Housing	A four-story, 42-unit apartment complex for low-income seniors located at 5114 54th Street E. The building is currently under construction.	2012
Vantage Flats	A four-story, 37-unit apartment building in the Minnehaha Neighborhood located at 5359 Minnehaha Avenue. Project was completed in the Summer 2008.	2007-2008
Creekside Commons	A 30-unit apartment building located at 5412 Stevens Avenue. Project was completed in 2010.	2009-2010
Asphalt Pavement Resurfacing	Asphalt Pavement Resurfacing at 60th Street, East of Chicago Avenue (PV056)	2013
	Asphalt Pavement Resurfacing at Wenonah West (PV056)	2011
Major Pavement Maintenance	Pavement sealcoating at 58th Street East between 28th Avenue South and 34th Avenue South, and at 57th Street East between 34th Avenue South and 42nd Avenue South (PV059)	2011
35W Bus Rapid Transit (BRT)	Proposed 35W BRT (along Crosstown Highway East of 35W) as part of the 2025 Transitway System with no new stops south of Minnehaha Parkway	Prior to 2030*
Intercity Regional Trail	See Intercity Regional Trail under City of Richfield	2014
Lyndale Avenue: A Vision	This plan is to upgrade and revitalize South Lyndale Avenue from Lake Street to 56th Street. It also supports Gateway Committee recommendations for Lyndale between 56th Street and the Crosstown Highway. These improvements include new entrance ramps to the Crosstown Highway and 35W, and exit ramp from Highway 35W to bring traffic to Lyndale Avenue via 59th Street or possibly 61st Street. This would allow for closure of TH 121 and conversion of land use to residential and/or open space. It is likely that at least the recommended improvements South of the Minnehaha Creek Parkway will be in the next CIP.	Likely before 2020

Table 5.21.1

Projects Identified for Consideration of Cumulative Potential Effects

Project	Description	Construction Year
MnDOT		
I-494 between 34th Avenue and France Avenue	This plan includes milling, overlay and construction of a west-bound auxiliary lane from Portland Avenue to Nicollet Avenue, a median barrier and drainage. It also includes construction of a west-bound auxiliary lane 35W to TH 100 and replacement of the Xerxes Avenue bridge.	2013
FAA		
PBN Procedure Design and Implementation	Since November 2010, the FAA has been working to develop PBN procedures and plan for implementation. In addition to safety and operational considerations, the FAA included noise criteria that were developed by the MSP NOC. The NOC noise criteria focused on a noise analysis, including Day-Night Average Sound Level (DNL) noise contour and single-event noise evaluations of the proposed procedures; a public information program; and various procedure design considerations intended to reduce noise impacts around the airport where possible. At the September 19, 2012 NOC meeting the FAA ATO presented the PBN procedures, highlighting the considerations given to the NOC procedure design criteria. The MAC provided their noise analysis of the procedures in compliance with the related NOC criteria. (The NOC facilitated the noise contour analysis.) The FAA indicated during the meeting that a statement of support for the RNAV implementation was needed from the MAC by the end of November 2012 to avoid lengthy delays in procedure publications. This support was needed to meet FAA ATO's requirements under FAA Order 7400.2. In response, the NOC took action to move forward with hosting two public open houses prior to the November 2012 NOC meeting. (The NOC facilitated the public information process.) Subsequently, at the November 14, 2012 NOC meeting the Committee determined that the FAA's process adequately considered the Committee's noise criteria and forwarded their recommendations to the MAC Commission. However, based on extensive input from community leaders and airport neighbors, the MAC Full Commission voted on November 19, 2012 to provide support for the FAA's plan except for departures on Runways 30L and 30R that fly to the northwest of the airport over communities such as South Minneapolis and Edina. The FAA ATO is currently evaluating the partial implementation supported by the MAC Full Commission.	2013

Table 5.21.1

Projects Identified for Consideration of Cumulative Potential Effects

Project	Description	Construction Year

Note:
(*) Exact construction dates for these projects are not known. For many of these improvements, studies and preliminary designs have already been completed. However, the estimated project construction date is highly dependent upon future funding and other project completion dates, among other things. Many of the forecasted conditions for traffic, employment, population, etc. in the studies are for the year 2030, and in addition the cities' Comprehensive Plans look at growth in the next 10 to 20 years. "Prior to 2030" designates the latest year for development in order to provide for forecasted volumes.

Sources:

- Richfield Comprehensive Plan, May 2009.
- City of Richfield Minnesota Capital Improvement Budget and Plan, 2011-2015.
- City of Richfield, Future Projects and Land Use, Meeting with MAC, Meeting Minutes, August 11, 2011.
- Bloomington Community Investments Program, 2011-2015 Draft.
- South Loop District Plan Presentation, May 3, 2011.
- Bloomington Comprehensive Plan, 2008.
- Bloomington CityWEB, Planning Division Development Map and Construction Projects.
- Minneapolis Capital Improvements Projects, 2011 Construction and Proposed 2012 – 2016 Capital Plan (Map) (April 29, 2011).
- The Minneapolis Plan for Sustainable Growth, Approved by City Council 10/2/2009.
- City of Minneapolis, Future Projects and Land Use, Meeting with MAC, Meeting Minutes, August 11, 2011.
- Highway Investment Plan Annual Update, MnDOT, February 2011.

The Alternatives would potentially result in construction, traffic and circulation, water quality and noise impacts. Therefore, these impact categories were considered in identifying the potential for the Action Alternatives along with the projects listed in Table 5.21.1 to result in a significant cumulative impact.

5.21.4.1 Cumulative Effects: Construction; Traffic and Circulation; and Water Quality

Construction of the Action Alternatives may create some unavoidable temporary impacts to surrounding communities such as noise, fugitive dust, and degraded water quality. These impacts would be minimized by implementing BMPs and would be localized; predominantly on the airport at the Post Road/TH 5 and 34th Avenue South/I-494 interchanges. Due to the localized nature of construction impacts, the potential for cumulative effects is likely most relevant to the South Loop District Plan. The MAC and City of Bloomington are coordinating construction sequencing for slated improvements. Given the need for the MAC and City of Bloomington to maintain traffic flow, it is unlikely construction projects will take place at the same time and in the same vicinity. Therefore, it is unlikely that the Alternatives along with the other identified projects would result in cumulative construction effects.

The Alternatives would result in traffic and circulation impacts. However, the analysis showed that the transportation facilities would generally operate significantly better with the Action Alternatives than with the No Action Alternative. Therefore, the Action Alternatives would not contribute to cumulative adverse traffic and circulation impacts.

The Alternatives including both airport and roadway improvements would result in minimal impacts to stormwater. Since none of the other projects considered would discharge stormwater to the storm sewer system at MSP, water quality impacts would not be cumulative. Other projects that discharge to non-MSP systems would be designed with rate and volume control measures to address water quality impacts. Therefore, significant cumulative impacts to the Minnesota River are not expected when considering past, present and future projects. Furthermore, NPDES permitting protects against water quality impacts that would exceed water quality standards.

5.21.4.2 Cumulative Effects: Aircraft Noise

Though the Action Alternatives do not result in any significant impacts, there is the potential for a cumulative significant impact when considering other airport projects. The only other project at the airport that could result in a noise impact is the FAA ATO proposed Performance Based Navigation (PBN) procedures, which includes Area Navigation (RNAV) and Required Navigation Performance (RNP) procedures, and are considered reasonably foreseeable. Therefore, an analysis was conducted to assess the potential for cumulative noise effects of the Alternatives and the proposed PBN procedures.

It is noted that this analysis was added during the development of the Final EA. At the time the Draft EA was published, the FAA was developing the proposed PBN procedures and therefore, it was not possible to evaluate associated noise impacts.

PBN Background

Since 2007 the Minneapolis-St. Paul International Airport (MSP) Noise Oversight Committee (NOC) has been analyzing possible air traffic procedures to reduce aircraft noise impacts around MSP. Early in this effort it was established that a critical element of this initiative would be the use of Area Navigation (RNAV), a method of navigation that permits aircraft operations on any desired course within the coverage of station-referenced navigation signals or within the limits of a self-contained system capability, or a combination of these. In short, this navigation technology provides the capability for aircraft to fly a desired track in a reproducible manner. This approach also allows for more seamless transition to Required Navigation Performance (RNP) operations in the future. Both RNAV and RNP are part of the PBN procedures.

Since November 2010, the FAA has been working to develop PBN procedures and plan for implementation. These procedures are part of a national effort to modernize the national airspace system as part of the Next Generation Air Transportation System. The Next Generation Air Transportation System (NextGen) is the FAA's plan to modernize the National Airspace System (NAS) through 2025. Through NextGen, the FAA is addressing the impact of air traffic growth by increasing NAS capacity and efficiency while simultaneously improving safety, reducing environmental impacts, and increasing user access to the NAS. To achieve its NextGen goals, the FAA is implementing new Performance-Based Navigation (PBN) routes and procedures that leverage emerging technologies and aircraft navigation capabilities.

The NOC developed and forwarded noise criteria for the FAA ATO's consideration during its development and implementation of PBN procedures at MSP. The NOC noise criteria focused on a noise analysis including Day- Night Average Sound Level (DNL) noise contour and single-event noise evaluations of the proposed procedures; a public information program; and various procedure design considerations intended to reduce noise impacts around the airport where possible. At the March 16, 2011 NOC meeting the Committee took unanimous action adopting the criteria to be forwarded to the FAA ATO. The criteria are included in Appendix N.

At the September 19, 2012 NOC meeting the FAA ATO presented the proposed PBN procedure tracks including 13 Standard Instrument Departures (SIDs) and six Standard Terminal Arrival Routes (STARs) and reviewed the design process and the noise considerations addressed in the FAA ATO's design process. Additionally, the MAC staff prepared a detailed noise analysis that was presented to the NOC in compliance with the related NOC criteria. (The NOC facilitated the noise contour analysis.) During this meeting, the FAA ATO indicated that a statement of support for the PBN implementation was needed from the MAC by the end of November 2012 to avoid lengthy delays in procedure publications. This support was needed to meet FAA ATO's requirements under FAA Order 7400.2. In response, the NOC took action to move forward with a public information program including two public open houses prior to the November 2012 NOC meeting. (The NOC facilitated the public information process.)

MAC Public Involvement Process for PBN

Shortly after the September 19, 2012 NOC meeting, NOC-sponsored PBN informational open houses were scheduled to help residents understand how the use of the FAA-proposed procedures could affect flight patterns at MSP and information was posted on the MAC Noise Program website (http://www.macnoise.com/news/open-houses-scheduled-msp-performance-based-navigation). Open houses were held on the evenings of November 8, 2012 at the Crosstown Covenant Church in Minneapolis and November 13, 2012 at the Eagan Community Center. Notice of the open houses was published widely in area newspapers. Several stories about the FAA ATO's project ran in local newspapers and on news channels. Coverage by local news channels included a piece on KSTP Channel 5 on October 8 directing those interested to attend the FAA ATO and MAC staff briefing to the Mendota Heights City Council on October 30. The story also announced the community open houses and directed interested parties to the information on the MAC Noise Program website.

In addition to the open houses, there was a focus on community briefings. FAA ATO and MAC staff provided an informational briefing to any entity that requested one, including the city councils of Richfield, Eagan, and Mendota Heights. Additionally, briefings were provided to the Mayor of Minneapolis, to a group of Minneapolis policy makers and legislative officials, to Apple Valley and Burnsville city staffs, to participants in the fourth quarter 2012 NOC Public Input Meeting on October 23, and to multiple individual residents.

Depending on where people lived, the feedback ranged from positive to very concerned. The predominant concern was with the concentration of overflights over certain residential areas. A large volume of communication was received by the MAC from residents and elected officials following the open houses expressing concern relative to concentrating flights over the residential areas (South Minneapolis and Edina) and the speed of the process, among other concerns.

MAC Support of PBN

Based on extensive input from community leaders and airport neighbors, the MAC Full Commission voted on November 19, 2012 to provide support for the FAA ATO's plan except for departures on Runways 30L and 30R that fly to the northwest of the airport over communities such as South Minneapolis and Edina. Specifically, the MAC passed the following action:

"The Metropolitan Airports Commission supports implementation of the Area Navigation (RNAV) procedures as designed by the Federal Aviation Administration with the exception of RNAV departure procedures off Runways 30L and 30R at Minneapolis-St. Paul International Airport."

The FAA ATO is evaluating the partial implementation supported by the MAC Full Commission.

The noise analysis completed by MAC that incorporated the partial PBN implementation was completed to determine if the Proposed Action would result in cumulative impacts for this EA. The analysis was based upon assumptions known as of November 20, 2012, including the final recommendation by the MAC Full Commission. The FAA ATO will continue with the PBN process in accordance with their procedural and environmental requirements prior to being able to proceed with any implementation.

Impact Analysis

The combined noise impacts of the alternatives and partial implementation of the FAA proposed PBN procedures (herein referred to as proposed PBN) were assessed for 2020 and 2025. The noise modeling was updated to analyze the combined impacts of the proposed PBN procedures and the alternatives included within this EA. The RNAV departure tracks off Runways 12L, 12R and 17 have been incorporated into the forecasted scenarios for each of the alternatives while arrival tracks were not adjusted.

NO ACTION ALTERNATIVE WITH PBN NOISE IMPACTS

Based on the 484,879 total forecast operations in 2020, approximately 4,383 acres are in the 65+ DNL noise contour and approximately 11,138 acres are in the 60+ DNL noise contour. **Table 5.21.2** contains the count of single-family and multi-family dwelling units and population in the 2020 and 2025 No Action Alternative with PBN DNL noise contours. The counts are based on parcels that are within or are intersected by the respective DNL contour lines. Parcels with one dwelling unit are counted as single-family and parcels with more than one dwelling unit are counted as multi-family.

Figure 5.21-1 provides the 2020 and 2025 No Action Alternative with PBN DNL noise contours and the parcels within the respective contours.

Table 5.21.2

Summary of 2020 and 2025 DNL No Action Alternative with PBN Noise Contour Single-Family and Multi-Family Unit and Population Counts by Parcel

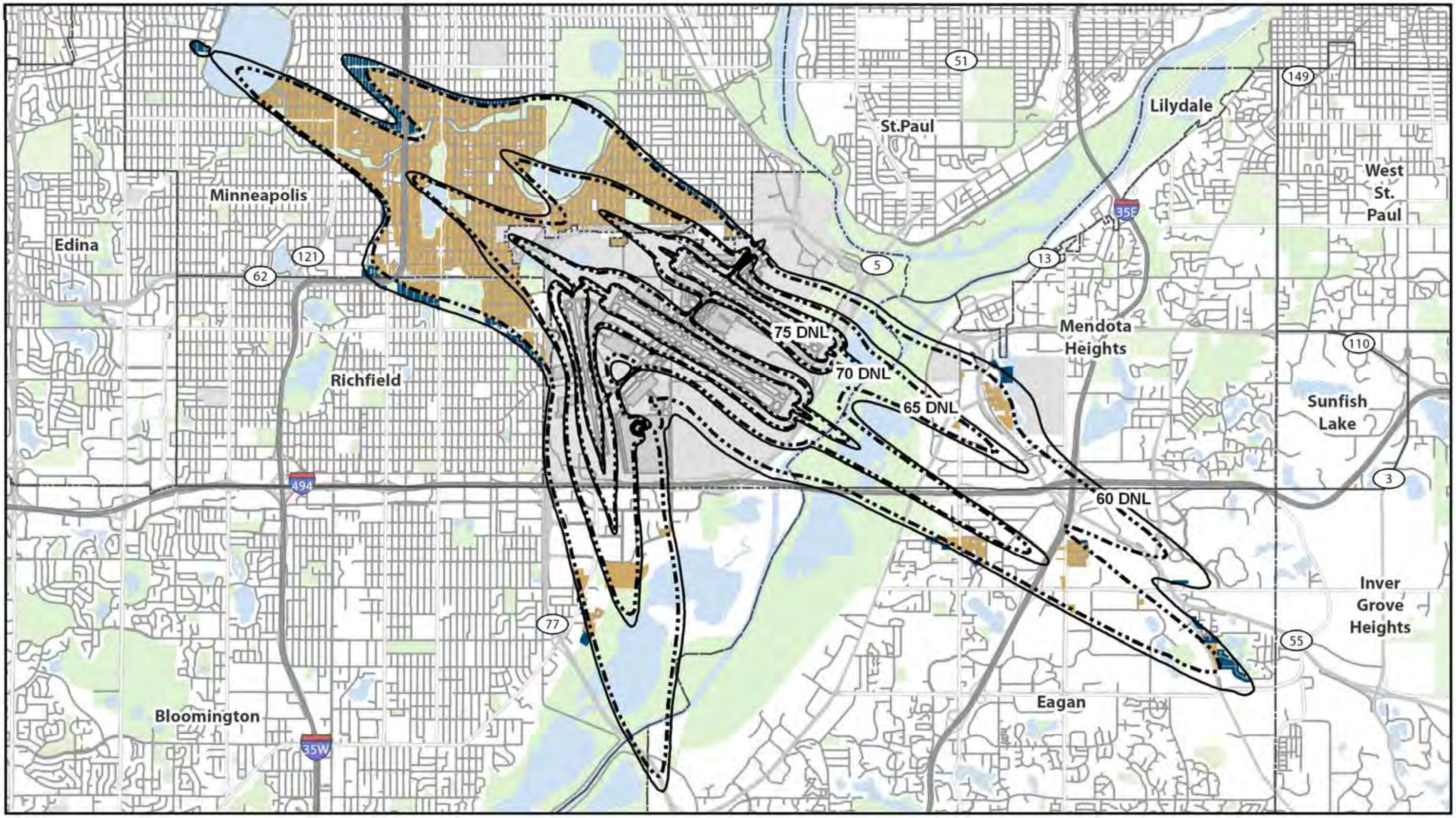
	City	Count	Single-Family					Multi-Family				
			60-64	65-69	70-74	75+	Total	60-64	65-69	70-74	75+	Total
2020 DNL Noise Contours with PBN	Minneapolis	Units	6869	1444	43	0	8356	1750	655	4	0	2409
		Population	17516	3682	110	0	21308	3472	1195	9	0	4676
	Bloomington	Units	62	1	0	0	63	702	2	0	0	704
		Population	158	3	0	0	161	1130	4	0	0	1134
	Richfield	Units	573	16	0	0	589	69	0	0	0	69
		Population	1496	42	0	0	1538	116	0	0	0	116
	Eagan	Units	168	0	0	0	168	0	0	0	0	0
		Population	472	0	0	0	472	0	0	0	0	0
	Mendota Heights	Units	40	1	0	0	41	3	0	0	0	3
		Population	109	3	0	0	112	4	0	0	0	4
	All Cities	Units	7712	1462	43	0	9217	2524	657	4	0	3185
		Population	19751	3730	110	0	23591	4722	1199	9	0	5930
2025 DNL Noise Contours with PBN	Minneapolis	Units	7362	1877	79	0	9318	2108	706	6	0	2820
		Population	18773	4786	201	0	23760	4161	1306	14	0	5481
	Bloomington	Units	79	1	0	0	80	702	2	0	0	704
		Population	201	3	0	0	204	1130	4	0	0	1134
	Richfield	Units	695	74	0	0	769	69	0	0	0	69
		Population	1814	193	0	0	2007	116	0	0	0	116
	Eagan	Units	265	2	0	0	267	0	0	0	0	0
		Population	745	6	0	0	751	0	0	0	0	0
	Mendota Heights	Units	61	1	0	0	62	3	0	0	0	3
		Population	167	3	0	0	170	4	0	0	0	4
	All Cities	Units	8462	1955	79	0	10496	2882	708	6	0	3596
		Population	21700	4991	201	0	26892	5411	1310	14	0	6735

Note: Parcel Intersect Methodology; Single-Family=1 Unit, Multi-Family>1 Unit; Population Reflects Estimation Based on Multipliers Provided by Met Council.

Source: MAC analysis, 2012.

Minneapolis-St. Paul International Airport 2020 Improvements EA

FIGURE 5.21-1



2020 and 2025 PBN - No Action Alternative DNL Noise Contours and Affected Parcels

LEGEND

Affected Parcels

Inside 2020 60 DNL

Between 2020 and 2025 60 DNL

Noise Contours

2020 No Action

2025 No Action

0 4,000 8,000 Meters

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HNTB

AIRLINES REMAIN ALTERNATIVE WITH PBN NOISE IMPACTS

Based on the 484,879 total forecast operations in 2020, approximately 4,382 acres are in the 65 DNL noise contour and approximately 11,134 acres are in the 60 DNL noise contour. **Table 5.21.3** contains the count of single-family and multi-family dwelling units and population in the 2020 and 2025 Airlines Remain Alternative with PBN DNL noise contours. The counts were completed using the same methodology used for the No Action Alternative.

Figure 5.21-2 provides the 2020 and 2025 Airlines Remain Alternative with PBN DNL noise contours and the parcels within the respective contours.

There are no areas of sensitive land uses that experience a 1.5 dB, or greater, increase in the 65 DNL noise contour when comparing the 2020 and 2025 Airlines Remain Alternative with PBN contours to the respective No Action Alternative with PBN DNL noise contours. Therefore, the FAA's impact threshold of significance is not exceeded.

Table 5.21.3

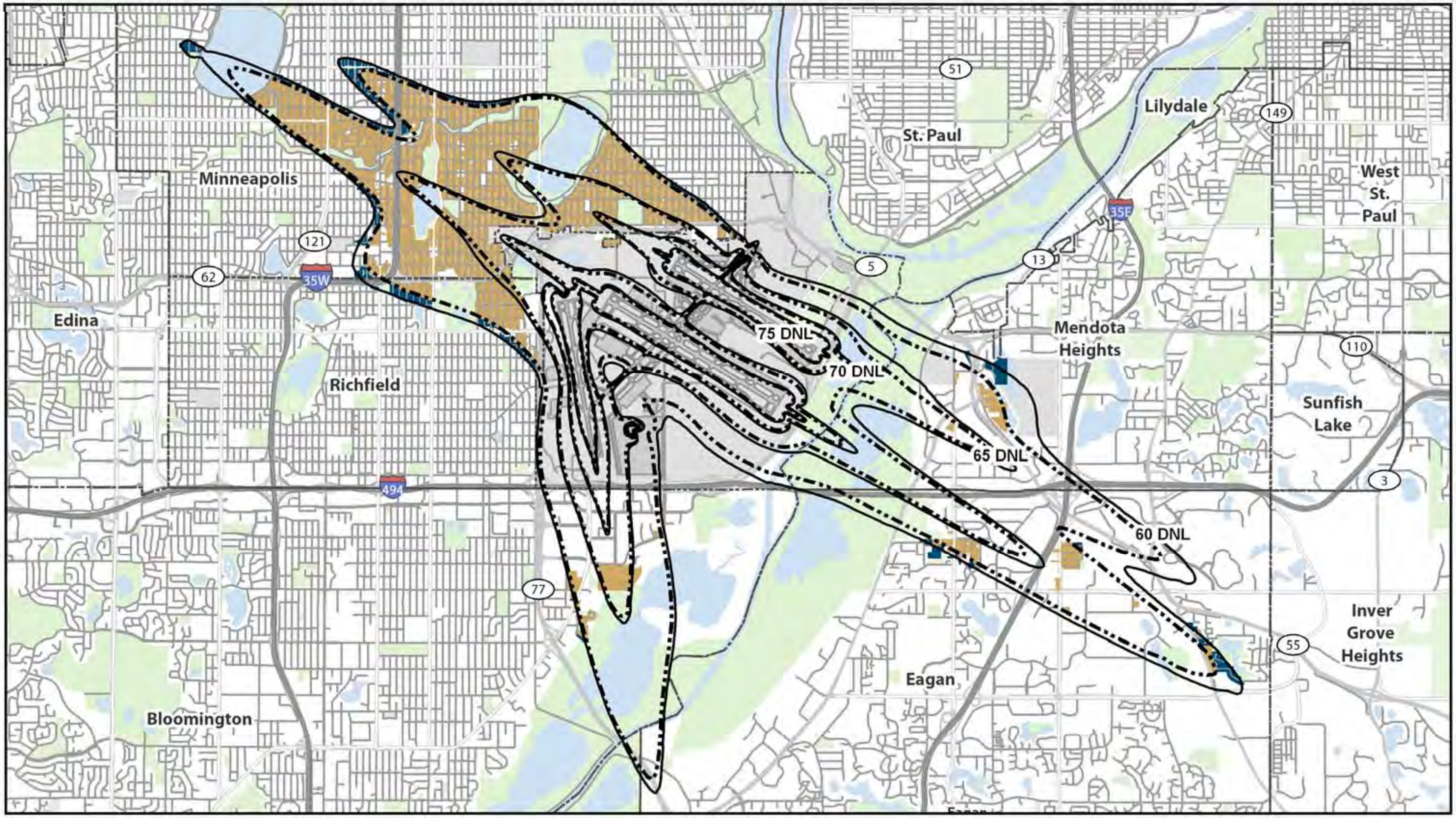
Summary of 2020 and 2025 DNL Alternative 1 – Airlines Remain with PBN Noise Contour Single-Family and Multi-Family Unit and Population Counts by Parcel

	City	Count	Single-Family					Multi-Family				
			60-64	65-69	70-74	75+	Total	60-64	65-69	70-74	75+	Total
2020 DNL Noise Contours with PBN	Minneapolis	Units	6891	1452	44	0	8387	1750	655	4	0	2409
		Population	17572	3703	112	0	21387	3472	1195	9	0	4676
	Bloomington	Units	62	1	0	0	63	702	2	0	0	704
		Population	158	3	0	0	161	1130	4	0	0	1134
	Richfield	Units	570	16	0	0	586	69	0	0	0	69
		Population	1488	42	0	0	1530	116	0	0	0	116
	Eagan	Units	171	0	0	0	171	0	0	0	0	0
		Population	481	0	0	0	481	0	0	0	0	0
	Mendota Heights	Units	40	1	0	0	41	3	0	0	0	3
		Population	109	3	0	0	112	4	0	0	0	4
	All Cities	Units	7734	1470	44	0	9248	2524	657	4	0	3185
		Population	19808	3751	112	0	23671	4722	1199	9	0	5930
2025 DNL Noise Contours with PBN	Minneapolis	Units	7316	1821	72	0	9209	2158	699	6	0	2863
		Population	18656	4644	184	0	23484	4243	1289	14	0	5546
	Bloomington	Units	69	1	0	0	70	702	2	0	0	704
		Population	176	3	0	0	179	1130	4	0	0	1134
	Richfield	Units	687	64	0	0	751	69	0	0	0	69
		Population	1794	167	0	0	1961	116	0	0	0	116
	Eagan	Units	256	2	0	0	258	0	0	0	0	0
		Population	719	6	0	0	725	0	0	0	0	0
	Mendota Heights	Units	68	1	0	0	69	3	0	0	0	3
		Population	186	3	0	0	189	4	0	0	0	4
	All Cities	Units	8396	1889	72	0	10357	2932	701	6	0	3639
		Population	21531	4823	184	0	26538	5493	1293	14	0	6800

Note: Parcel Intersect Methodology; Single-Family=1 Unit, Multi-Family>1 Unit; Population Reflects Estimation Based on Multipliers Provided by Met Council.

Source: MAC analysis, 2012.

FIGURE 5.21-2



2020 and 2025 PBN - Alternative 1 - Airlines Remain DNL Noise Contours and Affected Parcels

LEGEND

Affected Parcels

- Inside 2020 60 DNL
- Between 2020 and 2025 60 DNL

Noise Contours

- 2020 Alternative 1
- 2025 Alternative 1

0 4,000 8,000 Meters

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HNTB

AIRLINES RELOCATE ALTERNATIVE WITH PBN NOISE IMPACTS

Based on the 484,879 total forecast operations in 2020, approximately 4,384 acres are in the 65 DNL noise contour and approximately 11,123 acres are in the 60 DNL noise contours. **Table 5.21.4** contains the count of single-family and multi-family dwelling units and population in the 2020 and 2025 Airlines Relocate with PBN DNL noise contours. The counts were completed using the same methodology used for the No Action Alternative.

Figure 5.21-3 provides the 2020 and 2025 Airlines Relocate Alternative with PBN DNL noise contours and the parcels within the respective contours.

There are no areas of sensitive land uses that experience a 1.5 dB, or greater, increase in the 65 DNL noise contour when comparing the 2020 and 2025 Airlines Relocate Alternative with PBN contours to the respective No Action Alternative with PBN DNL noise contours. Therefore, the FAA's impact threshold of significance is not exceeded.

Table 5.21.4

Summary of 2020 and 2025 Alternative 2 - Airlines Relocate with PBN Noise Contour
Single-Family and Multi-Family Unit and Population Counts by Parcel

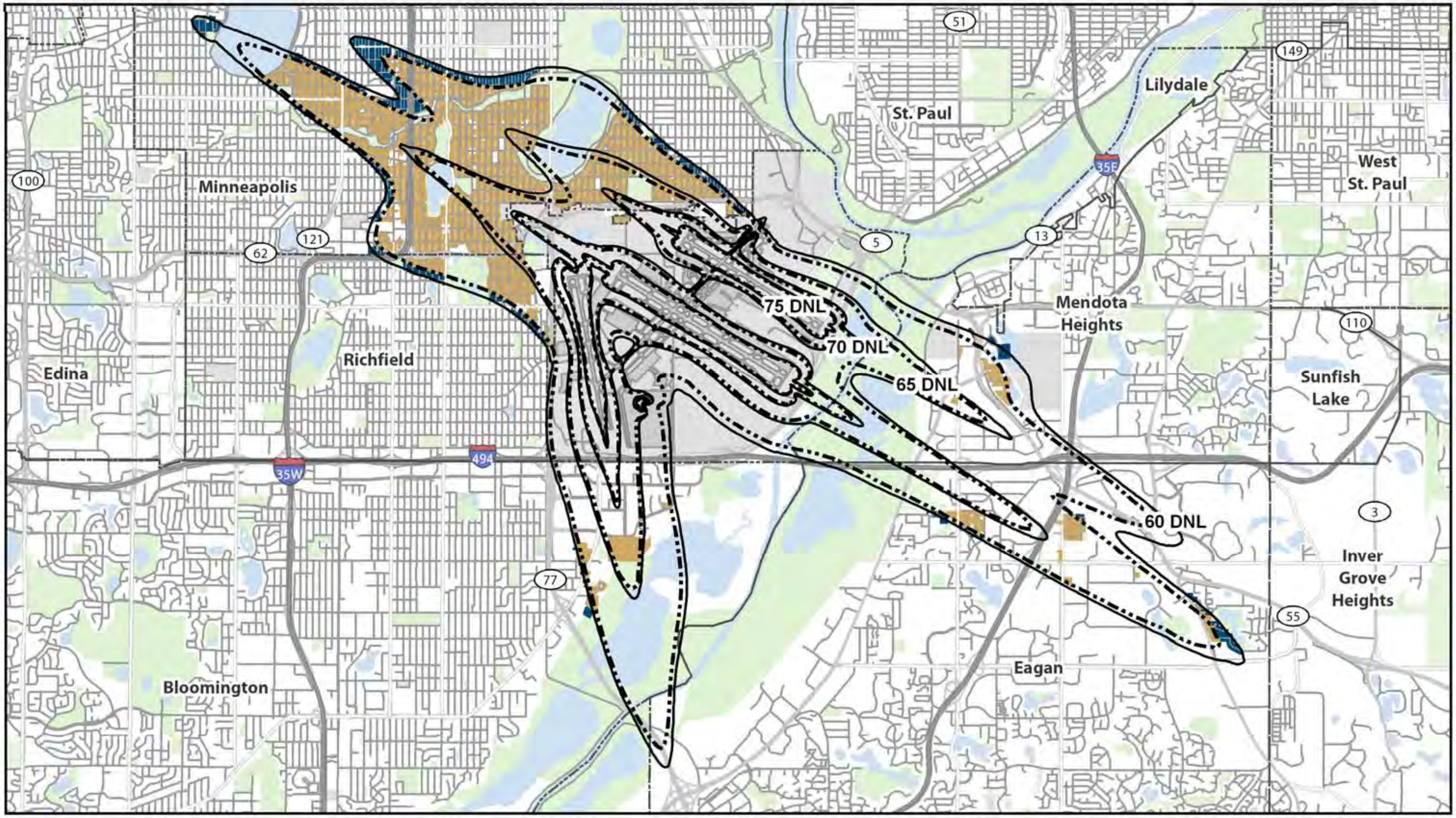
	City	Count	Single-Family					Multi-Family				
			60-64	65-69	70-74	75+	Total	60-64	65-69	70-74	75+	Total
2020 DNL Noise Contours with PBN	Minneapolis	Units	6719	1461	29	0	8209	1750	653	4	0	2407
		Population	17133	3726	74	0	20933	3459	1190	9	0	4658
	Bloomington	Units	67	1	0	0	68	702	2	0	0	704
		Population	171	3	0	0	174	1130	4	0	0	1134
	Richfield	Units	583	19	0	0	602	69	0	0	0	69
		Population	1521	50	0	0	1571	116	0	0	0	116
	Eagan	Units	176	0	0	0	176	0	0	0	0	0
		Population	495	0	0	0	495	0	0	0	0	0
	Mendota Heights	Units	40	1	0	0	41	3	0	0	0	3
		Population	109	3	0	0	112	4	0	0	0	4
	All Cities	Units	7585	1482	29	0	9096	2524	655	4	0	3183
		Population	19429	3782	74	0	23285	4709	1194	9	0	5912
2025 DNL Noise Contours with PBN	Minneapolis	Units	7593	1965	80	0	9638	2394	716	6	0	3116
		Population	19362	5011	204	0	24577	4636	1329	14	0	5979
	Bloomington	Units	82	1	0	0	83	708	2	0	0	710
		Population	209	3	0	0	212	1140	4	0	0	1144
	Richfield	Units	685	62	0	0	747	69	0	0	0	69
		Population	1788	162	0	0	1950	116	0	0	0	116
	Eagan	Units	250	2	0	0	252	0	0	0	0	0
		Population	703	6	0	0	709	0	0	0	0	0
	Mendota Heights	Units	60	1	0	0	61	3	0	0	0	3
		Population	164	3	0	0	167	4	0	0	0	4
	All Cities	Units	8670	2031	80	0	10781	3174	718	6	0	3898
		Population	22226	5185	204	0	27615	5896	1333	14	0	7243

Note: Parcel Intersect Methodology; Single-Family=1 Unit, Multi-Family>1 Unit; Population Reflects Estimation Based on Multipliers Provided by Met Council.

Source: MAC analysis, 2012.

Minneapolis-St. Paul International Airport 2020 Improvements EA

FIGURE 5.21-3



2020 and 2025 PBN - Alternative 2 - Airlines Relocate DNL Noise Contours and Affected Parcels

LEGEND

Affected Parcels

Inside 2020 60 DNL

Between 2020 and 2025 60 DNL

Noise Contours

2020 Alternative 2

2025 Alternative 2

0 4,000 8,000 Meters

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COMPARISON OF DEVELOPMENT ALTERNATIVE NOISE IMPACTS

There are no areas of sensitive land uses that would experience a 1.5 dB, or greater, increase in the 65 DNL noise contour and or a 3.0 dB, or greater, increase in the 60 DNL noise contour when comparing the 2020 and 2025 Airlines Remain Alternative with PBN and the Airlines Relocate Alternative with PBN noise contours to the respective No Action Alternative with PBN DNL noise contours. In 2020 the lowest number of residential units in the 65+ DNL noise contours is provided by the No Action Alternative. There are 4 more residential units in the Airlines Relocate Alternative and 9 more residential units in the Airlines Remain Alternative within the 65+ DNL noise contours. In 2025 the lowest number of residential units in the 65+ DNL noise contour is provided by the Airlines Remain Alternative.

When comparing the Action Alternatives DNL noise contours with PBN in 2020 and 2025 to the respective No Action Alternatives DNL noise contours with PBN the range of DNL change is minor. Comparing the:

- 2020 Airlines Remain Alternative 60+ DNL noise contour with PBN to the 2020 No Action Alternative 60+ DNL noise contour with PBN the range of DNL change is -0.2 dB DNL to 0.2 dB DNL.
- 2020 Airlines Relocate Alternative 60+ DNL noise contour with PBN the range of change when compared to the 2020 No Action Alternative 60+ DNL noise contour with PBN is -0.2 dB DNL to 0.3 dB DNL.
- 2025 Airlines Remain Alternative 60+ DNL noise contour with PBN to the 2025 No Action Alternative 60+ DNL noise contour with PBN the range of DNL change is -0.6 dB DNL to 0.6 dB DNL.
- 2025 Airlines Relocate Alternative 60+ DNL noise contour with PBN the range of change when compared to the 2025 No Action Alternative 60+ DNL noise contour with PBN is -0.4 dB DNL to 0.6 dB DNL.

Figure 5.21-4 provides a comparison of the 2020 No Action Alternative with PBN, the Airlines Remain Alternative with PBN, and the Airlines Relocate Alternative with PBN noise contours.

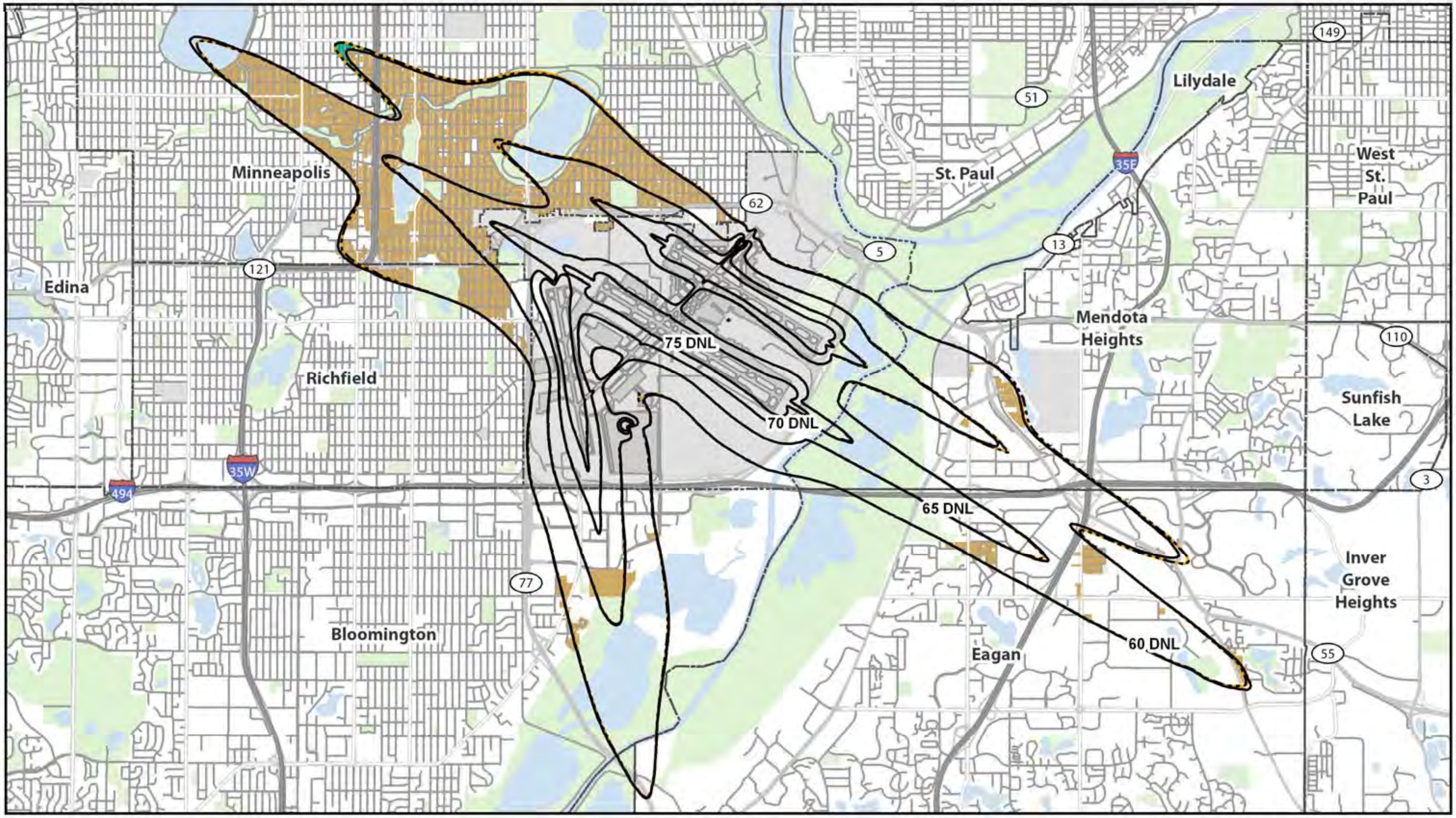
Figure 5.21-5 provides a comparison of the 2025 No Action Alternative with PBN, Airlines Remain Alternative with PBN, and the Airlines Relocate Alternative with PBN noise contours.

As is detailed in **Table 5.21.5** and **Table 5.21.6** there are only minor variations in 2020 and 2025 between the No Action Alternative with PBN and the Action Alternatives with PBN when looking at noise contour acreages, and the unit and population counts within each contour. The noise contours expand and contract slightly relative to one another to varying degrees and at different locations around the airport. This variability may result in the scenario with a slight reduction in acreage even though there is a slight increase in units within the contours, or vice versa, depending on the density of residential land use within each contour.

The small variation between the forecast impacts for the various alternatives is a function of FAA air traffic control procedures

Minneapolis-St. Paul International Airport 2020 Improvements EA

FIGURE 5.21-4



2020 Forecast PBN DNL Noise Contour Comparison and Affected Parcels

LEGEND

Noise Contours
- No Action
- Alternative 1
- Alternative 2

Affected Parcels
- Inside Alternative 2 60 DNL
- Between No Action 60 DNL and Alternative 2
- Between Alternative 1 60 DNL and Alternative 2

0 3,700 7,400 Meters

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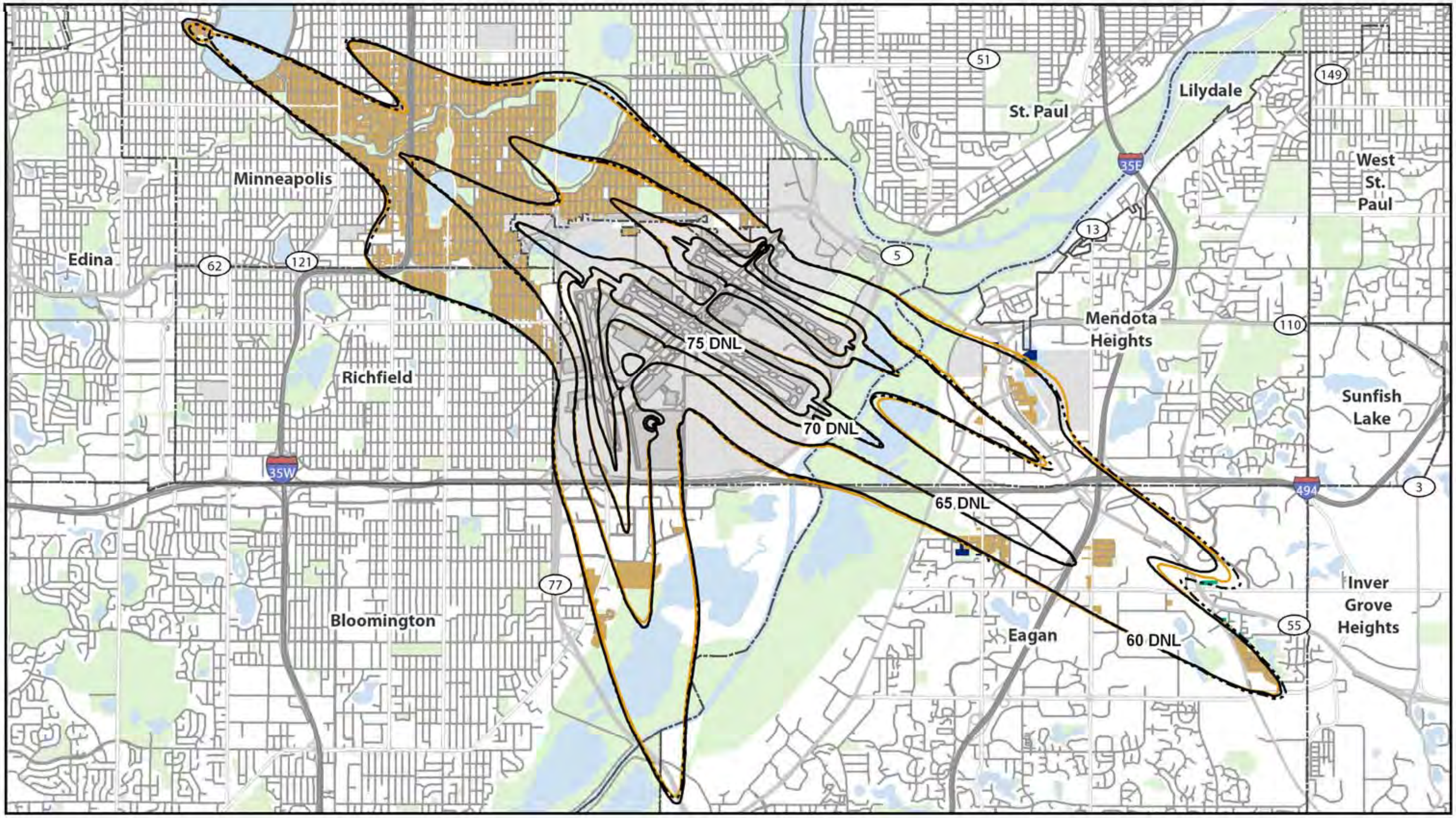
Minneapolis-St. Paul International Airport 2020 Improvements EA

FIGURE 5.21-5



2025 Forecast PBN DNL Noise Contour Comparison and Affected Parcels

LEGEND

Noise Contours

- No Action
- Alternative 1
- Alternative 2

Affected Parcels

- Inside Alternative 2 60 DNL
- Between No Action 60 DNL and Alternative 2
- Between Alternative 1 60 DNL and Alternative 2

N

0 3,900 7,800 Meters

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HNTB

during low-demand time periods in conjunction with the RUS and the different geographic locations of new gate additions at MSP that are provided with the various development options.

Table 5.21.5

2020 PBN Comparison of DNL Noise Contour Acreage and Affected Units and Population by Parcel

	Count	60-64	65-69	70-74	75+	Total
2020 No Action Alternative with PBN DNL Noise Contours	Acreage	6755	2789	930	664	**11138**
	Units	10236	2119	47	0	**12402**
	Population	24473	4929	119	0	**29521**
2020 Alternative 1 - Airlines Remain with PBN DNL Noise Contours	Acreage	6752	2788	930	664	**11134**
	Units	10258	2127	48	0	**12433**
	Population	24530	4950	121	0	**29601**
2020 Alternative 2 – Airlines Relocate with PBN DNL Noise Contours	Acreage	6739	2788	931	665	**11123**
	Units	10109	2137	33	0	**12279**
	Population	24138	4976	83	0	**29197**

Note:
Parcel intersect methodology; unit count reflects single-family and multi-family; population reflects estimation based on multipliers provided by Met Council.

Source: MAC analysis, 2012.

Table 5.21.6

2025 PBN Comparison of DNL Noise Contour Acreage and Affected Units and Population by Parcel

	Count	60-64	65-69	70-74	75+	Total
2025 No Action Alternative with PBN DNL Noise Contours	Acreage	7720	3165	1080	739	**12704**
	Units	11344	2663	85	0	**14092**
	Population	27111	6301	215	0	**33627**
2025 Alternative 1 – Airlines Remain with PBN DNL Noise Contours	Acreage	7621	3152	1075	738	**12586**
	Units	11328	2590	78	0	**13996**
	Population	27024	6116	198	0	**33338**
2025 Alternative 2 – Airlines Relocate with PBN DNL Noise Contours	Acreage	7685	3155	1083	739	**12662**
	Units	11844	2749	86	0	**14679**
	Population	28122	6518	218	0	**34858**

Note:
Parcel intersect methodology; unit count reflects single-family and multi-family; population reflects estimation based on multipliers provided by Met Council.

Source: MAC analysis, 2012.

SUMMARY

There are no areas of sensitive land uses that would experience a 1.5 dB, or greater, increase in the 65 DNL noise contour when comparing the 2020 and 2025 Airlines Remain Alternative with PBN and the Airlines Relocate Alternative with PBN noise contours to the respective No Action Alternative with PBN DNL noise contours. Therefore, the cumulative effects of the alternatives along with the proposed PBN procedures would not exceed the FAA's threshold of significance.

5.21.5 Cumulative Impacts Summary

The impacts associated with the Alternatives are minor. No single impact; even when considered with past, present and future actions; represents a substantial impact that cannot be mitigated. Therefore, none of the Alternatives would result in significant cumulative impacts.

Endnotes

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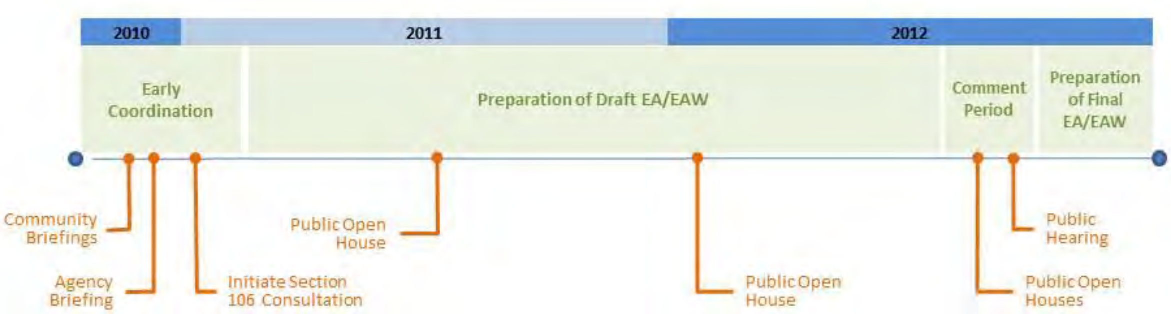
Chapter 6: Public and Agency Involvement

Public and agency coordination is conducted throughout the National Environmental Policy Act (NEPA) process to ensure exchange of information relevant to the Proposed Action and its potential impacts. **Figure 6.0-1** presents an overview of the coordination/consultation conducted during each phase of the NEPA process. The following sections provide detailed information about how and when coordination was conducted.

Figure 6.0-1

Public and Agency Involvement Overview



6.1 Early Coordination

According to Federal Aviation Administration (FAA) Order 5050.4B, early coordination with interested agencies and municipalities should begin early in the NEPA process in order to ensure that major issues are addressed. Therefore, one of the first steps the Metropolitan Airports Commission (MAC) completed in initiating the Environmental Assessment (EA) was to consult with the interested agencies and the surrounding communities.

6.1.1 Agency Briefing

Early coordination letters were sent to invite the following agencies to an Agency Briefing:

- Minnesota Department of Transportation (Mn/DOT) Office of Aeronautics
- Mn/DOT Environmental Services
- Minnesota Department of Agriculture
- Minnesota Department of Commerce

- Minnesota Environmental Quality Board
- Minnesota Department of Health
- Minnesota Department of Natural Resources
- Minnesota Pollution Control Agency
- Minnesota Board of Water and Soil Resources
- Office of the State Archaeologist
- FAA Airport District Office
- US Army Corps of Engineers
- US Environmental Protection Agency
- US Fish and Wildlife Service
- Veterans Affairs
- Federal Highway Administration
- Hennepin County
- National Park Service
- Minnesota Historical Society
- Indian Affairs Council
- Lower Minnesota Watershed Management Organization
- Minnehaha Creek Watershed District

The Agency Briefing was held on December 7, 2010. The briefing opened with introductions which were followed by a presentation. Via the presentation, the Proposed Action, Purpose and Need, preliminary alternatives and the anticipated level of analysis for each environmental impact category were described. The presentation concluded with a request that comments be submitted to the MAC by January 6, 2011. The sign-in sheet, meeting agenda, presentation, comment form and the Minneapolis-St. Paul International Airport (MSP) EA Informational Document are included in ***Appendix N, Public and Agency Involvement*****.**

After the Agency Briefing, a follow-up email, including electronic versions of the materials provided at the briefing, was sent to the agencies.

6.1.2 Community Briefing

The MAC held Community Briefing meetings for community officials to discuss the proposed airport improvements and the EA process. Representatives from the cities of Minneapolis, Richfield, Burnsville and Mendota Heights attended a briefing held on November 15, 2010, and representatives from the cities of Bloomington, Eagan, St. Paul and Apple Valley attended an additional briefing held on November 18, 2010. At the briefings, the MAC described the Proposed Action, presented a draft schedule and requested comments. The community briefing agenda and presentation are included in *Appendix N.*

Following the Agency Briefing on December 7, 2010, the MAC sent an email to the communities providing them with a copy of the Agency Briefing materials including the presentation, MSP EA Informational Document and the comment form. The email can be found in *Appendix N***.**

6.1.3 Agency/Community Comments

Written comments were received from the following agencies and cities during the early coordination period:

- US Army Corps of Engineers
- City of Mendota Heights
- City of Eagan
- US Environmental Protection Agency
- US Fish and Wildlife Service
- The Minneapolis Mayor's Office
- State Historic Preservation Office

Copies of the comments are provided in *Appendix N*. All comments were considered in the preparation of the EA.

6.1.4 Initiation of Section 106 Consultation

The FAA initiated Section 106 consultation early in the NEPA process to comply with Section 106 of the National Historic Preservation Act (NHPA). In a letter dated January 6, 2011, the FAA notified the State Historic Preservation Office (SHPO) that the Section 106 process would be completed as part of the EA. The letter also included a request that the SHPO concur with the FAA's proposed area of potential effect (APE).

As part of initiating Section 106 consultation, the FAA invited the Lower Sioux, Mendota Mdewakanton Dakota, Shakopee Mdewakanton Sioux and the Prairie Island Tribes to become consulting parties. The FAA also contacted the State of Minnesota Indian Affairs Council, the liaison between the State of Minnesota and the Tribal Governments, for input on concerns that uniquely or significantly affect the Tribes related to the Proposed Action. All correspondence between the FAA, the SHPO and the Tribal entities are provided in *Appendix N.*

6.2 Coordination during the Development of the Draft EA

The MAC coordinated with interested agencies and the public throughout the preparation of the Draft EA.

6.2.1 Noise Oversight Committee (NOC) Coordination

The MSP Noise Oversight Committee (NOC) was established in 2002 for the purpose of bringing industry and community representatives together to discuss noise issues at MSP and to bring policy recommendations to the MAC. The NOC has a representative from each of MSP's surrounding cities and representatives from various air carriers. The NOC meets every other month.

At the NOC meeting on May 18, 2011, the MAC provided a briefing focused on the aviation activity forecast for the MSP 2020 Improvements EA. The importance of updating the Long Term Comprehensive Plan (LTCP) Forecast was discussed. As part of the EA, the LTCP Forecast was updated to incorporate economic and airline industry changes that occurred since the LTCP Forecast was prepared. Several questions regarding the EA forecast and the gated flight schedules were addressed. The NOC agreed to disseminate information related to the Draft EA forecast via the *MSP Noise News*, MAC Web site and two public open houses (which were held July 13-14, 2011). The meeting agenda, forecast presentation, meeting notes and *MSP Noise News* article are included in *Appendix N*.

At the NOC meeting on July 20, 2011 the MAC briefly discussed the status of the EA. The MAC provided an update on the EA noise analysis at the November 16, 2011 NOC meeting. The MAC presented information on the MSP 2020 Improvements EA at the NOC meeting on January 18, 2012. The MAC also held NOC meetings on March 21, 2012, May 16, 2012 and July 11, 2012. Meeting agendas and notes are included in *Appendix N*.

6.2.2 Public Open Houses / Information Meetings

The MAC conducted two open houses in July 2011 to inform the public of the MSP 2020 Improvements EA. Open house notices were posted on various community web sites and published in both the *Southwest Journal* and the *Star Tribune*. An email was also sent out to subscribers of the *MSP Noise News* mailing list, which notified the subscriber that an update was posted to the Noise Programs Web site, which included a notice of the dates for the two open houses.

The open houses were conducted on July 13th and 14th, 2011. Presentation boards illustrating the EA/Environmental Assessment Worksheet (EAW) processes, Proposed Action, aviation activity forecast and alternatives were set-up around the meeting room. Representatives from the MAC and their consultants were available at the presentation boards to explain the board content and answer related questions. Members of the public thus had the opportunity to focus on the topics of interest to them and talk one on one with knowledgeable project representatives. All materials related to the public open house including announcements, web posts, sign-in sheets and copies of the presentation boards are contained in *Appendix N*.

Another open house was held on January 31, 2012 to share the results of the EA analysis with the public. Related materials are included in *Appendix N*.

Public open houses were held on September 17th and 18th, and October 1st to answer questions regarding the Draft EA. The open house on October 1st preceded the public hearing on the same date. See section 6.3 for more information regarding the public hearing.

6.2.3 Federal Highway Administration Coordination

Potential interchange concepts to improve the LOS and reduce queuing were assessed as part of the MSP Area Roadway Improvements Project. This project evaluation process commenced in 2010 and is funded by the MAC, City of Bloomington and Minnesota Department of Transportation. One of the main objectives was to develop interchange concepts at I-494/34th Avenue South, TH 5/Post Road, and TH 5/Glumack Drive. These interchange concepts are the foundation of the roadway improvements included under the two proposed airport development alternatives studied.

A project management team (PMT) was formed to garner input from key agencies throughout the project duration. The agencies represented on the PMT included the following:

- Metropolitan Airports Commission
- City of Bloomington
- Minnesota Department of Transportation
- Federal Highway Administration
- Federal Aviation Administration
- Metro Transit
- Metropolitan Council
- Minnesota Department of Economic Development

During the eleven PMT meetings held thus far, the PMT played a key role in evaluating the interchange concepts and identifying a preferred concept.

Several coordination meetings were held with FHWA to identify the additional analysis needed to meet FHWA NEPA requirements for the roadway improvements.

6.3 Draft EA Comments and Responses

The Draft EA was released for agency and public review and comment on August 30th, 2012. To facilitate submittal of comments, the MAC conducted open houses on September 17th and 18th, and October 1st, 2012. The purpose of these open houses was to share information regarding the Draft EA in an informal setting. The open house on October 1st preceded the public hearing on the same date. The purpose of the public hearing was to allow the public to formally submit verbal or written comments.

Agency and public comments received during the comment period from August 30th to October 11th, 2012 were considered in the development of the Final EA. Responses to all verbal and written comments received during the public hearing and all written comments received prior to the close of the comment period are provided in Appendix R, *Draft EA/EAW Comments and Responses*.

Chapter 7:
List of Preparers

7.1 List of Preparers

This chapter identifies the individuals assisting in the preparation and independent review of this Environmental Assessment (EA) along with each preparer's responsibilities.

Table 7.1.1 includes FAA staff who are responsible for the preparation of the EA and/or who were involved in its review. Supporting the FAA in this effort are individuals from the Metropolitan Airports Commission (MAC) and several consulting firms.

Table 7.1.1

List of Preparers

Name	Project Role	Education/ Registration	Experience (Years)	EA Project Responsibility
Federal Aviation Administration				
Kandice Krull	Environmental Protection Specialist	M.S. Environmental Science	6	Reviewer
Al Fenedick	Environmental Protection Specialist	M.S. Environmental Biology	26	Reviewer
Federal Highway Administration				
James McCarthy	Traffic Operations Engineer	M.S. Civil Engineering	28	Reviewer
Philip Forst	Environmental Protection Specialist	M.S. Civil Engineering	15	Reviewer
Emeka Ezekwemba	Field Operations Engineer	B.S. Civil Engineering	3	Reviewer
Minnesota Department of Transportation				
Peter Wasko, INCE	Metro District Noise and Air Quality Supervisor	Associates Degree	14	Reviewer (noise and air)

Name	Project Role	Education/ Registration	Experience (Years)	EA Project Responsibility
The Metropolitan Airports Commission				
Roy R. Fuhrmann	EA Project Manager	B.S. Airport Management	20	EA Project Management
Chad E. Leqve	Noise and Land Use Planner	B.S. Airport Management	15	Noise and Land Use Analysis, Document Development
Dana Swanson	GIS Analyst	B.S. Aviation Management	2	Spatial Analysis and Map Development
Amanda Nyren	INM Analyst	B.A. Geology	4	Noise Contour Development
Christene Sirois Kron	Proofreader /Editor	B.A. English, MA Education: Curriculum & Instruction	20	Document Review
Toni Howell	EA Reviewer	B.S. Biology	20	Document Review and Data Collection
Garry Warren, P.E.	Airport Development	B.S./ M.S. Civil Engineering/ P.E.	40	Purpose and Need; Alternatives; Airside and Landside Development and Facility Layouts: Transportation Analysis; Airfield Construction Impacts and Cost Estimate Review
Bridget Rief, P.E.	Airport Development	B.S. Civil Engineering/ P.E.	20	Purpose and Need; Alternatives; Airside and Landside Development and Facility Layouts; Transportation Analysis; Airfield Construction Impacts and Cost Estimate Review
Alan W. Howell, A.I.A.	EA Reviewer/ Design Direction	B. Architecture / A.I.A.	18	Alternatives and Facility Planning Design Direction
Alan Dye, P.E.	EA Reviewer/ Design Directions	B.S. Civil Engineering/ P.E.	24	Alternatives and Transportation Planning

Name	Project Role	Education/ Registration	Experience (Years)	EA Project Responsibility
HNTB Corporation				
Greg Albjerg, P.E.	Project Manager	B.S. Civil Engineering/ P.E.	35	Overall Project Manager
Audrey Wald	Deputy Project Manager	B.S. Airway Science Management	21	Project and Consultant Coordination
Kim Hughes, P.E.	Quality Assurance /Quality Control Manager	B.S. Civil Engineering/ P.E.	25	Quality Assurance (QA)/Quality Control (QC) for Overall Document Development
Barbara Kulvelis, C.E.P	Sr. Environmental Planner	B.S. Civil /Environmental Engineering/ C.E.P.	26	Document Development, Purpose and Need, Alternatives
Pat Kennon	Sr. Aviation Economist	B.S. Urban Planning M.S. Economics	30	Forecast and Fleet Mix Development
Ken Reed	Sr. Aviation Planner	B.S. Aviation Technology	25	SIMMOD Analysis
Kent Miller	GIS Analyst		12	GIS Analysis
Yue Xu	Aviation Economist	M.S./ Ph.D Civil Engineering	4	Day/Night Operations Split
Todd Wright	Aviation Planner	B.A. Aviation Management	10	Airside Analysis
Scott Litsheim	Aviation Planner	B.A. Geography	15	Airside Analysis
Chris LaBounty	Airport Planning Engineer	B.S. Civil Engineering	4	Concept Development and Planning Support
Jason Staebell	Website Manager	B.S. Civil Engineering	10	EA Project Website Management
Caroline Pinegar, A.I.C.P.	Environmental Planner	B.A. Historic Preservation, M.C.R.P. Masters in City and Regional Planning / A.I.C.P.	6	Document Development
Jillian Daniels	Jr. Aviation Environmental Planner	B.S. Aviation Management	2	Document Development, SIMMOD Analysis
Ryan Carey, E.I.T.	Jr. Environmental Planner	B.S. Civil Engineering/ E.I.T.	1	Document Development
Jessica Wyatt	Principle Landside Planner	B.S./ M.S. Civil Engineering	14	Landside QC and Documentation
Bo Yuan, P.E.	Sr. Transportation Engineer	B.S./ M.S. Civil Engineering/ P.E.	9	Landside Analysis
Shankar Natarajan	Transportation Engineer	B.S./ M.S. Civil Engineering	6	Landside Analysis
Ybette Ochoa	Transportation Engineer	B.S./ M.S. Civil Engineering	3	Landside Analysis
Neelima Ghanta	Transportation Engineer	B.S./ M.S. Civil Engineering	4	Landside Analysis

Name	Project Role	Education/ Registration	Experience (Years)	EA Project Responsibility
TKDA				
Robert Engstrom, P.E.	Airfield Consultant	B.S. Civil Engineering/ P.E.	27	Airfield Construction / Impacts
Michael Gould	Sr. Engineering Specialist		40	Airport Layout Plan / Graphics
Kimley-Horn and Associates, Inc.				
Melissa Barnes, P.E.	Traffic Forecasting and Arterial Modeling	B.S. Civil Engineering/ P.E.	7	Lead Arterial Operations Modeling And Traffic Forecasting
Brandon Bourdon, P.E.	Deputy Project Manager	B.S./ M.S. Civil Engineering/ P.E.	13	Deputy Project Manager, QA/QC – Traffic Analysis and Document Development
Gary Christensen, P.E.	Concept Layouts	B.S. Civil Engineering/ P.E.	38	Concept Alternatives Development and QA/QC
Gary Ehret, P.E.	Project Manager	B.S. Civil Engineering/ P.E.	32	Project Manager and QA /QC
Nicole Gulick, P.E.	Concept Layouts	B.S. Civil Engineering /P.E.	10	Concept Alternatives Development
Beth Kunkel, C.W.D., P.W.S.	Environmental Scientist	B.S. Wildlife Management/ C.W.D., P.W.S.	24	QA/QC and Document Development
HenWen Westman, E.I.T.	Arterial Modeling	B.A. Physics/ M.S. Civil Engineering/ E.I.T.	4	Lead Traffic Data Collection
Liesch Environmental Consultants & Engineers				
Harry Summitt, P.E.	Liesch Project Manager	B.S. Civil Engineering/ P.E.	37	Project Manager and QA/QC
Mat Knutson	Surface and Groundwater Quality Analysis	M.S. Environmental Engineering	16	Water Quality
Kris Langlie, P.E.	Hydrology & Hydraulics	B.S. Civil Engineering/ P.E.	5	Surface Water Modeling
Mark Miller	Biotic Assessments	B.S. Aquatic Biology/ Certified Fisheries Scientist	32	Biotic Resources; Endangered & Threatened Species
Tom Orr	Hazardous, Solid, and Other Regulated Waste Assessments	B.S. Wildlife Management/Soil Science; Asbestos Inspector; Wetland Delineator	18	Hazardous And Solid Waste; Contaminated Soil and Construction Dewatering Impacts
Eric Sundbo	Hazardous, Solid and Other Regulated Waste Assessments	B.S. Biology/ Asbestos Project Designer; Asbestos Site Supervisor	23	Hazardous and Solid Waste ; ACM; Renovation and Demolition Waste Impacts

Name	Project Role	Education/ Registration	Experience (Years)	EA Project Responsibility
Miller Dunwiddie Architecture				
Craig Lau, A.I.A.	Architect	B. Architecture/. B.A. Environmental Design/ A.I.A.	30	Facility Planning
Joel Stromgren, A.I.A., LEED AP	Architect	B. Architecture M. Architecture/ A.I.A., LEED AP	24	Facility Planning
Architectural Alliance				
Dennis LaFrance, A.I.A.	Aviation Planner / Designer	B. Architecture/ A.I.A.	44	Alternatives, Preliminary Engineering
Jeff Loeschen, A.I.A.	Project Manager	B. Architecture, B.S. Environmental Design/ A.I.A.	13	Document development, Purpose and Need, Alternatives, Preliminary Engineering and Environmental Consequences
Greg Maxam, A.I.A.	Aviation Planner	Bach of Architecture/ A.I.A.	28	Document development, Purpose and Need, Alternatives, Preliminary Engineering and Environmental Consequences
Wenck Associates, Inc.				
Peter G. Miller, P.S.S.	Project Manager	B.S. Environmental Studies/ P.S.S	18	Air Quality Document Development
Michael R. Shoemaker, P.E.	Air Quality Engineer	B.S. Chemical Engineering; M.B.A./ P.E.	8	Greenhouse Gases Analysis
Lori Bartels, P.E.	Air Quality Engineer	B.S. Chemical Engineering/ P.E.	24	Stationary Source Air Emissions
Archaeological Research Services – Sub-Consultant to HNTB Corporation				
Christina Harrison	Archaeological Consultant	M.Phil. and B.A. Archaeology and Historic Preservation	40	Archaeology
Hess, Roise and Company– Sub-Consultant to HNTB Corporation				
Charlene Roise	Historical Consultant	M.A., Preservation Studies	30	Historical/Architectural Resources
Penny Petersen	Researcher	B.A., Art History and Humanities	12	Historical/Architectural Resources
Curtis Transportation Consulting LLC. – Sub-Consultant to HNTB Corporation				
Owen Curtis	Senior Landside Consultant	B.S.E. Aerospace & Mechanical Sciences, M.S.E. Civil Engineering /Transportation	39	Landside Planning and QA/QC

Name	Project Role	Education/ Registration	Experience (Years)	EA Project Responsibility
SRF Consulting Group, Inc – Sub-Consultant to Kimley-Horn and Associates, Inc.				
Steve Wilson	Traffic Forecasting and Freeway Modeling	B.A. Geography/ M.S. Civil and Environmental Engineering	29	Task manager, QA/QC – traffic
Paul Morris, P.E.	Traffic Forecasting	B.A. Physics/ M.S. Civil Engineering/ P.E.	6	Lead traffic forecast development and analysis
Leif Garnass, P.E.	Freeway Modeling	B.S. Civil Engineering/ P.E.	8	Lead freeway operations modeling and analysis
Josh Maus, P.E.	Freeway Modeling	B.S. Civil Engineering/ P.E.	11	Freeway modeling QA/QC and analysis
Ryan Loos, E.I.T.	Freeway Modeling	B.S. Civil Engineering/ E.I.T.	3	Freeway operations modeling and analysis
Don Demers, P.E.	Project Manager	B.S. Civil Engineering/ P.E.	21	Project manager, QA/QC – concept alternatives
Bob Leba, P.E.	Concept Layouts	B.S. Civil Engineering/ P.E.	14	Lead concept alternatives development
Kristy Morter, P.E.	Concept Layouts	B.S. Civil Engineering/ P.E.	12	Concept alternatives development
Jeff Tykeson, P.E.	Concept Layouts	B.S. Civil Engineering/ P.E.	12	Concept alternatives development
Brett Danner	Senior Associate	Master of Science in Biology	11	Noise Analyst
KB Environmental Sciences – Sub-Consultant to Wenck Associates, Inc.				
Michael Kenney, C.H.M.M., Q.E.P., C.I.H.	Sr. Air Quality Scientist	B.A. Environmental Sciences M.S. Environmental Engineering Sciences/ C.H.M.M., Q.E.P., C.I.H.	30	Air Quality Analysis
Michael Ratte	Sr. Air Quality Scientist	B.S. Meteorology	20	Air Quality Analysis
Paul Sanford	Air Quality Scientist	B.S. Environmental Science and Policy	4	Air Quality Analysis
David Braslau Associates, Inc. – Sub-Consultant to Wenck Associates, Inc.				
David Braslau	Sr. Air Quality Scientist	B.S. MIT; M.S. UC Berkeley; Ph.D. UC Berkeley	40	Mobile source air emissions

Chapter 8: Abbreviations, Acronyms, & Glossary

8.1 Abbreviations and Acronyms

AC	Advisory Circular
ACBM	Asbestos-containing building materials
ACCRI	Aviation Climate Change Research Initiative
ACHP	Advisory Council on Historic Preservation
ACM	Asbestos Containing Materials
ACRP	Airport Cooperative Research Program
ADF	Aircraft Deicing Fluids
ADT	Average Daily Traffic
AGL	Above Ground Level
ALP	Airport Layout Plan
ANOMS	Airport Noise and Operations Monitoring System
AOA	Airport Operations Area
APE	Area of Potential Effect
APU	Auxiliary Power Units
ARFF	Aircraft Rescue and Fire Facility
AST	Aboveground Storage Tank
ASTM	American Society for Testing and Materials
ATADS	Air Traffic Activity Data System
ATC	Air Traffic Control

ATCT	Airport Traffic Control Tower
BMP	Best Management Practices
BRT	Bus Rapid Transit
BOD	Biochemical Oxygen Demand
BPATDS	Border Protection Airport Technical Design Standards
CAA	Clean Air Act
CBIS	Checked Baggage Inspection System
$CBOD_5$	Carbonaceous Biochemical Oxygen Demand
CBP	Customs Border Protection
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cfs	cubic feet per second
CH_4	Methane
CIP	Capital Improvement Program
CMSA	Consolidated Metropolitan Statistical Area
CO	Carbon Monoxide
CWA	Clean Water Act
CWN	Comprehensive Well Network
CZMA	Coastal Zone Management Act of 1972
CZMP	Coastal Zone Management Program

dB	Decibel
dBA	A-weighted Decibel
DDI	Diverging Diamond Interchange
DNL	Day-Night Average Sound Level
DOT	Department of Transportation
DLH	Duluth International Airport

EA	Environmental Assessment (Note: the EA meets the requirements for an EAW and the term EA is used interchangeably with EA/EAW)
EA/EAW	Environmental Assessment/Environmental Assessment Worksheet (Note: this term is used interchangeably with the term EA.)
EAU	Chippewa Valley Regional Airport
EAW	Environmental Assessment Worksheet
EB	East Bound
EDMS	Emissions and Dispersion Modeling System
EDS	Explosive Detection System
EIS	Environmental Impact Statement
EQB	Environmental Quality Board
ESA	Endangered Species Act

FAA	Federal Aviation Administration
FAR	Federal Aviation Regulation
FBO	Fixed Base Operator
FEMA	Federal Emergency Management Agency
FGDC	Federal Geographic Data Committee

FHWA	Federal Highway Administration
FICAN	Federal Interagency Committee on Aviation Noise
FICON	Federal Interagency Committee on Noise
FIRM	Flood Insurance Rate Map
FPPA	Farmland Protection Policy Acts of 1980 and 1995
FWS	U.S. Fish and Wildlife Service
GAO	General Accounting Office
GHGs	Greenhouse Gases
GIS	Geographic Information System
GISW	Glycol-Impacted Storm Water
GPS	Global Positioning System
GRV	Glycol Recovery Vehicle
GSE	Ground Support Equipment
GTC	Ground Transportation Center
HAPs	Hazardous Air Pollutants
H_2O	Water Vapor
HC	Hydrocarbons
HFCs	Hydrofluorocarbons
HPC	Minneapolis Heritage Preservation Commission
IAR	Interstate Access Request
IATA	International Air Transport Association

IHW	Industrial hazardous waste
INM	Integrated Noise Model
IPCC	Intergovernmental Panel on Climate Change
ISP	Integrated Spill Plan
LBP	Lead-Based Paint
LOS	Level of Service
LPST	Leaking Petroleum Storage Tank
LRT	Light Rail Transit
LTCP	Long Term Comprehensive Plan
LTO	Landing-Takeoff Cycle
MAC	Metropolitan Airports Commission
MACNOMS	MAC Noise and Operations Monitoring System
MEPA	Minnesota Environmental Policy Act
MERA	Minnesota Environmental Rights Act
MC	Metropolitan Council (of the Twin Cities Metropolitan Area)
MCBS	Minnesota County Biological Survey
MDNR	Minnesota Department of Natural Resources
mgd	million gallons per day
Mn/DOT	Minnesota Department of Transportation
MNAAQS	Minnesota Ambient Air Quality Standards
MPCA	Minnesota Pollution Control Agency
MPO	Metropolitan Planning Organization

MSATs	Mobile Source Air Toxics
MSL	Mean Sea Level
MSP	Minneapolis-St. Paul International Airport
MTOW	Maximum Take-Off Weight
MWRRS	Midwest Regional Rail System
N_2O	Nitrous Oxide
NAAQS	National Ambient Air Quality Standards
NAD	North American Datum
NB	North Bound
NCP	Noise Compatibility Program
NEPA	National Environmental Policy Act of 1969
NESHAP	National Emission Standard for Hazardous Air Pollutants
NHPA	National Historic Preservation Act of 1966
NLX	Northern Lights Express (Passenger Rail)
NO_2	Nitrogen Dioxide
NOAA	National Oceanic and Atmospheric Administration
NOC	Noise Oversight Committee
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NRHP	National Register of Historic Places
NURP	Nationwide Urban Runoff Program
NWI	National Wetland Inventory
NWS	National Weather Service

O_3	Ozone
O&M	Operations and maintenance
PA	Programmatic Agreement
PAC	Policy Advisory Committee
Part 77	14 Code of Federal Regulations Part 77
Pb	Lead
PBN	Performance-Based Navigation
PCBs	Polychlorinated Biphenyls
PFCs	Passenger Facility Charges
PFCs	Perfluorocarbons
PHOP	Peak Hour Originating Passenger
PHTP	Peak Hour Terminating Passenger
$PM_{2.5}$	Particulate Matter with a diameter of 2.5 microns or less
PM_{10}	Particulate Matter with a diameter of 10 microns or less
PnP	Plug and Pump
POV	Privately Owned Vehicle
ppm	parts per million
QTA	Quick Turn-Around
RCRA	Resource Conservation and Recovery Act
REC	Recognized Environmental Conditions

RGU Responsible Governmental Unit

RJ Regional Jet

RMT Remote Monitoring Tower

RNAV Area Navigation

RNP Required Navigation Performance

RPZ Runway Protection Zone

RON Remain Over-Night

RST Rochester International Airport

RUS Runway Use System

SB South Bound

SBAS (WAAS) Satellite Based Augmentation System (Wide Area Augmentation System)

SDS State Disposal System

SF/PHOP Square Feet/ Peak Hour Originating Passenger

SF_6 Sulfur Hexafluoride

SHPO State Historic Preservation Officer (Minnesota Historical Society)

SIP State Implementation Plan

SLAMM Source Loading and Management Model

SMP Soil Management Plan

SO_2 Sulfur Dioxide

SOC Species of Concern

SPCCP Spill Prevention Control and Countermeasure Plan

SPUI Single Point Urban Interchange

STC St. Cloud Regional Airport

SWMF	Storm Water Management Facility
SW3P	Storm Water Pollution Prevention Plan
TAF	Terminal Area Forecast
TH	Trunk Highway
TIP	Transportation Improvement Plan
TOD	Transit Oriented Development
TRB	Transportation Research Board
TSA	Transportation Security Administration
TSS	Threshold Siting Surface
TSS	Total Suspended Solids
USACE	U.S. Army Corp of Engineers
USC	United States Code
USEPA	US Environmental Protection Agency
UST	Underground Storage Tank
USGS	United States Geological Survey
v/c	Volume/Capacity
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compound
WB	West Bound
WEB	Watershed Environmental Baseline
XPSWMM	Storm Water Management Model

8.2 Glossary of Terms

A-Weighted Sound Level (dBA) – The A-Weighted Sound Level is sound pressure level which has been filtered or weighted to reduce the influence of the low and high frequency noise (formerly DBA). It was designed to approximate the response of the human ear to sound.[1]

Air Carrier – A person who undertakes directly by lease, or other arrangement, to engage in air transportation.[2]

Air Traffic Control (ATC) – A service operated by appropriate authority to promote the safe, orderly, and expeditious flow of air traffic.[3]

Airport Elevation – The highest point of an airport's usable runways measured in feet from mean sea level (MSL).[4]

Airport Master Plan – An airport master plan is a comprehensive study of the airport and typically describes short-, medium-, and long-term plans for airport development. One of the key products of a master plan is a set of drawings that provides a graphic representation of the long-term development plan for an airport. The primary drawing in this set is the Airport Layout Plan.[5]

Airport Operations – The landing, takeoff or touch-and-go procedure by an aircraft on a runway at an airport.[6]

> **Local Operations** – Aircraft operations performed by aircraft that are based at the airport and that operate in the local traffic pattern or within sight of the airport, that are known to be departing for or arriving from flights in local practice areas within a prescribed distance from the airport, or that execute simulated instrument approaches at the airport.
>
> **Itinerant Operations** – Operations by aircraft that leaves the local airspace.

Airport Reference Point (ARP) – The latitude and longitude of the approximate center of the airport.[7]

Airside / Airfield – The portion of an airport that contains the facilities necessary for the operation of aircraft.[8]

Airport Sponsor – The entity that is legally responsible for the management and operation of an airport including the fulfillment of the requirements of laws and regulations related thereto.[9]

Altitude – The height of a level, point, or object measured in feet Above Ground Level (AGL) or from Mean Sea Level (MSL).[10]

Apron – A specified portion of the airfield used for passenger, cargo or freight loading and unloading, aircraft parking, and the refueling, maintenance and servicing of aircraft.[11]

Biotic Community – A naturally occurring assemblage of animals and plants that live in the same environment and are mutually sustaining and interdependent.[12]

Clean Air Act (CAA) – The Federal law regulating air quality. The first Clean Air Act (CAA), passed in 1967, required that air quality criteria necessary to protect the public health and welfare be developed. Since 1967, there have been several revisions to the CAA. The Clean Air Act Amendments of 1990 represent the fifth major effort to address clean air legislation.[13]

Criteria Pollutants – The six pollutants listed in the CAA that are regulated by the EPA through the NAAQS because of their health and/or environmental effects. They are: nitrogen dioxide (NO_2), sulfur dioxide (SO_2), carbon monoxide (CO), ozone (O_3), particulate matter equal to or less than 10 microns in diameter (PM_{10}) and equal to or less than 2.5 microns in diameter ($PM_{2.5}$), and lead (Pb).[14]

Day-Night Average Sound Level (DNL) – The 24-hour average sound level, in decibels, for the period from midnight to midnight, obtained after the addition of ten decibels to sound levels for the periods between midnight and 7 a.m. and between 10 p.m. and midnight, local time, as averaged over a span of one year. It is the FAA standard metric for determining the cumulative exposure of individuals to noise.[15]

Decibel (dB) – Sound pressure level is a measure of the amplitude of the sound, while frequency relates to the sound's pitch. The range of sound pressures of interest is represented on the low end by the threshold of hearing of normal young people and on the upper end by the noise of gunfire at close range.[16]

Effect – Effects includes ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Effects may also include those resulting from actions which may have both beneficial and detrimental effects, even if on balance the agency believes that the effect will be beneficial.[17]

Environmental Assessment (EA) – An environmental assessment "Means a concise public document for which a Federal agency is responsible that serves to (1) Briefly provide sufficient evidence and analysis for determining whether to prepare and environmental impact statement or a finding of no significant impact. (2) Aid an agency's compliance with the Act [National Environmental Policy Act, as amended] when no environmental impact statement is necessary. (3) Facilitates preparation of a statement when one is necessary." [18] Use of a federal EA as a substitute for the Environmental Assessment Worksheet (EA/EAW) form is authorized under the Minnesota Environmental Review Program provided that the EA addresses the impact categories required in the EAW and the procedural requirements of the EAW process are completed.[19] Therefore, in this document the term EA generally refers to both the EA and EAW and is used interchangeably with the term EA/EAW.

Environmental Assessment Worksheet (EAW) – According to the Minnesota Environmental Policy Act (MEPA), " "Environmental assessment worksheet" means a brief document which is designed to set out the basic facts necessary to determine whether an environmental impact statement is required for a proposed action."[20] The responsible governmental unit (RGU) prepares an EAW "to provide the information needed to determine whether the project has the potential for significant environmental effects. It also provides permit information, informs the public about a project and helps identify ways to protect the environment." [21]

Equivalent Sound Level (L_{eq}, LAEQ, LAEQD or LAEQN) – Is the steady A-weighted sound level over an specified period (not necessarily 24 hours) that has the same acoustic energy as the fluctuating noise during that period (with no consideration of a nighttime weighting.) It is a measure of cumulative acoustical energy. Because the time interval may vary, it should always be specified by a subscript (such as L_{eq} 8) for an 8-hr exposure to workplace noise) or be clearly understood.[22]

Fixed Base Operator (FBO) – A business enterprise located at on airport that provides services to pilots including aircraft rental, training, fueling, maintenance, parking, and the sale of pilot supplies. [23]

General Aviation (GA) – The segment of aviation that encompasses all aspects of civil aviation except certified air carriers and other commercial operators such as airfreight carriers. [24]

Habitat – Habitat is a combination of environmental factors that provides food, water, cover and space that a living thing needs to survive and reproduce. Habitat types include: coastal and estuarine, rivers and streams, lakes and ponds, wetlands, riparian areas, deserts grasslands/prairie, forests, coral reefs, marine, perennial snow and ice, and urban.[25]

Hydrocarbons (HC) – These gases represent unburned and wasted fuel. They come from incomplete combustion of gasoline and from evaporation of petroleum fuels.[26]

Instrument Flight Rules (IFR) – Rules governing the procedures for conducting instrument flight. Also a term used by pilots and controllers to indicate type of flight plan.[27]

Instrument Meteorological Conditions (IMC) – Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling less than the minima specified for visual meteorological conditions.[28]

Invasive Species – Invasive species means an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health. Alien species means, with respect to a particular ecosystem, any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem.[29]

Landside – The portion of an airport that provides the facilities necessary for the processing of passengers, cargo, freight, and ground transportation vehicles.[30]

Land Use – The present or planned utilization of a given parcel of land. Such land uses are normally indicated or delineated on a land use map. Land use maps may indicate usages for any given time period past, present, or future, and such period should always be indicated.[31]

Land Use Plan – The long-range plan for desirable use of land in the city as officially adopted and as amended from time to time by the plan commission; the purpose of such plan includes to serve as a guide in the zoning and progressive changes in the zoning of land and to meet the changing needs [of the community], in the subdividing and use of undeveloped land, and in the acquisition of rights-of-way or sites for public purposes such as streets, parks, schools, and public buildings.[32]

Metropolitan and Micropolitan Statistical Areas (metro and micro areas) – Geographic entities defined by the U.S. Office of Management and Budget (OMB) for use by Federal statistical agencies in collecting, tabulating, and publishing Federal statistics. The term "Core Based Statistical Area" (CBSA) is a collective term for both metro and micro areas. A metro area contains a core urban area of 50,000 or more population, and a micro area contains an urban core of at least 10,000 (but less than 50,000) population. Each metro or micro area consists of one or more counties and includes the counties containing the core urban area, as well as any adjacent counties that have a high degree of social and economic integration (as measured by commuting to work) with the urban core.[33]

National Ambient Air Quality Standards (NAAQS) – Air Quality standards established by the EPA to protect human health (primary standards) and to protect property and aesthetics (secondary standards).[34]

National Environmental Policy Act (NEPA) – Federal legislation that establishes environmental policy for the nation. It requires an interdisciplinary framework for federal agencies to evaluate environmental impacts and contains action-forcing procedures to ensure that federal agency decision makers take environmental factors into account.[35]

Noise-Sensitive Area – An area where noise interferes with normal activities associated with its use. Normally, noise sensitive areas include residential, educational, health, and religious structures and sites, and parks, recreational areas (including areas with wilderness characteristics), wildlife refuges, and cultural and historical sites.[36]

Minnesota Environmental Policy Act (MEPA) – State of Minnesota statue that (a) declares a state policy that will encourage productive enjoyable harmony between human beings and their environment: (b) promotes efforts that will prevent of eliminate damage to the environment and biosphere and stimulate the health and welfare of human beings; and (c) enriches the understanding of the ecological systems and natural resources important to the state and the nation.[37]

Object Free Area (OFA) – An area on the ground centered on a runway, taxiway, or taxilane centerline provided to enhance the safety of aircraft operations by having the area free of objects, except for objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes.[38]

Ozone (O_3) – A colorless, toxic gas formed by the photochemical reactions in the atmosphere of VOCs with the oxides of nitrogen. Ozone commonly is referred as “Smog”. Ozone is not emitted directly by any airport.[39]

Peak Hour – An estimate of the busiest hour in a day. This is also known as the design hour.[40]

Prime Farmland – Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, forage, oilseed, and other agricultural crops with minimum inputs of fuel, fertilizer, pesticides, and labor, and without intolerable soil erosion, as determined by the Secretary. Prime farmland includes land that possesses the above characteristics but is being used currently to produce live stock and timber. It does not include land already in or committed to urban development or water storage.[41]

Principal Arterial – Principal arterials are roadways that are intended to provide the mobility of a larger network, with lower category roadways feeding into them. These Principal Arterials may range from fully grade-separated facilities to two-lane urban streets.

Record of Decision (ROD) – A ROD is a concise public record of the Agency's decision. The ROD states what the decision is, identifies all alternatives considered in reaching the Agency's decision, and specifies which were environmentally preferable. The ROD discusses all other relevant factors considered, including any essential considerations of national policy, economic and technical considerations, and the agency's statutory mission. The ROD states whether all practicable means to avoid or minimize environmental harm from the alternative selected have been adopted, and if not, why they were not. Where applicable, the ROD may include a monitoring and enforcement program for mitigation.[42]

Regional Roadway – A regional roadway is a roadway that has the functional classification of principal arterial that is operated and maintained by MnDOT. For this project the regional roadways are I-494, TH 77, TH 62, and TH 5.

Responsible Governmental Unit – "Responsible governmental unit" means the governmental unit that is responsible for preparation and review of environmental documents under MEPA.[43]

Runway Protection Zone (RPZ) – An area off the runway end to enhance the protection of people and property on the ground.[44]

Runway Safety Area (RSA) – A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway.[45]

Runway Threshold – The beginning of that portion of a runway usable for landing.[46]

Sound Exposure Level (SEL) – A single event metric that takes into account both the noise level and duration of the event and referenced to a standard duration of one second.[47]

Sound Pressure Level (SPL) – One-third octave band sound pressure levels that form the starting point for all other noise metrics. SPL provides a detailed description of the frequency components of single complex sound and are used in assessing the effectiveness of soundproofing.[48]

Unique Farmland – Unique farmland is land other than prime farmland that is used for production of specific high-value food and fiber crops, as determined by the Secretary. It has the special combination of soil quality, location, growing season, and moisture supply needed to economically produce sustained high quality or high yields of specific crops when treated and managed according to acceptable farming methods. Examples of such crops include citrus, tree nuts, olives, cranberries, fruits, and vegetables.[49]

Visual Meteorological Conditions (VMC) – Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling equal to or better than specified minima.[50]

Visual Flight Rules (VFR) – Rules that govern the procedures for conducting flight under visual conditions. The term 'VFR' is also used in the United States to indicate weather conditions that are equal to or greater than minimum VFR requirements. In addition, it is used by pilots and controllers to indicate type of flight plan.[51]

Volatile Organic Compound (VOC) – A type of chemical emitted as gas from certain solids or liquids. VOCs include a variety of chemicals, some of which may have short- and long-term adverse health effects. Concentrations of many VOCs are consistently higher indoors (up to ten times higher) than outdoors. Examples include: paints and lacquers, paint strippers, cleaning supplies, pesticides, building materials and furnishings, office equipment such as copiers and printers, correction fluids and carbonless copy paper, graphics and craft materials including glues and adhesives, permanent markers, and photographic solutions.[52]

Wake Turbulence – Phenomena resulting from the passage of an aircraft through the atmosphere. The term includes vortices, thrust stream turbulence, jet blast, jet wash, propeller wash, and rotor wash both on the ground and in the air.[53]

Wetland – An area that is regularly saturated by surface water or groundwater and is characterized by a prevalence of vegetation that is adapted for life in saturated soil conditions (e.g., swamps, bogs, fens, marshes, and estuaries).[54]

Zoning – An exercise of the police powers of the State, as delegated to local government, designating the uses permitted on each parcel of land within the zoning jurisdiction.[55]

Endnotes

[1] FAA Order 150/5020-1, August, 5 1983, p. 3

[2] 14 CFR, Title 14: Aeronautics and Space, Part 1 – Definitions and Abbreviations.

[3] Federal Aviation Administration Pilot/Controller Glossary, 2/14/08.

[4] FAA AC 150/5300-13 CHG 12, 1/3/08, p. 1

[5] FAA AC 150/5070-6B Airport Master Plans, 7/29/05, p. 5&6

[6] FAA AC 150/5070-6B Airport Master Plans, 7/29/05, p. Appendix A.

[7] FAA AC 150/5300-13 CHG 12, 1/3/08, p. 1

[8] FAA AC 150/5070-6B Airport Master Plans, 7/29/05, p. Appendix A.

[9] FAA AC 150/5070-6B Airport Master Plans, 7/29/05, p. Appendix A.

[10] Federal Aviation Administration Pilot/Controller Glossary, 2/14/08.

[11] FAA AC 150/5070-6B Airport Master Plans, 7/29/05, p. Appendix A.

[12] Environmental Protection Agency, http://www.epa.gov/OCEPAterms/bterms.html.

[13] Air Quality Procedures For Civilian Airports & Air Force Bases, US Department of Transportation Federal Aviation Administration and U.S. Department of Defense U.S. Air Force, 1997, p xiv.

[14] Ibid p. xv and AD 5.

[15] FAA Order 150/5020-1, August, 5 1983, p. 5.

[16] FAA Order 150/5020-1, August, 5 1983, p. 11.

[17] A Citizens Guide to NEPA Having Your Voice Heard, Council on Environmental Quality, 12/07, Appendix E.

[18] CEQ, Regulations For Implementing the Procedural Provisions Of The National Environmental Policy Act, §1508.9.

[19] Minnesota Environmental Quality Board, EAW Guidelines, May 12, 2010, p. 4.

[20] State of Minnesota, Minnesota Statutes 2012, section 116D.04.

[21] Minnesota Environmental Quality Board, Guide to Minnesota Environmental Review Rules, May 2010, p. 20.

[22] FAA Order 150/5020-1, August, 5 1983, p. 5.

[23] FAA AC 150/5070-6B Airport Master Plans, 7/29/05, p. Appendix A.

[24] FAA AC 150/5070-6B Airport Master Plans, 7/29/05, p. Appendix A.

[25] US Fish and Wildlife Service, http://www.fws.gov/habitat/, 6/20/08.

[26] Air Quality Procedures For Civilian Airports & Air Force Bases, US Department of Transportation Federal Aviation Administration and U.S. Department of Defense U.S. Air Force, 1997, p xviii.

[27] Federal Aviation Administration Pilot/Controller Glossary, 2/14/08.

[28] Ibid.

[29] Executive Order 13112, Invasive Species, 64 FR 6183, 2/8/99.

[30] FAA AC 150/5070-6B Airport Master Plans, 7/29/05, p. Appendix A.

[31] FAA Order 150/5020-1, August, 5 1983, p. 4

[32] American Planning Association, *A Planner's Dictionary,* 2004.

[33] US Census Bureau, http://www.census.gov/population/www/estimates/metroarea.html, 6/20/08.

[34] Air Quality Procedures For Civilian Airports & Air Force Bases, US Department of Transportation Federal Aviation Administration and U.S. Department of Defense U.S. Air Force, 1997, p xx.

[35] FAA AC 150/5070-6B Airport Master Plans, 7/29/05, p. Appendix A.

[36] FAA Order 1050.1E, 6/8/2004, Appendix A, p. A-14.

[37] State of Minnesota, Minnesota Statutes 2012, section 116D.01.

[38] FAA AC 150/5300-13 CHG 12, 1/3/08, p. 2

[39] Air Quality Procedures For Civilian Airports & Air Force Bases, US Department of Transportation Federal Aviation Administration and U.S. Department of Defense U.S. Air Force, 1997, p xxi.

[40] FAA AC 150/5070-6B Airport Master Plans, 7/29/05, p. Appendix A.

[41] Farmland Protection Policy Act, 7 USC 4201, Section 2, paragraph c(1)(A)

[42] FAA Order 1050.1E CHG 1, Environmental Impacts: Policies and Procedures, 3/20/06, p. 5-2.

[43] State of Minnesota, Minnesota Administrative Rules, 4410.0200 Definitions and Abbreviations, November 30, 2009, Subpart 75.

[44] FAA AC 150/5300-13 CHG 12, 1/3/08, p. 3.

[45] FAA AC150/5300-13 CHG 12, 1/3/08, p. 3.

[46] Federal Aviation Administration Pilot/Controller Glossary, 2/14/08.

[47] FAA Order 1050.1E, 6/8/2004, Appendix A, p. A-65.

[48] FAA Order 1050.1E, 6/8/2004, Appendix A, p. A-65.

[49] Farmland Protection Policy Act, 7 USC 4201, Section 2, paragraph c(1)(B).

[50] Federal Aviation Administration Pilot/Controller Glossary, 2/14/08.

[51] Federal Aviation Administration Pilot/Controller Glossary, 2/14/08.

[52] U.S. Environmental Protection Agency, “Basic Information,” http://www.epa.gov/iaq/voc.html.

[53] Federal Aviation Administration Pilot/Controller Glossary, 2/14/08.

[54] Environmental Protection Agency, www.epa.gov/glnpo/rptcong/1994/glossary.htm.

[55] FAA Order 150/5020-1, August, 5 1983, p. 4

Appendix C: MSP 2040 LTP Requirements

TECHNICAL MEMORANDUM

To: Lydia I. Werner, CM
Alan Howell, R.A.
Metropolitan Airports Commission

From: Brandon Bourdon, P.E.
Bill Schmitz, P.E.
Kimley-Horn and Associates, Inc.

Date: October 8, 2021

Subject: ***MSP Airport 2040 LTP***
Existing Landside Facility Requirements – Parking, Commercial Ground Transportation, and Rental Cars

CONTENT

1 OVERVIEW

This memorandum describes the existing landside parking, rental car, and commercial ground transportation facility requirements for the Minneapolis-St. Paul International Airport (MSP). This work is being completed as part of the MSP 2040 Long Term Plan (LTP). Kimley-Horn determined the existing facility requirements using a data driven approach that incorporated parking and commercial vehicle data provided by the Metropolitan Airports Commission (MAC) and a rental car company survey.

2 PARKING REQUIREMENTS

The MSP parking facilities accommodate both employee and public parkers. The combined employee and public parking demand determines the total Airport parking requirement.

2.1 Employee Parking

MAC and tenant employees park at both Terminal 1 and Terminal 2. Employee parking at Terminal 1 occupies a nested parking area in the Pink Ramp, with authorized employee proximity card access. Employee parking at Terminal 2 is intermixed with public parking in the Orange and Purple Ramps.

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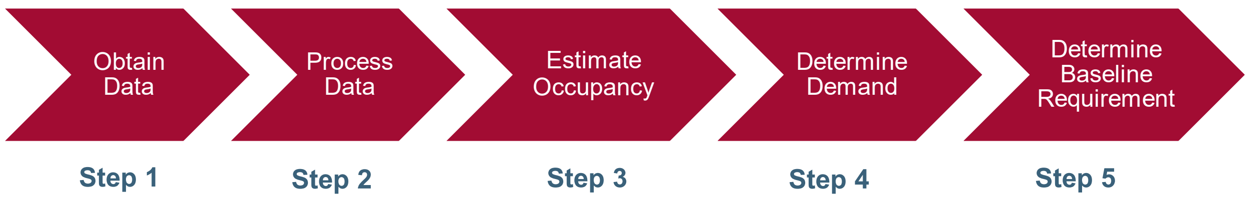
Methodology
Kimley-Horn utilized MAC provided employee parking transaction data from the Airport's parking access and revenue control system to determine employee parking demand because discreet employee parking occupancy data was not available. **Figure 1** graphically illustrates the methodology, with additional text description below. Employee parking transaction data is not included in this memorandum; the source data is available upon request.

Figure 1. Employee Parking Methodology



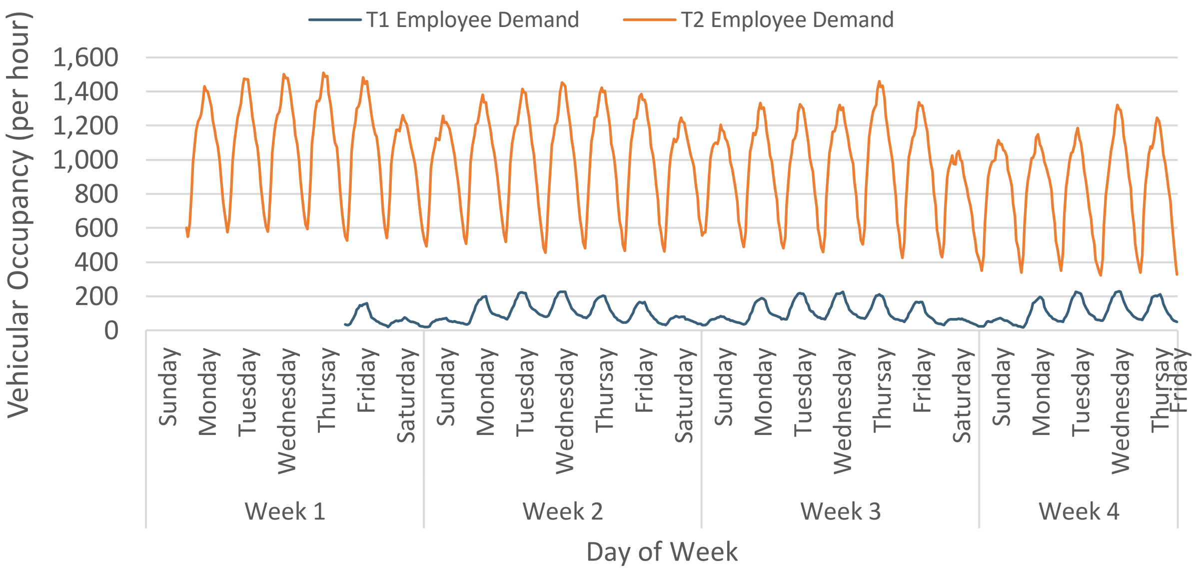
Source: Kimley-Horn and Associates, Inc.
Prepared by: Kimley-Horn and Associates, Inc.

- **Step 1:** MAC provided employee parking proximity card entry and exit data for March 2019, which approximately represents all employee parking activity.
- **Step 2:** For each day throughout March 2019, the number of entries per hour at each terminal were compared with exits per hour at each terminal to determine the number of vehicles parked at each terminal throughout the day.
- **Step 3:** Kimley-Horn estimated parking occupancy using an assumed occupancy to start the month.
- **Step 4:** The peak occupancy at both Terminal 1 and Terminal 2 was selected to determine the employee parking demand. Peak occupancy was used to provide a high level of service during shift changes.
- **Step 5:** The parking requirement was determined by applying a 10% service factor to the demand. The service factor adjustment accounts for known inefficiencies in employee parking operations including vehicles parked in multiple stalls, circulating to find a preferred stall within a facility, and miscounts of customers leaving or entering stalls. The employee parking service factor also accounts for enhanced parking demand during shift changes, when employees for the next shift arrive before the prior shift leaves.

The employee parking analysis included in this memorandum does not include Delta employees parking outside MAC facilities. At the time of this analysis, Delta employees parked on Quick Ride Ramp Level 1 and in a surface lot on 34th Street. Delta employees with an employee proximity card providing access to MSP parking facilities are included in the employee parking requirement.

Requirement
Figure 2 (below) presents the estimated employee parking demand. The results show that throughout the month, the number of employees parked at Terminal 1 consistently peaks at approximately 225 vehicles, and Terminal 2 peaks at approximately 1,450 vehicles. The resulting employee parking requirement is summarized in **Table 1**.

Figure 2 – Employee Parking Occupancy (March 2019)



Source: Kimley-Horn and Associates, Inc.
Prepared by: Kimley-Horn and Associates, Inc.

Table 1 – Existing Employee Parking Requirement (2019)

Parking Facility	Demand	Requirement (1)
Terminal 1	225	250
Terminal 2	1,500	1,650
Total	1,725	1,900

(1) Assumes a 10% circulation factor
Source: Kimley-Horn and Associates, Inc.
Prepared by: Kimley-Horn and Associates, Inc.

2.2 Public Parking

MSP public parking is served by a combination of on-airport and off-airport parking facilities. MAC supplies on airport parking as an airport revenue source. Private companies provide off-airport parking with shuttle access to the airport as a business, independent from the MAC. Off-airport parking operators do pay MAC a fee for shuttle access; shuttle requirements are discussed below.

Methodology

Kimley-Horn utilized MAC provided parking occupancy data provided by the MSP parking operator to determine on-airport public parking demand; off-airport parking demand was estimated as described below. **Figure 3** graphically illustrates the methodology, with additional text description below. A summary of the data provided by MAC is available in **Attachment A**.

Figure 3. Public Parking Methodology

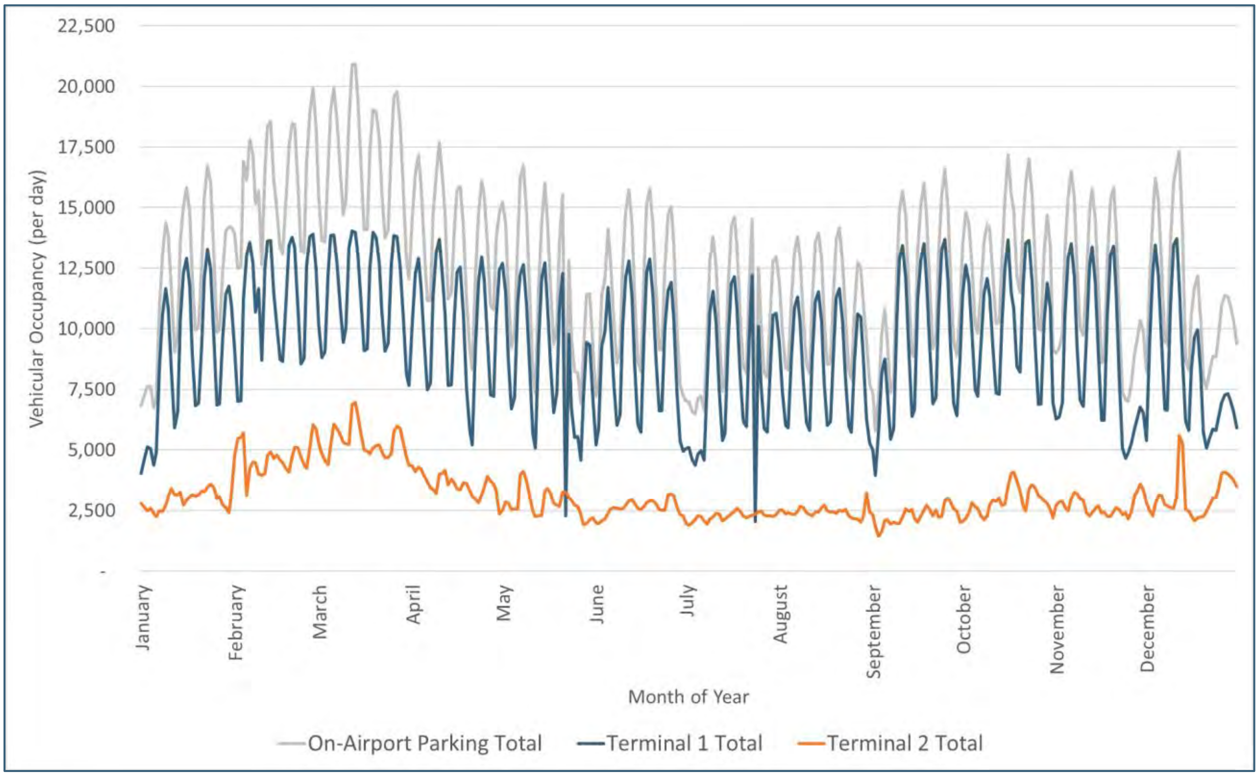
Source: Kimley-Horn and Associates, Inc.
Prepared by: Kimley-Horn and Associates, Inc.

- **Step 1:** MAC provided parking occupancy for each facility during calendar year 2019. The occupancy counts were taken at the peak of each day. Occupancies include valet parking, E-Park Elite, Terminal 1 General Parking, Terminal 2 Short Term parking, and Terminal 2 General Parking.
- **Step 2:** The occupancy counts from each parking product were aggregated to identify total occupancy each day. Employee parking counts were removed. The resulting total occupancy values were then arranged from highest to lowest occupancy.
- **Step 3:** Kimley-Horn estimated off-airport parking occupancy based on an assumed off-airport parking supply and peak period occupancy.
- **Step 4:** The 20th busiest day based on the sorted data was then identified as the design day for parking demand. The total demand includes both on-airport and off-airport demand. The 20th busiest day is industry standard for determining airport public parking demand. Peak occupancy is not used because using the busiest day as the design day will cause over planning and result in an excess of unused parking stalls, except during the busiest day
- **Step 5:** The parking requirement was determined by applying a 5% service factor to the design day demand. The service factor adjustment accounts for known inefficiencies in public parking operations including vehicles parked in multiple stalls, inability of customers to find available parking within a facility, and challenges directing customers to parking levels with available stalls within a large parking operation.

On-Airport Occupancy

Figure 4 shows not only where peaking occurs throughout the year, but also the consistency of parking at Terminal 1 and the relative inconsistency of parking occupancy at Terminal 2 (which peaks during spring and the fall holiday season).

Figure 4 – Chronological Public Parking Occupancy (2019)



Source: Kimley-Horn and Associates, Inc.
Prepared by: Kimley-Horn and Associates, Inc.

Off-Airport Occupancy

Although not located on MAC property, nor controlled or operated by MAC, off-airport parking occupancy is an important component in understanding overall public parking demand at MSP. Existing off-airport parking inventory was estimated for the companies operating at the time this study was completed. **Table 2** outlines the estimated parking inventory at each off-airport site and the total estimated off-airport parking supply.

Table 2 – Estimated Off-Airport Parking Inventory (2019)

	Parking Stalls
Park 'N Go	1,300
Park 'N Fly	1,800
EZ Air Park	1,600
Shepard Road Airport Parking	1,300
Total	**6,000**

Source: Kimley-Horn and Associates, Inc.
Prepared by: Kimley-Horn and Associates, Inc.

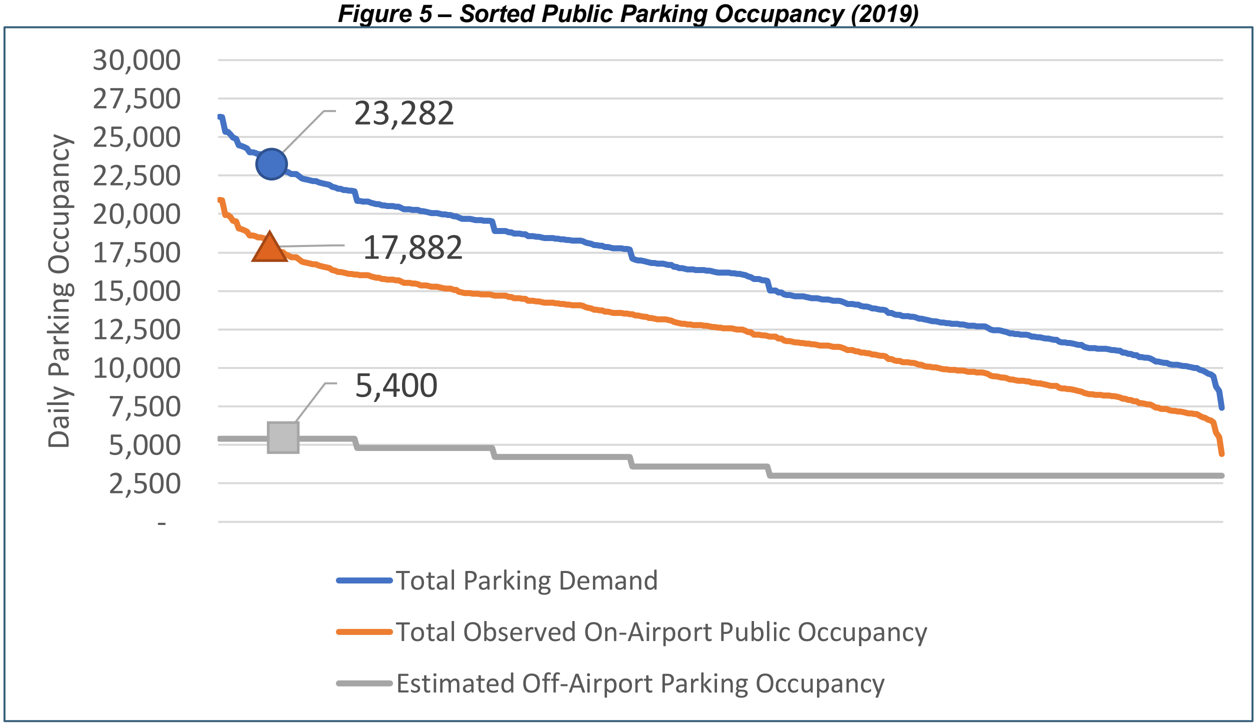
This study did not include a detailed investigation of off-airport parking occupancy. Professional judgement was used to estimate off-airport parking occupancy. The off-airport parking occupancy was assumed to be:

- 90% during the busiest 50-days of the year
- 80% between the 51st and 100th busiest days of the year
- 70% between the 101st and 150th busiest days of the year
- 60% between the 151st and 200th busiest days of the year
- 50% for the 201st busiest day through the remainder of the year

Airport Public Parking Requirement

Combining observed on-airport public parking occupancy with an off-airport estimate provides a holistic picture of existing public parking demand at MSP. **Figure 5** shows public parking occupancy counts (both on- and off-airport) in 2019 (sorted from highest to lowest) and the total public parking demand (the sum of on- and off-airport occupancy). The numbers highlighted on the graph represent the 20th busiest day when sorted from highest to lowest occupancy. As discussed previously, the 20th busiest day is the design day for public parking activity. The off-airport design day occupancy is identified with a square. The on-airport design day occupancy is identified with a triangle. The total airport design day occupancy is identified with a circle.

Figure 5 – Sorted Public Parking Occupancy (2019)



Source: Kimley-Horn and Associates, Inc.
Prepared by: Kimley-Horn and Associates, Inc.

Table 3 shows both the parking demand and the parking stall requirement. The parking stall demand was increased by 5% service factor to calculate the total public parking stall requirement. The service factor accounts for the operational challenge to fill a parking facility to capacity due to customer search time for the last available parking stall and to account for improperly parked vehicles.

Table 3 – Total Airport Public Parking Requirement (2019)

Parking Facility	Demand	Requirement [1]
On-Airport	17,900[2]	18,800
Off-Airport	5,400[3]	5,700
Total	**23,300**	**24,500**

[1]Assumes a 5% circulation factor

[2] 20th busiest day, rounded to nearest hundred stalls

[3]Assumes 90% occupancy of total estimated off-airport stalls

Source: Kimley-Horn and Associates, Inc.

Prepared by: Kimley-Horn and Associates, Inc.

Total Airport Parking Requirement

The total existing airport parking requirement is determined by combining the employee and public parking requirement. **Table 4** summarizes the existing parking requirement based on 2019 parking data provided by MAC and the existing supply of on-airport parking.

Table 4 – Existing Airport Parking Requirement Summary

	Parking Requirement Summary	Existing On-Airport Supply
Public	24,500	-
Employee	1,900	-
Total	**26,400**	**27,200**

Source: Kimley-Horn and Associates, Inc.

Prepared by: Kimley-Horn and Associates, Inc.

3 RENTAL CAR OPERATIONAL FACILITIES REQUIREMENTS ANALYSIS

There were four rental car agency (RAC or RACs) families operating on-airport at MSP in 2019. The four families consisted of Enterprise Holding Inc. (Alamo, Enterprise, and National), Dollar Thrifty Automotive Group (Dollar, Hertz, and Thrifty), Avis Budget Group (Avis, Budget, and Payless), and SIXT Rental Car. The on-airport RACs utilize MAC constructed, and tenant financed, facilities to rent and service customer vehicles.

3.1 Methodology

Kimley-Horn surveyed the RACs in the spring of 2020 to gather average day, peak month data from 2019 operations. The RACs provided Kimley-Horn data related to the number of return transactions per day, rental transactions per hour during an average day, and overall monthly activity. The RACs identified August 2019 as the peak month of activity. Kimley-Horn aggregated the RAC transaction data for the peak hour on an average day, the results of which can be found in **Table 5**. Figure 16 graphically illustrates the methodology, with additional text description below. The RAC survey responses are available in **Attachment B**.

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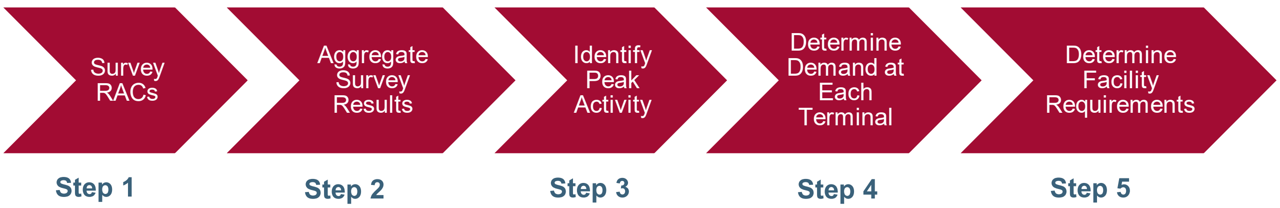
Table 5 – RAC Survey Results (2019)

	Existing Demand
Peak rentals per Hour	**494**
Peak returns per Hour	**264**

Source: Kimley-Horn and Associates, Inc.
Prepared by: Kimley-Horn and Associates, Inc.

Figure 6. Rental Car Methodology



Source: Kimley-Horn and Associates, Inc.
Prepared by: Kimley-Horn and Associates, Inc.

- **Step 1:** Kimley-Horn administered a survey of the RACs to understand existing rental and return activity cycles.
- **Step 2:** Disparate RAC survey responses were aggregated to determine combined RAC activity.
- **Step 3:** Data was processed to determine the peak vehicle rental and peak vehicle return activity. Peak activity was used to determine RAC facility requirements to provide a high customer level of service.
- **Step 4:** The RACs provided combined data for both Terminal 1 and Terminal 2. Historically, approximately 85% of airport originating passenger activity occurred at Terminal 1. Kimley-Horn assumed 90% of the peak hour RAC activity occurred at Terminal 1, and 20% of the peak hour RAC activity occurred at Terminal 2 to determine requirement. The total activity assumes a 5% terminal specific passenger surge above the historic airport split because Terminal 1 and Terminal 2 operations peak at different hours during the day.
- **Step 5:** The rental car facility requirement were determined using the peak hour rentals and returns, industry-standard surge factors, industry-standard sizing factors, and industry-standard transaction times. Critical sizing factors include:
  - **Customer Service Counters:** 40% of customers by-pass the counters, and each counter transaction takes 8-minutes
  - **Ready / Return Stalls:** 2.5 times rental activity plus 1.0 times return activity
  - **Quick Turnaround:**
    - Fueling Positions: 1 fueling position can accommodate 4 returns per hour
    - Car Wash Bays: 1 wash bay for every 4 fueling positions
    - Vehicle Storage:4 times the peak hour returns

3.2 Requirements

Below, **Table 6** outlines the results of the RAC facility requirements analysis. In determining the number of facilities required at each terminal, the total airport facility demand values were found to be 85% of total activity at Terminal 1 and 15% of total activity of Terminal 2. However, for the purposes of facility sizing, these activity levels were increased by 5% at each terminal, resulting in a split of 90% at Terminal 1 and 20% at Terminal 2. Allocating 110% of the peak activity was done to account for surging that occurs at each terminal throughout the day in which the peak hours at both terminals may not occur simultaneously.

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A 1.25 surge factor is applied to customer service counter positions, fueling positions, and wash bays to account for uneven activity distribution within the peak hour.

Table 6 – Rental Car Requirements by Facility Type

	Existing Demand[(1)]		
Facility	**Terminal 1**	**Terminal 2**	**Airport Total**
	Existing Supply	*Existing Supply*	*Existing Supply*
Customer Service Counter Positions [(2)]	**45**	**10**	**55**
	48	*29*	*77*
Ready/Return Stalls	**1,350**	**300**	**1,650**
	2,050	*665*	*2,715*
Fueling Positions [(2)]	**75**	**17**	**92**
	76	*24*	*100*
Wash Bays [(2)]	**19**	**5**	**24**
	12	*8*	*20*
QTA Storage (On-Site Vehicles)	**950**	**210**	**1,160**
	575	*685*	*1,260*

[(1)]Terminal Split: 90% Terminal 1, 20% Terminal 2.
[(2)]Includes 1.25X surge factor.
Source: Kimley-Horn and Associates, Inc.
Prepared by: Kimley-Horn and Associates, Inc.

4 COMMERCIAL GROUND TRANSPORTATION REQUIREMENTS ANALYSIS

Numerous commercial ground transportation modes serve MSP at both Terminal 1 and Terminal 2. Commercial ground transportation operators include:

- Limo
- Taxi
- Charter Bus
- Metro Transit
- Hotel courtesy shuttle
- Off-Airport Parking Shuttle
- Off-Airport Rental Car Shuttle
- Out State Shuttle
- Shared Ride
- Transportation Network Company (TNC)

4.1 Methodology

MAC provided Kimley-Horn commercial ground transportation data for requirements analysis. TNC transaction data is collected by the operators, and the operators provide the data to MAC. MAC collects transaction data for legacy commercial ground transportation operators through MAVIS. **Figure 7** summarizes the methodology and steps followed to determine the TNC pick-up requirements. **Figure 8** summarizes the methodology and steps followed to determine the non-TNC operator facility requirements.

Figure 7. TNC Demand Methodology

Source: Kimley-Horn and Associates, Inc.
Prepared by: Kimley-Horn and Associates, Inc.

- **Step 1:** The analysis to determine the required number of TNC positions involved obtaining monthly TNC transactions for MSP from August 2019. While the data included pick-up and drop-off activity, the pick-up activity served as the basis of the requirements because that activity is operationally limited to defined locations.
- **Step 2:** The monthly data was aggregated and processed by the hour, day, and week.
- **Step 3:** The data was further processed to determine the number of TNC pick-ups that occurred every fifteen minutes at each terminal and across the entire airport during August 2019. To determine the number of required positions, the approximate 99th percentile 15-minute activity level was utilized. The 99th percentile was used because it provides a high level of customer service during most of the month, with limited peak periods where demand exceeds supply.
- **Step 4:** The number of required positions was determined using an average observed transaction time with an assumed surge factor of 1.5 to account for sudden increases in activity.

Figure 8. Non-TNC Demand Methodology

Source: Kimley-Horn and Associates, Inc.
Prepared by: Kimley-Horn and Associates, Inc.

- **Step 1:** The analysis to determine the required number of non-TNC mode positions involved obtaining monthly automated vehicle identification (AVI) transponder transaction data from the MAC MAVIS system for August 2019. The exit time for each transaction was used as the basis of analysis. The exit time for taxis and limos is assumed to correspond with a passenger pick-up transaction. For other modes, the exit time could be a pick-up or drop-off activity.
- **Step 2:** The AVI data (which provided timestamps for entry and exit movements) were processed to determine the number of transactions that occurred by the hour, day, and week. The data was not split by Terminal. Kimley-Horn split activity by terminal assuming the following:
  - **Step 2A:** For all modes other than charter buses, Kimley-Horn assumed 90% of the activity occurred at Terminal 1, and 20% of the activity occurred at Terminal 2 to determine requirements. The total activity assumes a 5% terminal specific passenger surge above the historic airport split because Terminal 1 and Terminal 2 operations peak at different hours during the day.
  - **Step 2B:** For charter buses, Kimley-Horn assumed 80% of the activity occurred at Terminal 1, and 40% of the activity occurred at Terminal 2 to determine requirements. This was determined in coordination with MAC staff to better reflect observed facility utilization.

- **Step 3:** Similar to the process for TNCs, the hourly data was further distilled into 15-minute time periods. The activity per 15 minutes was determined for each individual mode. To determine the number of required positions, the approximate 99th percentile 15-minute activity level was utilized.
- **Step 4:** The number of required positions was determined using an average observed dwell time and a surge factor of 1.5 to account for sudden increases in activity.
    - **Step 4A:** For taxis and limos, determine the required total number of positions by doubling the number of loading positions. This accounts for close-in vehicle staging used to reduce customer wait times and enhance the customer experience.

Dwell times were derived from the HNTB *Minneapolis - St. Paul International Airport, Landside Data Collection Summary Report* (2019). Dwell times calculated in 2019 were used. However, if values were not available for a given mode in the report, dwell times from 2015 were used. Guidance was provided by MAC staff in adjusting dwell times for several modes. **Table 7** summarizes the design vehicle dwell time for each mode.

Table 7. Vehicle Dwell Time

Vehicle Type	Dwell Time (min:sec)
TNC	3:20 (Terminal 1) 2:00 (Terminal 2)
Taxi	2:00
Limo	10:00
Charter Bus	20:00
Hotel Courtesy Shuttle / Shared Ride	5:00
Off-Airport Parking Shuttle	5:30
Out State Shuttle	6:00

Source: MAC, HNTB, Kimley-Horn and Associates, Inc.
Prepared by: Kimley-Horn and Associates, Inc.

A summary of the processed commercial ground transportation data is available in **Attachment C**. Vehicle activity was processed to identify the peak activity and develop a histogram distribution of activity through the month. This histogram showed the frequency of the number of transactions that occurred in 15-minute intervals throughout the month per vehicle type.

4.10 Requirements

The requirements for each mode described above are displayed below in **Table 8** and **Table 9**. The requirements are grouped by “Vehicles for Hire” and “Scheduled Vehicles” providers. These groupings reflect services Kimley-Horn considers substitutes – meaning a customer may choose another provider within the grouping such as a limo or a taxi, but the same customer is unlikely to choose a limo or a hotel courtesy shuttle. **Table 8** shows the required positions for commercial modes categorized as vehicles for hire and includes taxis, limos, and TNCs. These modes provide a similar service; grouping them provides an approximation of the existing vehicles for hire service requirement. **Table 9** shows the required positions for commercial modes categorized as scheduled vehicles. These include buses, hotel courtesy shuttles, off-airport parking shuttles, out state shuttles, and shared rides. These modes provide a similar service and grouping them provides an approximation of the existing shared or scheduled service requirement. **Table 9** also includes a requirement for Metro Transit buses. Metro Transit Route 54 bus service currently operates at Terminal 1 with two bus positions.

Table 8 – Commercial Ground Transportation Requirement – Vehicles for Hire

Mode Type	Required Loading Positions		
	Terminal 1	Terminal 2	Airport Total
	Existing Supply	*Existing Supply*	*Existing Supply*
Limo	**28**	**6**	**34**
	23	*9*	*32*
Taxi	**21**	**6**	**27**
	44	*12*	*56*
TNC	**38**	**7**	**45**
	30	*8*	*38*
Total	**87**	**19**	**106**
	97	*29*	*126*

Source: Kimley-Horn and Associates, Inc.
Prepared by: Kimley-Horn and Associates, Inc.

Table 9 – Commercial Ground Transportation Requirement – Scheduled Vehicles

	Required Loading Positions		
Mode Type	**Terminal 1**	**Terminal 2**	**Airport Total**
Bus	8	4	12
Metro Transit	2	-	2
Hotel Courtesy Shuttle	10	3	13
Off-Airport Parking Shuttle	5	5	10
Off-Airport Rental Shuttle(1)	2	2	4
Out State Shuttle	6	2	8
Shared Ride	2	2	4
Total	**35**	**18**	**53**
Existing Airport Supply	*36*	*26*	*62*

Source: Kimley-Horn and Associates, Inc.
Prepared by: Kimley-Horn and Associates, Inc.

5 SUMMARY

Table 10, **Table 11**, **Table 12**, and **Table 13** summarize the existing facility requirements analyzed in the memorandum. The requirements include parking stalls, rental car facilities, and commercial ground transportation positions.

Table 10. Existing Parking Requirements (2019)

	Required Stalls	Existing On-Airport Supply
Public (1)	24,500	-
Employee (2)	1,900	-
Total	**26,400**	**27,200**

(1) Includes On-Airport and Off-Airport parking
(2) Does not include Delta parking demand in Quick Ride Ramp or 34th Ave Lot
Source: Kimley-Horn and Associates, Inc.
Prepared by: Kimley-Horn and Associates, Inc.

Table 11. Existing Rental Car Facility Requirements (2019)

Facility	Requirement		
	Terminal 1	**Terminal 2**	**Airport Total**
	Existing Supply	*Existing Supply*	*Existing Supply*
Customer Service Counter Positions	**45**	**10**	**55**
	48	*29*	*77*
Ready/Return Stalls	**1,350**	**300**	**1,650**
	2,050	*665*	*2,715*
Fueling Positions	**75**	**17**	**92**
	76	*24*	*100*
Wash Bays	**19**	**5**	**24**
	12	*8*	*20*
QTA Storage (On-Site Vehicles)	**950**	**210**	**1,160**
	575	*685*	*1,260*

Source: Kimley-Horn and Associates, Inc.
Prepared by: Kimley-Horn and Associates, Inc.

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Table 12. Existing Commercial Vehicle Requirements - Vehicles for Hire

Mode Type	Required Loading Positions		
	Terminal 1	Terminal 2	Airport Total
	Existing Supply	*Existing Supply*	*Existing Supply*
Limo	**28**	**6**	**34**
	23	*9*	*32*
Taxi	**21**	**6**	**27**
	44	*12*	*56*
TNC	**38**	**7**	**45**
	30	*8*	*38*
Total	**87**	**19**	**106**
	97	*29*	*126*

Source: Kimley-Horn and Associates, Inc.
Prepared by: Kimley-Horn and Associates, Inc.

Table 13. Existing Commercial Vehicle Requirements - Scheduled Vehicles

Mode Type	Required Loading Positions		
	Terminal 1	Terminal 2	Airport Total
Bus	8	4	12
Metro Transit	2	-	2
Hotel Courtesy Shuttle	10	3	13
Off-Airport Parking Shuttle	5	5	10
Off-Airport Rental Shuttle	2	2	4
Out State Shuttle	6	2	8
Shared Ride	2	2	4
Total	**35**	**18**	**53**
Existing Airport Supply	*36*	*26*	*62*

Source: Kimley-Horn and Associates, Inc.
Prepared by: Kimley-Horn and Associates, Inc.

6 ATTACHMENTS

Attachment A – Public Parking Occupancy Data (CY 2019)
Attachment B – RAC Survey Responses
Attachment C – Processed Commercial Vehicle Data

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Attachment A

Public Parking Occupancy Data (CY 2019)

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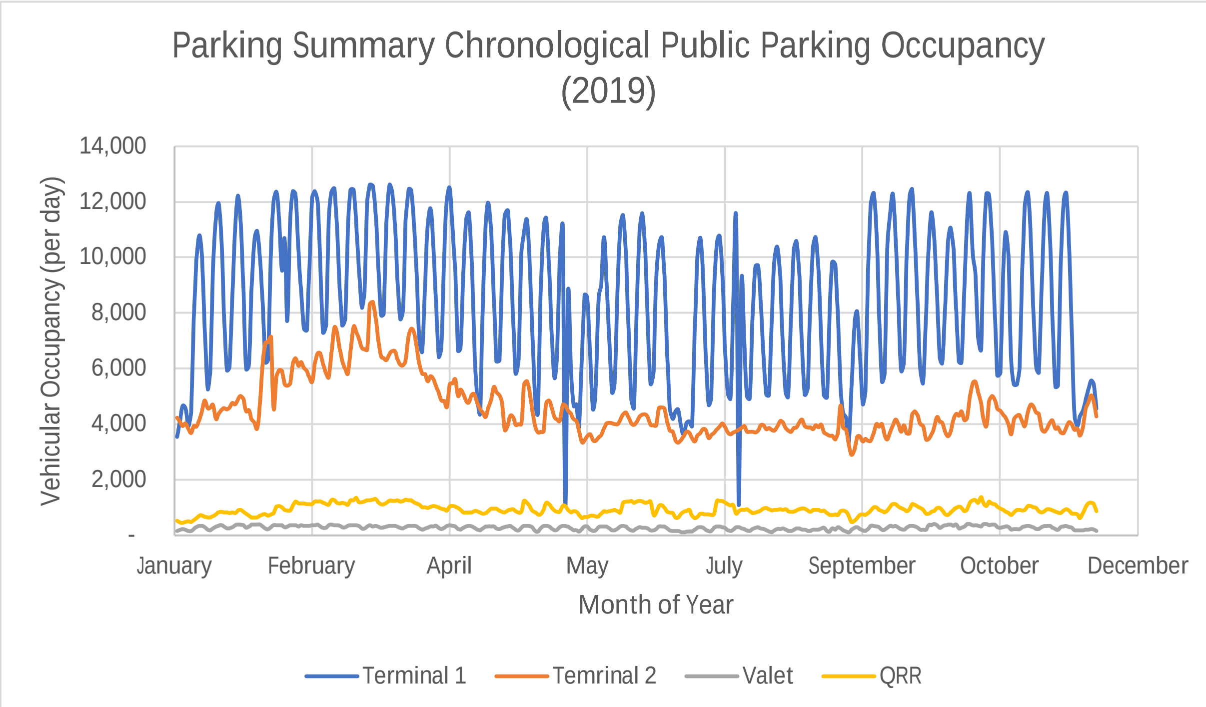


				T1	T2	Valet	QRR
January	1/1/2019	Tuesday 01	January-01	3,545	4,244	172	531
	1/2/2019	Wednesday 02	January-02	4,165	4,084	206	468
	1/3/2019	Thursday 03	January-03	4,670	3,937	230	454
	1/4/2019	Friday 04	January-04	4,588	4,038	198	495
	1/5/2019	Saturday 05	January-05	3,929	3,825	161	508
	1/6/2019	Sunday 06	January-06	4,451	3,693	157	496
	1/7/2019	Monday 07	January-07	7,807	3,932	242	548
	1/8/2019	Tuesday 08	January-08	9,899	3,921	308	625
	1/9/2019	Wednesday 09	January-09	10,805	4,166	345	719
	1/10/2019	Thursday 10	January-10	9,991	4,504	343	722
	1/11/2019	Friday 11	January-11	7,477	4,856	302	678
	1/12/2019	Saturday 12	January-12	5,268	4,589	213	656
	1/13/2019	Sunday 13	January-13	5,963	4,600	194	656
	1/14/2019	Monday 14	January-14	9,604	4,700	248	701
	1/15/2019	Tuesday 15	January-15	11,472	4,182	316	757
	1/16/2019	Wednesday 16	January-16	11,952	4,378	349	840
	1/17/2019	Thursday 17	January-17	10,746	4,508	378	852
	1/18/2019	Friday 18	January-18	8,045	4,587	323	833
	1/19/2019	Saturday 19	January-19	5,953	4,549	262	837
	1/20/2019	Sunday 20	January-20	6,080	4,603	264	816
	1/21/2019	Monday 21	January-21	8,459	4,760	291	833
	1/22/2019	Tuesday 22	January-22	11,125	4,732	374	808
	1/23/2019	Wednesday 23	January-23	12,223	4,894	387	897
	1/24/2019	Thursday 24	January-24	11,393	5,029	384	921

	1/25/2019	Friday 25	January-25	8,721	4,897	367	851
	1/26/2019	Saturday 26	January-26	5,994	4,466	283	795
	1/27/2019	Sunday 27	January-27	6,101	4,512	313	713
	1/28/2019	Monday 28	January-28	8,754	4,198	387	653
	1/29/2019	Tuesday 29	January-29	10,611	4,059	397	642
	1/30/2019	Wednesday 30	January-30	10,957	3,859	387	654
	1/31/2019	Thursday 31	January-31	10,110	4,646	395	706
February	2/1/2019	Friday 01	February-01	8,298	6,221	317	757
	2/2/2019	Saturday 02	February-02	6,226	6,924	248	767
	2/3/2019	Sunday 03	February-03	6,314	6,959	226	714
	2/4/2019	Monday 04	February-04	10,358	7,141	309	761
	2/5/2019	Tuesday 05	February-05	12,081	4,563	373	798
	2/6/2019	Wednesday 06	February-06	12,381	5,699	380	1,028
	2/7/2019	Thursday 07	February-07	11,498	5,949	369	1,064
	2/8/2019	Friday 08	February-08	9,546	5,914	364	1,016
	2/9/2019	Saturday 09	February-09	10,673	5,458	291	929
	2/10/2019	Sunday 10	February-10	7,721	5,391	322	895
	2/11/2019	Monday 11	February-11	11,449	5,478	371	901
	2/12/2019	Tuesday 12	February-12	12,390	6,202	380	1,080
	2/13/2019	Wednesday 13	February-13	12,279	6,376	368	1,217
	2/14/2019	Thursday 14	February-14	10,189	6,110	328	1,157
	2/15/2019	Friday 15	February-15	8,800	6,239	367	1,147
	2/16/2019	Saturday 16	February-16	7,462	6,035	347	1,158
	2/17/2019	Sunday 17	February-17	7,386	5,913	342	1,136
	2/18/2019	Monday 18	February-18	9,701	5,692	348	1,131
	2/19/2019	Tuesday 19	February-19	12,154	5,531	376	1,131
	2/20/2019	Wednesday 20	February-20	12,385	6,167	369	1,230
	2/21/2019	Thursday 21	February-21	11,957	6,556	386	1,226
	2/22/2019	Friday 22	February-22	9,618	6,543	324	1,233
	2/23/2019	Saturday 23	February-23	7,305	6,168	268	1,187
	2/24/2019	Sunday 24	February-24	7,572	5,836	285	1,139
February	2/25/2019	Monday	February-25	11,367	5,694	372	1,115
	2/26/2019	Tuesday	February-26	12,350	6,532	389	1,279
	2/27/2019	Wednesday	February-27	12,481	7,481	376	1,276
	2/28/2019	Thursday	February-28	11,120	7,295	368	1,181
	3/1/2019	Friday	March-01	8,911	6,729	358	1,149
	3/2/2019	Saturday	March-02	7,565	6,280	292	1,184
	3/3/2019	Sunday	March-03	7,810	5,995	299	1,149
	3/4/2019	Monday	March-04	11,048	5,834	355	1,109
	3/5/2019	Tuesday	March-05	12,429	6,631	375	1,273
	3/6/2019	Wednesday	March-06	12,450	7,516	371	1,269
	3/7/2019	Thursday	March-07	11,227	7,337	373	1,354
	3/8/2019	Friday	March-08	9,625	7,089	338	1,201
	3/9/2019	Saturday	March-09	8,203	6,748	255	1,192
	3/10/2019	Sunday	March-10	8,774	6,706	247	1,224
	3/11/2019	Monday	March-11	11,979	6,692	329	1,272
	3/12/2019	Tuesday	March-12	12,617	8,326	372	1,263

	3/13/2019	Wednesday	March-13	12,574	8,401	330	1,289
	3/14/2019	Thursday	March-14	11,650	7,871	344	1,313
March	3/15/2019	Friday	March-15	9,836	7,087	323	1,202
	3/16/2019	Saturday	March-16	7,918	6,440	276	1,122
	3/17/2019	Sunday	March-17	7,991	6,390	291	1,126
	3/18/2019	Monday	March-18	11,224	6,301	320	1,178
	3/19/2019	Tuesday	March-19	12,600	6,529	344	1,250
	3/20/2019	Wednesday	March-20	12,390	6,627	341	1,255
	3/21/2019	Thursday	March-21	11,331	6,644	346	1,236
	3/22/2019	Friday	March-22	9,327	6,369	320	1,269
	3/23/2019	Saturday	March-23	7,785	6,144	272	1,225
	3/24/2019	Sunday	March-24	8,125	6,134	263	1,237
	3/25/2019	Monday	March-25	11,300	6,303	309	1,284
	3/26/2019	Tuesday	March-26	12,456	7,192	344	1,262
	3/27/2019	Wednesday	March-27	12,413	7,445	342	1,266
	3/28/2019	Thursday	March-28	11,266	7,336	342	1,198
	3/29/2019	Friday	March-29	9,212	6,728	326	1,144
	3/30/2019	Saturday	March-30	7,007	6,162	256	1,104
	3/31/2019	Sunday	March-31	6,640	5,827	220	1,024
April	4/1/2019	Monday	April-01	9,140	5,800	251	1,013
	4/2/2019	Tuesday	April-02	11,218	5,544	286	999
	4/3/2019	Wednesday	April-03	11,775	5,730	332	1,033
	4/4/2019	Thursday	April-04	10,571	5,653	323	1,062
	4/5/2019	Friday	April-05	8,325	5,370	357	1,045
	4/6/2019	Saturday 06	April-06	6,430	5,133	269	1,011
	4/7/2019	Sunday 07	April-07	6,788	4,866	237	958
	4/8/2019	Monday 08	April-08	10,323	4,834	289	935
	4/9/2019	Tuesday 09	April-09	12,132	4,636	344	895
	4/10/2019	Wednesday 10	April-10	12,518	5,447	360	1,049
	4/11/2019	Thursday 11	April-11	10,953	5,481	351	1,066
	4/12/2019	Friday 12	April-12	9,464	5,616	329	1,038
	4/13/2019	Saturday 13	April-13	6,660	5,013	242	987
	4/14/2019	Sunday 14	April-14	6,755	5,244	214	930
	4/15/2019	Monday 15	April-15	9,732	5,068	286	824
	4/16/2019	Tuesday 16	April-16	11,392	4,848	332	825
	4/17/2019	Wednesday 17	April-17	11,605	4,795	340	821
	4/18/2019	Thursday 18	April-18	9,681	5,080	330	837
	4/19/2019	Friday 19	April-19	6,631	5,066	267	884
	4/20/2019	Saturday 20	April-20	4,995	4,779	215	871
	4/21/2019	Sunday 21	April-21	4,423	4,547	190	820
	4/22/2019	Monday 22	April-22	8,266	4,423	260	792
	4/23/2019	Tuesday 23	April-23	11,057	4,273	317	804
	4/24/2019	Wednesday 24	April-24	11,980	4,584	335	879
	4/25/2019	Thursday 25	April-25	10,959	4,894	322	958
	4/26/2019	Friday 26	April-26	8,544	5,335	330	973
	4/27/2019	Saturday 27	April-27	6,273	5,165	248	963
	4/28/2019	Sunday 28	April-28	6,313	5,037	232	891

	4/29/2019	Monday 29	April-29	9,506	4,780	268	849
	4/30/2019	Tuesday 30	April-30	11,509	3,808	306	838
May	5/1/2019	Wednesday 01	May-01	11,694	3,973	335	903
	5/2/2019	Thursday 02	May-02	10,414	4,313	345	930
	5/3/2019	Friday 03	May-03	7,854	4,265	268	935
	5/4/2019	Saturday 04	May-04	5,823	3,989	209	884
	5/5/2019	Sunday 05	May-05	6,392	4,019	184	820
	5/6/2019	Monday 06	May-06	10,129	4,008	286	860
	5/7/2019	Tuesday 07	May-07	10,895	5,420	348	1,244
	5/8/2019	Wednesday 08	May-08	11,350	5,552	348	1,175
	5/9/2019	Thursday 09	May-09	9,868	5,173	340	1,058
	5/10/2019	Friday 10	May-10	7,416	4,526	295	891
	5/11/2019	Saturday 11	May-11	4,860	3,913	163	841
	5/12/2019	Sunday 12	May-12	4,393	3,713	132	761
	5/13/2019	Monday 13	May-13	8,594	3,724	257	755
	5/14/2019	Tuesday 14	May-14	11,026	3,747	339	924
	5/15/2019	Wednesday 15	May-15	11,429	4,754	349	1,167
	5/16/2019	Thursday 16	May-16	9,809	4,864	332	1,139
	5/17/2019	Friday 17	May-17	7,462	4,642	259	1,012
	5/18/2019	Saturday 18	May-18	5,672	4,254	195	900
	5/19/2019	Sunday 19	May-19	6,536	4,175	210	853
	5/20/2019	Monday 20	May-20	9,913	4,116	306	861
	5/21/2019	Tuesday 21	May-21	11,095	4,701	343	1,065
	5/22/2019	Wednesday 22	May-22	1,100	4,687	337	1,058
	5/23/2019	Thursday 23	May-23	8,764	4,496	315	913
	5/24/2019	Friday 24	May-24	5,846	4,370	245	842
	5/25/2019	Saturday 25	May-25	4,656	4,182	196	878
	5/26/2019	Sunday 26	May-26	4,717	4,114	188	861
	5/27/2019	Monday 27	May-27	3,909	3,773	137	745
	5/28/2019	Tuesday 28	May-28	6,503	3,355	240	629
	5/29/2019	Wednesday 29	May-29	8,655	3,427	332	673
	5/30/2019	Thursday 30	May-30	8,569	3,579	314	670
	5/31/2019	Friday 31	May-31	6,371	3,638	218	709
June	6/1/2019	Saturday 01	June-01	4,543	3,437	169	709
	6/2/2019	Sunday 02	June-02	5,231	3,406	186	682
	6/3/2019	Monday 03	June-03	8,520	3,529	302	690
	6/4/2019	Tuesday 04	June-04	9,000	3,607	322	786
	6/5/2019	Wednesday 05	June-05	10,740	3,845	330	873
	6/6/2019	Thursday 06	June-06	9,196	4,021	316	863
	6/7/2019	Friday 07	June-07	6,864	4,058	247	880
	6/8/2019	Saturday 08	June-08	5,142	4,041	184	903
	6/9/2019	Sunday 09	June-09	5,547	4,013	191	915
	6/10/2019	Monday 10	June-10	9,145	4,003	261	868
	6/11/2019	Tuesday 11	June-11	11,201	4,179	334	839
	6/12/2019	Wednesday 12	June-12	11,519	4,366	343	1,167
	6/13/2019	Thursday 13	June-13	9,988	4,416	313	1,217
	6/14/2019	Friday 14	June-14	7,324	4,245	242	1,225

	6/15/2019	Saturday 15	June-15	4,880	4,039	180	1,238
	6/16/2019	Sunday 16	June-16	4,599	3,985	186	1,175
	6/17/2019	Monday 17	June-17	8,500	4,110	265	1,226
	6/18/2019	Tuesday 18	June-18	10,989	4,281	309	1,236
	6/19/2019	Wednesday 19	June-19	11,598	4,349	277	1,224
	6/20/2019	Thursday 20	June-20	10,154	4,363	275	1,169
	6/21/2019	Friday 21	June-21	7,461	4,237	247	1,200
	6/22/2019	Saturday 22	June-22	5,452	3,982	183	1,216
	6/23/2019	Sunday 23	June-23	5,916	3,972	183	735
	6/24/2019	Monday 24	June-24	9,245	3,964	236	823
	6/25/2019	Tuesday 25	June-25	10,406	4,590	331	1,063
	6/26/2019	Wednesday 26	June-26	10,708	4,608	333	1,088
	6/27/2019	Thursday 27	June-27	9,297	4,556	319	999
	6/28/2019	Friday 28	June-28	6,525	4,085	246	850
	6/29/2019	Saturday 29	June-29	4,587	3,770	176	826
	6/30/2019	Sunday 30	June-30	4,203	3,731	156	803
July	7/1/2019	Monday 01	July-01	4,461	3,434	169	645
	7/2/2019	Tuesday 02	July-02	4,529	3,332	163	640
	7/3/2019	Wednesday 03	July-03	3,924	3,439	122	783
	7/4/2019	Thursday 04	July-04	3,629	3,565	108	852
	7/5/2019	Friday 05	July-05	4,036	3,733	131	879
	7/6/2019	Saturday 06	July-06	4,110	3,695	149	926
	7/7/2019	Sunday 07	July-07	3,938	3,509	144	720
	7/8/2019	Monday 08	July-08	7,346	3,383	208	628
	7/9/2019	Tuesday 09	July-09	9,944	3,589	281	679
	7/10/2019	Wednesday 10	July-10	10,707	3,688	300	773
	7/11/2019	Thursday 11	July-11	9,390	3,834	283	774
	7/12/2019	Friday 12	July-12	6,639	3,808	216	765
	7/13/2019	Saturday 13	July-13	4,691	3,508	152	759
	7/14/2019	Sunday 14	July-14	4,993	3,606	156	742
	7/15/2019	Monday 15	July-15	8,681	3,693	269	763
	7/16/2019	Tuesday 16	July-16	10,525	3,816	324	1,236
	7/17/2019	Wednesday 17	July-17	10,791	3,907	327	1,251
	7/18/2019	Thursday 18	July-18	9,506	4,033	292	1,243
	7/19/2019	Friday 19	July-19	6,865	3,917	275	1,190
	7/20/2019	Saturday 20	July-20	5,117	3,720	194	1,122
	7/21/2019	Sunday 21	July-21	4,941	3,644	163	1,091
	7/22/2019	Monday 22	July-22	8,205	3,699	217	1,099
	7/23/2019	Tuesday 23	July-23	11,351	3,753	296	793
	7/24/2019	Wednesday 24	July-24	1,100	3,802	299	882
	7/25/2019	Thursday 25	July-25	9,139	3,872	257	919
	7/26/2019	Friday 26	July-26	6,796	3,929	225	920
	7/27/2019	Saturday 27	July-27	4,999	3,742	177	939
	7/28/2019	Sunday 28	July-28	4,919	3,728	168	869
	7/29/2019	Monday 29	July-29	7,654	3,730	232	814
	7/30/2019	Tuesday 30	July-30	9,681	3,709	269	821
	7/31/2019	Wednesday 31	July-31	9,716	3,770	293	863

August	8/1/2019	Thursday 01	August-01	8,477	3,966	245	904
	8/2/2019	Friday 02	August-02	6,349	3,961	235	980
	8/3/2019	Saturday 03	August-03	5,061	3,815	190	988
	8/4/2019	Sunday 04	August-04	5,046	3,865	145	941
	8/5/2019	Monday 05	August-05	7,936	3,798	127	911
	8/6/2019	Tuesday 06	August-06	9,975	3,781	190	933
	8/7/2019	Wednesday 07	August-07	10,388	3,922	242	914
	8/8/2019	Thursday 08	August-08	9,292	4,114	232	938
	8/9/2019	Friday 09	August-09	6,866	4,070	255	931
	8/10/2019	Saturday 10	August-10	5,187	3,870	215	947
	8/11/2019	Sunday 11	August-11	4,990	3,771	172	880
	8/12/2019	Monday 12	August-12	8,022	3,730	168	853
	8/13/2019	Tuesday 13	August-13	10,306	3,874	201	862
	8/14/2019	Wednesday 14	August-14	10,588	3,888	256	898
	8/15/2019	Thursday 15	August-15	9,286	4,071	244	955
	8/16/2019	Friday 16	August-16	6,785	4,163	215	979
	8/17/2019	Saturday 17	August-17	5,068	3,943	209	967
	8/18/2019	Sunday 18	August-18	5,326	3,884	170	904
	8/19/2019	Monday 19	August-19	8,351	3,888	172	860
	8/20/2019	Tuesday 20	August-20	10,381	3,829	210	913
	8/21/2019	Wednesday 21	August-21	10,736	3,964	215	926
	8/22/2019	Thursday 22	August-22	9,415	3,901	216	913
	8/23/2019	Friday 23	August-23	6,929	3,993	244	883
	8/24/2019	Saturday 24	August-24	5,035	3,716	289	891
	8/25/2019	Sunday 25	August-25	4,973	3,649	160	808
	8/26/2019	Monday 26	August-26	8,030	3,591	142	748
	8/27/2019	Tuesday 27	August-27	9,834	3,585	256	740
	8/28/2019	Wednesday 28	August-28	9,740	3,466	215	750
	8/29/2019	Thursday 29	August-29	7,956	3,694	294	747
	8/30/2019	Friday 30	August-30	5,366	4,678	255	880
	8/31/2019	Saturday 31	August-31	4,413	3,892	189	895
September	9/1/2019	Sunday 01	September-01	4,227	3,791	144	854
	9/2/2019	Monday 02	September-02	3,365	3,282	114	699
	9/3/2019	Tuesday 03	September-03	5,278	2,904	201	484
	9/4/2019	Wednesday 04	September-04	7,567	3,088	276	530
	9/5/2019	Thursday 05	September-05	8,065	3,538	296	631
	9/6/2019	Friday 06	September-06	6,585	3,571	243	730
	9/7/2019	Saturday 07	September-07	4,719	3,379	175	759
	9/8/2019	Sunday 08	September-08	5,191	3,468	174	745
	9/9/2019	Monday 09	September-09	9,551	3,409	243	799
	9/10/2019	Tuesday 10	September-10	11,859	3,412	347	892
	9/11/2019	Wednesday 11	September-11	12,314	3,684	337	1,016
	9/12/2019	Thursday 12	September-12	11,002	4,007	335	1,012
	9/13/2019	Friday 13	September-13	8,068	3,924	299	931
	9/14/2019	Saturday 14	September-14	5,533	3,998	202	881
	9/15/2019	Sunday 15	September-15	5,854	3,619	208	841
	9/16/2019	Monday 16	September-16	10,275	3,459	284	890

	9/17/2019	Tuesday 17	September-17	11,673	3,737	354	1,047
	9/18/2019	Wednesday 18	September-18	12,287	3,953	329	1,132
	9/19/2019	Thursday 19	September-19	10,728	4,181	340	1,122
	9/20/2019	Friday 20	September-20	8,148	3,982	280	1,043
	9/21/2019	Saturday 21	September-21	5,911	3,734	223	984
	9/22/2019	Sunday 22	September-22	6,254	3,966	207	935
	9/23/2019	Monday 23	September-23	9,827	3,683	269	876
	9/24/2019	Tuesday 24	September-24	12,179	3,694	344	946
	9/25/2019	Wednesday 25	September-25	12,458	4,353	340	1,125
	9/26/2019	Thursday 26	September-26	10,733	4,465	335	1,098
	9/27/2019	Friday 27	September-27	8,160	4,305	283	1,042
	9/28/2019	Saturday 28	September-28	5,913	4,005	210	994
	9/29/2019	Sunday 29	September-29	5,505	3,937	201	925
	9/30/2019	Monday 30	September-30	8,009	3,460	208	789
October	10/1/2019	Tuesday 01	October-01	10,409	3,483	377	784
	10/2/2019	Wednesday 02	October-02	11,623	3,635	379	849
	10/3/2019	Thursday 03	October-03	10,841	3,870	410	888
	10/4/2019	Friday 04	October-04	8,643	4,268	374	984
	10/5/2019	Saturday 05	October-05	6,446	4,107	268	993
	10/6/2019	Sunday 06	October-06	6,215	4,053	321	911
	10/7/2019	Monday 07	October-07	8,404	3,721	370	765
	10/8/2019	Tuesday 08	October-08	10,563	3,570	385	748
	10/9/2019	Wednesday 09	October-09	11,082	3,737	395	820
	10/10/2019	Thursday 10	October-10	10,273	4,198	358	931
	10/11/2019	Friday 11	October-11	8,058	4,382	400	1,001
	10/12/2019	Saturday 12	October-12	6,259	4,317	256	1,044
	10/13/2019	Sunday 13	October-13	6,231	4,461	284	1,002
	10/14/2019	Monday 14	October-14	9,071	4,142	324	877
	10/15/2019	Tuesday 15	October-15	11,399	4,231	408	941
	10/16/2019	Wednesday 16	October-16	12,298	4,966	411	1,183
	10/17/2019	Thursday 17	October-17	10,099	5,478	359	1,265
	10/18/2019	Friday 18	October-18	9,405	5,538	362	1,276
	10/19/2019	Saturday 19	October-19	7,138	5,163	356	1,182
	10/20/2019	Sunday 20	October-20	6,712	4,756	330	1,388
	10/21/2019	Monday 21	October-21	10,451	4,142	405	1,147
	10/22/2019	Tuesday 22	October-22	12,298	3,935	405	1,066
	10/23/2019	Wednesday 23	October-23	12,280	4,820	379	1,213
	10/24/2019	Thursday 24	October-24	10,661	5,012	388	1,144
	10/25/2019	Friday 25	October-25	8,060	4,883	388	1,119
	10/26/2019	Saturday 26	October-26	5,761	4,569	307	1,042
	10/27/2019	Sunday 27	October-27	5,868	4,494	275	973
	10/28/2019	Monday 28	October-28	9,233	4,352	302	933
	10/29/2019	Tuesday 29	October-29	10,917	4,240	335	862
	10/30/2019	Wednesday 30	October-30	9,887	3,982	310	815
	10/31/2019	Thursday 31	October-31	6,219	3,650	213	739
November	11/1/2019	Friday 01	November-01	5,438	4,171	228	836
	11/2/2019	Saturday 02	November-02	5,445	4,299	226	918

	11/3/2019	Sunday 03	November-03	6,047	4,326	222	918
	11/4/2019	Monday 04	November-04	9,553	4,091	299	897
	11/5/2019	Tuesday 05	November-05	11,867	3,932	334	922
	11/6/2019	Wednesday 06	November-06	12,352	4,440	336	1,051
	11/7/2019	Thursday 07	November-07	10,940	4,704	333	1,066
	11/8/2019	Friday 08	November-08	8,293	4,654	291	1,026
	11/9/2019	Saturday 09	November-09	6,050	4,427	239	993
	11/10/2019	Sunday 10	November-10	5,886	4,376	239	885
	11/11/2019	Monday 11	November-11	8,711	3,869	296	826
	11/12/2019	Tuesday 12	November-12	11,600	3,729	340	877
	11/13/2019	Wednesday 13	November-13	12,318	3,854	336	940
	11/14/2019	Thursday 14	November-14	10,861	4,052	347	935
	11/15/2019	Friday 15	November-15	7,974	4,145	288	908
	11/16/2019	Saturday 16	November-16	5,347	3,842	231	861
	11/17/2019	Sunday 17	November-17	5,415	3,898	208	823
	11/18/2019	Monday 18	November-18	9,622	3,712	299	814
	11/19/2019	Tuesday 19	November-19	12,009	3,692	335	910
	11/20/2019	Wednesday 20	November-20	12,328	3,900	337	953
	11/21/2019	Thursday 21	November-21	10,549	4,076	312	904
	11/22/2019	Friday 22	November-22	7,117	3,992	283	795
	11/23/2019	Saturday 23	November-23	4,314	3,791	195	782
	11/24/2019	Sunday 24	November-24	3,944	3,852	180	763
	11/25/2019	Monday 25	November-25	4,278	3,592	177	634
	11/26/2019	Tuesday 26	November-26	4,494	3,895	183	801
	11/27/2019	Wednesday 27	November-27	4,852	4,534	204	1,013
	11/28/2019	Thursday 28	November-28	5,233	4,765	206	1,152
	11/29/2019	Friday 29	November-29	5,578	5,043	222	1,187
	11/30/2019	Saturday 30	November-30	5,434	4,795	214	1,120
December	12/1/2019	Sunday 01	December-01	4,567	4,285	174	876
	12/2/2019	Monday 02	December-02	8,549	3,942	297	788
	12/3/2019	Tuesday 03	December-03	11,407	3,727	352	802
	12/4/2019	Wednesday 04	December-04	12,355	4,237	355	966
	12/5/2019	Thursday 05	December-05	11,064	4,568	317	1,005
	12/6/2019	Friday 06	December-06	8,360	4,572	282	1,019
	12/7/2019	Saturday 07	December-07	5,714	4,211	214	970
	12/8/2019	Sunday 08	December-08	5,775	4,159	214	886
	12/9/2019	Monday 09	December-09	9,975	4,079	340	820
	12/10/2019	Tuesday 10	December-10	12,432	4,047	350	900
	12/11/2019	Wednesday 11	December-11	12,496	4,569	345	1,091
	12/12/2019	Thursday 12	December-12	10,584	7,049	311	1,059
	12/13/2019	Friday 13	December-13	7,738	6,732	315	966
	12/14/2019	Saturday 14	December-14	5,223	3,989	263	898
	12/15/2019	Sunday 15	December-15	4,939	3,927	269	826
	12/16/2019	Monday 16	December-16	7,471	3,722	325	731
	12/17/2019	Tuesday 17	December-17	8,886	3,509	328	681
	12/18/2019	Wednesday 18	December-18	9,199	3,649	324	672
	12/19/2019	Thursday 19	December-19	7,378	3,680	286	663

12/20/2019	Friday 20	December-20	5,057	3,714	194	693
12/21/2019	Saturday 21	December-21	4,228	3,918	148	935
12/22/2019	Sunday 22	December-22	4,480	4,177	145	1,099
12/23/2019	Monday 23	December-23	4,703	4,448	164	1,212
12/24/2019	Tuesday 24	December-24	4,694	4,481	143	1,198
12/25/2019	Wednesday 25	December-25	5,201	4,819	136	1,226
12/26/2019	Thursday 26	December-26	5,750	5,484	191	1,230
12/27/2019	Friday 27	December-27	6,024	5,540	231	1,238
12/28/2019	Saturday 28	December-28	6,125	5,450	248	1,172
12/29/2019	Sunday 29	December-29	5,942	5,359	244	1,068
12/30/2019	Monday 30	December-30	5,602	5,192	260	938
12/31/2019	Tuesday 31	December-31	4,997	4,938	245	885

Attachment B

RAC Survey Responses

kimley-horn.com 767 Eustis Street, Suite 100, St. Paul, MN 55114 651 645 4197

Rentals	
Hour	Total Rentals
Peak Day	Monday
12AM to 6AM	208
6AM	31
7AM	84
8AM	494
9AM	333
10AM	494
11AM	420
12PM	481
1PM	334
2PM	457
3PM	294
4PM	241
5PM	378
6PM	342
7PM	324
8PM	218
9PM	159
10PM to 12AM	146
Total	5438
Peak Hour	494

Returns	
Hour	Total Returns
Peak Day	Monday
12AM to 6AM	349
6AM	126
7AM	178
8AM	190
9AM	215
10AM	231
11AM	208
12PM	234
1PM	264
2PM	237
3PM	237
4PM	246
5PM	252
6PM	179
7PM	100
8PM	55
9PM	29
10PM to 12AM	38
Total	3368
Peak Hour	264

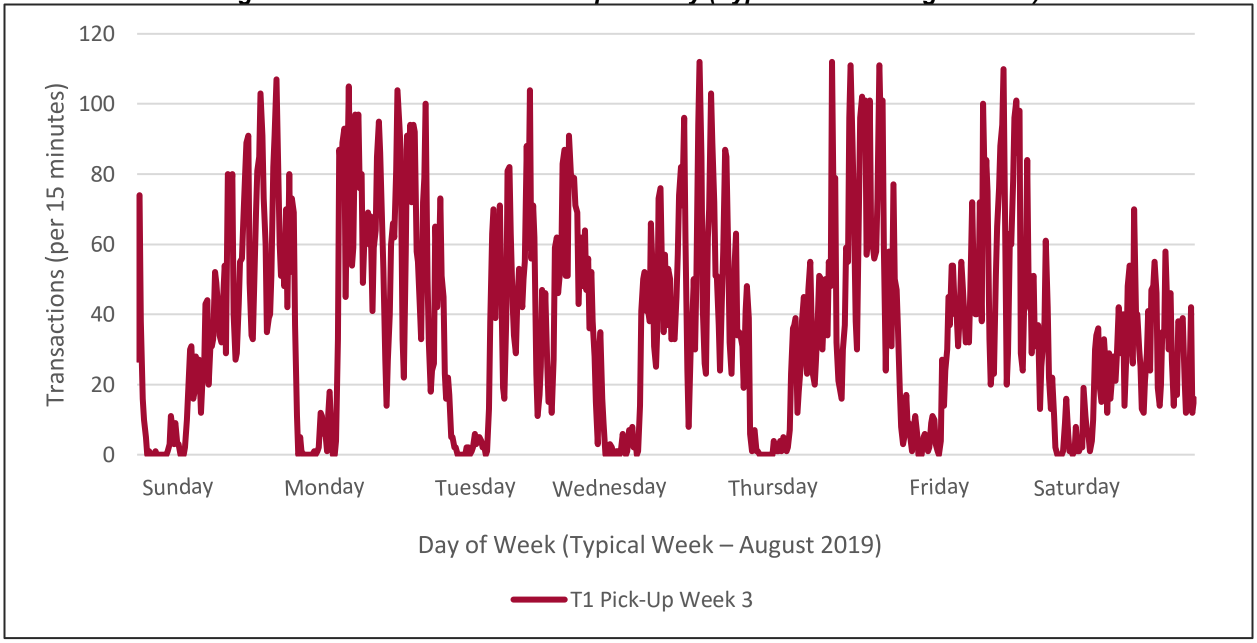
Kimley»Horn

Attachment C

Processed Commercial Vehicle Data

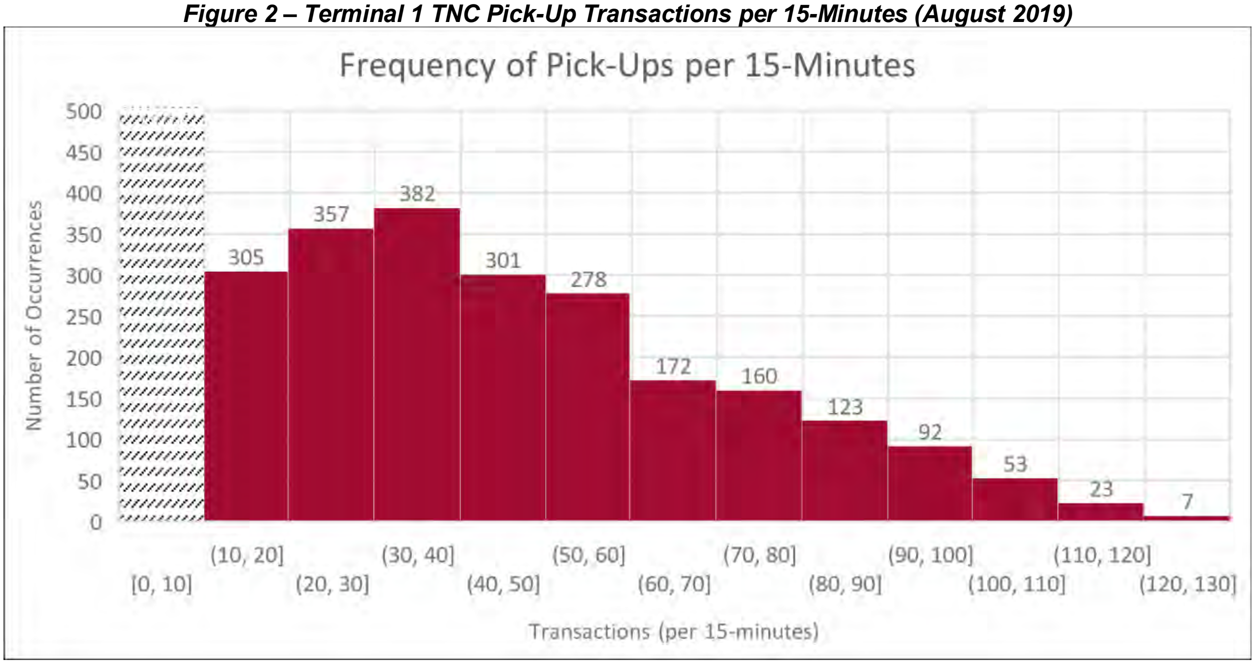
1 TNC (Terminal 1)

Figure 1 – Terminal 1 TNC Pick-Up Activity (Typical Week - August 2019)



Source: Kimley-Horn and Associates, Inc.
Prepared by: Kimley-Horn and Associates, Inc.

Figure 2 – Terminal 1 TNC Pick-Up Transactions per 15-Minutes (August 2019)



Source: Kimley-Horn and Associates, Inc.
Prepared by: Kimley-Horn and Associates, Inc.

Table 1 – Terminal 1 TNC Pick-Up Transactions per 15-Minutes (August 2019)

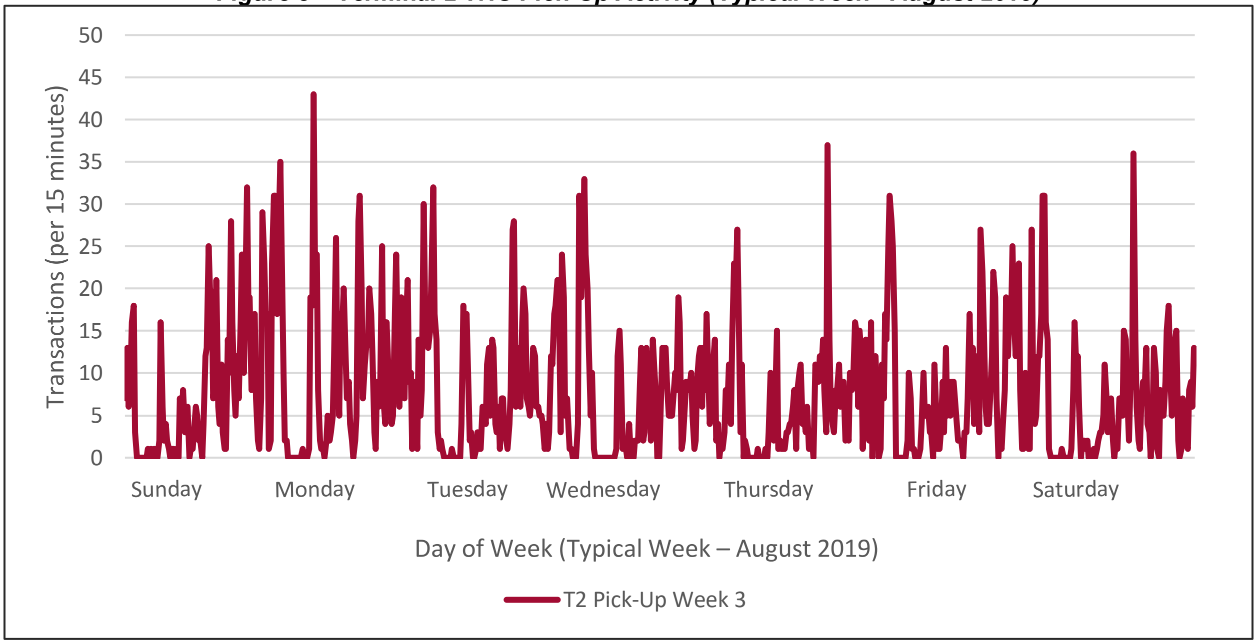
Demand Analysis			
Percentile	95th Percentile	**99.6th Percentile**	Peak
Design 15-min Pickup Vehicle Activity	93 veh	**115 veh**	129 veh
TNC Pickup Positions: Required	32 pos	**38 pos**	43 pos
No. of 15-min Periods Design Demand is Exceeded throughout the month	144 periods (36 hours)	**12 periods (3 hours)**	-

Source: Kimley-Horn and Associates, Inc.
Prepared by: Kimley-Horn and Associates, Inc.

- Note: Transaction time is greater than at Terminal 2 due to the higher demand and the challenges customers experience matching with a vehicle during peak periods.

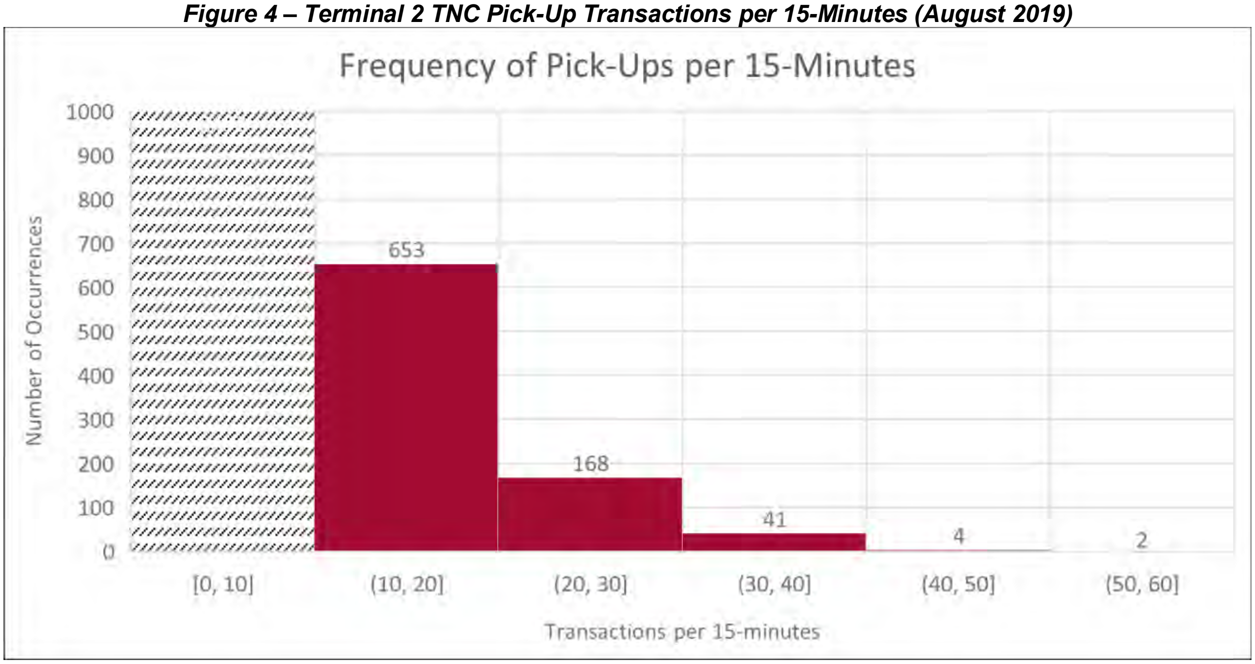
2 TNC (Terminal 2)

Figure 3 – Terminal 2 TNC Pick-Up Activity (Typical Week - August 2019)



Source: Kimley-Horn and Associates, Inc.
Prepared by: Kimley-Horn and Associates, Inc.

Figure 4 – Terminal 2 TNC Pick-Up Transactions per 15-Minutes (August 2019)



Source: Kimley-Horn and Associates, Inc.
Prepared by: Kimley-Horn and Associates, Inc.

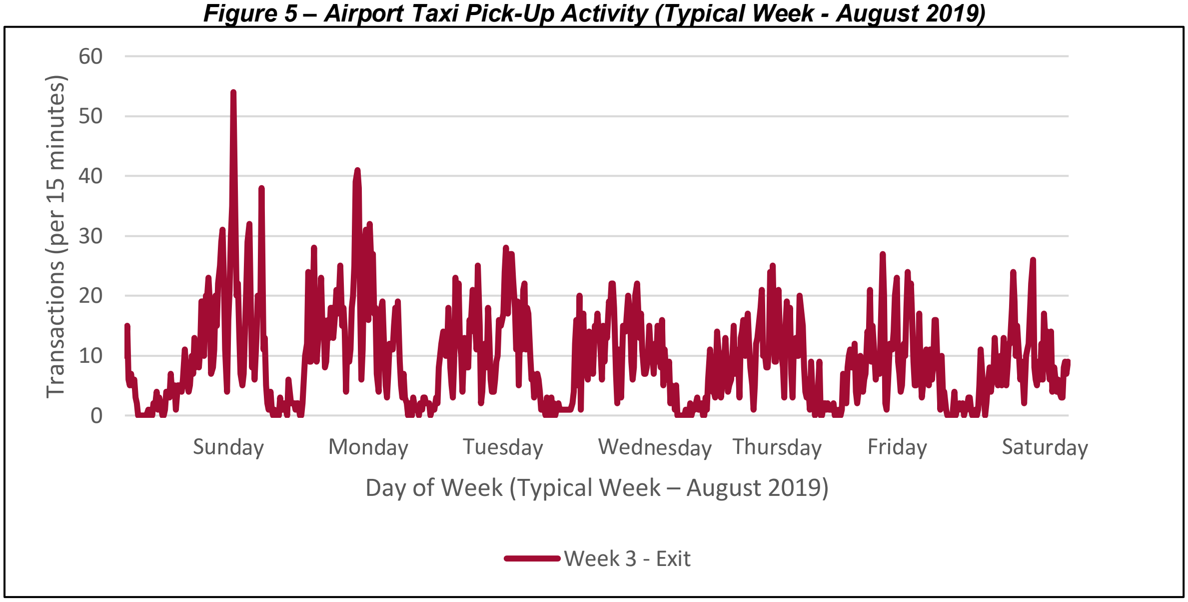
Table 2 – Terminal 2 TNC Pick-Up Transactions per 15-Minutes (August 2019)

Demand Analysis			
Percentile	95th Percentile	**99.4th Percentile**	Peak
Design 15-min Pickup Vehicle Activity	23 veh	**35 veh**	55 veh
TNC Pickup Positions: Required	5 pos	**7 pos**	11 pos
No. of 15-min Periods Design Demand is Exceeded throughout the month	144 periods (36 hours)	**18 periods (4.5 hours)**	-

Source: Kimley-Horn and Associates, Inc.
Prepared by: Kimley-Horn and Associates, Inc.

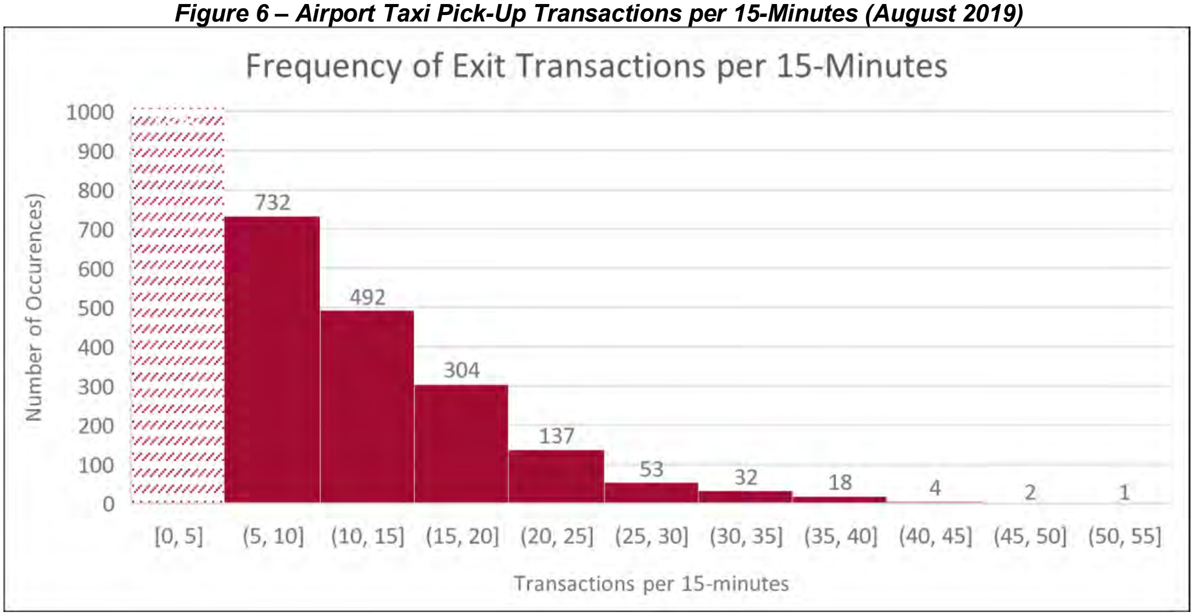
3 Taxi

Figure 5 – Airport Taxi Pick-Up Activity (Typical Week - August 2019)



Source: Kimley-Horn and Associates, Inc.
Prepared by: Kimley-Horn and Associates, Inc.

Figure 6 – Airport Taxi Pick-Up Transactions per 15-Minutes (August 2019)



Source: Kimley-Horn and Associates, Inc.
Prepared by: Kimley-Horn and Associates, Inc.

Table 3 – Airport Total Taxi Pick-Up Transactions per 15-Minutes (August 2019)

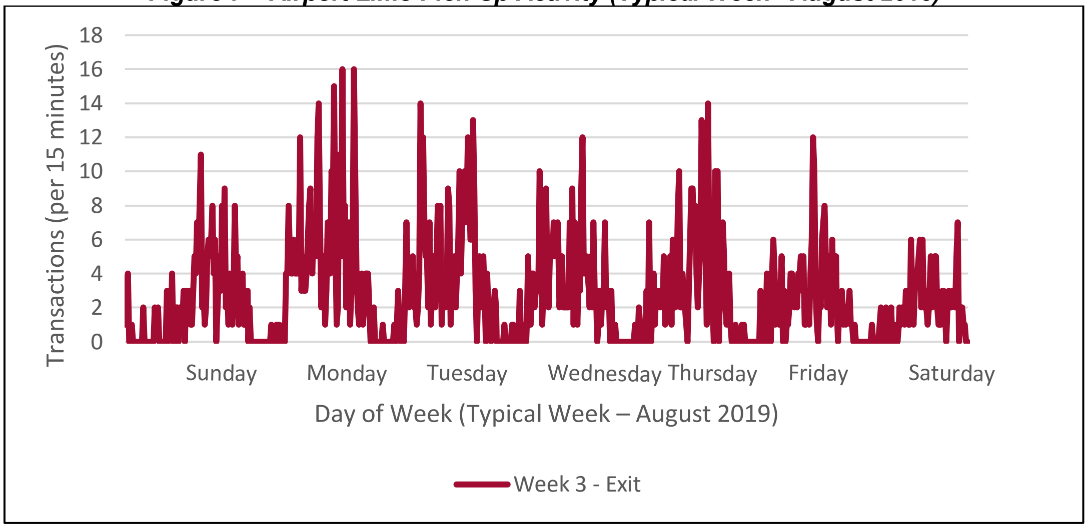
Demand Analysis			
Percentile	95th Percentile	**99.5th Percentile**	Peak
Design 15-min Pickup Vehicle Activity	23 veh	**38 veh**	54 veh
TNC Pickup Positions: Required	5 pos	**8 pos**	11 pos
No. of 15-min Periods Design Demand is Exceeded throughout the month	144 periods (36 hours)	**16 periods (4 hours)**	-

Source: Kimley-Horn and Associates, Inc.
Prepared by: Kimley-Horn and Associates, Inc.

- Loading Position Requirement:
  - Airport Total: 8
  - Terminal 1: 7 (90% Airport Total)
  - Terminal 2: 2 (20% Airport Total)
- Staging Position Requirement: Assume double the number of loading positions at each terminal
  - Terminal 1: 14
  - Terminal 2: 4

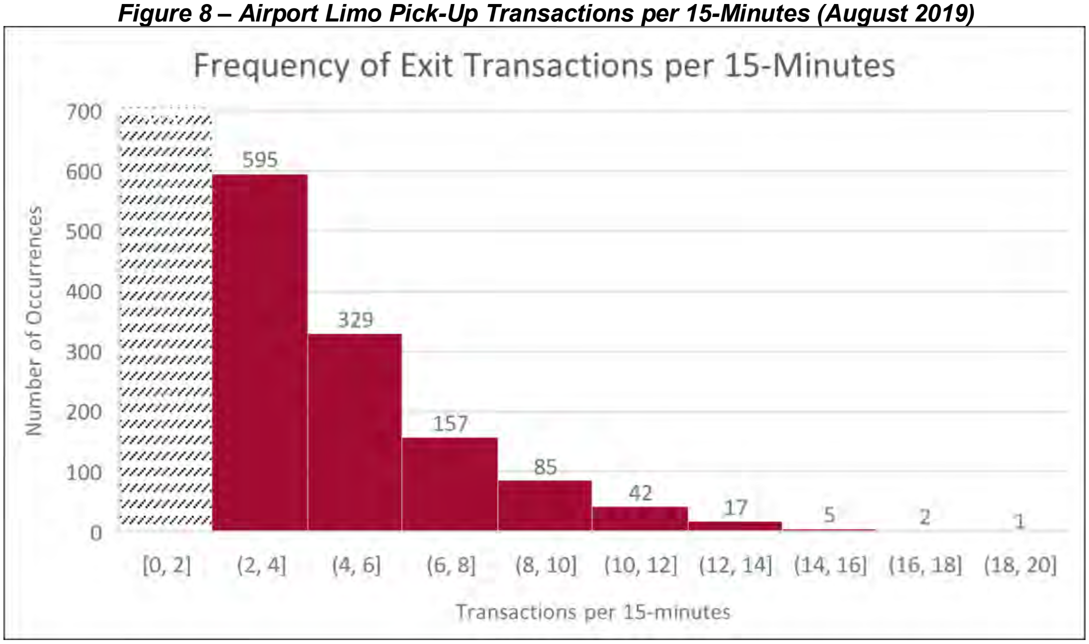
4 Limo

Figure 7 – Airport Limo Pick-Up Activity (Typical Week - August 2019)



Source: Kimley-Horn and Associates, Inc.
Prepared by: Kimley-Horn and Associates, Inc.

Figure 8 – Airport Limo Pick-Up Transactions per 15-Minutes (August 2019)



Source: Kimley-Horn and Associates, Inc.
Prepared by: Kimley-Horn and Associates, Inc.

Table 3 – Airport Total Limo Pick-Up Transactions per 15-Minutes (August 2019)

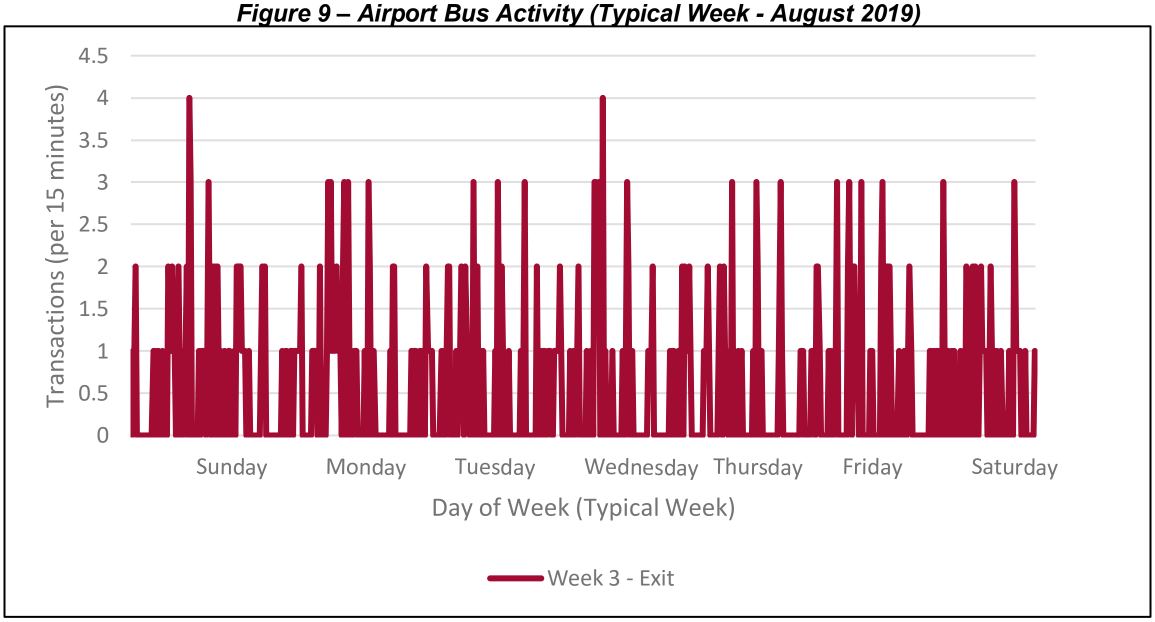
Demand Analysis			
Percentile	95th Percentile	**99.8th Percentile**	Peak
Design 15-min Pickup Vehicle Activity	8 veh	**15 veh**	19 veh
TNC Pickup Positions: Required	8 pos	**15 pos**	19 pos
No. of 15-min Periods Design Demand is Exceeded throughout the month	144 periods (36 hours)	**6 periods (1.5 hours)**	-

Source: Kimley-Horn and Associates, Inc.
Prepared by: Kimley-Horn and Associates, Inc.

- Loading Position Requirement:
  - Airport Total: 15
  - Terminal 1: 14 (90% Airport Total)
  - Terminal 2: 3 (20% Airport Total)
- Staging Position Requirement: Assume equal to the number of loading positions at each terminal
  - Terminal 1: 14
  - Terminal 2: 3

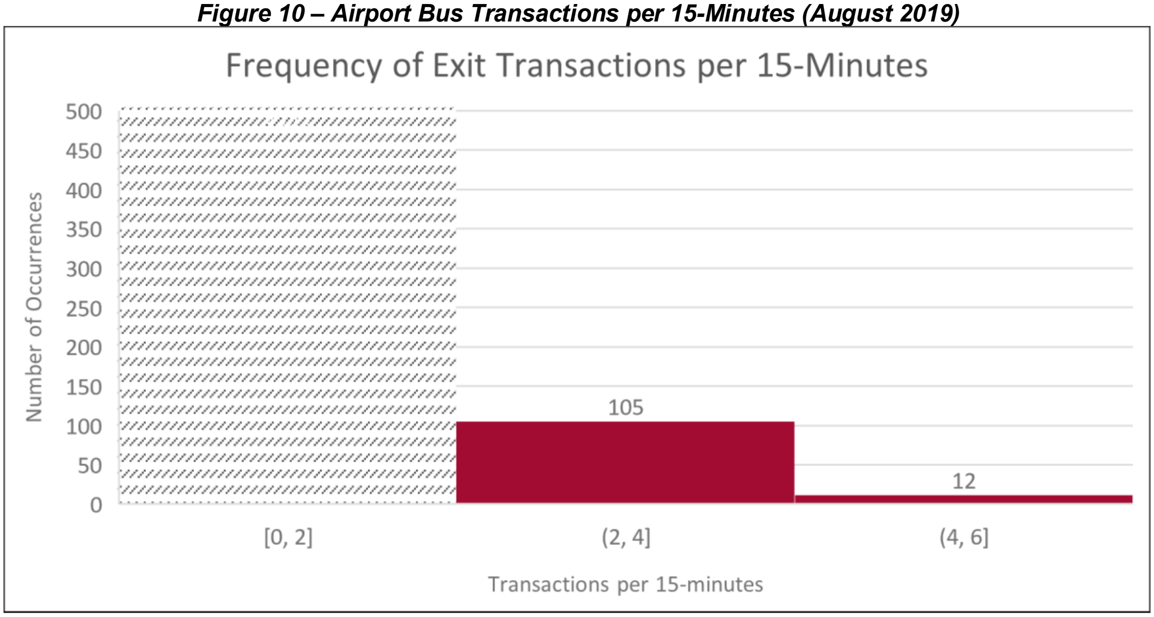
5 Charter Bus

Figure 9 – Airport Bus Activity (Typical Week - August 2019)



Source: Kimley-Horn and Associates, Inc.
Prepared by: Kimley-Horn and Associates, Inc.

Figure 10 – Airport Bus Transactions per 15-Minutes (August 2019)



Source: Kimley-Horn and Associates, Inc.
Prepared by: Kimley-Horn and Associates, Inc.

Table 4 – Airport Total Limo Pick-Up Transactions per 15-Minutes (August 2019)

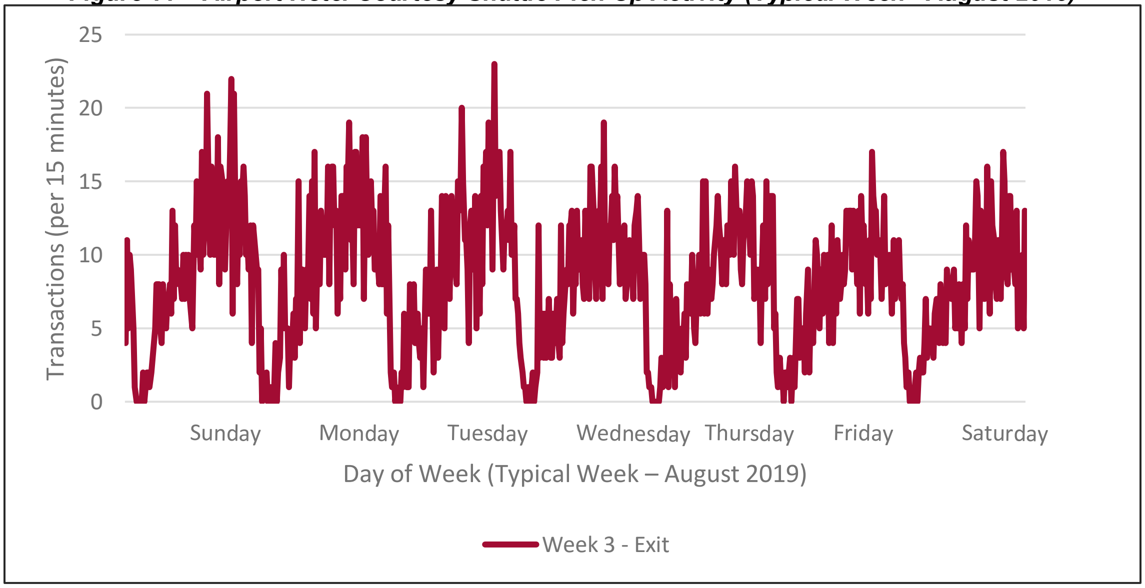
Demand Analysis			
Percentile	95th Percentile	**99.6th Percentile**	Peak
Design 15-min Pickup Vehicle Activity	2 veh	**5 veh**	6 veh
TNC Pickup Positions: Required	4 pos	**10 pos**	12 pos
No. of 15-min Periods Design Demand is Exceeded throughout the month	144 periods (36 hours)	**10 periods (3.5 hours)**	-

Source: Kimley-Horn and Associates, Inc.
Prepared by: Kimley-Horn and Associates, Inc.

- Loading Position Requirement:
  - Airport Total: 10
  - Terminal 1: 8 (80% Airport Total)
  - Terminal 2: 4 (40% Airport Total)

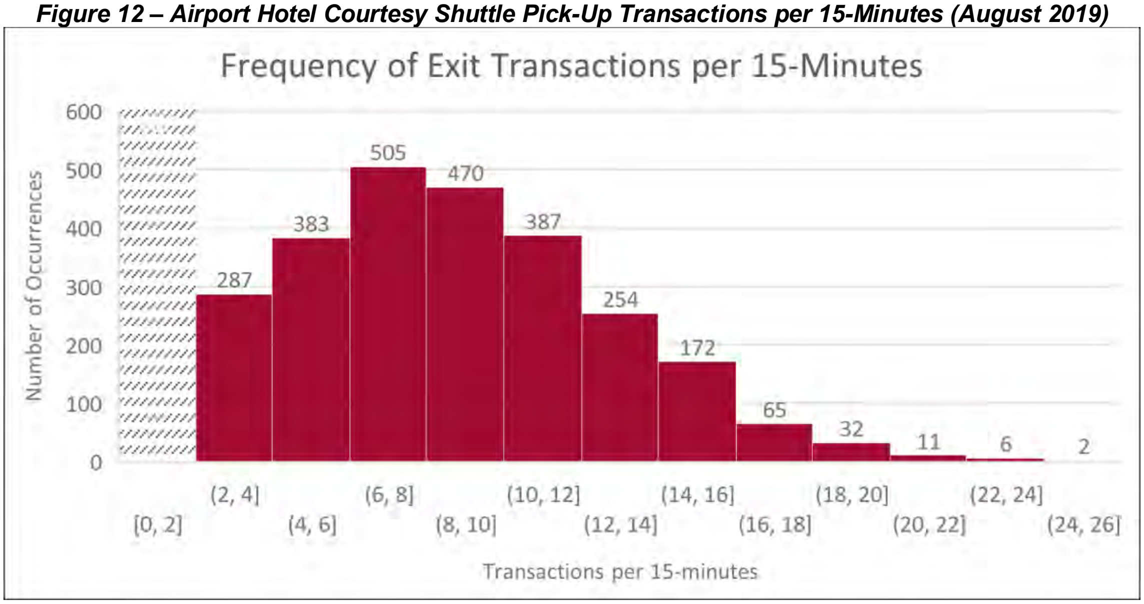
6 Hotel Courtesy Shuttle

Figure 11 – Airport Hotel Courtesy Shuttle Pick-Up Activity (Typical Week - August 2019)



Source: Kimley-Horn and Associates, Inc.
Prepared by: Kimley-Horn and Associates, Inc.

Figure 12 – Airport Hotel Courtesy Shuttle Pick-Up Transactions per 15-Minutes (August 2019)



Source: Kimley-Horn and Associates, Inc.
Prepared by: Kimley-Horn and Associates, Inc.

Table 5 – Airport Total Hotel Courtesy Shuttle Pick-Up Transactions per 15-Minutes (August 2019)

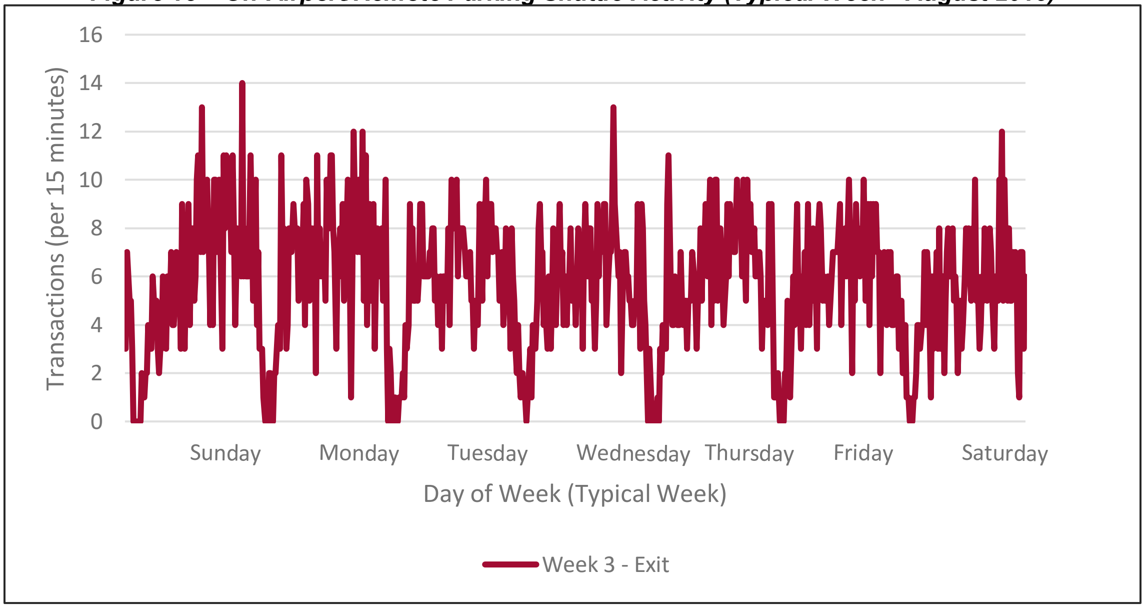
Demand Analysis			
Percentile	95th Percentile	**99.6th Percentile**	Peak
Design 15-min Pickup Vehicle Activity	16 veh	**22 veh**	26 veh
TNC Pickup Positions: Required	8 pos	**11 pos**	13 pos
No. of 15-min Periods Design Demand is Exceeded throughout the month	144 periods (36 hours)	**10 periods (3.5 hours)**	-

Source: Kimley-Horn and Associates, Inc.
Prepared by: Kimley-Horn and Associates, Inc.

- Loading Position Requirement:
  - Airport Total: 11
  - Terminal 1: 10 (90% Airport Total)
  - Terminal 2: 3 (20% Airport Total)

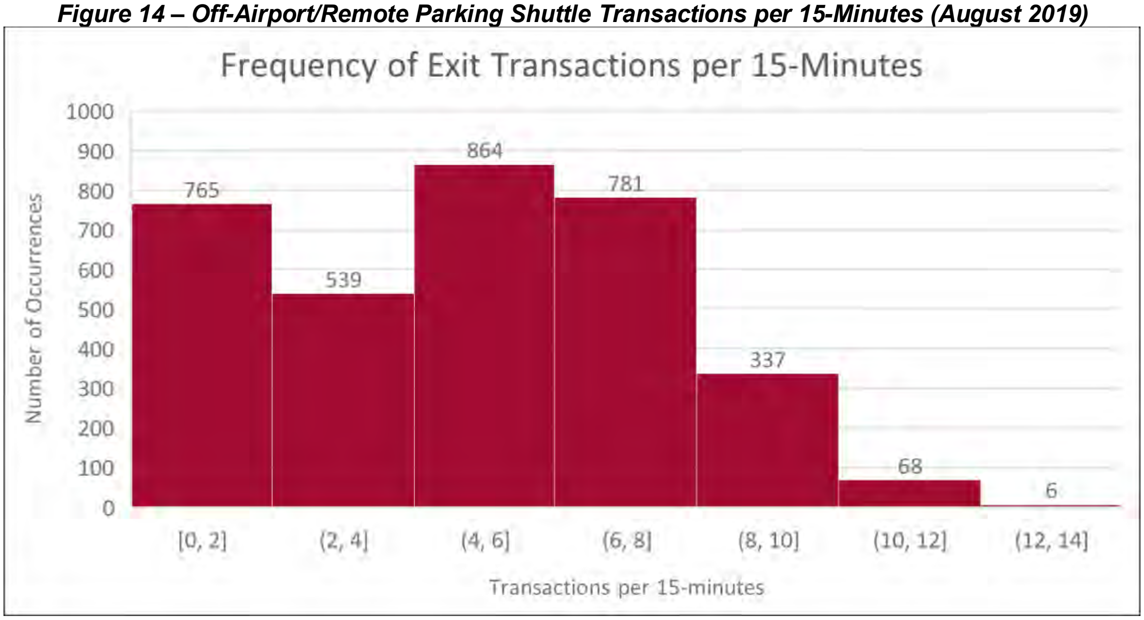
7 Off-Airport/Remote Parking Shuttle

Figure 13 – Off-Airport/Remote Parking Shuttle Activity (Typical Week - August 2019)



Source: Kimley-Horn and Associates, Inc.
Prepared by: Kimley-Horn and Associates, Inc.

Figure 14 – Off-Airport/Remote Parking Shuttle Transactions per 15-Minutes (August 2019)



Source: Kimley-Horn and Associates, Inc.
Prepared by: Kimley-Horn and Associates, Inc.

Table 6 – Airport Total Off-Airport/Remote Parking Shuttle Transactions per 15-Minutes (August 2019)

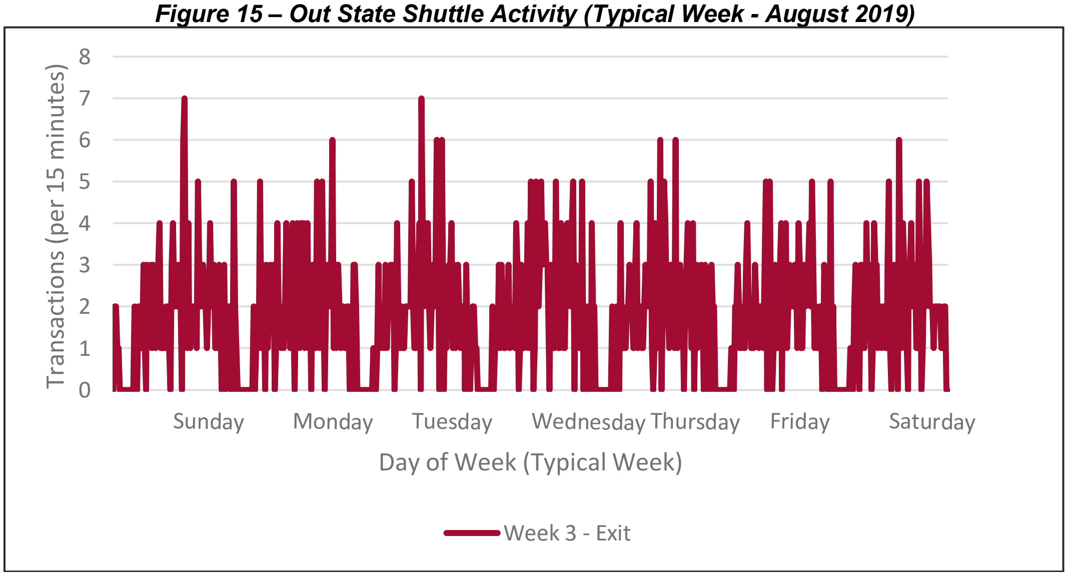
Demand Analysis			
Percentile	95th Percentile	**99.3th Percentile**	Peak
Design 15-min Pickup Vehicle Activity	10 veh	**12 veh**	14 veh
TNC Pickup Positions: Required	5 pos	**5 pos**	8 pos
No. of 15-min Periods Design Demand is Exceeded throughout the month	144 periods (36 hours)	**20 periods (5 hours)**	-

Source: Kimley-Horn and Associates, Inc.
Prepared by: Kimley-Horn and Associates, Inc.

- Loading Position Requirement: 5
  - Airport Total: 5
  - Terminal 1: 5 (provide one position per operator)
  - Terminal 2: 5 (provide one position per operator)

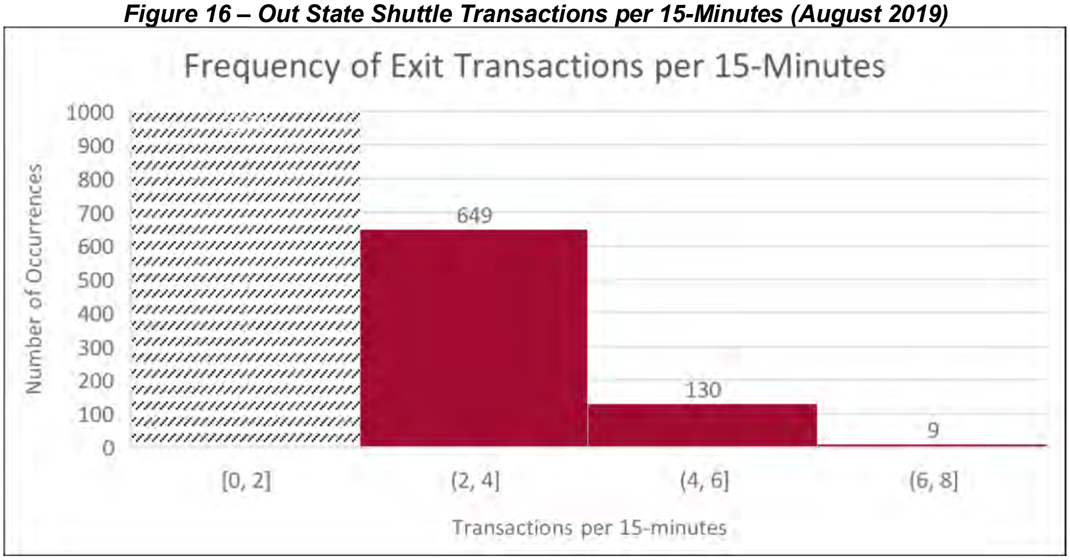
8 Out State Shuttle

Figure 15 – Out State Shuttle Activity (Typical Week - August 2019)



Source: Kimley-Horn and Associates, Inc.
Prepared by: Kimley-Horn and Associates, Inc.

Figure 16 – Out State Shuttle Transactions per 15-Minutes (August 2019)



Source: Kimley-Horn and Associates, Inc.
Prepared by: Kimley-Horn and Associates, Inc.

Table 7 – Airport Total Out-State Shuttle Transactions per 15-Minutes (August 2019)

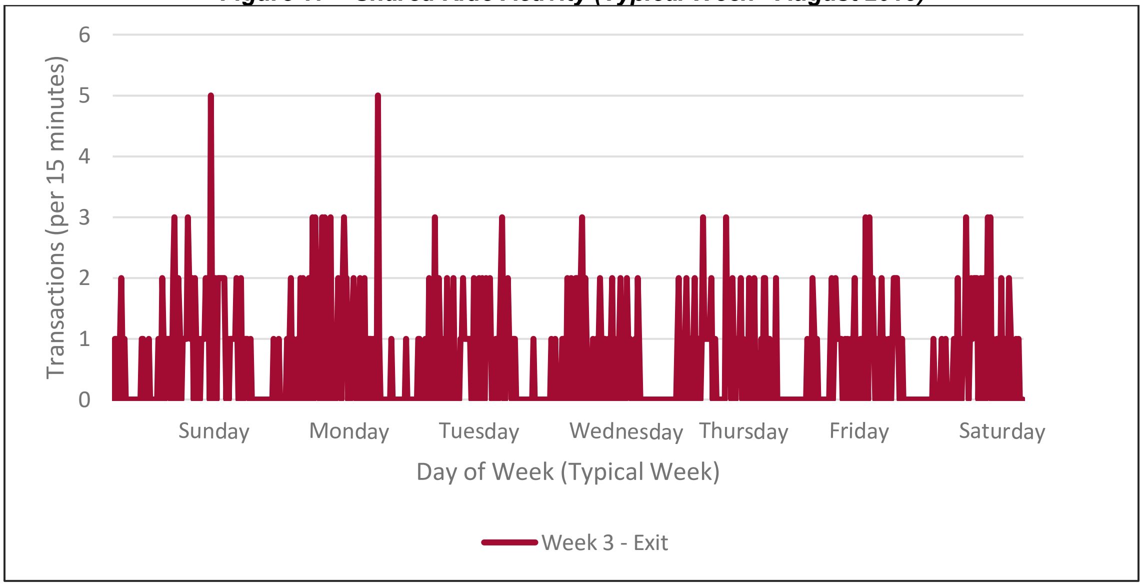
Demand Analysis			
Percentile	95th Percentile	**99.7th Percentile**	Peak
Design 15-min Pickup Vehicle Activity	4 veh	**7 veh**	8 veh
TNC Pickup Positions: Required	2 pos	**4 pos**	5 pos
No. of 15-min Periods Design Demand is Exceeded throughout the month	144 periods (36 hours)	**8 periods (2 hours)**	-

Source: Kimley-Horn and Associates, Inc.
Prepared by: Kimley-Horn and Associates, Inc.

- Loading Position Requirement:
  - Airport Total: 4
  - Terminal 1: 3 (80% Airport Total)
  - Terminal 2: 2 (20% Airport Total; provide 2 minimum for redundancy)
- Staging Position Requirement: Assume equal to the number of loading positions at each terminal
  - Terminal 1: 3
  - Terminal 2: 0 – loading only occurs at Terminal 2

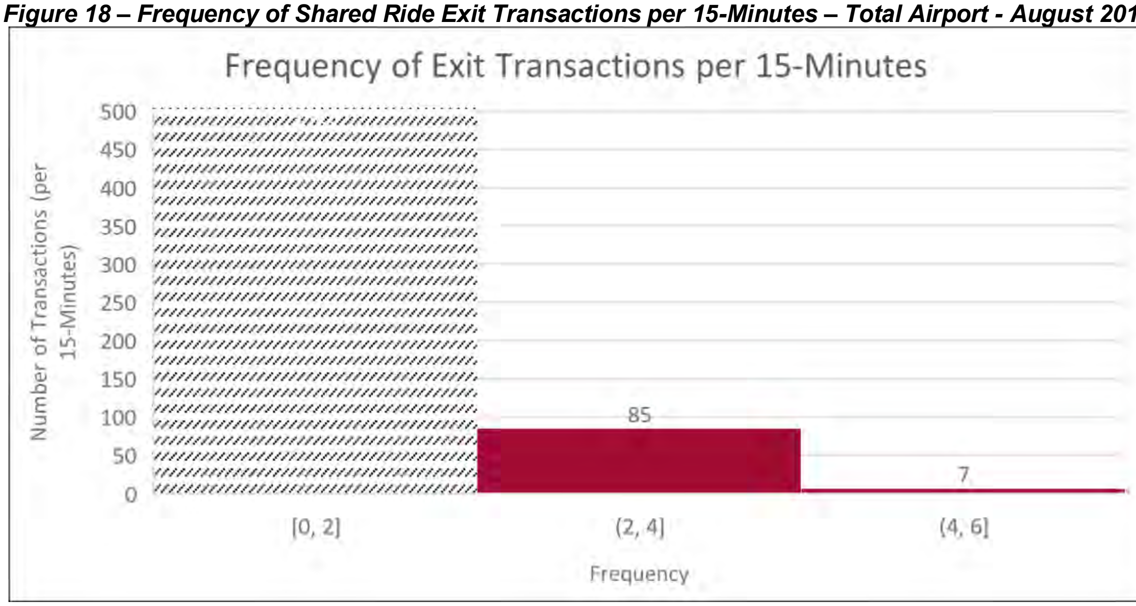
9 Shared Ride

Figure 17 – Shared Ride Activity (Typical Week - August 2019)



Source: Kimley-Horn and Associates, Inc.
Prepared by: Kimley-Horn and Associates, Inc.

Figure 18 – Frequency of Shared Ride Exit Transactions per 15-Minutes – Total Airport - August 2019



Source: Kimley-Horn and Associates, Inc.
Prepared by: Kimley-Horn and Associates, Inc.

Table 8 – Airport Total Shared Ride Transactions per 15-Minutes (August 2019)

Demand Analysis			
Percentile	95th Percentile	**99.5th Percentile**	Peak
Design 15-min Pickup Vehicle Activity	2 veh	**4 veh**	6 veh
TNC Pickup Positions: Required	1 pos	**2 pos**	3 pos
No. of 15-min Periods Design Demand is Exceeded throughout the month	144 periods (36 hours)	**14 periods (3.5 hours)**	-

Source: Kimley-Horn and Associates, Inc.
Prepared by: Kimley-Horn and Associates, Inc.

- Loading Position Requirement: 2
  - Airport Total: 2
  - Terminal 1: 2 (provide minimum number of positions for redundancy)
  - Terminal 2: 2 (provide minimum number of positions for redundancy)

TECHNICAL MEMORANDUM

To: Eric Gilles
Metropolitan Airports Commission

From: William J. Schmitz, P.E.
Kimley-Horn and Associates, Inc.

Date: June 30th, 2022

Subject: ***MSP 2040 LTP***
Curbfront and Access Roadway Requirements

CONTENT

1 OVERVIEW

This technical memorandum documents the existing and future anticipated requirements for terminal curbfront and access roadway facilities for the Minneapolis-St. Paul International Airport (MSP). This work is being completed as part of the MSP 2040 Long Term Plan (LTP).

Kimley-Horn determined the terminal curbfront requirements using a data driven approach. Data provided by the Metropolitan Airports Commission (MAC) integrated with Kimley-Horn's Advanced Land-Transportation Performance Simulation (ALPS™) microsimulation model that was used to understand existing and future demands on MSP's terminal curbfronts and access roadways. From this, anticipated terminal curbfront requirements could be determined, which will inform the development process for 2040 LTP landside alternatives.

The analyses and requirements documented in this memorandum focus on Departures curbfronts and Private Arrivals curbfronts. Requirements for commercial ground transportation areas, parking and rental car facilities, and non-terminal roadways (e.g., adjacent freeways) are documented separately.

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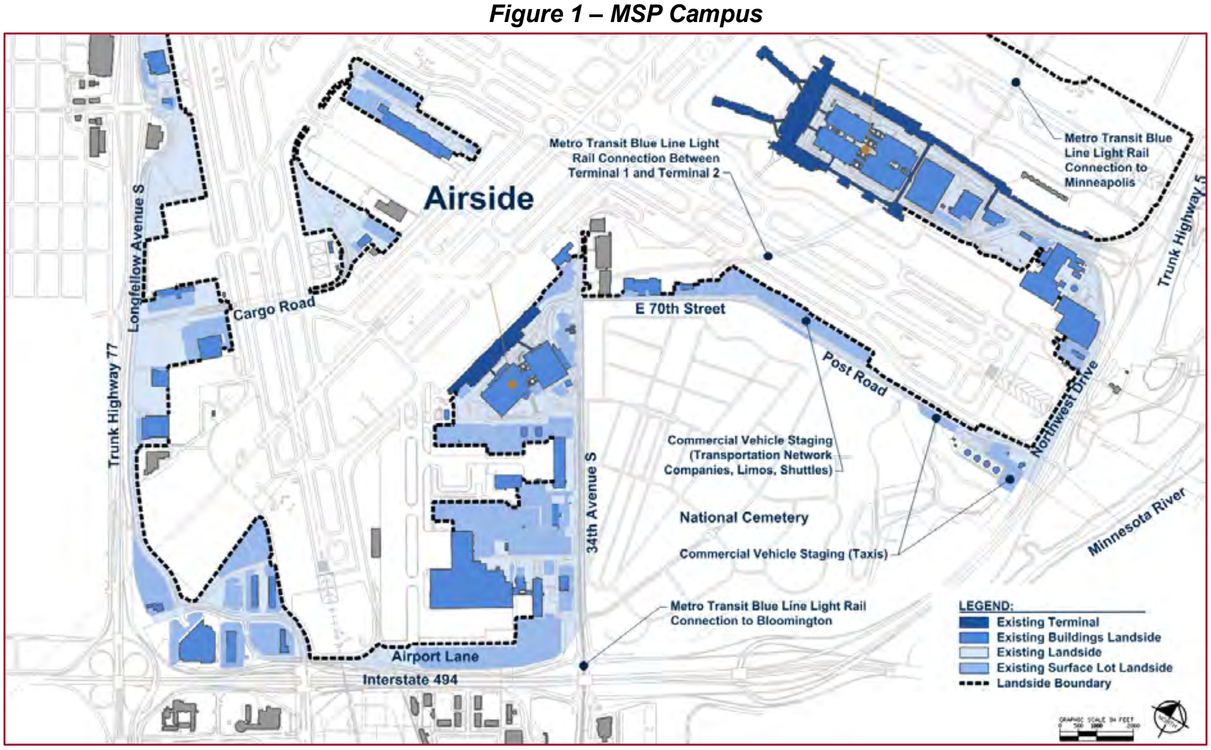
While a summary of the identified requirements is included in the 2040 LTP document, this technical memorandum summarizes the methodology, available data, key inputs, analysis methods, and detailed results of the assessments for curbfront requirements and access/egress roadway requirements.

2 STUDY AREA

The facility requirements focused on:

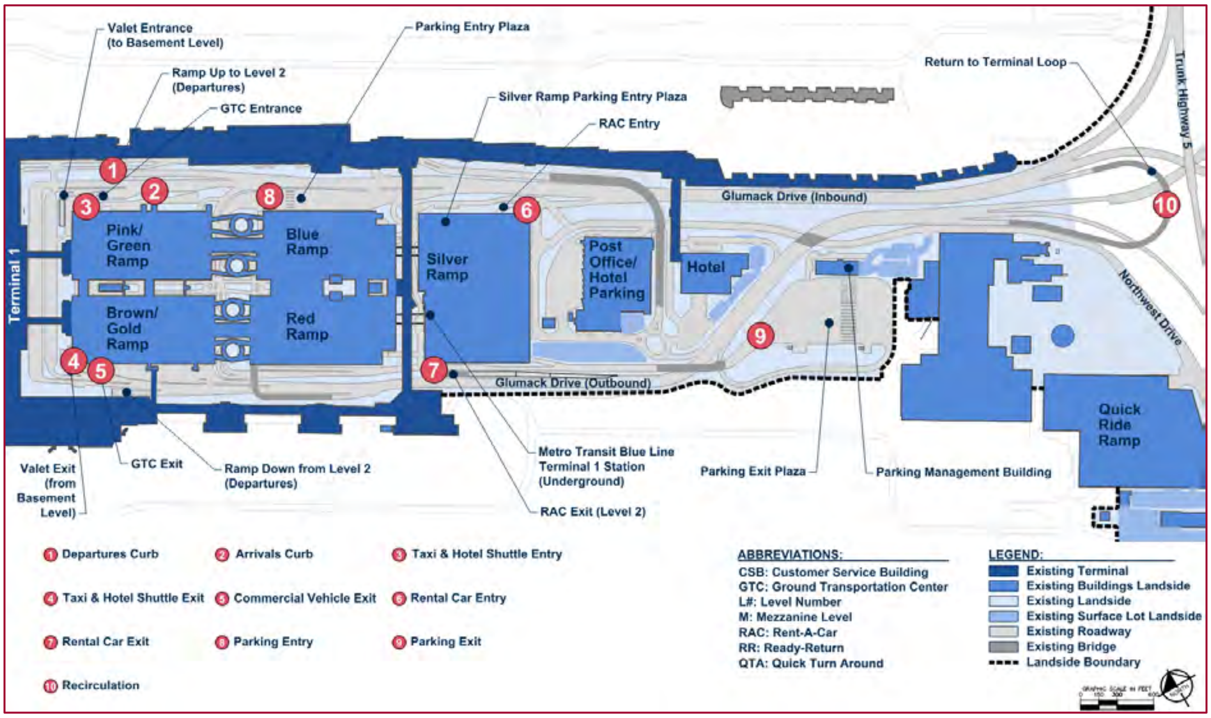
- Terminals 1 and 2 Curbfront Capacity:
  - Terminal 1 Arrivals Curb (Lower Roadway)
  - Terminal 1 Departures Curb (Upper Roadway)
  - Terminal 2 Combined Arrivals/Departures Curb
- Terminals 1 and 2 Curbfront Access Roadway Capacity:
  - Terminal 1 Arrivals Access Roadway (2 Lanes)
  - Terminal 1 Departures Access Roadway (2 Lanes)
  - Terminal 2 Combined Arrivals/Departures Access Roadway (3 Lanes)

Figure 1 – MSP Campus



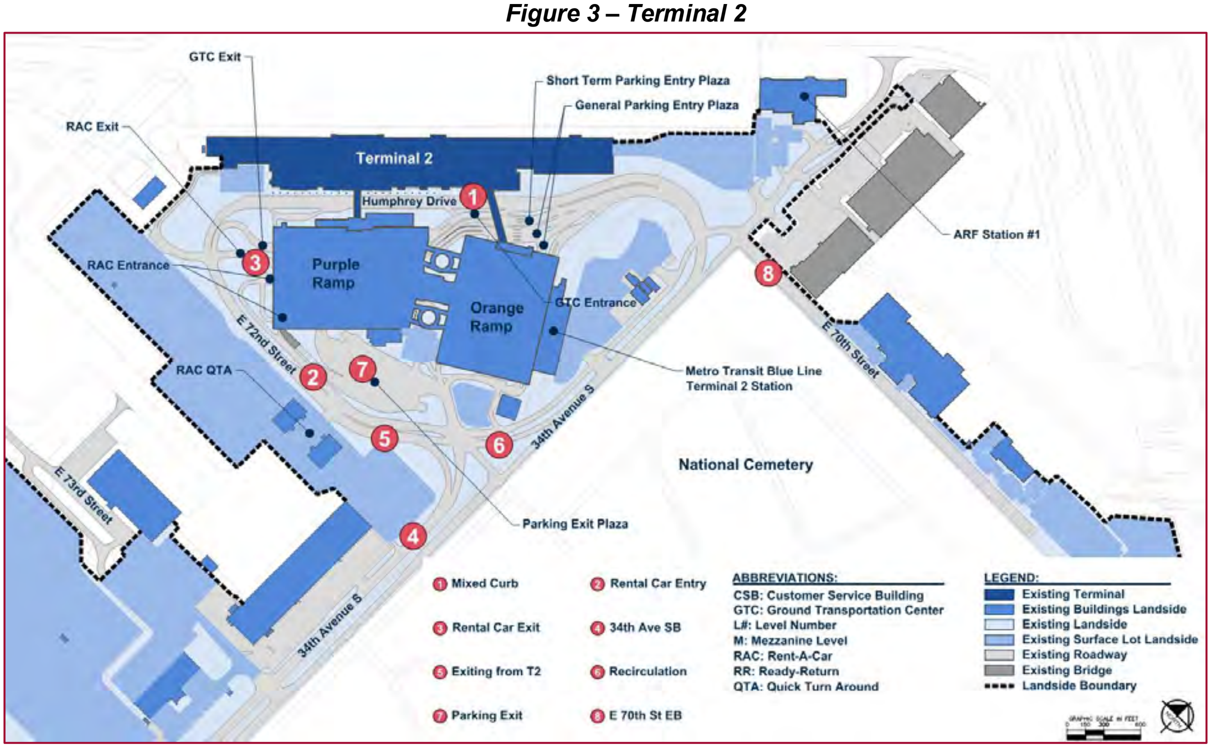
Prepared by: Kimley-Horn, August 2022

Figure 2 – Terminal 1



Prepared by: Kimley-Horn, August 2022

Figure 3 – Terminal 2



Prepared by: Kimley-Horn, August 2022

3 OVERVIEW OF ALPS™ MODEL DEVELOPMENT

3.1 ALPS™ Overview

Landside operations at MSP were analyzed using the ALPS microsimulation tool. ALPS is a modeling and analysis tool that allows the user to create simulations that encompass the various pedestrian and vehicular movements within the terminal roadway system and inside the terminal building itself. The ALPS simulation model combines a variety of travel modes (e.g., private autos, buses, shuttles, pedestrians, etc.) in a single comprehensive model – portraying the effects each mode has upon the others. Using ALPS, a facility is evaluated as a comprehensive system rather than as a group of unrelated parts.

Fundamental to ALPS is the ability to generate passenger demands based on existing and/or anticipated flight schedules. Passenger characteristics, such as time of arrival at the airport and accompanying visitors, are applied to the flight activity to generate the passenger demands throughout a 24-hour period. Vehicular characteristics, such as mode choice and vehicle occupancy, are applied to the passenger demands to generate vehicular activity by vehicle type and trip type (shuttle, personal car, taxi, buses, etc.).

Once the vehicular activity is generated, the individual vehicles are routed through the modeled roadway network and stop at their respective curbfronts or destinations. Through the simulation capabilities of ALPS, the curbfront operations and pedestrian movements can be visualized to observe the congestion at the curbfronts and roadways. In addition to the visual representation of curbfront congestion, quantitative results are also captured within the ALPS program.

3.2 ALPS™ for MSP

Specific to the MSP, a baseline ALPS model was developed to reflect airport conditions and operations for both vehicular and pedestrian circulation on the selected calibration date of Thursday, August 8, 2019. Data and operational parameters from August 8, 2019 were collected. Once the baseline model was established, the model was calibrated to more closely reflect observed traffic counts from August 8th, 2019. These data inputs are expanded in Chapter 4. The trip generation for the MSP existing conditions model is driven by the 24-hour flight schedule from August 8, 2019, including characteristics such as aircraft size, passenger load factors, connection parameters, and gate assignments, to capture the peaking unique to MSP. Using the calibrated existing conditions model, a forecast/future design day flight schedule can be input to evaluate the characteristics of proposed conditions and projected passenger activity. With a future conditions ALPS model, operational performance metrics can be output.

4 DATA INPUTS, DATA PROCESSING, AND PLANNING ASSUMPTIONS

The curbfront and roadway requirements analysis was based on demand outputs from the ALPS™ simulation model, which utilized existing data and provided inputs, where possible. Much of the data originated from passenger intercept surveys conducted in 2019, operational observations conducted on Thursday, August 8, 2019, a Spring 2018 design day flight schedule (DDFS), and a Summer 2018 DDFS – all collected or prepared by others. Additionally, Kimley-Horn collected automated traffic counts on Thursday, August 8, 2019 to correlate with the operational observations by others. The following subsections summarize the data and information provided to Kimley-Horn. The one exception is the egress profiles, which were assumed by Kimley-Horn, as described in Section 4.4.

4.1 Baseline Calibration Date

In 2019, MSP experienced its peak month of passenger activity in August 2019. It is typically considered an industry best practice to conduct planning analyses based on Peak Month Average Day (PMAD) activity levels, which is reflective of an average operating day within the peak month. In 2019, the MAC engaged Kimley-Horn to collect traffic count data, as well as have curbfront operational observations performed by others, on Thursday, August 8, 2019. Additionally, passenger intercept surveys were conducted by others around a similar time. Summaries of the curbfront observation data (by others) and passenger intercept surveys (by others) were provided to Kimley-Horn by the MAC. Following coordination with the MAC, it was determined that Thursday, August 8, 2019 would be the calibration date for the ALPS existing conditions model, which aligns with the traffic counts and field observation data. To further correlate the data with ALPS model activity generation, the MAC provided Kimley-Horn with the actual passenger flight schedule that occurred on August 8, 2019. While not required for establishing a calibrated existing conditions model, this date is considered representative of PMAD conditions.

4.2 2019 Passenger Intercept Survey

In 2019, the MAC engaged others to conduct passenger intercept surveys. A summary of results of the survey was provided to Kimley-Horn, which provided input related to early show-up profile, passenger mode choice on the landside, and traveling party size distribution.

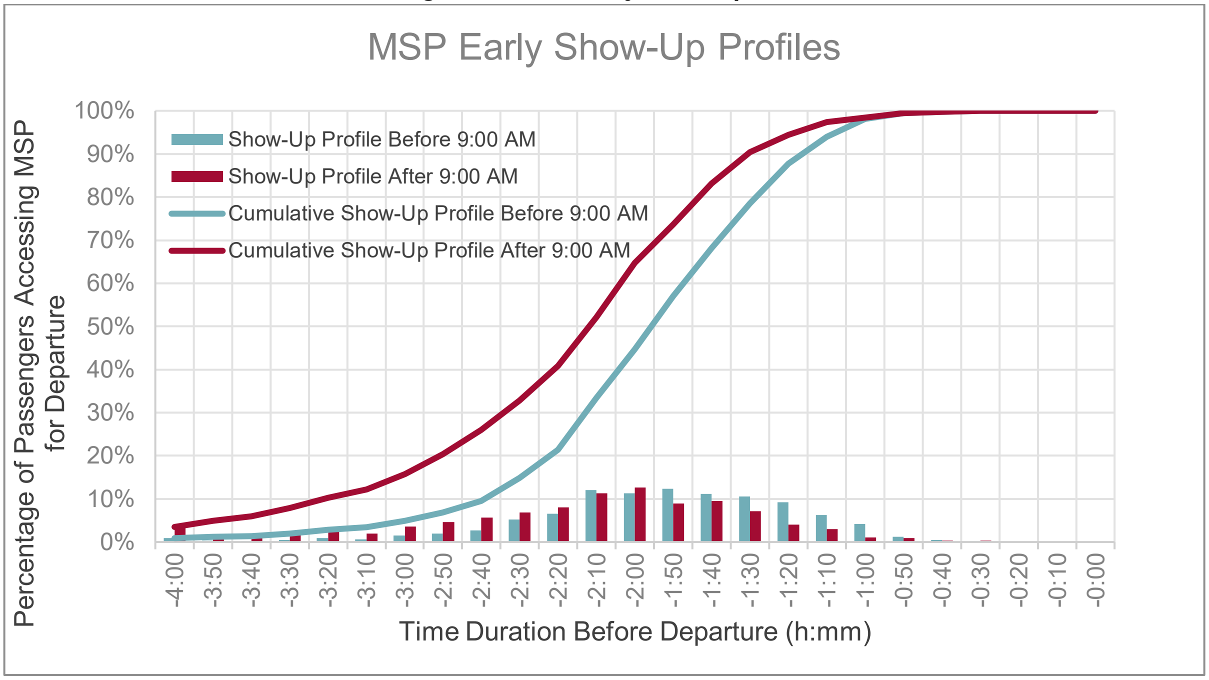
4.3 Early Show-Up Profile (Originating Departures)

The early show up profile is a time-based distribution of how early originating passengers show-up to the airport (i.e., utilize landside facilities) prior to their departure time. For this analysis, two profiles were used:

- Departures prior to 9:00 AM
- Departures after 9:00 AM

These two profiles are MSP site-specific distributions based on Passenger Survey Data from March 2019 and August 2019 and tweaked as part of the model calibration process. The profiles used are depicted Figure 4. Flight schedules used in this analysis were processed with these early show-up profiles to estimate originating passenger demands/flows on the landside (described further Section 4.5.4).

Figure 4 – MSP Early Show-Up Profiles

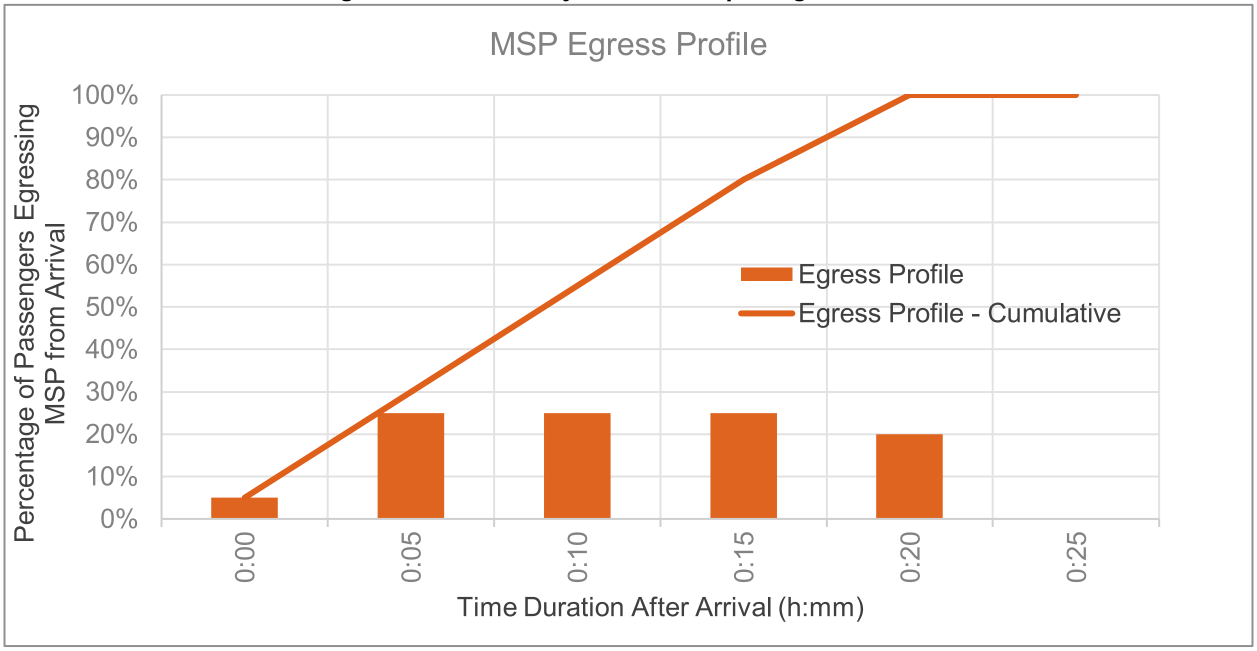


Prepared by: Kimley-Horn, August 2022

4.4 Egress Profile (Terminating Arrivals)

The egress profile is a time-based distribution of how long it takes terminating passengers to exit the aircraft after their arrival time. From there, passengers reach the landside at different times depending on the time spent at the baggage claim, if any. For this analysis, a single egress profile was developed by Kimley-Horn based on industry data/experience and is depicted in Figure 5. Flight schedules used in this analysis were processed with this egress profile to estimate terminating passenger demands/flows on the landside (described further Section 4.5.4).

Figure 5 – MSP Kimley-Horn-Developed Egress Profile



Data Source: Kimley-Horn, August 2022; Prepared by: Kimley-Horn, August 2022

4.5 Planning Activity Levels (PALs) / Flight Schedules

The 2019 baseline flight schedule did not include load factor or connecting % parameters; thus, load factor and connecting % parameters were taken from the 2018 Spring and Summer DDFSs and applied to the baseline schedule. The PAL 1 and PAL 3 flight schedules included load factor and connecting % parameters on a per-flight basis. Accordingly, all passenger activity projections and comparisons in this analysis focused on originations and terminations, or O&D passengers, because it is those passengers that utilize landside facilities.

4.5.1 August 8, 2019 Flight Schedule (for Baseline Model)

The August 8, 2019 flight schedule was used to develop and calibrate the existing conditions MSP ALPS model. This flight schedule coincides with the date of data collection, which allowed the traffic data to be correlated with the flight schedule for model calibration purposes. A schedule was also provided for Spring 2019 but, in coordination with MAC, it was determined the base calibration should be based on Summer 2019 (thus August 8, 2019) to account for August activity and peaking characteristics at the airport.

4.5.2 Parameters from 2018 Spring DDFS and Summer DDFS

As mentioned previously, the load factors and connecting factors from the 2018 Summer and Spring DDFSs were applied to the August 2019 flight schedule to process and obtain O&D passenger demands. From there, the load factor parameters were refined during the calibration process. The calibrated parameters are presented if it differs from the original 2018 DDFS source data. The following table contains the load factor by flight population used in the baseline ALPS model.

Table 1 – 2018 DDFS Load Factors

Type	Terminal 1 (OAL)		Terminal 1 (DL)		Terminal 2	
	2018 DDFS	Calibrated	2018 DDFS	Calibrated	2018 DDFS	Calibrated
Enplanement	86.4%	87.4%	86.4%	87.4%	87.2%	89.2%
Deplanement	88.0%	89.0%	86.8%	87.8%	86.5%	88.5%

Similarly, the percentage of connecting passengers is a passenger characteristic which directly impacts the landside demand. The following table contains the connecting percentage of enplanements and connecting percentage of deplanements by flight population that were applied to the August 2019 flight schedule.

Table 2 – 2018 DDFS Connecting Factors

Type	Terminal 1 (OAL)	Terminal 1 (DL)		Terminal 2
	2018 DDFS	2018 DDFS	Calibrated	2018 DDFS
Connecting Enplanement	2.9%	See Table 3		3.8%
Connecting Deplanement	3.0%	See Table 3		4.3%

Upon review of Delta Airlines flights in the 2018 DDFS, the percentage of connecting passengers varied significantly by time-of-day. Therefore, the ALPS model includes connection percentages that vary by time-of-day for Delta Airlines flights to better represent the passenger landside activity. The following table contains the Delta Airlines connecting passenger percentages by time-of-day.

Table 3 – 2018 DDFS Connecting Factors (DL + AF)

Time Period	Connecting Enplanement		Connecting Deplanement	
	2018 DDFS	Calibrated	2018 DDFS	Calibrated
12:00 AM – 8:00 AM	26.7%	24.7%	67.2%	64.2%
8:00 AM – 7:00 PM	55.0%	52.0%	56.8%	53.8%
7:00 PM – 10:00 PM	64.4%	61.4%	50.6%	47.6%
10:00 PM – 12:00 AM	69.3%	66.3%	23.3%	21.3%

4.5.3 Planning Activity Levels

Planning Activity Levels (PALs) based on projections of future annual enplanement activity were determined by Ricondo and Associates, Inc. as part of the MSP 2040 Long Term Plan Forecast Technical Memorandum dated November 2021. The PALs established in the MSP 2040 LTP forecast were used for the future requirements. The forecast passenger demands used for the landside requirements assume an aggressive recovery from the COVID-19 pandemic. Two PAL levels were used for the future curbfront requirements analysis: PAL 1 and PAL 3 which are associated with the projected years 2025 and 2040 respectively.

4.5.4 Design Day Flight Schedules

Design Day Flight Schedules (DDFSs), prepared by Ricondo & Associates, Inc., were used to generate passenger and vehicular activity within the ALPS microsimulation model for PALs 1 and 3. The DDFSs were processed using a detailed processing tool that incorporates the early show-up and egress profiles, load factors, and connecting passengers to generate landside passenger demands which in turn generates vehicles within the ALPS model using a gamut of calibrated model input parameters. The model-generated demands are used to determine the future curbside and roadway requirements.

Both a spring and summer DDFS were provided for PALs 1 and 3. During the LTP process, the PAL 3 DDFSs were revised based on a preferred airline allocation concept by the airport. This resulted in two DDFS scenarios for PAL 3: "Alternate 2" reflects the scenario in which airline allocations remain consistent from present day into PAL 3, and "Alternate 3.1A" reflects the scenario in which some airlines relocate from their current terminal. Both PAL 3 airline allocation scenarios have both a spring and summer DDFS associated with them. This curbfront analysis reports the curbfront requirements for both PAL 3 scenarios: Alternate 2 and Alternate 3.1A.

The graphs on the following pages show the projected landside passenger demands for Terminal 1 and Terminal 2. These demands were developed using a detailed processing tool that incorporates the early show-up and egress profiles, load factors, and connecting passengers to calculate projected landside passenger demands.

Figure 6 – Projected Terminal 1 Originating Landside Passenger Demands

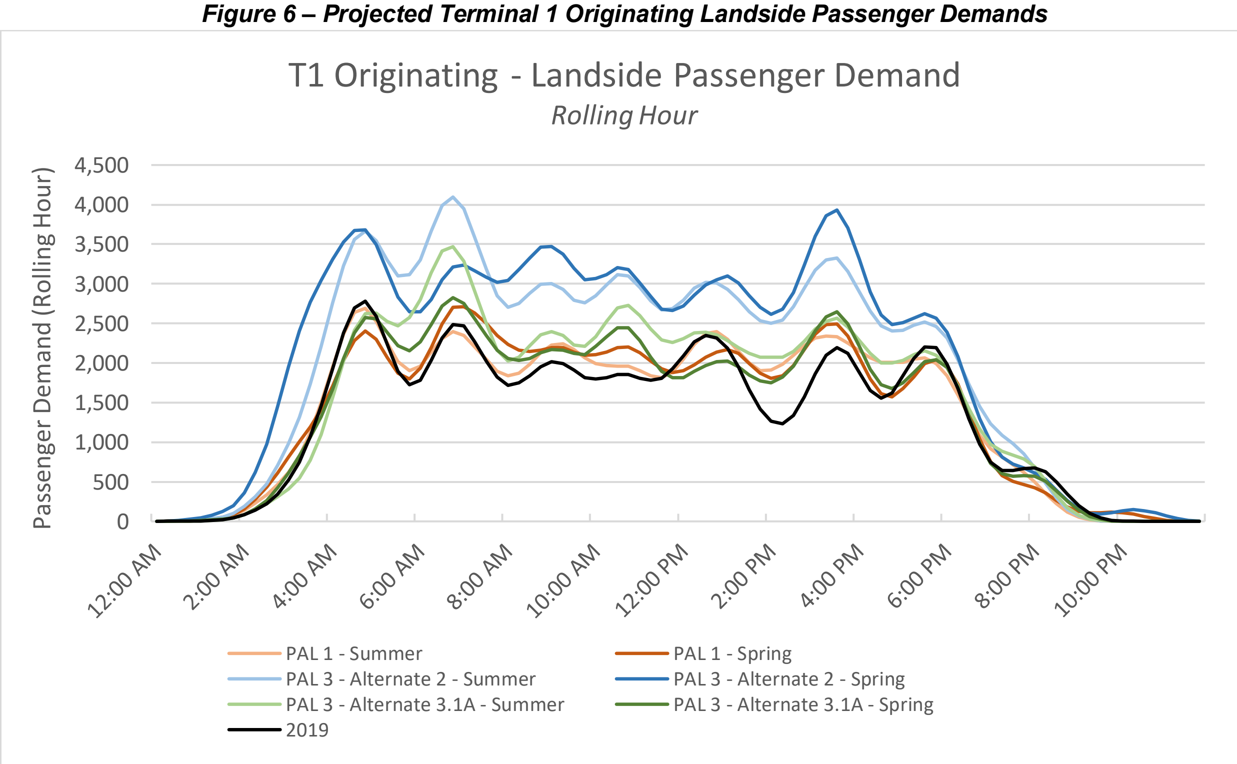


Figure 7 – Projected Terminal 1 Terminating Landside Passenger Demands

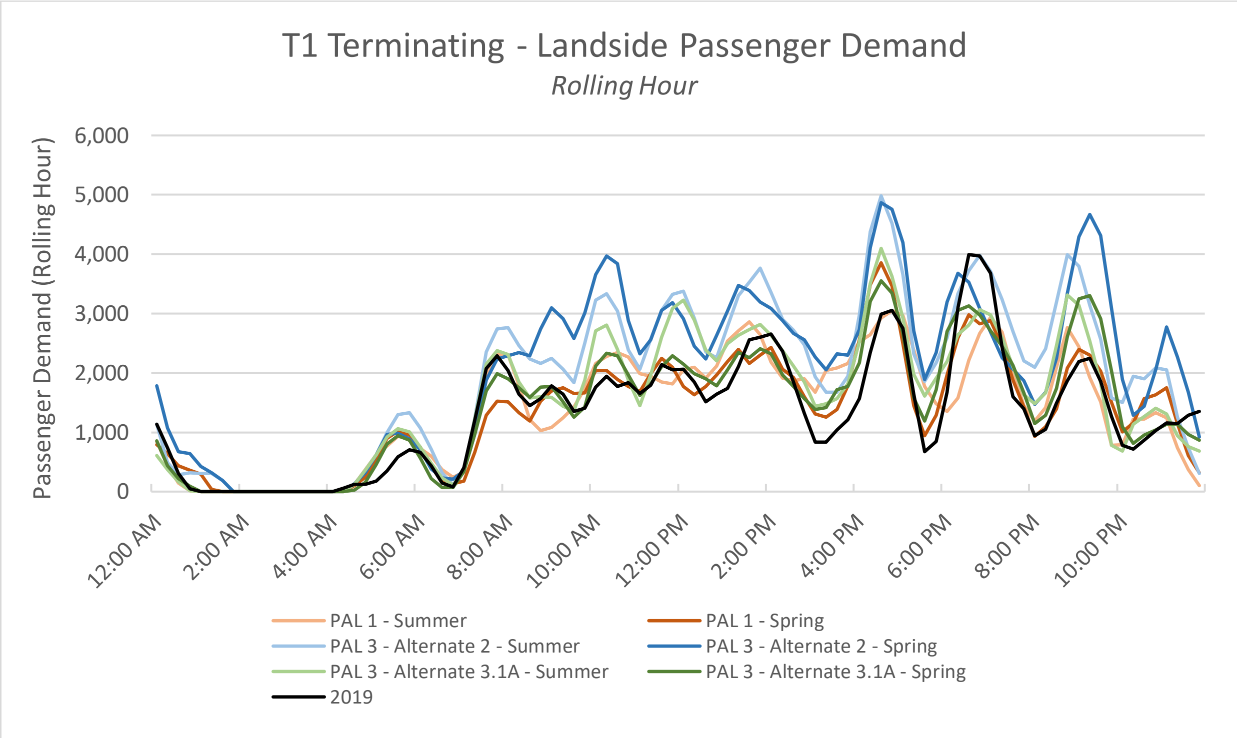


Figure 8 – Projected Terminal 2 Originating Landside Passenger Demands

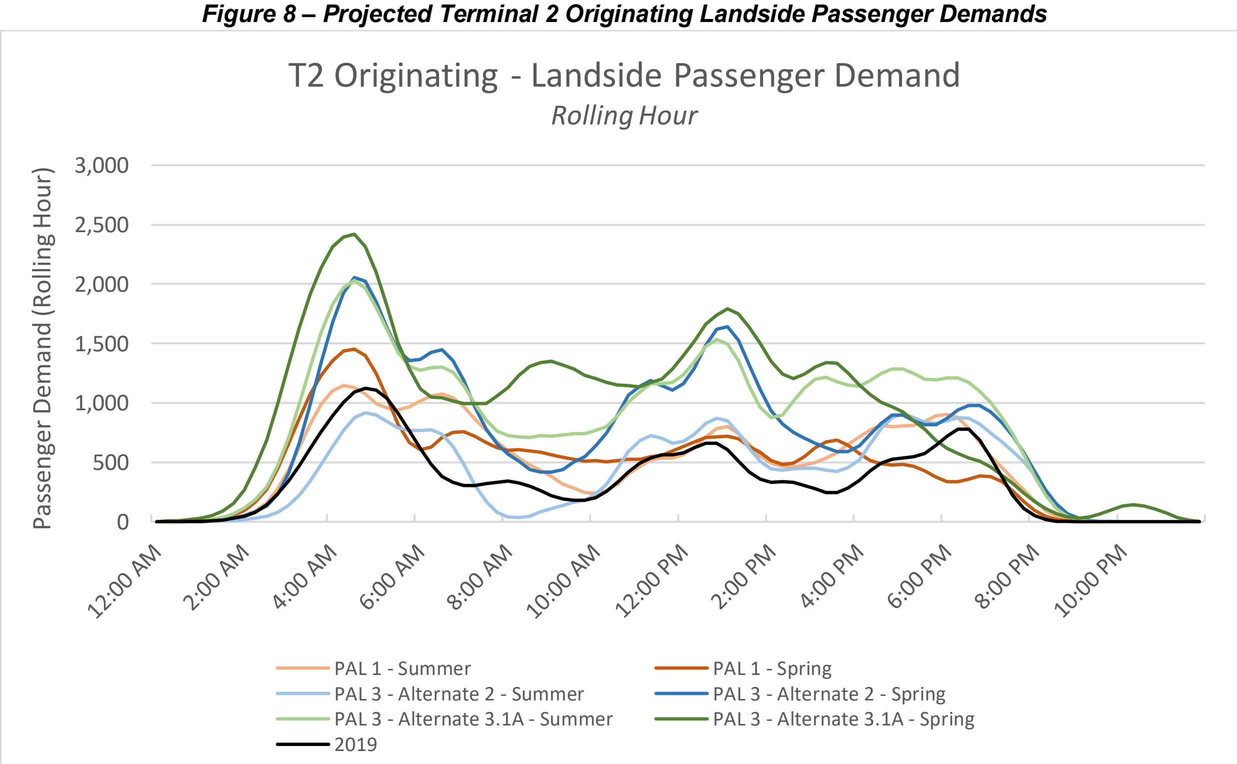


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Figure 9 – Projected Terminal 2 Terminating Landside Passenger Demands

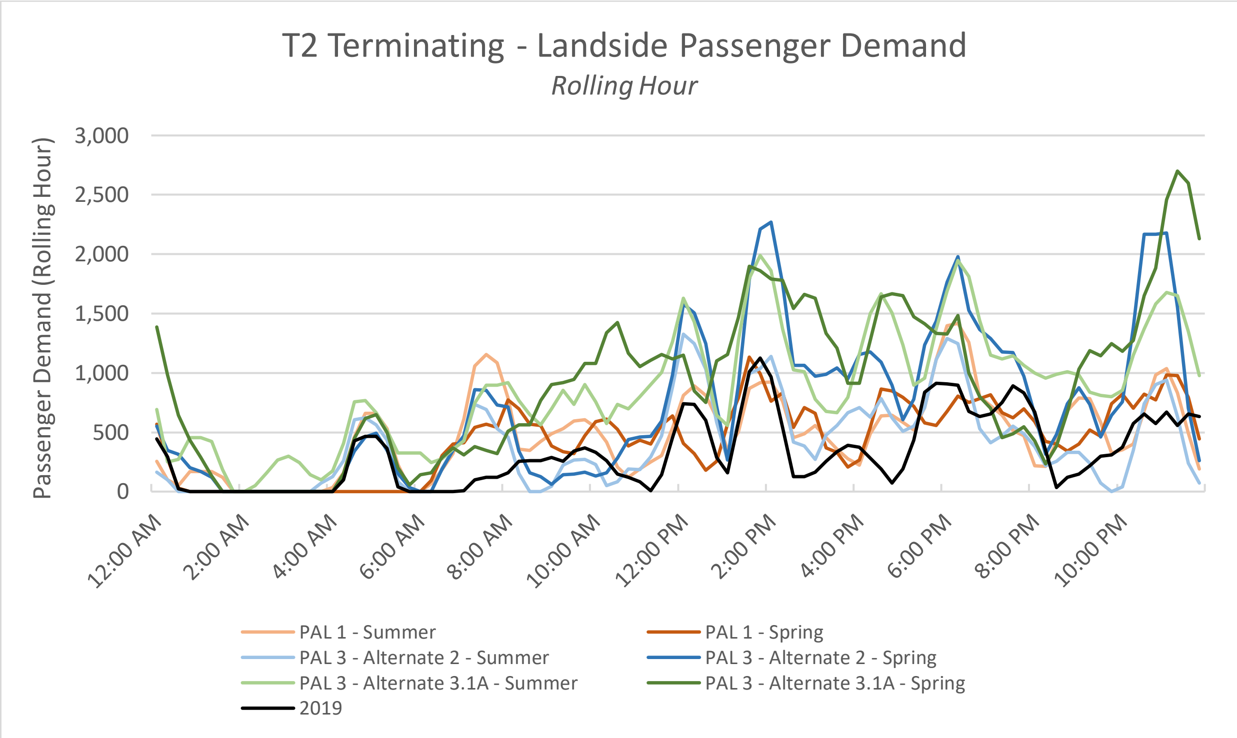
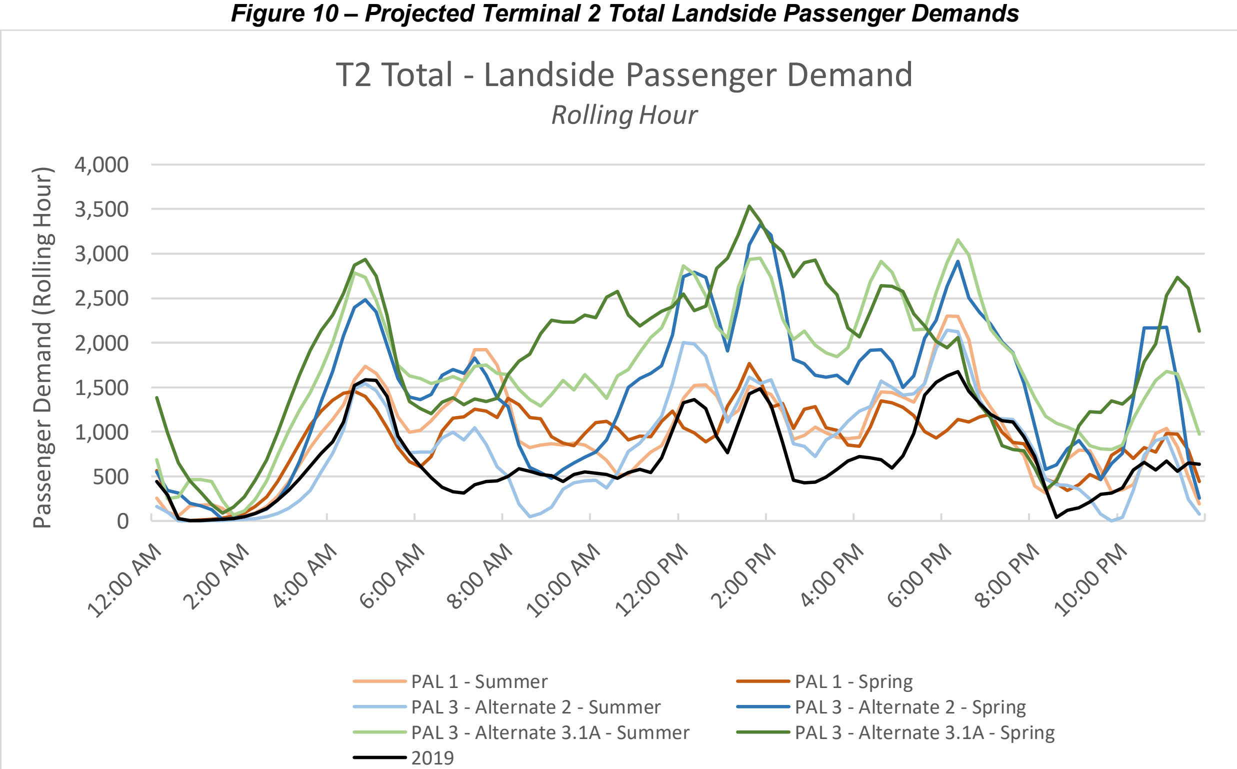


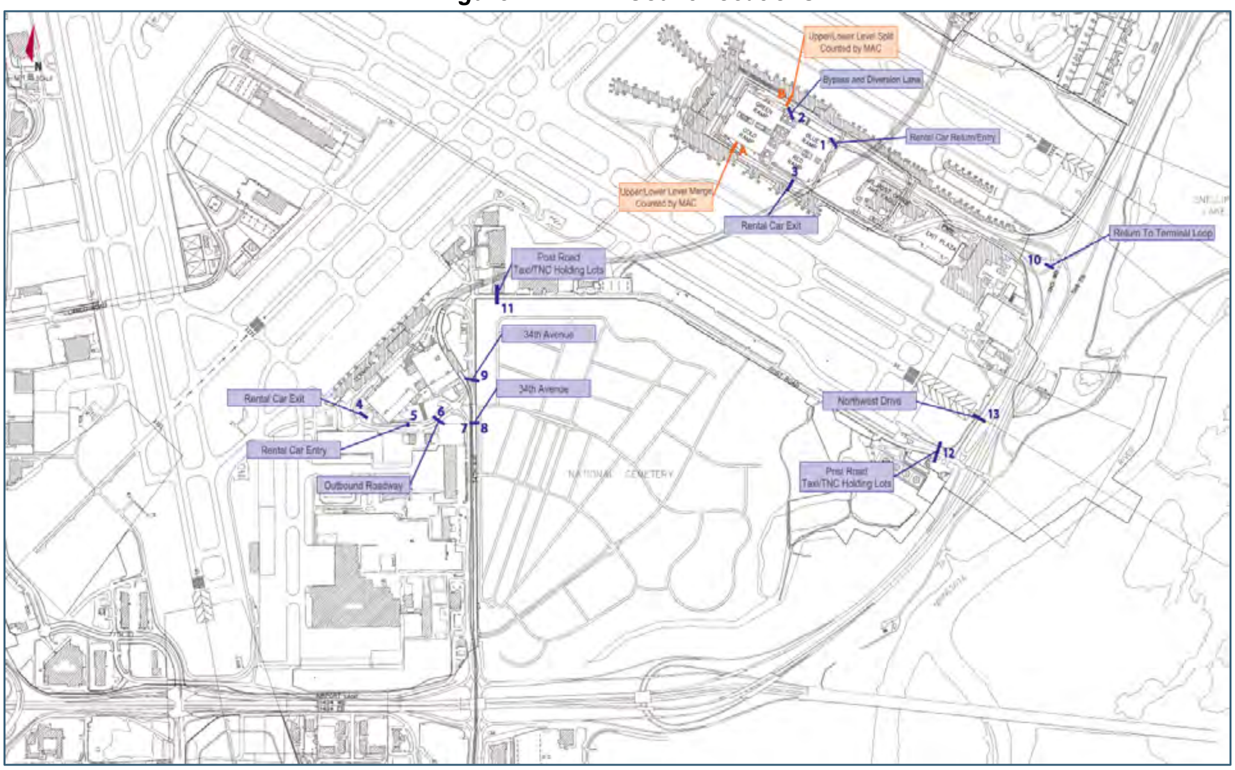
Figure 10 – Projected Terminal 2 Total Landside Passenger Demands



4.6 Traffic Count & Vehicle Transaction Data

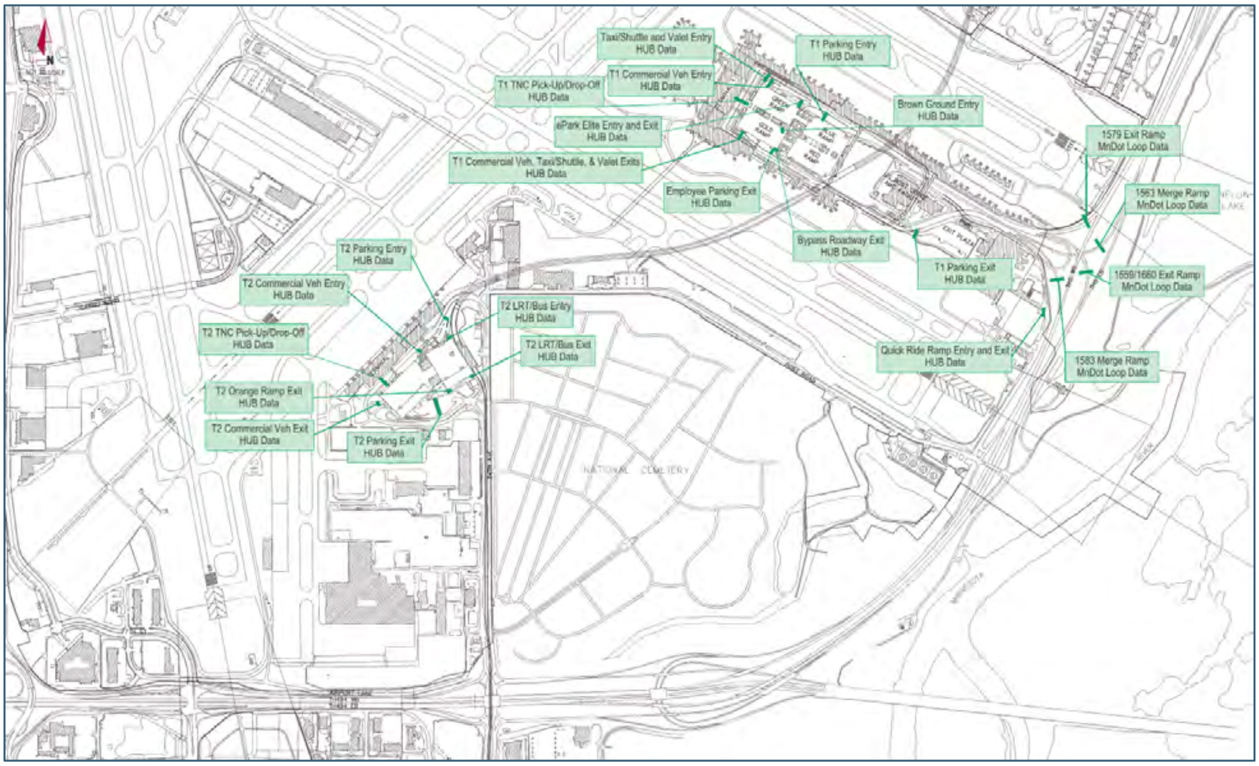
Traffic count (traffic volume) data was collected and/or requested from three (3) independent data sources to cover the entire study area. Video-based automatic traffic recorders (ATRs) were obtained by Kimley-Horn and covered several key locations within the on-airport terminal access/egress roadway network. HUB transaction data was provided by the MAC, which provided volume data for parking entry/exit points and some commercial ground transportation areas. MnDOT count station data provided volumes for the connecting ramps between MSP and SR 5. All three data sources provided continuous volume data in 15-minute intervals for Thursday, August 8, 2019. Video-based ATR count locations are shown in Figure 11. HUB transaction and MnDOT count station locations are shown in Figure 12.

Figure 11 – ATR Count Locations



Prepared by: Kimley-Horn, 2019

Figure 12 – MAC, MNDOT, & Hub Data Locations



Prepared by: Kimley-Horn, 2019

Note: Traffic counts were also collected in Spring 2019, but it was determined in coordination with MAC the base calibration should be based on Summer 2019, thus August 8, 2019.

4.7 Passenger Mode Choice

While the input flight schedules drive the passenger activity, how those passengers choose to access and egress the terminal is determined by passenger mode choice inputs. A passenger intercept survey conducted in 2019 by the airport authority was used as the starting point. Final mode choice inputs vary by time-of-day and were tweaked as part of the model calibration process to better reflect data and observed operations. The following table summarizes the passenger mode choice split by terminal for arriving and departing passengers – both based on the 2019 passenger survey and the calibrated ALPS model inputs.

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Table 4 – Passenger Mode Choice

Mode Choice	Terminal 1		Terminal 2	
	Pax Survey	ALPS Model	Pax Survey	ALPS Model
Private Vehicle Drop-Off/Pick-Up	39%	24% - 40%	45%	38% - 58%
Private Vehicle with Visitor	-	6% - 9%	-	7% - 9%
Rental Car	11%	9% - 20%	7%	2% - 20%
TNC (Uber/Lyft)	19%	17% - 21%	14%	12% - 20%
Taxi	2%	2% - 3%	1%	2%
Limo	< 1%	< 1%	< 1%	< 1%
Parking – Terminal Lot	12%	2% - 9%	15%	1% - 12%
Parking – Valet	-	< 1%	-	-
Parking – QRR	-	< 1%	-	-
Parking – Off-Airport	4%	2% - 3%	8%	3% - 5%
Hotel/Courtesy Shuttle	8%	3% - 5%	3%	2% - 4%
Light Rail	4%	0% - 3%	3%	0% - 3%
Charter Bus	< 1%	≤ 1%	< 1%	< 1%
Shared Van-Ride	< 1%	≤ 1%	1%	1%
Route 54	< 1%	≤ 1%	-	-

4.8 Curbside Vehicular Dwell Times

Vehicular dwell time is a measure of how long a vehicle occupies a space within the curbside facility for the purposes of dropping off or picking up a passenger or group of passengers traveling together. Curbfront observations from the Thursday, August 8, 2019 data collection effort (performed by others) were used as a starting point. Dwell time model inputs were tweaked as part of the model calibration process to better reflect observed operations and congestion. Note: curbfront observations were performed by others and the model calibration was performed with the limited field data provided to Kimley-Horn.

The following table summarizes the average dwell times and ranges as input into the curbfront analysis model for the purposes of evaluating curbfront requirements. The model allows for variability in dwell times within the simulation. Dwell times vary for drop-off versus pick-up and by vehicle type. These dwell times are assumed to remain consistent for the projected future activity levels.

Table 5 – MSP Average Dwell Times (mm:ss)

Mode Choice	Terminal 1		Terminal 2	
	Drop-off	Pick-up	Drop-off	Pick-up
Private Vehicle	2:25[1]	3:25	2:30	4:50
TNC (Uber/Lyft)	0:55	1:00	1:10	1:10
Taxi	1:15	1:54	1:05	1:54
Limo	1:20	6:25	1:30	8:20
Valet	0:45	2:00	-	-
Hotel/Courtesy Shuttle	1:30	3:25	1:30	3:25
QRR Shuttle	2:15	2:15	-	-
Off-Airport Shuttle	1:20	4:50	1:20	4:50
Regional Bus	6:00	6:00	6:00	6:00
Charter Bus	6:00	10:00	6:00	10:00
Shared Van-Ride	1:40	5:50	1:40	5:50
Delta Employee Shuttle	2:00	2:00	-	-
Route 54	1:30	1:30	-	-

Source: Kimley-Horn, August 2019; Prepared by: Kimley-Horn, September 2022
[1]Analysis using the observed dwell time resulted in unrealistically low requirements. Therefore, the analysis used the ACRP 40 default dwell time for POV Drop-off.

4.9 Traveling Group Size

A key passenger characteristic driving the vehicular landside demand is the traveling group size (or party size) distribution. The group size distribution directly impacts the number of vehicles generated to meet the originating and terminating passenger demand, as the model generates one vehicle per traveling group. The weighted average group size as indicated by the passenger intercept surveys was 1.82 for T1 and 2.04 for T2. As part of the model calibration process, the weighted average group sizes were adjusted to 1.52 for T1 and 1.74 for T2.

4.10 Facility Level of Service (LOS)

A target of LOS C was used for the Departures curbfront requirements, Private Arrivals curbfront requirements, and access/egress roadway requirements. Planning for LOS C is consistent with guidance in the ACRP's *Report 40* for new facilities at airports.

4.11 Recirculation and Cell Phone Lot Usage

Vehicular recirculation is defined as a private vehicle bypassing a curbfront once before recirculating back to the curbfront to conduct a pickup. Cell Phone Lot usage is defined as a private vehicle using the cell phone lot, either from the access roadway or from bypassing the curbfront, prior to going to the curbfront to pick-up a passenger. Recirculation and cell phone lot usage parameters were derived from the vehicle volume count data and adjusted as part of the model calibration process. For the arrivals curbfront at T1, 20% of private vehicles were assigned to recirculate, and separately, 20% were routed to visit the cell phone lot directly prior to picking up their passenger at the curbfront. For arrivals activity at the T2 curbfront, 20% of private vehicles were assigned to recirculate, and separately, 20% were routed to recirculate to the cell phone lot after bypassing the curbfront prior to picking up their passenger at the curbfront.

4.12 Near-Term Mode Shifts

All traffic data collection was conducted in 2019, thus, the calibrated baseline model reflects passenger mode choice based on pre-pandemic passenger tendencies and travel behaviors. Since the pandemic, mode choice shifts have been observed at various U.S. airports in response to continued public health concerns (e.g., fewer shared-ride trips to the airport). As a result, for PAL 1, the mode choice was altered to account for possible near term shifts in mode choice and thus landside facility demands.

Two mode shift scenarios were modeled. First, a No POV Growth Scenario, assumes the same mode split from 2019 (as shown in Section 4.7). Second, a High POV Growth Scenario, assumes a shift in mode choice from 2019, resulting in a higher number of passengers being dropped off/picked up my family/friends at the departures/arrivals curb. This sensitivity scenario resulted in a 10% increase in POV drop off/pick-up demand.

5 TERMINAL CURBFRONT REQUIREMENTS

This section summarizes the methodology, analysis methods, and results of the MSP curbfront requirements assessment. For the purposes of this planning-level assessment, terminal curbfront requirements focus on the curbfront length required to provide sufficient capacity for drop-off/pick-up operations on the departures curbfronts and private arrivals curbfronts. Commercial vehicle curbfront requirements are documented in a separate technical memorandum. The supporting curbfront capacity analysis was macroscopic (spreadsheet-based). The curbfront requirements support the alternatives development process and recommendations contained in the LTP.

5.1 Curbfront Vehicular Volume Development

As described in Section 06, the arrivals/departures curbfront volumes collected on August 8, 2022 served as the baseline for the curbfront analysis. The curbfront volumes were categorized by vehicle type/mode to the extent that the provided data allowed. To develop projected vehicular volumes, the DDFS flight schedules were input into the ALPS model which in-turn generated vehicular volumes for the different PALs (described in Section 4.5). The projected peak hour vehicular curbing demands are shown in the tables below.

Table 6 – Terminal 1 Curbing Demands

Peak Hour	Arrivals	Departures
Curb	**Arrivals**	**Departures**
August 2019	604	1,087
PAL 1 No POV Growth	581	1,069
PAL 1 High POV Growth	665	1,117
PAL 3 Alternate 2 (Summer)	1,180	1,400
PAL 3 Alternate 2 (Spring)	1,130	1,631
PAL 3 Alternate 3.1A (Summer)	1,010	1,368
PAL 3 Alternate 3.1A (Spring)	806	1,166

Table 7 – Terminal 2 Curbing Demands

Peak Hour	Arrivals	Departures	Combined
Curb	**Arrivals**	**Departures**	**Arrivals+Departures[1]**
August 2019	273	530	646
PAL 1 No POV Growth	392	482	732
PAL 1 High POV Growth	450	502	825
PAL 3 Alternate 2 (Summer)	417	547	866
PAL 3 Alternate 2 (Spring)	757	821	1,126
PAL 3 Alternate 3.1A (Summer)	438	815	950
PAL 3 Alternate 3.1A (Spring)	477	979	905

[1]Reflects total vehicle demand during the combined peak; assumes peaking characteristics remain consistent into the future
Source: Kimley-Horn, September 2022; Prepared by: Kimley-Horn, September 2022

5.2 Analysis Methodology

The curbfront requirements were determined through methodologies and capacities defined in ACRP's *Report 40*. The analysis to estimate curb frontage required for Departures traffic and Private Arrivals traffic was supported by ACRP's Quick Analysis Tool for Airport Roadways (QATAR), a planning-level macroscopic analysis tool for estimating airport terminal curbfront level of service (LOS).

QATAR provides Curb LOS and curbfront Roadway LOS. The Curb LOS was considered for determining the required curbfront length (in feet). The Roadway LOS was considered for determining the required laneage/configurations. As described in Section 0, LOS C was used as the target LOS threshold for both metrics to identify curbfront requirements.

5.3 Considerations for Curbfront Configuration Options

The following curbfront configuration parameters should be considered when interpreting the curbfront requirements in Section 0 during alternatives/concept development.

5.3.1 Single-Lane vs. Double-Lane Curbing

Terminal curbfront roadways at commercial airports commonly consist of at least three lanes total (including loading/unloading lanes and through lanes), thus allowing for double-lane curbing (or double-parking). Accordingly, the QATAR assumes double-lane curbing is allowed. Based on existing curbfront configurations, the Departures curbfront at Terminal 1 was modeled with 2 through lanes and 2 curbing lanes, the Arrivals curbfront at Terminal 1 was modeled with 3 through lanes and 2 curbing lanes, and the Arrivals/Departures curbfront at Terminal 2 was modeled with 3 through lanes and 2 curbing lanes. Curbfront length requirements presented in Section 0 represent end-to-end curbfront length assuming double-lane curbing is allowed.

5.4 Terminal 1 and Terminal 2 Curbfront Requirements

The Terminal 1 and Terminal 2 curbside requirements based on achieving target LOS C (described in Section 0) are summarized in the tables below.

***Table 8 – Terminal 1 Curbside Requirements (LOS C)*[1]**

Peak Hour	Arrivals	Departures
Curb	**Arrivals**	**Departures**
August 2019	840’	840’
PAL 1 No POV Growth	815’	840’
PAL 1 High POV Growth	980’	860’
PAL 3 Alternate 2 (Summer)	1,130’	1,130’
PAL 3 Alternate 2 (Spring)	1,130’	1,320’
PAL 3 Alternate 3.1A (Summer)	940’	1,080’
PAL 3 Alternate 3.1A (Spring)	765’	890’

[1]Requirements reflect end-to-end curbfront length assuming double curbing is allowed as described in section 5.3.1

***Table 9 – Terminal 2 Curbside Requirements (LOS C)*[1]**

Peak Hour	Arrivals	Departures	Combined
Curb	**Arrivals**	**Departures**	**Arrivals+Departures**[2]
August 2019	590’	490’	930’
PAL 1 No POV Growth	715’	440’	1,055’
PAL 1 High POV Growth	740’	465’	1,105’
PAL 3 Alternate 2 (Summer)	690’	515’	1,055’
PAL 3 Alternate 2 (Spring)	940’	690	1,330
PAL 3 Alternate 3.1A (Summer)	890’	715’	1,355’
PAL 3 Alternate 3.1A (Spring)	940’	840’	1,255’

[1]Requirements reflect end-to-end curbfront length assuming double curbing is allowed as described in section 5.3.1

[2]Reflects total length required during the combined peak; assumes peaking characteristics remain consistent into the future

Source: Kimley-Horn, September 2022; Prepared by: Kimley-Horn, September 2022

6 ACCESS/EGRESS ROADWAY METHODOLOGY & REQUIREMENTS

This section summarizes the methodology, analysis methods, and results of the Terminal 1 and Terminal 2 access roadway requirements assessment. The supporting roadway capacity analysis was macroscopic (spreadsheet-based). The roadway requirements support the alternatives development process and recommendations contained in the LTP.

6.1 Roadway Vehicular Volume Development

As described in Section 06, the arrivals/departures curbfront volumes collected on August 8, 2022 served as the baseline for the access roadway analysis. To develop projected vehicular volumes, the DDFS flight schedules were input into the ALPS model which in-turn generated vehicular volumes for the different PAL levels (described in Section 4.5). The projected peak hour vehicular demands are shown in the tables below. These volumes are higher than curbing volumes as they also include bypassing/recirculating vehicles, commercial pick-up vehicles that were not part of the curbfront requirements analysis in Section 5, and maintenance vehicles.

Table 10 – Terminal 1 and Terminal 2 Access Roadway Peak Hour Volumes

	Terminal 1 Departures	Terminal 1 Arrivals	Terminal 2 Arrivals/Departures
2019	1,330	930	860
PAL 1 No POV Growth	1,290	890	1,010
PAL 1 High POV Growth	1,330	980	1,060
PAL 3 Alternate 2 (Summer)	1,730	1,150	1,000
PAL 3 Alternate 2 (Spring)	1,940	1,120	1,220
PAL 3 Alternate 3.1A (Summer)	1,470	1,000	1,300
PAL 3 Alternate 3.1A (Spring)	1,330	810	1,230

6.2 Analysis Methodology

The access roadway requirements were determined through methodologies and capacities defined in ACRP's *Report 40*. Roadway capacities included in this publication are tailored for airport terminal access/egress roadways and typical user mix.

Roadway capacity for a given roadway segment considers number of lanes and free-flow speed. The resulting LOS is a function of volume-to-capacity ratio and free-flow speed. As described in Section 4.10, LOS C was used as the target LOS threshold to identify access/egress roadway requirements, i.e., number of lanes required to serve the projected vehicular demand.

Both the Terminal 1 and Terminal 2 roadway systems are complex, with a variety of merges, diverges, and weave sections. Therefore, this macroscopic roadway capacity analysis focused on the primary entries into and out of the Terminal 1 and Terminal 2 curbfronts.

6.3 Terminal Access Roadway LOS Analysis

The Terminal 1 and Terminal 2 access roadway lane requirements are based on achieving LOS C at 25 MPH with existing and projected demands. While the posted speed limit is 15 MPH, ACRP does not provide alternate capacities for speeds slower than 25 MPH. Further justifying the use of 25 MPH capacities, motorists were often observed driving faster than the 15 MPH posted speed limit along the approach roadways.

Due to existing roadway infrastructure constraints, this requirements assessment was conducted by performing a roadway LOS analysis with the existing roadway geometry/laneage. For roadways showing LOS D, this may be considered acceptable by MAC, as LOS D is considered acceptable by ACRP for existing facilities. For roadways showing LOS E, planning-level provisions should be provided for future roadway capacity improvement projects. The access roadway LOS analysis is summarized in the table below.

Table 11 – Terminal 1 and Terminal 2 Access Roadway LOS

	Terminal 1 Departures	Terminal 1 Arrivals	Terminal 2 Arrivals/Departures
	2 Lanes	2 Lanes	3 Lanes
2019	D	C	B
PAL 1 No POV Growth	D	C	B
PAL 1 High POV Growth	D	C	B
PAL 3 Alternate 2 (Summer)	E	C	B
PAL 3 Alternate 2 (Spring)	E	C	C
PAL 3 Alternate 3.1A (Summer)	D	C	C
PAL 3 Alternate 3.1A (Spring)	D	C	C

7 CONCLUSION

The anticipated curbfront and access/egress roadway requirements for MSP Terminal 1 and Terminal 2 detailed in this technical memorandum are being referenced to support the ongoing alternatives review and concept development process.

Attachments

- Attachment A – Flight Schedules
- Attachment B – QATAR Output Files
- *ALPS simulation videos may be available upon request*

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Attachment A

Flight Schedules

August 8th, 2019

Equip	Mkt Al	Flight	Stops	Orig	Dep Term	Hub Term	Dep Time	Hub Time	Arr Time	Hub Term	Arr Term	Dest	Stops	Mkt Al	Flight	Equip	Seats
738	SY	396	0	SFO	I	2	1825	0003									
73W	WN	506	0	PHX	4	2	1910	0005									
E7W	UA	3531	0	EWR	C	1	2159	0005									
739	DL	1593	0	SFO	1	1	1835	0006									
32B	NK	424	0	LAX	5	1	1840	0010									
73W	WN	6568	0	DEN		2	2125	0010									
738	AA	2692	0	CLT		1	2244	0022									
32A	NK	170	0	LAS	1	1	1922	0026									
E7W	UA	5722	0	SFO	3	1	2306	0500									
								0500	0631	1	3	ORD	0	AA	3781	E75	76
321	DL	326	0	LAX	3	1	2330	0503									
738	SY	476	0	ANC	S	2	2045	0504									
738	SY	290	0	SEA		2	2355	0506									
738	SY	430	0	LAX	5	2	2340	0510									
								0520	0847	1	S	ATL	0	DL	1991	757	199
								0530	0655	2		MDW	0	WN	5556	73W	143
								0530	0914	2	C	BOS	0	B6	2236	320	162
739	DL	1332	0	FAI		1	2130	0543									
								0545	0700	2	4	PHX	0	WN	1337	73W	143
757	DL	806	0	SFO	1	1	0015	0551									
321	DL	1450	0	LAS	1	1	0055	0557									
739	DL	2303	0	PDX		1	0050	0600									
739	DL	1601	0	ANC	S	1	2141	0600									
								0600	0705	1		DEN	0	UA	1864	320	150
								0600	0723	1	1	LAS	0	NK	169	32A	182
								0600	0734	1	3	ORD	0	AA	1510	738	160
								0600	0755	2	5	LAX	0	SY	421	738	183
								0600	0855	1	B	IAH	0	UA	6346	E7W	76
								0600	0939	1		PHL	0	AA	1812	E90	99
319	DL	1785	0	FSD		1	0505	0603									
								0603	1044	1		MIA	0	AA	4608	E75	76
739	DL	2440	0	SEA		1	0050	0604									
								0605	0741	1	1	ORD	0	UA	754	73G	126
717	DL	2896	0	FAR		1	0505	0606									
739	DL	1969	0	LAX	3	1	0030	0607									
CRJ	DL	4276	0	BJI		1	0505	0609									
CR7	DL	3719	0	RST		1	0513	0610									
E7W	DL	4767	0	GFK		1	0500	0615									
764	DL	576	0	HNL	2	1	1725	0615									
								0615	0955	1	C	EWR	0	UA	3520	E7W	76
CRJ	DL	4255	0	ABR		1	0500	0616									
717	DL	2674	0	BIS		1	0500	0620									
CRJ	DL	4720	0	DLH		1	0520	0620									
								0625	0750	2	2	STL	0	WN	49	73W	143
								0625	0905	1	EM	DTW	0	DL	1582	739	180
								0625	0950	1	S	ATL	0	DL	1122	739	180
								0625	1041	2		RSW	0	SY	383	73G	126
								0629	1007	1		CLT	0	AA	894	321	187
								0630	0730	2		DEN	0	WN	1673	73W	143
								0630	0825	1	5	LAX	0	NK	323	32B	228
								0630	0915	2		AUS	0	SY	627	738	183
								0630	0929	1	1	YYZ	0	AC	7732	E75	76
CR9	DL	4031	0	MOT		1	0500	0631									
								0640	1050	2		MCO	0	SY	339	738	183
								0645	0918	1		IND	0	DL	2332	319	132
								0645	1005	2		BWI	0	WN	2490	73W	143
								0650	0759	1	3	PHX	0	DL	1514	321	191
								0650	0817	1	1	STL	0	DL	3336	CR9	76
								0650	0822	1	2	ORD	0	DL	2424	321	191
								0650	0838	1		MDW	0	DL	3624	CR7	69
								0650	0927	1		DFW	0	AA	1395	738	160
								0650	0953	1	3	YYZ	0	DL	5463	CR9	76
								0650	1016	1	B	DCA	0	DL	1464	319	132
								0650	1023	1	D	PHL	0	DL	2115	717	110
								0650	1035	2	E	BOS	0	SY	251	738	183
								0650	1036	1	A	BOS	0	DL	808	320	157
								0650	1100	1		MCO	0	DL	606	757	199
								0655	0811	1	1	LAS	0	DL	2712	321	191
								0655	0821	1	B	MCI	0	DL	2656	717	110
								0655	0840	1		SEA	0	DL	2193	757	199
								0655	1030	1	2	RDU	0	DL	2675	320	157
								0655	1035	1	D	LGA	0	DL	1996	319	132
								0659	0804	1		DEN	0	DL	1175	739	180
								0659	0850	1	2	LAX	0	DL	485	739	180

								0700	0810	1		FSD	0	DL	4178	CRJ	50
								0700	0818	1		DEN	0	F9	461	320	180
								0700	0850	1	2	SLC	0	DL	327	757	199
								0700	0855	1		SEA	0	AS	1017	320	150
								0700	1045	2	B	EWR	0	SY	233	738	183
								0705	0838	1		BIS	0	DL	3793	CRJ	50
								0705	1039	1	C	DCA	0	AA	4594	E75	76
								0705	1100	1	B	EWR	0	DL	2498	221	109
								0706	1059	1	4	JFK	0	DL	2032	717	110
								0710	0920	2	I	SFO	0	SY	391	738	183
								0710	0956	1	E	DFW	0	DL	3639	E7W	70
								0710	1001	1	A	IAH	0	DL	1999	221	109
								0711	0940	1		GRR	0	DL	3321	CR9	76
								0712	0835	1		OMA	0	DL	3777	CR9	76
CR9	DL	5383	0	ATW		1	0600	0714									
								0715	0827	1		MKE	0	DL	1819	739	180
								0715	0923	1	1	SFO	0	DL	1938	757	199
								0715	0931	1	3	SFO	0	UA	5980	E7W	76
								0725	0834	1		FAR	0	DL	3669	CRJ	50
								0725	0850	2	B	MCI	0	WN	1410	73W	143
								0725	0901	1	4	PHX	0	AA	1040	738	160
								0725	1053	1	S	ATL	0	DL	1565	757	199
								0725	1100	2	D	PHL	0	SY	269	738	183
CR9	DL	3654	0	TVC		1	0700	0729									
								0730	0834	1		DEN	0	UA	697	739	179
								0730	0835	2		DEN	0	SY	657	738	183
								0730	1000	2	1	DAL	0	WN	1405	73H	175
321	DL	883	0	MKE		1	0620	0732									
								0740	0850	1		MSN	0	DL	5186	CR9	76
								0740	1030	2	A	SAT	0	SY	625	738	183
321	DL	850	0	GRR		1	0715	0741									
CR9	DL	4765	0	YYZ	3	1	0630	0742									
320	DL	1368	0	DCA	B	1	0605	0744									
CR9	DL	3527	0	GRB		1	0630	0744									
PL2	4B	821	0	TVF			0630	0745									
320	DL	2234	0	PIT		1	0630	0745									
CRJ	DL	3491	0	CWA		1	0635	0746									
320	DL	1112	0	MCI	B	1	0620	0747									
738	DL	2423	0	CMH		1	0640	0747									
717	DL	3001	0	CLT		1	0600	0748									
E7W	UA	5466	0	ORD	2	1	0625	0748									
CRJ	DL	4242	0	MQT		1	0708	0748									
739	DL	1301	0	BWI		1	0607	0749									
CR7	DL	3515	0	CID		1	0642	0749									
CR9	DL	5479	0	YUL		1	0600	0750									
319	DL	381	0	IND		1	0704	0750									
E7W	DL	3827	0	OMA		1	0630	0753									
CRJ	DL	3892	0	SBN		1	0700	0753									
CRJ	DL	3798	0	ISN		1	0607	0754									
CR7	DL	3598	0	MDW		1	0612	0754									
								0754	1045	1		CVG	0	DL	3411	CR9	76
73W	WN	2281	0	MCI	B	2	0640	0755									
319	DL	2829	0	YWG		1	0630	0756									
CRJ	DL	3329	0	MBS		1	0706	0757									
717	DL	2738	0	ALB		1	0613	0758									
E7W	DL	3702	0	SDF		1	0650	0758									
757	DL	1569	0	DTW	EM	1	0705	0758									
319	DL	570	0	PHL	D	1	0610	0759									
CRJ	DL	4277	0	RHI		1	0640	0759									
CRJ	DL	3661	0	LAN		1	0710	0759									
321	DL	809	0	BOS	A	1	0545	0800									
319	DL	2873	0	ROC		1	0645	0800									
757	DL	1386	0	MSN		1	0645	0800									
								0800	0950	2	1	SAN	0	SY	401	738	183
								0800	1055	1	B	IAH	0	UA	4335	E7W	70
717	DL	1434	0	BUF		1	0644	0801									
CR9	DL	3544	0	DLH		1	0650	0801									
CRJ	DL	4218	0	LSE		1	0700	0801									
CR9	DL	4746	0	RIC		1	0600	0802									
CR9	DL	3390	0	XNA		1	0605	0802									
CRJ	DL	4224	0	BRD		1	0700	0802									
321	DL	1919	0	LGA	D	1	0603	0804									
CRJ	DL	4794	0	PIA		1	0626	0805									
								0805	0925	2	3	LAS	0	SY	101	738	183
CRJ	DL	3834	0	AZO		1	0700	0806									
CR9	DL	3629	0	BIS		1	0632	0807									
739	DL	1989	0	FAR		1	0700	0807									
717	DL	446	0	MEM		1	0600	0808									

CR9	DL	5393	0	CVG		1	0700	0808									
E7W	DL	4047	0	CHS		1	0600	0809									
CRJ	DL	4259	0	HIB		1	0705	0809									
221	DL	2956	0	EWR	B	1	0619	0810									
CR9	DL	3905	0	STL	1	1	0631	0810									
CR9	DL	3623	0	DAY		1	0700	0810									
CRJ	DL	3912	0	FSD		1	0701	0810									
CRJ	DL	3889	0	FWA		1	0710	0812									
CRJ	DL	3712	0	LNK		1	0630	0813									
319	DL	1594	0	SYR		1	0650	0814									
CR9	DL	3440	0	LEX		1	0655	0814									
717	DL	2331	0	BNA		1	0600	0815									
CRJ	DL	4009	0	ICT		1	0620	0815									
CRJ	DL	4231	0	MLI		1	0642	0815									
CR9	DL	5247	0	TYS		1	0646	0815									
CR9	DL	5370	0	DSM		1	0655	0815									
717	DL	2497	0	CLE		1	0700	0815									
CRJ	DL	4222	0	CIU		1	0716	0815									
738	AA	998	0	ORD	3	1	0655	0816									
								0820	1053	1		DFW	0	AA	2299	738	160
								0825	0940			TVF	0	4B	822	PL2	8
								0830	1005	2		MDW	0	WN	2423	73W	143
								0843	1030	1	2	SLC	0	DL	2795	320	157
								0845	0947	1		GEG	0	DL	645	320	157
								0845	1031	1		MDW	0	DL	3622	CR7	69
								0845	1040	1	2	LAX	0	DL	1679	753	234
								0845	1041	1		YYC	0	DL	1275	319	132
								0845	1043	1		SEA	0	DL	2622	753	234
								0845	1047	1		BNA	0	DL	1269	717	110
								0845	1104	1		MEM	0	DL	5329	CR9	76
								0845	1107	1		TVC	0	DL	370	717	110
								0845	1147	1		CLE	0	DL	3883	CR9	70
								0845	1148	1		CMH	0	DL	3436	CR9	76
								0845	1209	1	S	ATL	0	DL	1815	320	157
E70	UA	3529	0	EWR	C	1	0645	0846									
717	DL	2328	0	RAP		1	0620	0849									
73W	WN	389	0	MDW		2	0720	0850									
								0850	1011	1		CID	0	DL	3734	CRJ	50
								0850	1016	1		BZN	0	DL	1041	321	191
								0850	1022	1	2	ORD	0	DL	2859	717	110
								0850	1023	1		YWG	0	DL	4559	E7W	76
								0850	1025	1	2	ORD	0	UA	5481	E7W	76
								0850	1025	1		BIS	0	DL	4839	CRJ	50
								0850	1055	1		TUL	0	DL	4713	CR9	76
								0850	1302	1		TPA	0	DL	1740	738	160
319	DL	2968	0	AUS		1	0605	0851									
E75	AA	4570	0	LGA	B	1	0650	0851									
739	DL	1440	0	SLC	2	1	0525	0854									
320	B6	835	0	BOS	C	2	0641	0855									
								0855	1054	1		XNA	0	DL	5482	CR9	76
								0855	1100	1		BOI	0	DL	935	738	160
								0855	1109	1		OKC	0	DL	3713	CR9	70
								0855	1205	1		PIT	0	DL	5151	CR9	76
								0855	1233	1		CLT	0	DL	677	717	110
								0855	1314	1		RSW	0	DL	1652	739	180
								0855	1333	1		MIA	0	DL	1936	319	132
								0856	1140	1	EM	DTW	0	DL	464	757	199
								0858	1238	1		BDL	0	DL	842	717	110
								0900	0953	1		RAP	0	DL	3688	CRJ	50
								0900	1015	1		DEN	0	DL	1708	739	180
								0900	1018	1		MKE	0	DL	2053	717	110
								0900	1036	1		LNK	0	DL	3726	CRJ	50
								0900	1142	1		SBN	0	DL	3599	CRJ	50
								0900	1244	1	D	LGA	0	DL	2096	319	132
CR9	DL	3681	0	IAH	A	1	0605	0901									
321	DL	1866	0	ATL	S	1	0725	0901									
717	DL	1639	0	SAT	A	1	0610	0902									
E7W	DL	4055	0	DFW	E	1	0625	0902									
								0902	1050	1		MOT	0	DL	3903	CRJ	50
739	DL	1716	0	DEN		1	0605	0903									
321	DL	1718	0	MSO		1	0530	0904									
320	DL	3010	0	FCA		1	0532	0904									
320	DL	1488	0	JFK	4	1	0657	0905									
								0905	1011	1		DLH	0	DL	3865	CR9	76
								0905	1022	1		FSD	0	DL	3945	CRJ	50
								0905	1028	1		OMA	0	DL	3967	E7W	70
								0905	1050	1	2	SAN	0	DL	3003	321	191
								0905	1051	1	1	STL	0	DL	4040	CR9	76

								0905	1136	1	E	DFW	0	DL	3046	221	109
								0905	1234	1		BWI	0	DL	1579	320	157
								0906	1025	1		DSM	0	DL	3867	E7W	70
320	F9	458	0	DEN		1	0605	0908									
								0910	1025	1	3	PHX	0	DL	1874	321	191
								0910	1032	1		GFK	0	DL	3540	CRJ	50
								0910	1036	1		BIL	0	DL	3534	CR9	76
								0910	1051	1	3	ORD	0	AA	998	738	160
								0910	1112	1		ICT	0	DL	3896	CRJ	50
								0910	1205	1	S	ANC	0	DL	2374	739	180
								0910	1215	1	A	SAT	0	DL	3592	CR9	76
								0910	1245	1		IAD	0	DL	3564	CR9	70
								0910	1325	1	2	MEX	0	DL	451	319	132
319	DL	1939	0	GTF		1	0600	0911									
E7W	DL	4483	0	HLN		1	0540	0913									
321	DL	1203	0	BZN		1	0600	0914									
CRJ	DL	3939	0	GFK		1	0750	0914									
CR7	DL	3563	0	OKC		1	0700	0915									
739	UA	1683	0	ORD	1	1	0745	0915									
								0915	1029	1		INL	0	DL	4221	CRJ	50
								0915	1038	1	1	LAS	0	DL	2610	321	191
								0915	1051	1		PDX	0	DL	1761	739	180
								0915	1220	1	A	IAH	0	DL	5398	CR9	76
								0915	1330	1		MCO	0	DL	3026	757	199
E7W	DL	4811	0	YXE		1	0600	0920									
717	DL	746	0	ORD	2	1	0745	0920									
CR9	DL	3488	0	DSM		1	0801	0920									
								0920	1031	1		FAR	0	DL	3703	CRJ	50
								0920	1205	1		AUS	0	DL	2397	319	132
738	DL	622	0	BOI		1	0535	0921									
738	DL	2065	0	BIL		1	0630	0925									
717	DL	820	0	DTW	EM	1	0830	0925									
								0925	1125	2		BNA	0	WN	698	73W	143
								0925	1143	1	1	SFO	0	DL	2789	739	180
								0927	1319	1	B	LGA	0	AA	4570	E75	76
								0930	1310	1	C	EWR	0	UA	3641	E70	70
319	AA	2041	0	CLT		1	0756	0939									
								0940	1327	2	C	BOS	0	B6	836	320	162
319	DL	1222	0	DCA	B	1	0800	0941									
E7W	DL	3971	0	IAD		1	0800	0942									
738	AA	1100	0	DFW		1	0719	0944									
717	DL	1132	0	CLT		1	0800	0945									
73W	WN	502	0	MDW		2	0815	0945									
319	DL	2119	0	LGA	D	1	0750	0949									
E75	AC	7731	0	YYZ	1	1	0845	0952									
								0953	1411	1		MCO	0	F9	458	320	186
73W	WN	1185	0	BNA		2	0750	0955									
								0955	1056	1		MSN	0	DL	1793	717	110
								0955	1121	1	B	MCI	0	DL	1318	320	157
								0955	1155	1		ISN	0	DL	4007	CRJ	50
								0955	1231	1		IND	0	DL	2286	717	110
								0955	1252	1		DAY	0	DL	3320	CRJ	50
								0955	1259	1	3	YYZ	0	DL	5031	CR9	76
								0955	1259	1		SDF	0	DL	3589	E7W	76
								0955	1323	1	S	ATL	0	DL	553	739	180
								0956	1140	1		MDW	0	DL	4729	CR7	69
752	DL	261	0	KEF		1	0830	1000									
								1000	1110	1		GRB	0	DL	3586	CR7	69
								1000	1112	1		FSD	0	DL	3952	CRJ	50
								1000	1256	1		CVG	0	DL	3375	CR9	76
								1000	1350	1	A	BOS	0	DL	1366	321	191
								1000	1358	1	B	EWR	0	DL	3775	CR9	76
								1001	1344	1	D	LGA	0	DL	1796	319	132
								1001	1435	1	2	FLL	0	DL	1769	739	180
CRJ	DL	3930	0	MOT		1	0830	1005									
								1005	1110	1		RHI	0	DL	4318	CRJ	50
								1005	1236	1		GRR	0	DL	3558	E7W	76
								1005	1359	1	4	JFK	0	DL	1310	717	110
319	DL	1465	0	BDL		1	0815	1009									
E7W	UA	6022	0	IAD		1	0830	1009									
73W	WN	2267	0	BWI		2	0825	1010									
								1010	1144	1	1	ORD	0	UA	1633	739	179
								1010	1355	1		RIC	0	DL	3797	E7W	70
320	F9	1739	0	CVG		1	0909	1011									
739	DL	880	0	BWI		1	0835	1012									
								1015	1148	1	2	ORD	0	DL	3034	717	110
								1015	1255	1		MSY	0	DL	1755	738	160
								[illegible]	1257	1	EM	DTW	0	DL	971	[illegible]	132

E90	AA	513	0	PHL		1	0820	1017									
CRJ	DL	4178	0	FSD		1	0900	1017									
321	DL	994	0	BOS	A	1	0810	1019									
								1019	1355	1		CLT	0	AA	2041	319	128
								1020	1130	2		DEN	0	WN	502	73W	143
738	DL	1536	0	ATL	S	1	0845	1024									
								1024	1139	1		ATW	0	DL	4119	E7W	76
757	DL	1486	0	MCO		1	0800	1025									
CNC	3E	2120	0	MCW		1	0935	1025									
								1025	1122	1		CWA	0	DL	5211	CRJ	50
CRJ	DL	3669	0	FAR		1	0915	1026									
								1028	1410	1		JAX	0	DL	974	319	132
CR9	DL	3580	0	EWR	B	1	0825	1029									
								1030	1210	2		MDW	0	WN	1185	73W	143
								1030	1407	1	D	PHL	0	DL	2080	717	110
E7W	DL	3909	0	DFW	E	1	0800	1032									
717	DL	1497	0	BNA		1	0820	1032									
CR9	DL	3777	0	OMA		1	0915	1034									
717	DL	2656	0	MCI	B	1	0910	1035									
CR9	DL	3837	0	CLE		1	0931	1035									
								1035	1334	1	1	YYZ	0	AC	7734	E75	76
E7W	DL	3628	0	IAH	A	1	0735	1036									
CR9	DL	5186	0	MSN		1	0925	1036									
								1036	1356	1	B	DCA	0	DL	1764	319	132
CR9	DL	5401	0	ORF		1	0840	1040									
CRJ	DL	3793	0	BIS		1	0910	1040									
CR9	DL	3336	0	STL	1	1	0910	1040									
739	DL	1819	0	MKE		1	0925	1040									
CRJ	DL	3804	0	RAP		1	0800	1041									
CR9	DL	5457	0	YYZ	3	1	0929	1042									
E7W	UA	4290	0	IAH	B	1	0750	1044									
739	DL	1629	0	DTW	EM	1	0955	1044									
CR9	DL	3321	0	GRR		1	1015	1044									
717	DL	595	0	RDU	2	1	0852	1045									
CR7	DL	4495	0	MDW		1	0910	1045									
CRJ	DL	4485	0	CID		1	0929	1045									
CR7	DL	6295	0	CMH		1	0943	1045									
CR9	DL	5052	0	CVG		1	0945	1045									
								1045	1215	2	2	STL	0	WN	2267	73W	143
								1045	1249	2		SBA	0	SY	415	73G	126
								1045	1340	1	B	IAH	0	UA	6342	E7W	76
738	UA	1437	0	DEN		1	0755	1046									
73W	WN	1398	0	DEN		2	0800	1050									
321	DL	2424	0	ORD	2	1	0920	1050									
319	DL	2332	0	IND		1	1003	1050									
								1050	1320	1		DFW	0	AA	1100	738	160
739	DL	2461	0	DEN		1	0800	1053									
E7W	UA	3423	0	EWR	C	1	0840	1053									
								1103	1443	1		PHL	0	AA	513	E90	99
								1105	1400	1		CVG	0	F9	1738	320	186
								1110	1205	1		MCW	0	3E	2121	CNC	8
319	AA	1955	0	MIA		1	0830	1113									
								1115	1208	1		RAP	0	DL	4797	CRJ	50
								1115	1235	1	1	LAS	0	DL	1535	321	191
								1115	1302	1	M	YVR	0	DL	1084	739	180
								1115	1303	1	2	SLC	0	DL	2978	320	157
								1115	1305	1	A	SMF	0	DL	1981	738	160
								1115	1319	1		ICT	0	DL	3704	CRJ	50
								1115	1403	1	E	DFW	0	DL	4046	E7W	76
								1115	1446	1	S	ATL	0	DL	1557	752	193
								1115	1452	1	2	HNL	0	DL	577	764	246
739	DL	2001	0	PDX		1	0600	1116									
								1116	1257	1		MOT	0	DL	5272	CR9	76
CR7	AA	4190	0	ORD	3	1	0950	1117									
32A	NK	346	0	IAH	A	1	0834	1118									
								1120	1218	1		DLH	0	DL	3968	CRJ	50
								1120	1239	1		DSM	0	DL	5225	CR9	76
								1120	1244	1		GFK	0	DL	3579	CRJ	50
								1120	1303	1	2	SAN	0	DL	1728	321	191
								1120	1319	1	A	SJC	0	DL	1791	319	132
								1124	1310	1		SEA	0	DL	1670	757	199
								1124	1410	1	EM	DTW	0	DL	2601	717	110
333	KL	655	0	AMS		1	0940	1125									
PL2	4B	823	0	TVF			1010	1125									
								1125	1222	1		RST	0	DL	3578	CRJ	50
								1125	1232	1		HIB	0	DL	4230	CRJ	50
								1125	1235	1		BJI	0	DL	4278	CRJ	50
								1125	1245	1		FAR	0	DL	6243	CR7	69

								1125	1246	1		OMA	0	DL	3848	CR7	69
								1125	1302	1		YWG	0	DL	4655	CR9	70
								1126	1345	1	I	HND	0	DL	121	77L	288
								1127	1308	1	2	ORD	0	UA	4310	E7W	70
								1130	1245	1	3	PHX	0	DL	1255	321	191
								1130	1255	1		ABR	0	DL	4244	CRJ	50
								1130	1300	1		BIL	0	DL	4077	CR9	76
								1130	1303	1		PSC	0	DL	3519	E7W	76
								1130	1305	2		MDW	0	WN	859	73W	143
								1130	1308	1		BIS	0	DL	3529	CRJ	50
								1130	1339	1		BNA	0	DL	1468	717	110
32A	NK	452	0	ATL	N	1	0953	1133									
753	DL	1352	0	SEA		1	0620	1134									
								1135	1326	1		SNA	0	DL	2089	319	132
								1135	1532	1	C	EWR	0	UA	3658	E7W	76
								1136	1331	1		YYC	0	DL	2347	319	132
								1137	1248	1		DEN	0	UA	1683	738	166
319	DL	2384	0	JAC		1	0830	1140									
								1142	1322	1		PDX	0	DL	1503	739	180
320	DL	2072	0	GEG		1	0700	1144									
321	DL	1537	0	PHX	3	1	0640	1145									
319	UA	1660	0	ORD	1	1	1010	1145									
								1145	1340	1	2	LAX	0	DL	1543	739	180
739	DL	2555	0	YVR	M	1	0620	1146									
								1147	1322	1	3	ORD	0	AA	4190	CR7	65
CR9	DL	4818	0	YEG		1	0805	1148									
								1150	1256	1		GEG	0	DL	1484	717	110
								1150	1331	1		ABQ	0	DL	1356	738	160
								1150	1350	1		MSO	0	DL	1775	321	191
								1150	1358	1		YEG	0	DL	4771	CR9	76
								1150	1450	1	A	IAH	0	DL	3371	CR9	76
								1151	1304	1		DEN	0	DL	1779	739	180
739	DL	1335	0	LAX	3	1	0615	1152									
E75	AA	4597	0	DCA	C	1	1006	1152									
								1153	1640	1		MIA	0	AA	1955	319	128
757	DL	1847	0	SFO	1	1	0610	1155									
321	DL	3054	0	SAN	2	1	0615	1155									
CR9	DL	3865	0	DLH		1	1050	1155									
319	DL	892	0	YYC		1	0825	1156									
320	DL	987	0	ATL	S	1	1028	1200									
738	DL	1745	0	SMF	A	1	0640	1202									
CRJ	DL	3945	0	FSD		1	1047	1202									
319	DL	1849	0	SJC	A	1	0625	1204									
E7W	DL	3984	0	PSC		1	0700	1204									
CRJ	DL	4268	0	IMT		1	1055	1206									
321	DL	1528	0	LAS	1	1	0700	1207									
CRJ	DL	4221	0	INL		1	1054	1208									
E7W	DL	3867	0	DSM		1	1100	1208									
73W	WN	2497	0	STL	2	2	1035	1210									
717	DL	2053	0	MKE		1	1057	1210									
CRJ	DL	3703	0	FAR		1	1102	1213									
739	DL	1854	0	PDX		1	0700	1214									
77L	DL	43	0	CDG	2E	1	1015	1214									
								1214	1416	1		BOI	0	DL	779	739	180
319	DL	2499	0	SLC	2	1	0848	1215									
CRJ	DL	4839	0	BIS		1	1050	1215									
CRJ	DL	3540	0	GFK		1	1057	1215									
E7W	DL	3799	0	OMA		1	1058	1215									
717	DL	370	0	TVC		1	1150	1215									
								1215	1500	1	N	DTW	0	NK	985	32A	182
738	SY	658	0	DEN		2	0930	1220									
E7W	DL	4718	0	YWG		1	1054	1220									
CR9	DL	3411	0	CVG		1	1120	1222									
								1224	1559	1	C	DCA	0	AA	4597	E75	76
CRJ	DL	3726	0	LNK		1	1101	1225									
								1225	1603	1		MYR	0	NK	931	32A	182
319	DL	860	0	SNA		1	0645	1227									
E70	UA	3467	0	IAH	B	1	0935	1227									
738	SY	422	0	LAX	5	2	0700	1230									
								1230	1421	1		FCA	0	DL	2548	319	132
								1230	1556	1		IAD	0	UA	2332	319	128
717	DL	2859	0	ORD	2	1	1101	1231									
CR7	DL	3622	0	MDW		1	1106	1233									
738	SY	390	0	SFO	I	2	0700	1235									
738	SY	292	0	PDX		2	0725	1235									
333	DL	161	0	AMS		1	1035	1235									
								1236	1625	1		RIC	0	DL	4781	CR9	76
77L	DL	120	0	HND	I	1	1525	1239									

								1240	1410	2		MDW	0	WN	2497	73W	143
319	DL	1496	0	LGA	D	1	1030	1241									
319	DL	1464	0	DCA	B	1	1104	1241									
717	DL	1793	0	MSN		1	1136	1241									
CRJ	DL	3599	0	SBN		1	1207	1241									
738	AA	2086	0	DFW		1	1019	1242									
								1245	1358	1		FSD	0	DL	3843	CRJ	50
								1245	1523	1		SBN	0	DL	3611	CRJ	50
								1245	1545	1		CLE	0	DL	5041	CR9	76
								1245	1545	1		DAY	0	DL	3879	CRJ	50
								1245	1613	1	B	DCA	0	DL	1589	320	157
								1245	1616	1	S	ATL	0	DL	1188	321	191
								1245	1621	1		BDL	0	DL	526	319	132
								1245	1627	1	D	PHL	0	DL	3434	CR9	76
								1245	1627	1		YUL	0	DL	5549	CR9	76
								1245	1652	1	B	EWR	0	DL	3933	CR9	76
CRJ	DL	3903	0	MOT		1	1117	1247									
								1250	1404	1		CID	0	DL	4135	CRJ	50
								1250	1443	1	2	LAX	0	DL	1947	739	180
								1250	1657	1		TPA	0	DL	1712	739	180
717	DL	2115	0	PHL	D	1	1102	1251									
								1253	1538	1	E	DFW	0	DL	3951	E7W	76
								1253	1618	1		BWI	0	DL	1299	321	191
								1253	1618	1		IAD	0	DL	511	717	110
CRJ	DL	4318	0	RHI		1	1135	1254									
								1254	1549	1		CMH	0	DL	1916	738	160
E75	AS	3374	0	PDX		1	0730	1255									
								1255	1504	1	1	SFO	0	DL	1411	757	199
								1255	1639	1	D	LGA	0	DL	1784	320	157
757	DL	1004	0	LAX	3	1	0730	1256									
CR7	DL	3586	0	GRB		1	1145	1257									
E7W	UA	3497	0	EWR	C	1	1100	1259									
CR9	DL	4040	0	STL	1	1	1126	1259									
								1259	1531	1		IND	0	DL	2691	319	132
								1259	1637	1	2	RDU	0	DL	708	717	110
CRJ	DL	3688	0	RAP		1	1018	1300									
								1300	1444	1	1	STL	0	DL	3656	E7W	76
								1300	1719	1		MCO	0	DL	801	753	234
								1301	1354	1		RAP	0	DL	3776	CRJ	50
								1301	1423	1		GFK	0	DL	3659	CRJ	50
								1302	1604	1		CVG	0	DL	5163	CR9	76
								1303	1419	1		FAR	0	DL	3862	CRJ	50
E7W	DL	3639	0	DFW	E	1	1030	1304									
								1304	1524	1		GRR	0	DL	1873	319	132
CNC	3E	2811	0	IWD		1	1145	1305									
								1305	1438	1		YXE	0	DL	4820	E7W	70
								1305	1700	1	A	BOS	0	DL	2549	321	191
								1310	1442	1	2	ORD	0	UA	3624	E70	70
717	DL	841	0	DTW	EM	1	1220	1312									
								1313	1457	1		MDW	0	DL	4122	CR7	69
								1314	1645	1		CLT	0	DL	2948	717	110
717	DL	3050	0	RDU	2	1	1125	1315									
								1317	1450	1	2	ORD	0	DL	2560	319	132
								1317	1548	1		TVC	0	DL	4001	CRJ	50
320	AA	2553	0	CLT		1	1140	1320									
								1322	1424	1		DLH	0	DL	4131	CRJ	50
753	DL	676	0	SEA		1	0800	1323									
CR9	DL	3436	0	CMH		1	1223	1324									
32A	NK	381	0	BWI		1	1150	1326									
								1326	1454	1	B	MCI	0	DL	775	319	132
								1326	1805	1		MIA	0	DL	1525	319	132
								1327	1558	1		DFW	0	AA	2086	738	160
319	DL	2149	0	LGA	D	1	1130	1329									
CRJ	DL	3952	0	FSD		1	1220	1329									
320	DL	1318	0	MCI	B	1	1206	1330									
CRJ	DL	5211	0	CWA		1	1225	1330									
								1330	1442	1		MKE	0	DL	1338	717	110
								1330	1509	1		BIS	0	DL	4828	CRJ	50
								1330	1633	1		PIT	0	DL	1933	739	180
								1330	1650	2		IAD	0	SY	235	738	183
321	DL	3052	0	SAN	2	1	0800	1332									
757	DL	3008	0	SFO	1	1	0800	1333									
CR9	DL	4713	0	TUL		1	1130	1334									
CRJ	DL	3896	0	ICT		1	1145	1334									
								1335	1505	2		STL	0	SY	275	738	183
								1335	1602	1		AZO	0	DL	3699	CRJ	50
								1335	1732	1	C	EWR	0	UA	3601	E7W	76
320	DL	869	0	SLC	2	1	1008	1337									

320	DL	2542	0	BOS	A	1	1130	1339									
739	DL	567	0	ATL	S	1	1206	1339									
E7W	DL	4119	0	ATW		1	1216	1339									
								1339	1449	1		GRB	0	DL	4041	E7W	70
								1340	1535	1		PDX	0	AS	3377	E75	76
E7W	DL	3558	0	GRR		1	1311	1343									
CRJ	DL	3578	0	RST		1	1247	1344									
73W	WN	3338	0	DEN		2	1040	1345									
738	SY	252	0	BOS	E	2	1135	1345									
221	DL	2498	0	EWR	B	1	1140	1345									
717	DL	1269	0	BNA		1	1140	1345									
								1345	1458	1		ATW	0	DL	3748	CR7	69
								1345	1545	2		BNA	0	SY	631	738	183
CR9	DL	3949	0	IAD		1	1205	1349									
CR7	DL	4729	0	MDW		1	1215	1349									
CR9	DL	3937	0	MEM		1	1139	1350									
717	DL	2282	0	JFK	4	1	1142	1350									
320	DL	1451	0	BWI		1	1213	1350									
CR9	DL	5151	0	PIT		1	1240	1350									
CRJ	DL	3968	0	DLH		1	1243	1350									
								1350	1733	2		PVD	0	SY	267	738	183
E75	AA	4188	0	ORD	3	1	1224	1353									
								1354	1513	1		OMA	0	DL	4140	E7W	70
CR9	DL	3713	0	OKC		1	1144	1355									
738	SY	270	0	PHL	D	2	1200	1355									
CR9	DL	5340	0	IAH	A	1	1104	1356									
32A	NK	250	0	MCO		1	1125	1356									
320	F9	2018	0	COS		1	1048	1357									
319	DL	2965	0	AUS		1	1117	1400									
738	SY	234	0	EWR	B	2	1145	1400									
								1400	1459	1		MSN	0	DL	377	717	110
								1400	1658	1		BUF	0	DL	2045	717	110
								1400	1701	1	A	SAT	0	DL	3582	CR9	76
717	DL	2286	0	IND		1	1311	1401									
319	AA	372	0	PHX	4	1	0852	1403									
CR9	DL	3608	0	SAT	A	1	1110	1403									
73G	SY	384	0	RSW		2	1135	1403									
CRJ	DL	4230	0	HIB		1	1259	1403									
								1404	1642	1	EM	DTW	0	DL	1683	717	110
738	SY	626	0	SAT	A	2	1120	1405									
CNC	3E	2222	0	FOD		1	1245	1405									
								1405	1745	1		CLT	0	AA	2553	320	150
321	DL	1514	0	PHX	3	1	0900	1408									
739	DL	1708	0	DEN		1	1113	1408									
CRJ	DL	4278	0	BJI		1	1302	1408									
739	UA	573	0	DEN		1	1116	1409									
738	SY	340	0	MCO		2	1145	1410									
321	DL	2605	0	LAS	1	1	0910	1413									
CRJ	DL	4007	0	ISN		1	1220	1413									
								1414	1715	1	A	IAH	0	DL	3603	CR9	76
								1414	1724	1	3	YYZ	0	DL	5462	CR9	76
717	DL	1052	0	CLT		1	1237	1417									
319	DL	1884	0	SNA		1	0845	1418									
739	DL	705	0	ANC	S	1	0600	1420									
739	DL	1623	0	LAX	3	1	0845	1420									
73W	WN	775	0	MDW		2	1250	1420									
								1420	1520	1		CWA	0	DL	5343	CRJ	50
								1420	1523	1		LSE	0	DL	4295	CRJ	50
								1420	1523	1		RHI	0	DL	4267	CRJ	50
								1420	1543	1		BZN	0	DL	639	320	157
								1420	1610	1	2	LAX	0	DL	696	757	199
								1420	1700	1		AUS	0	DL	2967	319	132
321	DL	1041	0	BZN		1	1114	1421									
CRJ	DL	3320	0	DAY		1	1320	1423									
								1423	1600	1	3	ORD	0	AA	4188	E75	76
738	DL	709	0	BOI		1	1044	1424									
757	DL	606	0	MCO		1	1158	1424									
								1425	1532	1		DEN	0	NK	381	32A	182
								1425	1547	1		BIL	0	DL	4106	E7W	76
								1425	1555	2		MDW	0	WN	3338	73W	143
								1425	1727	1		SDF	0	DL	3685	E7W	76
CR9	DL	3534	0	BIL		1	1120	1426									
CR9	DL	5225	0	DSM		1	1315	1427									
								1427	1831	1	4	JFK	0	DL	106	320	157
CRJ	DL	3579	0	GFK		1	1312	1429									
CR7	DL	6243	0	FAR		1	1320	1429									
								1430	1525	1		BRD	0	DL	4262	CRJ	50
								1430	1545			TVF	0	4B	824	PL2	8

								1430	1548	1	1	LAS	0	DL	1225	320	157
								1431	1546	1		DSM	0	DL	5347	CR9	76
								1431	1624	1		ICT	0	DL	3619	CRJ	50
E70	UA	3710	0	ORD	2	1	1255	1432									
								1433	1611	1		SEA	0	DL	1363	753	234
CRJ	DL	3770	0	CID		1	1319	1434									
221	DL	1197	0	DFW	E	1	1215	1435									
CRJ	DL	4244	0	ABR		1	1320	1435									
E7W	DL	3589	0	SDF		1	1329	1435									
319	DL	1512	0	DTW	EM	1	1349	1436									
								1437	1545	1		DEN	0	DL	2475	739	180
								1438	1529	1		RST	0	DL	4170	CRJ	50
								1438	1720	1	2	ICN	0	DL	171	77L	288
320	UA	1228	0	SFO	3	1	0855	1440									
320	DL	3018	0	GEG		1	0955	1440									
717	DL	1686	0	BDL		1	1243	1440									
CR7	DL	3848	0	OMA		1	1321	1440									
								1440	1652	1		OKC	0	DL	3925	CR9	70
								1440	1653	1		MEM	0	DL	5224	CR9	76
738	AA	2203	0	DFW		1	1220	1441									
								1441	1547	1	3	PHX	0	DL	1038	321	191
717	DL	1734	0	ORD	2	1	1310	1442									
CR9	DL	5460	0	YYZ	3	1	1334	1442									
								1442	1552	1		COS	0	F9	2019	320	180
								1442	1629	1	2	SLC	0	DL	829	757	199
								1443	1604	1	4	PHX	0	AA	372	319	128
32S	AS	1143	0	SAN	2	1	0850	1445									
								1445	1605	1		IWD	0	3E	2810	CNC	8
								1448	1633	1		MOT	0	DL	4023	CRJ	50
								1449	1907	1		MCO	0	NK	137	32A	182
333	DL	163	0	AMS		1	1250	1453									
E7W	UA	6128	0	IAH	B	1	1205	1454									
								1455	1550	2		DEN	0	WN	775	73W	143
								1455	1555	1		GEG	0	DL	796	320	157
								1455	1625	2	5	ORD	0	SY	261	738	183
319	DL	1319	0	YYC		1	1121	1457									
738	AA	122	0	ORD	3	1	1329	1459									
CR9	DL	5272	0	MOT		1	1332	1459									
								1500	0555	1		AMS	0	KL	656	333	292
								1500	1606	2		DEN	0	SY	651	738	183
								1502	1645	1		MDW	0	DL	3591	CR7	69
CRJ	DL	3529	0	BIS		1	1336	1505									
								1507	1647	1	1	ORD	0	UA	1126	739	179
								1509	1648	1		PDX	0	DL	2894	739	180
CR9	DL	4854	0	YWG		1	1342	1510									
								1510	1624	1		GRB	0	DL	5160	CR9	76
								1510	1650	1		BIS	0	DL	3535	CR9	70
								1510	1650	2		SEA	0	SY	285	738	183
								1510	1743	1		IND	0	DL	1889	319	132
								1510	1745	1	EM	DTW	0	DL	1476	319	132
								1510	1801	1		CLE	0	DL	2241	717	110
								1510	1809	1		DAY	0	DL	3420	CRJ	50
								1510	1812	1		CMH	0	DL	6258	CR7	69
								1510	1849	1	2	RDU	0	DL	2285	717	110
								1510	1901	1	A	BOS	0	DL	154	321	191
								1510	1906	1	B	EWR	0	DL	1074	221	109
CRJ	DL	4797	0	RAP		1	1233	1513									
CNC	3E	2122	0	MCW		1	1415	1515									
								1515	1628	1		IMT	0	DL	4236	CRJ	50
								1515	1647	1	1	STL	0	DL	2170	717	110
								1515	1719	1		ISN	0	DL	3524	CRJ	50
								1515	1720	2	I	SFO	0	SY	395	738	183
								1515	1821	1		PIT	0	DL	3732	CR9	76
								1515	1859	1	D	LGA	0	DL	968	321	191
								1515	1912	1	C	EWR	0	UA	3673	E70	70
								1519	1841	1	B	DCA	0	DL	952	321	191
								1520	1736	1	1	SFO	0	DL	1593	739	180
								1520	1858	1	D	PHL	0	DL	1120	738	160
								1521	1750	1		TVC	0	DL	4166	CR9	76
								1522	1634	1		ATW	0	DL	5508	CR9	76
								1522	1850	1	S	ATL	0	DL	1715	757	199
								1523	1719	1		BNA	0	DL	2403	717	110
738	SY	102	0	LAS	3	2	1025	1525									
								1525	1649	1		GFK	0	DL	3538	CRJ	50
								1525	1653	1		LNK	0	DL	3866	CRJ	50
								1525	1715	2	5	LAX	0	SY	425	738	183
								1525	1724	1		TUL	0	DL	3645	E7W	76
								1525	1754	1	E	DFW	0	DL	1443	221	109

								1525	1907	1		BDL	0	DL	793	717	110
								1526	1637	1		MKE	0	DL	3058	739	180
								1526	1638	1		FAR	0	DL	3835	CR7	69
								1526	1645	1		YWG	0	DL	2839	319	132
								1527	1800	1		DFW	0	AA	2203	738	160
CRJ	DL	3843	0	FSD		1	1423	1528									
								1530	1650	1		FOD	0	3E	2223	CNC	8
								1530	1650	2	3	LAS	0	SY	103	73G	126
								1530	1737	1	3	SFO	0	UA	1150	320	150
								1530	1750	1		GRR	0	DL	963	320	157
E90	AA	528	0	PHL		1	1345	1534									
CRJ	DL	3704	0	ICT		1	1344	1535									
								1535	1735	1	2	SAN	0	AS	1142	32S	119
								1539	1835	1		CVG	0	DL	5209	CR9	76
								1540	1659	1		OMA	0	DL	3941	CR9	76
								1540	1700	1		MLI	0	DL	4331	CRJ	50
								1543	1719	1	2	ORD	0	DL	669	319	132
								1545	1840	1	B	IAH	0	UA	6325	E7W	76
E75	AC	7733	0	YYZ	1	1	1440	1547									
CRJ	DL	3862	0	FAR		1	1444	1548									
								1549	1703	1		INL	0	DL	4228	CRJ	50
								1549	1717	1	B	MCI	0	DL	895	717	110
								1549	1733	1	3	ORD	0	AA	122	738	160
772	AF	694	0	CDG	2E	1	1345	1550									
								1550	1701	1		MSN	0	DL	4082	CR9	70
CRJ	DL	4131	0	DLH		1	1449	1552									
76W	DL	11	0	LHR	3	1	1255	1553									
73W	WN	4888	0	PHX	4	2	1050	1555									
320	AS	1836	0	SEA		1	1035	1600									
319	UA	905	0	ORD	1	1	1425	1600									
								1600	1700	1		MCW	0	3E	2123	CNC	8
739	DL	594	0	ATL	S	1	1421	1601									
								1603	1715	1		CID	0	DL	3845	CRJ	50
E75	AA	4593	0	DCA	C	1	1415	1604									
738	DL	1740	0	TPA		1	1347	1605									
								1605	0715	1	2E	CDG	0	DL	42	77L	288
757	DL	1938	0	SFO	1	1	1030	1609									
CRJ	DL	3659	0	GFK		1	1449	1609									
								1610	1717	1		FSD	0	DL	3513	CRJ	50
								1614	2002	1		PHL	0	AA	528	E90	99
320	B6	1735	0	BOS	C	2	1401	1617									
319	UA	2118	0	DEN		1	1325	1619									
								1624	1714	1		RAP	0	DL	4070	CRJ	50
73W	WN	1742	0	MDW		2	1455	1625									
CRJ	DL	3611	0	SBN		1	1548	1626									
321	DL	1874	0	PHX	3	1	1123	1627									
								1627	1728	1		DLH	0	DL	3690	CRJ	50
717	DL	1468	0	BNA		1	1420	1629									
								1630	1916	2	S	ANC	0	SY	475	738	183
								1630	1929	1	1	YYZ	0	AC	7736	E75	76
319	DL	1764	0	DCA	B	1	1455	1634									
								1634	2029	1	B	LGA	0	AA	4583	E75	76
								1635	1745	2		DEN	0	WN	4888	73W	143
319	DL	1873	0	GRR		1	1610	1636									
320	DL	1055	0	DTW	EM	1	1545	1638									
717	DL	1338	0	MKE		1	1522	1639									
717	DL	2080	0	PHL	D	1	1450	1641									
319	DL	855	0	LGA	D	1	1429	1642									
								1644	1734	1		RST	0	DL	4784	CRJ	50
753	DL	1632	0	SEA		1	1130	1645									
739	DL	1652	0	RSW		1	1412	1646									
753	DL	1358	0	LAX	3	1	1118	1649									
E7W	DL	4041	0	GRB		1	1532	1649									
CRJ	DL	4170	0	RST		1	1554	1649									
757	DL	1714	0	MCO		1	1424	1650									
319	DL	974	0	JAX		1	1451	1650									
								1650	1840	1		SEA	0	AS	1837	320	149
320	AA	621	0	CLT		1	1510	1651									
717	DL	377	0	MSN		1	1545	1651									
CR9	DL	4077	0	BIL		1	1345	1652									
CR7	DL	3748	0	ATW		1	1533	1654									
CR9	DL	3454	0	CVG		1	1551	1654									
CRJ	DL	4262	0	BRD		1	1557	1654									
CRJ	DL	4001	0	TVC		1	1621	1654									
757	EI	89	0	DUB	2	1	1410	1655									
CR9	DL	3775	0	EWR	B	1	1445	1655									
								1655	1837	1	1	ORD	0	UA	2238	319	128
								1655	2029	1	S	ATL	0	DL	3033	738	160

739	DL	1779	0	DEN		1	1402	1656									
319	DL	775	0	MCI	B	1	1534	1657									
321	DL	155	0	BOS	A	1	1448	1658									
319	DL	2691	0	IND		1	1614	1658									
E7W	DL	3656	0	STL	1	1	1524	1659									
CRJ	DL	5343	0	CWA		1	1551	1659									
CRJ	DL	4295	0	LSE		1	1554	1659									
739	DL	1449	0	SJC	A	1	1125	1701									
								1701	1810	1		DEN	0	UA	1114	319	128
221	DL	1223	0	IAH	A	1	1420	1702									
CRJ	DL	4267	0	RHI		1	1550	1702									
								1702	2051	2	C	BOS	0	B6	1736	320	162
739	DL	1761	0	PDX		1	1149	1703									
E7W	DL	4140	0	OMA		1	1545	1703									
CRJ	DL	3776	0	RAP		1	1421	1704									
CRJ	DL	4828	0	BIS		1	1534	1704									
32A	NK	191	0	DTW	N	1	1615	1704									
CRJ	DL	3699	0	AZO		1	1627	1704									
321	DL	1687	0	SAN	2	1	1124	1705									
738	DL	2444	0	SMF	A	1	1144	1705									
321	DL	1002	0	LAS	1	1	1155	1705									
319	DL	1936	0	MIA		1	1413	1705									
E7W	DL	4046	0	DFW	E	1	1433	1705									
E7W	DL	3554	0	RIC		1	1504	1705									
757	DL	2696	0	ATL	S	1	1521	1705									
319	DL	2560	0	ORD	2	1	1530	1705									
								1707	0820	1		AMS	0	DL	160	333	293
E7W	UA	6151	0	IAH	B	1	1420	1709									
E75	AA	4500	0	LGA	B	1	1500	1710									
								1710	2040	2		BWI	0	WN	1742	73W	143
CR7	DL	4122	0	MDW		1	1532	1712									
E70	UA	3424	0	EWR	C	1	1500	1713									
CRJ	DL	3879	0	DAY		1	1610	1714									
738	AA	2193	0	DFW		1	1454	1717									
CR9	DL	5041	0	CLE		1	1620	1723									
739	UA	1715	0	ORD	1	1	1555	1727									
PL2	4B	825	0	TVF			1615	1730									
320	DL	1380	0	SLC	2	1	1359	1731									
738	SY	276	0	STL		2	1605	1735									
								1735	1848	1		FAR	0	DL	3791	CRJ	50
								1735	1848	1		FSD	0	DL	3679	CRJ	50
								1735	1908	1	1	STL	0	DL	2364	320	157
								1735	1909	1	2	ORD	0	DL	2359	319	132
								1735	1915	1		MOT	0	DL	3607	CRJ	50
								1735	1924	1	2	SLC	0	DL	2819	319	132
								1735	2118	1		CLT	0	DL	614	717	110
								1736	2116	1		CLT	0	AA	621	320	150
								1737	1924	1		MDW	0	DL	3542	CR7	69
								1740	1856	1		DSM	0	DL	3423	CR9	76
								1740	1907	1	B	MCI	0	DL	1076	717	110
								1740	2112	1	B	DCA	0	DL	1187	319	132
								1740	2201	1		MCO	0	DL	2254	757	199
77L	DL	170	0	ICN	2	1	1940	1744									
								1744	1905	1		GFK	0	DL	3767	CRJ	50
								1744	1910	1		OMA	0	DL	4078	E7W	70
								1744	1934	1		SNA	0	DL	1782	319	132
								1744	2028	1		FAI	0	DL	1332	739	180
320	AA	2450	0	PHX	4	1	1240	1745									
								1745	1858	1		MKE	0	DL	1544	319	132
								1745	2037	1	S	ANC	0	DL	1601	739	180
								1745	2115	1		IAD	0	UA	6047	E7W	76
								1745	2134	1	D	LGA	0	DL	2296	321	191
								1745	2136	1	B	EWR	0	DL	1658	221	109
								1746	2127	1	C	DCA	0	AA	4642	E75	76
								1749	1940	1		HLN	0	DL	4458	E7W	76
								1749	1956	1		BNA	0	DL	2265	717	110
73W	WN	2134	0	STL	2	2	1615	1750									
								1750	1907	1		MSN	0	DL	4085	E7W	70
								1750	2002	1	1	SFO	0	DL	1505	757	199
								1750	2043	1	A	SAT	0	DL	649	717	110
								1750	2045	1	A	IAH	0	UA	3666	E70	70
								1750	2051	1	A	IAH	0	DL	3663	CR9	76
								1750	2138	1		RIC	0	DL	3989	CR9	76
								1753	2040	1	E	DFW	0	DL	3946	E7W	76
								1754	0755	1	3	LHR	0	DL	10	76W	226
								1754	1954	1	A	SJC	0	DL	1647	319	132
								1755	1949	1	A	SMF	0	DL	1858	738	160
								1755	1953	1	2	LAX	0	DL	1330	753	234

								1755	2200	1		CHS	0	DL	3962	E7W	70
								1756	1923	1		JAC	0	DL	2990	319	132
								1758	2012	1		OKC	0	DL	4651	CR7	69
								1759	2129	1		BWI	0	NK	106	32A	182
								1800	1856	1		RAP	0	DL	4068	CRJ	50
								1800	1944	1		SEA	0	DL	2253	753	234
								1801	1919	1		DEN	0	DL	1748	739	180
								1801	2203	1	A	BOS	0	DL	2062	321	191
								1802	1945	1		PDX	0	DL	725	739	180
								1802	2137	1		BWI	0	DL	1975	739	180
763	DE	2010	0	FRA	1	2	1520	1805									
73W	WN	5557	0	MDW		2	1645	1805									
75T	FI	657	0	KEF		2	1645	1805									
								1805	2116	1		LEX	0	DL	5249	CR9	76
								1805	2143	1	S	ATL	0	DL	375	757	199
								1806	1929	1	1	LAS	0	DL	1551	321	191
								1806	1952	1	2	SAN	0	DL	884	321	191
								1808	1933	1	4	PHX	0	AA	2496	738	160
								1810	1925			TVF	0	4B	826	PL2	8
738	DL	1356	0	ABQ		1	1445	1819									
73W	WN	994	0	DEN		2	1520	1820									
319	DL	1365	0	YYC		1	1445	1821									
								1821	2102	1	EM	DTW	0	DL	1669	320	157
E7W	DL	4819	0	YXE		1	1509	1822									
								1825	1950	2	4	PHX	0	WN	2134	73W	143
321	DL	1775	0	MSO		1	1500	1827									
757	DL	1624	0	ATL	S	1	1643	1829									
								1830	2009	1	1	ORD	0	UA	226	739	179
CR9	DL	4772	0	YEG		1	1445	1831									
738	AA	241	0	ORD	3	1	1705	1831									
739	DL	1769	0	FLL	2	1	1535	1833									
CR9	DL	3371	0	IAH	A	1	1544	1833									
319	DL	452	0	MEX	2	1	1415	1834									
CRJ	DL	4023	0	MOT		1	1700	1834									
CR7	DL	3835	0	FAR		1	1719	1834									
717	DL	1484	0	GEG		1	1351	1835									
73W	WN	1537	0	MCI	B	2	1715	1835									
739	UA	662	0	SFO	3	1	1252	1836									
738	DL	572	0	SMF	A	1	1314	1836									
717	DL	107	0	JFK	4	1	1559	1836									
CRJ	DL	3538	0	GFK		1	1716	1837									
E7W	DL	3519	0	PSC		1	1333	1839									
717	DL	861	0	CLT		1	1643	1839									
738	DL	647	0	CMH		1	1735	1839									
								1840	2050	2		BNA	0	WN	5557	73W	143
								1840	2114	1		DFW	0	AA	2406	320	150
321	DL	1535	0	LAS	1	1	1336	1843									
321	DL	2339	0	BOS	A	1	1625	1843									
E7W	DL	3951	0	DFW	E	1	1608	1844									
CRJ	DL	3619	0	ICT		1	1649	1844									
CR9	DL	5242	0	DSM		1	1722	1844									
CRJ	DL	4228	0	INL		1	1729	1844									
739	DL	1933	0	PIT		1	1731	1844									
								1845	0815	1	2	DUB	0	EI	88	757	177
321	DL	1255	0	PHX	3	1	1345	1847									
739	DL	1347	0	LAX	3	1	1310	1848									
319	DL	2840	0	YWG		1	1725	1848									
739	DL	1344	0	SFO	1	1	1304	1849									
320	DL	1589	0	DCA	B	1	1700	1849									
CRJ	DL	4331	0	MLI		1	1725	1849									
CR9	DL	4082	0	MSN		1	1740	1849									
757	DL	859	0	DTW	EM	1	1758	1849									
738	SY	632	0	BNA		2	1645	1850									
739	DL	779	0	BOI		1	1514	1854									
320	F9	463	0	MCO		1	1624	1854									
717	DL	511	0	IAD		1	1657	1854									
717	DL	2474	0	RDU	2	1	1704	1854									
CRJ	DL	3866	0	LNK		1	1722	1854									
CR9	DL	3452	0	ATW		1	1722	1854									
717	DL	2566	0	MCI	B	1	1724	1854									
CR9	DL	3373	0	GRB		1	1731	1854									
717	DL	2045	0	BUF		1	1738	1854									
CRJ	DL	3299	0	DAY		1	1749	1854									
738	SY	262	0	ORD	5	2	1725	1855									
								1855	2020	2		MDW	0	WN	994	73W	143
320	DL	927	0	LGA	D	1	1640	1856									
319	DL	526	0	BDL		1	1702	1858									
738	DL	1898	0	MSY		1	1609	1859									

CR9	DL	3535	0	BIS		1	1725	1859									
739	DL	3058	0	MKE		1	1735	1859									
CRJ	DL	3845	0	CID		1	1740	1859									
CRJ	DL	3513	0	FSD		1	1745	1859									
319	DL	1689	0	IND		1	1814	1859									
32S	AS	1156	0	SEA		1	1335	1900									
319	DL	2548	0	FCA		1	1529	1900									
32A	NK	932	0	MYR		1	1658	1900									
CR9	DL	4781	0	RIC		1	1700	1900									
333	DL	165	0	AMS		1	1700	1900									
CR9	DL	5478	0	YUL		1	1704	1900									
321	DL	1299	0	BWI		1	1716	1900									
CR7	DL	3591	0	MDW		1	1720	1900									
CRJ	DL	3690	0	DLH		1	1753	1900									
CR9	DL	4166	0	TVC		1	1825	1900									
CR9	DL	3469	0	XNA		1	1706	1903									
CR9	DL	3434	0	PHL	D	1	1708	1905									
320	DL	963	0	GRR		1	1835	1905									
CRJ	DL	4784	0	RST		1	1805	1906									
717	DL	548	0	CLE		1	1800	1907									
E7W	DL	3685	0	SDF		1	1757	1908									
717	DL	2170	0	STL	1	1	1728	1909									
73W	WN	36	0	DAL	1	2	1645	1910									
CR9	DL	3941	0	OMA		1	1734	1910									
								1910	2040	2	2	STL	0	WN	1537	73W	143
738	AA	1578	0	DFW		1	1647	1912									
E70	UA	3521	0	EWR	C	1	1659	1912									
73G	SY	416	0	SBA		2	1340	1915									
								1920	0630	2		KEF	0	FI	656	75T	216
								1922	2255	1	S	ATL	0	DL	1046	738	160
32A	NK	382	0	DEN		1	1626	1924									
E7W	UA	4315	0	ORD	2	1	1750	1924									
CR9	DL	5459	0	YYZ	3	1	1759	1924									
								1924	2103	1	3	ORD	0	AA	241	738	160
								1930	2042	1		DSM	0	DL	3465	CR9	76
								1930	2042	1		FSD	0	DL	3947	CRJ	50
								1930	2113	1		MOT	0	DL	3915	CRJ	50
								1930	2132	1		MEM	0	DL	2705	717	110
								1930	2206	1		SBN	0	DL	4684	CRJ	50
								1930	2207	1		AUS	0	DL	2970	319	132
739	DL	1677	0	YVR	M	1	1400	1932									
319	DL	669	0	ORD	2	1	1759	1933									
757	DL	2462	0	SEA		1	1411	1934									
739	DL	1503	0	PDX		1	1420	1934									
								1935	1050	1		AMS	0	DL	162	333	293
								1935	2100	1		LNK	0	DL	3706	CRJ	50
								1935	2107	1		YXE	0	DL	4810	E7W	70
								1935	2124	1		YYC	0	DL	2278	319	132
								1935	2138	1	3	SFO	0	UA	1138	739	179
319	DL	1791	0	SJC	A	1	1400	1937									
CRJ	DL	3524	0	ISN		1	1745	1938									
739	DL	1934	0	ATL	S	1	1755	1938									
								1938	2130	1	2	LAX	0	DL	1431	739	180
319	DL	2089	0	SNA		1	1410	1939									
E7W	DL	4106	0	BIL		1	1630	1939									
CR9	DL	3925	0	OKC		1	1730	1939									
								1939	2059	1		DEN	0	F9	463	320	186
CR9	DL	5224	0	MEM		1	1729	1940									
738	SY	236	0	IAD		2	1755	1940									
								1940	2036	1		DLH	0	DL	3617	CR9	76
								1940	2038	1		GEG	0	DL	1841	320	157
								1940	2119	1		BIS	0	DL	4148	CR9	70
								1940	2216	1	E	DFW	0	DL	3936	E7W	76
321	DL	1728	0	SAN	2	1	1401	1942									
CRJ	DL	3691	0	RAP		1	1700	1944									
320	DL	639	0	BZN		1	1628	1945									
739	DL	2475	0	DEN		1	1643	1945									
CR9	DL	3933	0	EWR	B	1	1727	1945									
E7W	DL	3823	0	TUL		1	1735	1945									
738	DL	1964	0	CVG		1	1840	1945									
								1945	2055	2		DEN	0	WN	36	73W	143
								1945	2102	1	3	PHX	0	DL	1239	321	191
								1945	2113	1		GTF	0	DL	1928	319	132
								1945	2144	1		XNA	0	DL	5245	CR9	76
								1946	2138	1	A	SMF	0	DL	2662	738	160
								1946	2139	1		MSO	0	DL	929	321	191
319	UA	2274	0	IAD		1	1750	1948									
								1949	2120	1		PSC	0	DL	3970	E7W	76

								1949	2144	1		ICT	0	DL	4027	CRJ	50
738	SY	652	0	DEN		2	1700	1950									
								1950	2138	1	M	YVR	0	DL	2482	739	180
								1950	2150	1		FCA	0	DL	3024	320	157
								1950	2154	1	A	SJC	0	DL	2194	739	180
								1950	2158	1		YEG	0	DL	4817	CR9	76
								1950	2250	1	A	IAH	0	DL	3618	E7W	76
								1954	2115	1	1	LAS	0	DL	1710	321	191
								1954	2149	1		SNA	0	DL	2671	319	132
								1955	1110	1	2E	CDG	0	AF	673	772	316
								1955	2145	1	2	SLC	0	DL	2407	739	180
								1955	2147	1		SEA	0	DL	2642	739	180
								1955	2150	1		SEA	0	AS	1037	32S	119
								1955	2155	1		BOI	0	DL	2492	738	160
								1955	2213	1	1	SFO	0	DL	2027	757	199
								1958	2145	1	2	SAN	0	DL	596	321	191
								1959	2126	1		BZN	0	DL	1597	321	191
73G	SY	104	0	LAS	3	2	1500	2000									
73W	WN	1732	0	BNA		2	1800	2000									
								2000	2112	1		DEN	0	DL	2759	739	180
								2000	2345	1	C	EWR	0	UA	3538	E70	70
								2004	2344	1	D	LGA	0	DL	1596	319	132
73H	WN	5466	0	MDW		2	1830	2005									
								2005	2257	1	A	IAH	0	NK	281	32A	182
738	SY	628	0	AUS		2	1730	2009									
717	DL	2403	0	BNA		1	1758	2009									
CR9	DL	3732	0	PIT		1	1856	2012									
								2015	0011	1	B	EWR	0	DL	3595	CR9	76
								2015	0012	1	4	JFK	0	DL	2214	717	110
								2015	2115	1		CWA	0	DL	3433	CRJ	50
								2015	2252	1		MBS	0	DL	5178	CRJ	50
								2015	2344	1	B	DCA	0	DL	1776	320	157
								2015	2346	1		CLT	0	DL	3459	CR9	76
								2015	2351	1		BDL	0	DL	1660	319	132
								2015	2352	1		YUL	0	DL	5503	CR9	76
739	DL	1712	0	TPA		1	1755	2017									
								2020	0014	1		ORF	0	DL	3282	CR9	76
								2020	2257	1		IND	0	DL	2460	319	132
								2020	2306	1		FWA	0	DL	4768	CRJ	50
								2020	2338	1		TYS	0	DL	5485	CR9	76
								2020	2351	1		ALB	0	DL	2842	717	110
								2020	2353	1	N	ATL	0	NK	429	32A	182
								2020	2355	1		IAD	0	DL	4803	E7W	76
								2020	2359	1	2	RDU	0	DL	1852	717	110
								2021	2350	1	D	PHL	0	DL	2961	319	132
CRJ	DL	3791	0	FAR		1	1915	2022									
CRJ	DL	3679	0	FSD		1	1915	2025									
								2025	1215	2	1	FRA	0	DE	2011	763	257
								2025	2125	1		LSE	0	DL	4296	CRJ	50
								2025	2328	1		BUF	0	DL	394	717	110
								2025	2330	1		SDF	0	DL	3692	E7W	76
								2026	2330	1		ROC	0	DL	632	319	132
								2026	2341	1		SYR	0	DL	2166	319	132
								2029	2128	1		HIB	0	DL	4257	CRJ	50
								2029	2333	1		PIT	0	DL	2327	717	110
								2030	2134	1		FAR	0	DL	930	717	110
								2030	2145	1		CID	0	DL	3509	CR7	69
								2030	2157	1	1	ORD	0	UA	658	319	128
								2030	2216	1		MDW	0	DL	3522	CR7	69
								2030	2304	1		TVC	0	DL	4024	CR9	70
								2030	2343	1	3	YYZ	0	DL	4482	CR9	76
								2030	2359	1		BWI	0	DL	1101	739	180
32B	NK	742	0	DFW	E	1	1805	2032									
								2032	2214	1		PDX	0	DL	1995	739	180
321	AA	2408	0	PHX	4	1	1531	2035									
								2035	2152	1		ATW	0	DL	4151	CR9	76
								2035	2200	2		MDW	0	WN	301	73W	143
								2035	2214	1		PIA	0	DL	4799	CRJ	50
								2035	2259	1		MQT	0	DL	4215	CRJ	50
								2035	2318	1		CVG	0	DL	956	738	160
								2035	2330	1		CLE	0	DL	1405	717	110
								2035	2335	1		DAY	0	DL	3549	CR9	70
								2037	0013	1	S	ATL	0	DL	2333	739	180
								2040	0028	1	A	BOS	0	DL	665	321	191
								2040	2235	2	5	LAX	0	SY	429	738	183
								2040	2317	1		AZO	0	DL	3821	CRJ	50
								2040	2322	1		LAN	0	DL	4079	CRJ	50
								2040	2325	1	EM	DTW	0	DL	371	757	199

								2040	2336	1		CMH	0	DL	803	738	160
								2041	2205	1	B	MCI	0	DL	1377	320	157
752	DL	1618	0	ATL	S	1	1904	2045									
								2045	2205	1		MLI	0	DL	4319	CRJ	50
								2045	2244	1		ISN	0	DL	3805	CRJ	50
								2045	2248	2	I	SFO	0	SY	397	738	183
								2045	2324	1		CIU	0	DL	4212	CRJ	50
CR9	DL	3423	0	DSM		1	1935	2049									
								2050	2210	2	B	MCI	0	WN	5206	73H	175
								2052	2235	1	1	STL	0	DL	3814	CR9	76
753	DL	801	0	MCO		1	1827	2053									
								2053	2256	1		BNA	0	DL	2459	717	110
319	DL	1876	0	MKE		1	1940	2055									
								2055	2223	1	2	ORD	0	DL	2037	717	110
								2055	2235	2		SEA	0	SY	289	738	183
E7W	DL	4085	0	MSN		1	1950	2058									
								2059	2254	2	B	SMF	0	SY	411	73G	126
								2059	2255	1	2	LAX	0	DL	2036	739	180
757	DL	2721	0	SEA		1	1542	2100									
321	DL	2790	0	BOS	A	1	1841	2101									
757	DL	2121	0	SLC	2	1	1735	2103									
E7W	UA	6269	0	IAH	B	1	1815	2104									
319	DL	1611	0	DTW	EM	1	2015	2105									
E7W	DL	4078	0	OMA		1	1950	2107									
								2110	2356	2	S	ANC	0	SY	473	73G	126
739	DL	1005	0	LAX	3	1	1543	2111									
221	DL	1443	0	DFW	E	1	1850	2111									
739	DL	1089	0	DEN		1	1818	2112									
717	DL	1076	0	MCI	B	1	1947	2112									
								2115	2235	2	3	PHX	0	SY	609	738	183
CRJ	DL	3607	0	MOT		1	1945	2118									
320	DL	2208	0	RDU	2	1	1930	2121									
739	UA	220	0	ORD	1	1	1950	2122									
739	DL	2374	0	ANC	S	1	1303	2124									
319	DL	2359	0	ORD	2	1	1955	2124									
73H	WN	280	0	STL	2	2	1955	2125									
								2125	2300	2		PDX	0	SY	299	738	183
321	DL	952	0	DCA	B	1	1946	2127									
320	DL	2364	0	STL	1	1	1955	2127									
321	DL	2292	0	LGA	D	1	1920	2129									
320	DL	796	0	GEG		1	1650	2132									
CR7	DL	3542	0	MDW		1	1959	2133									
738	DL	1120	0	PHL	D	1	1943	2135									
CR9	DL	4006	0	SAT	A	1	1845	2137									
319	DL	653	0	AUS		1	1856	2137									
								2138	2359	1	E	DFW	0	NK	749	32B	228
CR9	DL	3507	0	IAH	A	1	1846	2139									
757	DL	1411	0	SFO	1	1	1602	2140									
321	DL	941	0	SAN	2	1	1610	2142									
319	DL	1525	0	MIA		1	1847	2143									
717	DL	793	0	BDL		1	1950	2144									
E75	AC	7735	0	YYZ	1	1	2040	2147									
								2147	1300	1		AMS	0	DL	164	333	293
320	DL	1225	0	LAS	1	1	1646	2149									
717	DL	1207	0	JFK	4	1	1915	2150									
757	DL	993	0	ATL	S	1	2014	2152									
321	DL	1038	0	PHX	3	1	1648	2154									
739	DL	600	0	PDX		1	1646	2155									
221	DL	1074	0	EWR	B	1	1945	2155									
73W	WN	1668	0	BWI		2	2020	2200									
738	AA	2381	0	ORD	3	1	2042	2210									
								2215	0925	1		KEF	0	DL	260	752	193
73W	WN	6100	0	MDW		2	2050	2220									
								2225	0003	1		MOT	0	DL	3997	CR9	76
								2225	0032	1	1	SFO	0	DL	1117	757	199
								2225	0110	1	S	ANC	0	DL	2500	739	180
								2225	2313	1		RST	0	DL	3594	CR7	69
								2225	2331	1		DSM	0	DL	3310	CR9	76
								2225	2350	1		YWG	0	DL	2650	319	132
								2225	2359	1		PDX	0	DL	682	739	180
								2225	2359	1		SEA	0	DL	2302	739	180
								2226	2335	1		BIL	0	DL	2335	738	160
								2230	0046	1		GRR	0	DL	1833	321	191
								2230	2303	1		RAP	0	DL	2348	717	110
								2230	2330	1		BJI	0	DL	4266	CRJ	50
								2230	2342	1		ABR	0	DL	4264	CRJ	50
								2230	2350	1	1	LAS	0	DL	593	321	191
								2231	2356	1		BIS	0	DL	2038	[illegible]	110

								2234	2323	1		DLH	0	DL	4705	CRJ	50
73W	WN	1145	0	DEN		2	1950	2235									
								2235	2325	1		BRD	0	DL	4265	CRJ	50
								2235	2333	1		FSD	0	DL	2916	319	132
								2235	2333	1		RHI	0	DL	4279	CRJ	50
								2235	2339	1		FAR	0	DL	1872	739	180
								2235	2345	1		GRB	0	DL	3774	CR9	76
								2235	2351	1		OMA	0	DL	3605	E7W	70
								2235	2352	1		GFK	0	DL	4115	E7W	70
								2240	0032	1	2	LAX	0	DL	2321	321	191
E90	AA	2070	0	PHL		1	2050	2243									
								2245	2343	1		MSN	0	DL	783	757	199
								2247	0031	1	2	SAN	0	DL	2340	321	191
739	DL	1013	0	SEA		1	1730	2249									
753	DL	1371	0	LAX	3	1	1720	2252									
								2252	2359	1		MKE	0	DL	926	321	191
320	B6	2235	0	BOS	C	2	2041	2255									
757	DL	569	0	ATL	S	1	2122	2256									
738	SY	404	0	SAN	1	2	1730	2300									
738	SY	286	0	SEA		2	1750	2301									
739	UA	238	0	ORD	1	1	2130	2302									
321	DL	2051	0	LAS	1	1	1808	2310									
738	AA	2806	0	DFW		1	2054	2317									
320	AS	1012	0	SEA		1	1810	2330									
73W	WN	493	0	MDW		2	2215	2335									
320	UA	669	0	DEN		1	2045	2339									
E75	AA	4502	0	DCA	C	1	2200	2340									
738	SY	426	0	LAX	5	2	1810	2342									
E75	AA	4674	0	MIA		1	2059	2346									
E75	AA	3780	0	ORD	3	1	2220	2349									
757	DL	1695	0	SLC	2	1	2030	2359									
320	F9	460	0	DEN		1	2059	2359									
738	DL	1130	0	ATL	S	1	2228	2359									

PAL 1 Summer

	2	PAX															2	PAX												
INBOUND																OUTBOUND														
A_CODE	A_DAY	A_TYPE	A_MAIR	A_FLT#	A_MKT	A_D/I/F	A_TIME	A_LF	A_PAX	A_CX	A_OD	A_STS	A_EQP	A_GATE	G_TIME	D_CODE	D_DAY	D_TYPE	D_MAIR	D_FLT#	D_MKT	D_D/I/F	D_TIME	D_LF	D_PAX	D_CX	D_OD	D_STS	D_EQP	D_GATE
3E-2931	2	PAX	3E	1005	MCW	D	10:25	58%	5	-	5	8	CNC		0:45	3E-2932	2	PAX	3E	1006	MCW	D	11:10	54%	4	-	4	8	CNC	
3E-2933	2	PAX	3E	1003	IWD	D	13:05	99%	8	-	8	8	CNC		1:40	3E-2934	2	PAX	3E	1004	IWD	D	14:45	100%	8	-	8	8	CNC	
3E-2935	2	PAX	3E	1001	FOD	D	14:05	54%	4	-	4	8	CNC		1:25	3E-2936	2	PAX	3E	1002	FOD	D	15:30	80%	6	-	6	8	CNC	
3E-2937	2	PAX	3E	1007	MCW	D	15:15	58%	5	-	5	8	CNC		0:45	3E-2938	2	PAX	3E	1008	MCW	D	16:00	54%	4	-	4	8	CNC	
4B-2939	2	PAX	4B	1009	TVF	D	7:45	75%	6	0	6	8	PL2		0:40	4B-2940	2	PAX	4B	1010	TVF	D	8:25	78%	6	0	6	8	PL2	
4B-2941	2	PAX	4B	1011	TVF	D	12:21	75%	6	0	6	8	PL2		1:12	4B-2942	2	PAX	4B	1012	TVF	D	13:33	78%	6	0	6	8	PL2	
4B-2943	2	PAX	4B	1013	TVF	D	17:30	75%	6	0	6	8	PL2		0:40	4B-2944	2	PAX	4B	1014	TVF	D	18:10	78%	6	0	6	8	PL2	
AA-1035	2	PAX	AA	1051	ORD	D	8:29	91%	145	6	139	160	73H		0:48	AA-1036	2	PAX	AA	1054	ORD	D	9:17	86%	137	6	131	160	73H	
AA-1061	2	PAX	AA	1041	LGA	D	8:34	73%	55	1	54	76	E75		0:33	AA-1062	2	PAX	AA	1044	LGA	D	9:07	73%	56	1	55	76	E75	
AA-1037	2	PAX	AA	1029	DFW	D	9:46	97%	155	3	153	160	73H		1:04	AA-1038	2	PAX	AA	1034	DFW	D	10:50	96%	153	2	151	160	73H	
AA-1063	2	PAX	AA	1065	PHL	D	10:13	79%	60	1	59	76	E75		0:41	AA-1064	2	PAX	AA	1068	PHL	D	10:54	80%	61	1	60	76	E75	
AA-1039	2	PAX	AA	1015	CLT	D	11:07	87%	140	1	139	160	73H		0:47	AA-1040	2	PAX	AA	1020	CLT	D	11:54	84%	134	1	133	160	73H	
AA-1021	2	PAX	AA	1067	PHL	D	11:13	79%	119	2	117	150	320		0:40	AA-1022	2	PAX	AA	1070	PHL	D	11:53	80%	120	2	118	150	320	
AA-1065	2	PAX	AA	1047	MIA	D	11:28	90%	69	1	68	76	E75		0:32	AA-1066	2	PAX	AA	1050	MIA	D	12:00	90%	68	0	68	76	E75	
AA-1067	2	PAX	AA	1053	ORD	D	11:47	91%	69	3	66	76	E75		0:32	AA-1068	2	PAX	AA	1056	ORD	D	12:19	86%	65	3	62	76	E75	
AA-1069	2	PAX	AA	1023	DCA	D	11:55	87%	66	1	65	76	E75		0:35	AA-1070	2	PAX	AA	1026	DCA	D	12:30	86%	65	1	64	76	E75	
AA-1041	2	PAX	AA	1031	DFW	D	12:36	97%	155	3	153	160	73H		0:45	AA-1042	2	PAX	AA	1036	DFW	D	13:21	96%	153	2	151	160	73H	
AA-1043	2	PAX	AA	1055	ORD	D	13:37	91%	145	6	139	160	73H		0:46	AA-1044	2	PAX	AA	1058	ORD	D	14:23	86%	137	6	131	160	73H	
AA-1045	2	PAX	AA	1073	PHX	D	13:46	88%	140	3	138	160	73H		1:02	AA-1046	2	PAX	AA	1076	PHX	D	14:48	88%	141	4	137	160	73H	
AA-1051	2	PAX	AA	1033	DFW	D	14:39	97%	167	3	164	172	7M8		0:45	AA-1052	2	PAX	AA	1038	DFW	D	15:24	96%	164	2	162	172	7M8	
AA-1017	2	PAX	AA	1057	ORD	D	15:04	91%	99	4	95	109	221		0:45	AA-1018	2	PAX	AA	1060	ORD	D	15:49	86%	93	4	89	109	221	
AA-1071	2	PAX	AA	1069	PHL	D	15:22	79%	60	1	59	76	E75		0:43	AA-1072	2	PAX	AA	1072	PHL	D	16:05	80%	61	1	60	76	E75	
AA-1019	2	PAX	AA	1017	CLT	D	16:32	87%	112	1	111	128	319		0:58	AA-1020	2	PAX	AA	1022	CLT	D	17:30	84%	107	1	107	128	319	
AA-1073	2	PAX	AA	1059	ORD	D	16:45	91%	69	3	66	76	E75		0:35	AA-1074	2	PAX	AA	1046	LGA	D	17:20	73%	56	1	55	76	E75	
AA-1075	2	PAX	AA	1043	LGA	D	16:49	73%	55	1	54	76	E75		0:41	AA-1076	2	PAX	AA	1062	ORD	D	17:30	86%	65	3	62	76	E75	
AA-1023	2	PAX	AA	1035	DFW	D	17:07	97%	182	3	178	187	321		1:14	AA-1024	2	PAX	AA	1040	DFW	D	18:21	96%	179	2	176	187	321	
AA-1077	2	PAX	AA	1025	DCA	D	17:22	87%	66	1	65	76	E75		0:30	AA-1078	2	PAX	AA	1028	DCA	D	17:52	86%	65	1	64	76	E75	
AA-1047	2	PAX	AA	1075	PHX	D	17:27	88%	140	3	138	160	73H		0:45	AA-1048	2	PAX	AA	1078	PHX	D	18:12	88%	141	4	137	160	73H	
AA-1049	2	PAX	AA	1061	ORD	D	18:31	91%	145	6	139	160	73H		0:54	AA-1050	2	PAX	AA	1064	ORD	D	19:25	86%	137	6	131	160	73H	
AA-1025	2	PAX	AA	1037	DFW	D	19:00	97%	155	3	153	160	73H		TOW/RON	AA-1026	2	PAX	AA	1016	CLT	D	5:01	84%	134	1	133	160	73H	
AA-1027	2	PAX	AA	1039	DFW	D	20:59	97%	155	3	153	160	73H		TOW/RON	AA-1028	2	PAX	AA	1030	DFW	D	6:00	96%	153	2	151	160	73H	
AA-1055	2	PAX	AA	1063	ORD	D	22:08	91%	69	3	66	76	E75		TOW/RON	AA-1056	2	PAX	AA	1052	ORD	D	6:00	86%	65	3	62	76	E75	
AA-1029	2	PAX	AA	1019	CLT	D	22:12	87%	140	1	139	160	73H		TOW/RON	AA-1030	2	PAX	AA	1018	CLT	D	6:26	84%	134	1	133	160	73H	
AA-1057	2	PAX	AA	1045	LGA	D	22:14	73%	55	1	54	76	E75		TOW/RON	AA-1058	2	PAX	AA	1048	MIA	D	6:03	90%	68	0	68	76	E75	
AA-1015	2	PAX	AA	1071	PHL	D	22:27	79%	86	1	85	109	221		TOW/RON	AA-1016	2	PAX	AA	1066	PHL	D	6:09	80%	87	1	85	109	221	
AA-1059	2	PAX	AA	1049	MIA	D	23:25	90%	69	1	68	76	E75		TOW/RON	AA-1060	2	PAX	AA	1042	LGA	D	7:07	73%	56	1	55	76	E75	
AA-1053	2	PAX	AA	1027	DCA	D	23:44	87%	61	1	60	70	CR7		TOW/RON	AA-1054	2	PAX	AA	1024	DCA	D	6:59	86%	60	1	59	70	CR7	
AA-1031	2	PAX	AA	1077	PHX	D	23:54	88%	140	3	138	160	73H		TOW/RON	AA-1032	2	PAX	AA	1074	PHX	D	7:20	88%	141	4	137	160	73H	
AA-1033	2	PAX	AA	1021	CLT	D	23:56	87%	140	1	139	160	73H		TOW/RON	AA-1034	2	PAX	AA	1032	DFW	D	8:33	96%	153	2	151	160	73H	
AC-1081	2	PAX	AC	1079	YYZ	P	10:04	92%	70	7	63	76	E75		0:41	AC-1082	2	PAX	AC	1082	YYZ	P	10:45	93%	71	7	64	76	E75	
AC-1083	2	PAX	AC	1081	YYZ	P	15:54	92%	70	7	63	76	E75		0:41	AC-1084	2	PAX	AC	1084	YYZ	P	16:35	93%	71	7	64	76	E75	
AC-1079	2	PAX	AC	1083	YYZ	P	20:34	92%	70	7	63	76	E75		TOW/RON	AC-1080	2	PAX	AC	1080	YYZ	P	6:30	93%	71	7	64	76	E75	
AF-2945	2	PAX	AF	1085	CDG	I	15:57	96%	310	139	170	324	359		3:36	AF-2946	2	PAX	AF	1086	CDG	I	19:33	94%	304	137	167	324	359	
AS-1089	2	PAX	AS	1089	SAN	D	11:45	84%	64	-	64	76	E75		0:52	AS-1090	2	PAX	AS	1090	SAN	D	12:37	85%	64	-	64	76	E75	
AS-1087	2	PAX	AS	1091	SEA	D	13:43	90%	161	2	159	178	7M9		1:06	AS-1088	2	PAX	AS	1094	SEA	D	14:49	88%	157	2	156	178	7M9	
AS-1091	2	PAX	AS	1087	PDX	D	15:18	84%	64	2	62	76	E75		0:45	AS-1092	2	PAX	AS	1088	PDX	D	16:03	85%	64	2	63	76	E75	
AS-1093	2	PAX	AS	1093	SEA	D	18:37	90%	69	1	68	76	E75		1:12	AS-1094	2	PAX	AS	1096	SEA	D	19:49	88%	67	1	66	76	E75	
AS-1085	2	PAX	AS	1095	SEA	D	23:02	90%	143	1	142	159	7M8		TOW/RON	AS-1086	2	PAX	AS	1092	SEA	D	6:49	88%	140	1	139	159	7M8	
B6-1177	2	PAX	B6	1097	BOS	D	8:11	89%	134	1	133	150	320		1:26	B6-1178	2	PAX	B6	1100	BOS	D	9:37	91%	137	1	137	150	320	
B6-1179	2	PAX	B6	1099	BOS	D	16:27	89%	134	1	133	150	320		0:45	B6-1180	2	PAX	B6	1102	BOS	D	17:12	91%	137	1	137	150	320	
B6-1175	2	PAX	B6	1101	BOS	D	23:12	89%	134	1	133	150	320		TOW/RON	B6-1176	2	PAX	B6	1098	BOS	D	5:45	91%	137	1	137	150	320	
DE-1181	2	PAX	DE	1103	FRA	I	18:25	99%	288	1	287	291	788		2:05	DE-1182	2	PAX	DE	1104	FRA	I	20:30	100%	290	28	262	291	788	
DL-2133	2	PAX	DL	2133	ATL	D	0:11	94%	124	0	124	132	319		7:05	DL-2134	2	PAX	DL	2134	IND	D	7:16	78%	102	46	57	132	319	
DL-2515	2	PAX	DL	2515	LAX	D	5:15	97%	186	70	116	192	3N1		1:35	DL-2516	2	PAX	DL	2516	SLC	D	6:50	88%	168	45	123	192	3N1	
DL-2339	2	PAX	DL	2339	LAS	D	5:18	97%	174	77	97	180	739		1:32	DL-2340	2	PAX	DL	2340	BOS	D	6:50	97%	174	25	149	180	739	
DL-2277	2	PAX	DL	2277	SEA	D	5:33	98%	275	160	116	281	339		1:57	DL-2278	2	PAX	DL	2278	ATL	D	7:30	98%	276	53	223	281	339	
DL-2341	2	PAX	DL	2341	SFO	D	5:40	98%	176	61	115	180	739		1:10	DL-2342	2	PAX	DL	2342	LAS	D	6:50	93%	167	31	136	180	739	
DL-2517	2	PAX	DL	2517	SMF	D	5:43	79%	152	88	64	192	3N1		1:17	DL-2518	2	PAX	DL	2518	SFO	D	7:00	92%	176	36	140	192	3N1	
DL-2343	2	PAX	DL	2343	PHX	D	5:47	84%	152	55	97	180	739		1:08	DL-2344	2	PAX	DL	2344	LGA	D	6:55	96%	173	33	140	180	739	
DL-2245	2	PAX	DL	2245	PDX	D	6:00	99%	190	128	63	192	321		0:50	DL-2246	2	PAX	DL	2246	LAX	D	6:50	87%	167	26	141	192	321	
DL-2645	2	PAX	DL	2645	FSD	D	6:00	81%	62	45	17	76	CR9		0:55	DL-2646	2	PAX	DL	2646	GRR	D	6:55	53%	40	22	18	76	CR9	
DL-2005	2	PAX	DL	2005	FAR	D	6:08	73%	80	77	2	109	221		1:28	DL-2006	2	PAX	DL	2006	IAH	D	7:36	85%	92	28	64	109	221	
DL-2519	2	PAX	DL	2519	ANC	D	6:09	100%	192	150	42	192	3N1		1:54	DL-2520	2	PAX	DL	2520	DCA	D	8:03	91%	174	38	136	192	3N1	
DL-2647	2	PAX	DL	2647	TVC	D	6:09	80%	61	47	14	76	E7W		0:46	DL-2648	2	PAX	DL	2648	MDW	D	6:55	85%	65	13	52	76	E7W	
DL-2461	2	PAX	DL	2461	FAI	D	6:10	91%	182	145	37	199	757		1:49	DL-2462	2	PAX	DL	2462	SFO	D	8:00	92%	183	43	140	199	757	
DL-2247	2	PAX	DL	2247	LAX	D	6:12	99%	190	120	70	192	321		2:33	DL-2248	2	PAX	DL	2248	DTW	D	8:45	97%	187	68	119	192	321	
DL-2299	2	PAX	DL	2299	DLH	D	6:12	68%	75	59	16	109	221		2:32	DL-2300	2	PAX	DL	2300	BHM	D	8:45	85%	92	29	64	109	221	
DL-2649	2	PAX	DL	2649	BJI	D	6:13	78%	60	55	5	76	CR9		0:47	DL-2650	2	PAX	DL	2650	BIS	D	7:00	54%	41	21	19	76	CR9	
DL-2603	2	PAX	DL	2603	GFK	D	6:15	94%	65	52	13	69	CR7		0:45	DL-2604	2	PAX	DL	2604	DFW	D	7:00	85%	58	9	49	69	CR7	
DL-2651	2	PAX	DL	2651	ABR	D	6:19	73%	56	53	3	76	CR9		0:43	DL-2652	2	PAX	DL	2652	OMA	D	7:02	52%	39	23	16	76	CR9	
DL-2605	2	PAX	DL	2605	BIS	D	6:20	66%	46	36	10	69	CR7		1:30	DL-2606	2	PAX	DL	2606	FAR	D	7:50	64%	44	28	16	69	CR7	
DL-2831	2	PAX	DL	2831	MBS	D	6:25	80%	61	43	18	76	CR9		2:25	DL-2846	2	PAX	DL	2846	LNK	D	8:50	77%	59	39	20	76	CR9	
DL-2463	2	PAX	DL	2463	OGG	D	6:30	92%	182	128	55	199	757		2:04	DL-2464	2	PAX	DL	2464	SAN	D	8:34	92%	183	67	116	199	757	
DL-2067	2	PAX	DL	2067	GRB	D	6:31	73%	94	80	15	130	223		1:26	DL-2068	2	PAX	DL	2068	YYZ	P	7:57	66%	86	42	45	130	223	
DL-2601	2	PAX	DL	2601	HNL	D	6:38	97%	274	196	78	281	339		3:36	DL-2602	2	PAX	DL	2602	HNL	D	10:14	95%	267	162	105	281	339	
DL-2249	2	PAX	DL	2249	SYR	D	7:05	87%	166	111	55	192	321		1:40	DL-2250	2	PAX	DL	2250	GEG	D	8:45	86%	164	118	46	192	321	
DL-2653	2	PAX	DL	2653	OMA	D	7:14	78%	59	46	13	76	E7W		1:31	DL-2654	2	PAX	DL	2654	IAD	D	8:45	87%	66	33	33	76	E7W	
DL-2833	2	PAX	DL	2833	RST	D	7:15	72%	54	50	4	76	CR9		1:45	DL-2848	2	PAX	DL	2848	ICT	D	9:00	73%	56	34	22	76	CR9	
DL-2135	2	PAX	DL	2135	MSN	D	7:29	75%	99	86	13	132	319		1:20	DL-2136	2	PAX	DL	2136	PIT	D	8:50	84%	110	61	49	132	319	
DL-2069	2	PAX	DL	2069	ATW	D	7:36	63%	82	68	14	130	223		1:19	DL-2070	2	PAX	DL	2070	BNA	D	8:55	85%	110	27	83	130	223	
DL-2345	2	PAX	DL	2345	GRR	D	7:40	79%	143	110	33	180	739		1:15	DL-2346	2	PAX	DL	2346	MCI	D	8:55	67%	120	64	56	180	739	
DL-2347	2	PAX	DL	2347	DCA	D	7:48	93%	168	108	60	180	739		1:11	DL-2348	2	PAX	DL	2348	PHX	D	9:00	90%	162	37	124	180	739	
DL-2137	2	PAX	DL	2137	ORD	D	7:49	83%	109	46	63	132	319		1:06	DL-2138	2	PAX	DL	2138	RSW	D	8:55	84%	111	23	88	132	319	
DL-2203	2	PAX	DL	2203	YWG	P	7:50	100%	156	152	4	157	320		3:16	DL-2204	2	PAX	DL	2204	SJC	D	11:06	84%	131	63	69	157	320	
DL-2301	2	PAX	DL	2301	IAD	D	7:52	90%	98	55	43	109	221		0:53	DL-2302	2	PAX	DL	2302	BIS	D	8:45	71%	78	52	26	109	221	
DL-2655	2	PAX	DL	2655	YUL	P	7:52	96%	73	48	25	76	CR9		0:54	DL-2656	2	PAX	DL	2656	CLE	D	8:46	87%	66	27	40	76	CR9	
DL-2007	2	PAX	DL	2007	IND	D	7:54	89%	97	60	37	109	221		0:56	DL-2008	2	PAX	DL	2008	TVC	D	8:50	74%	81	60	21	109	221	
DL-2009	2	PAX	DL	2009	STL	D	7:54	81%	88	52	36	109	221		1:16	DL-2010	2	PAX	DL	2010	FSD	D	9:10	70%	76	38	38	109	221	
DL-2349	2	PAX	DL	2349	MKE	D	7:54	83%	150	108	42	180	739		1:16	DL-2350	2	PAX	DL	2350	MKE	D	9:10	63%	113	62	51	180	739	
DL-2657	2	PAX	DL	2657	MOT	D	7:54	72%	54	43	12	76	CR9		0:56	DL-2658	2	PAX	DL	2658	MEM	D	8:50	89%	67	38	30	76	CR9	
DL-2659	2	PAX	DL	2659	BIS	D	7:54	67%	51	41	10	76	E7W		0:56	DL-2660	2	PAX	DL	2660	MDW	D	8:50	93%	71	21	50	76	E7W	
DL-2607	2	PAX	DL	2607	ICT	D	7:56	75%	52	34	18	69	CR7		0:59	DL-2608	2	PAX	DL	2608	CID	D	8:55	68%	47	39	8	69	CR7	
DL-2351	2	PAX	DL	2351	LGA	D	7:58	89%	160	58	102	180	739		1:32	DL-2352	2	PAX	DL	2352	BWI	D	9:30	89%	159	49	110	180	739	
DL-2071	2	PAX	DL	2071	YYZ	P	7:59	81%	106	62	44	130	223		1:22	DL-2072	2	PAX	DL	2072	CVG	D	9:21	86%	112	47	65	130	223	
DL-2139	2	PAX	DL	2139	CLT	D	7:59	83%	110	58	52	132	319		1:01	DL-2140	2	PAX	DL	2140	MKE	D	9:00	82%	108	72	36	132	319	
DL-2141	2	PAX	DL	2141	PHL	D	7:59	93%	122	72	50	132	319		1:01	DL-2142	2	PAX	DL	2142	RAP	D	9:00	71%	93	66	27	132	319	
DL-2205	2	PAX	DL	2205	ALB	D	7:59	86%	135	90	45	157	320		3:25	DL-2206	2	PAX	DL	2206	ABQ	D	11:24	86%	135	58	77	157	320	
DL-2207	2	PAX	DL	2207	PIT	D	7:59	79%	124	81	43	157	320		3:46	DL-2208	2	PAX	DL	2208	SNA	D	11:45	95%	149	68	81	157	320	
DL-2521	2	PAX	DL	2521	RDU	D	7:59	84%	162	71	91	192	3N1		0:46	DL-2522	2	PAX	DL	2522	SLC	D	8:45	91%	175	85	91	192	3N1	
DL-2661	2	PAX	DL	2661	CIU	D	7:59	75%	57	46	11	76	CR9		0:56	DL-2662	2	PAX	DL	2662	BDL	D	8:55	90%	69	42	27	76	CR9	
DL-2663	2	PAX	DL	2663	LEX	D	7:59	72%	55	37	18	76	E7W		0:56	DL-2664	2	PAX	DL	2664	MOT	D	8:55	71%	54	36	18	76	CR9	
DL-2253	2	PAX	DL	2253	JFK	D	8:00	94%	181	56	126	192	321		1:10	DL-2254	2	PAX	DL	2254	SFO	D	9:10	94%	180	69	111	192	321	
DL-2073	2	PAX	DL	2073	EWR	D	8:00	79%	103	46	57	130	223		0:44	DL-2074	2	PAX	DL	2074	EWR	D	8:44	81%	105	29	76	130	223	
DL-2353	2	PAX	DL	2353	MCI	D	8:00	68%	123	80	42	180	739		2:00	DL-2354	2	PAX	DL	2354	PHX	D	10:00	91%	165	57	108	180	739	
DL-2837	2	PAX	DL	2837	LSE	D	8:02	84%	64	62	2	76	CR9		1:08	DL-2850	2	PAX	DL	2850	INL	D	9:10	80%	61	47	13	76	CR9	
DL-2251	2	PAX	DL	2251	DTW	D	8:03	97%	186	97	90	192	321		1:00	DL-2252	2	PAX	DL	2252	BZN	D	9:03	88%	170	130	40	192	321	
DL-2665	2	PAX	DL	2665	BRD	D	8:03	72%	54	52	2	76	CR9		1:02	DL-2666	2	PAX	DL	2666	FAR	D	9:05	69%	52	50	2	76	CR9	
DL-2011	2	PAX	DL	2011	BNA	D	8:04	88%	95	44	52	109	221		1:45	DL-2012	2	PAX	DL	2012	CVG	D	9:49	98%	107	55	52	109	221	
DL-2143	2	PAX	DL	2143	ROC	D	8:04	84%	110	76	34	132	319		1:46	DL-2144	2	PAX	DL	2144	IND	D	9:50	91%	120	65	55	132	319	
DL-2609	2	PAX	DL	2609	CVG	D	8:04	89%	62	33	29	69	CR7		1:11	DL-2610	2	PAX	DL	2610	YXE	I	9:15	55%	38	34	4	69	CR7	
DL-2013	2	PAX	DL	2013	CLE	D	8:05	83%	90	37	53	109	221		1:55	DL-2014	2	PAX	DL	2014	STL	D	10:00	90%	99	51	47	109	221	
DL-2523	2	PAX	DL	2523	BOS	D	8:06	97%	186	65	121	192	3N1		1:49	DL-2524	2	PAX	DL	2524	ATL	D	9:55	99%	191	84	107	192	3N1	
DL-2667	2	PAX	DL	2667	MDW	D	8:07	79%	60	21	39	76	E7W		1:03	DL-2668	2	PAX	DL	2668	IAH	D	9:10	92%	70	25	44	76	CR9	
DL-2845	2	PAX	DL	2845	HIB	D	8:08	61%	46	37	9	76	CR9		1:07	DL-2852	2	PAX	DL	2852	RHI	D	9:15	76%	58	48	9	76	CR9	
DL-2075	2	PAX	DL	2075	MEM	D	8:09	86%	112	71	41	130	223		0:45	DL-2076	2	PAX	DL	2076	BIL	D	8:54	74%	96	77	19	130	223	
DL-2355	2	PAX	DL	2355	BWI	D	8:09	93%	167	71	95	180	739		0:48	DL-2356	2	PAX	DL	2356	DEN	D	8:57	97%	174	63	111	180	739	
DL-2145	2	PAX	DL	2145	RIC	D	8:10	73%	97	47	50	132	319		1:50	DL-2146	2	PAX	DL	2146	MCI	D	10:00	83%	109	70	40	132	319	
DL-2669	2	PAX	DL	2669	MLI	D	8:10	72%	55	38	17	76	CR9		1:00	DL-2670	2	PAX	DL	2670	MSN	D	9:10	71%	54	46	8	76	CR9	
DL-2611	2	PAX	DL	2611	CWA	D	8:13	77%	53	47	6	69	CR7		1:37	DL-2612	2	PAX	DL	2612	DLH	D	9:50	70%	48	39	9	69	CR7	
DL-2671	2	PAX	DL	2671	LAN	D	8:15	77%	59	35	24	76	CR9		0:55	DL-2672	2	PAX	DL	2672	GFK	D	9:10	84%	64	41	22	76	E7W	
DL-2673	2	PAX	DL	2673	PIA	D	8:15	64%	49	36	13	76	CR9		1:14	DL-2674	2	PAX	DL	2674	DSM	D	9:29	78%	59	52	7	76	CR9	
DL-2847	2	PAX	DL	2847	DLH	D	8:15	77%	59	48	10	76	CR9		1:26	DL-2854	2	PAX	DL	2854	SBN	D	9:41	83%	63	36	27	76	CR9	
DL-2849	2	PAX	DL	2849	FWA	D	8:15	67%	51	33	18	76	CR9		1:26	DL-2856	2	PAX	DL	2856	XWA	D	9:41	51%	39	33	6	76	CR9	
DL-2675	2	PAX	DL	2675	DAY	D	8:16	71%	54	34	20	76	CR9		1:24	DL-2676	2	PAX	DL	2676	LSE	D	9:40	49%	37	36	1	76	CR9	
DL-2677	2	PAX	DL	2677	CHS	D	8:17	88%	67	34	33	76	CR9		1:24	DL-2678	2	PAX	DL	2678	SDF	D	9:41	82%	62	32	30	76	CR9	
DL-2255	2	PAX	DL	2255	SLC	D	8:20	93%	178	97	81	192	321		1:30	DL-2256	2	PAX	DL	2256	BOS	D	9:50	97%	187	48	139	192	321	
DL-2015	2	PAX	DL	2015	DSM	D	8:20	89%	97	88	9	109	221		1:01	DL-2016	2	PAX	DL	2016	FAR	D	9:22	82%	90	87	3	109	221	
DL-2323	2	PAX	DL	2323	MCO	D	8:26	95%	153	58	95	160	738		1:13	DL-2324	2	PAX	DL	2324	BOI	D	9:39	97%	155	91	64	160	738	
DL-2851	2	PAX	DL	2851	AZO	D	8:29	77%	58	38	20	76	CR9		1:20	DL-2858	2	PAX	DL	2858	LAN	D	9:49	84%	64	40	24	76	CR9	
DL-2853	2	PAX	DL	2853	XNA	D	8:29	77%	59	33	26	76	CR9		1:52	DL-2860	2	PAX	DL	2860	BIS	D	10:21	73%	56	38	17	76	CR9	
DL-2855	2	PAX	DL	2855	TUL	D	8:37	69%	52	34	18	76	CR9		1:44	DL-2862	2	PAX	DL	2862	BJI	D	10:21	81%	62	57	5	76	CR9	
DL-2683	2	PAX	DL	2683	DFW	D	8:45	100%	76	28	48	76	CR9		1:05	DL-2684	2	PAX	DL	2684	YYZ	P	9:50	89%	68	43	24	76	E7W	
DL-2357	2	PAX	DL	2357	DEN	D	8:57	96%	173	66	107	180	739		1:13	DL-2358	2	PAX	DL	2358	DTW	D	10:10	98%	176	78	98	180	739	
DL-2679	2	PAX	DL	2679	SAT	D	8:57	83%	63	24	39	76	CR9		0:47	DL-2680	2	PAX	DL	2680	YYC	P	9:44	90%	69	55	14	76	CR9	
DL-2525	2	PAX	DL	2525	BIL	D	8:58	68%	130	100	30	192	3N1		1:03	DL-2526	2	PAX	DL	2526	JFK	D	10:01	99%	189	53	137	192	3N1	
DL-2325	2	PAX	DL	2325	AUS	D	8:59	90%	144	48	97	160	738		1:01	DL-2326	2	PAX	DL	2326	MCO	D	10:00	94%	151	41	110	160	738	
DL-2359	2	PAX	DL	2359	DTW	D	9:00	97%	174	84	90	180	739		1:10	DL-2360	2	PAX	DL	2360	MCO	D	10:10	95%	170	53	117	180	739	
DL-2527	2	PAX	DL	2527	ATL	D	9:04	97%	187	76	110	192	3N1		2:11	DL-2528	2	PAX	DL	2528	LAX	D	11:15	90%	174	68	106	192	3N1	
DL-2681	2	PAX	DL	2681	DFW	D	9:05	80%	61	21	40	76	CR9		0:45	DL-2682	2	PAX	DL	2682	GRR	D	9:50	88%	67	50	17	76	E7W	
DL-2077	2	PAX	DL	2077	DSM	D	9:06	76%	99	87	11	130	223		1:51	DL-2078	2	PAX	DL	2078	CLT	D	10:57	90%	117	54	63	130	223	
DL-2859	2	PAX	DL	2859	LNK	D	9:09	78%	59	43	16	76	CR9		1:12	DL-2864	2	PAX	DL	2864	HIB	D	10:21	49%	37	29	8	76	CR9	
DL-2361	2	PAX	DL	2361	GTF	D	9:09	74%	133	111	22	180	739		2:18	DL-2362	2	PAX	DL	2362	DEN	D	11:27	97%	174	67	107	180	739	
DL-2861	2	PAX	DL	2861	RHI	D	9:09	83%	63	54	9	76	CR9		2:15	DL-2868	2	PAX	DL	2868	ABR	D	11:25	75%	57	54	3	76	CR9	
DL-2147	2	PAX	DL	2147	BUF	D	9:10	94%	124	82	42	132	319		0:50	DL-2148	2	PAX	DL	2148	MSY	D	10:00	77%	102	41	61	132	319	
DL-2079	2	PAX	DL	2079	OKC	D	9:15	83%	108	73	35	130	223		1:57	DL-2080	2	PAX	DL	2080	AUS	D	11:12	97%	126	46	79	130	223	
DL-2149	2	PAX	DL	2149	CMH	D	9:18	79%	104	62	42	132	319		1:28	DL-2150	2	PAX	DL	2150	PHL	D	10:47	100%	132	71	61	132	319	
DL-2465	2	PAX	DL	2465	BOS	D	9:30	96%	192	59	133	199	757		1:24	DL-2466	2	PAX	DL	2466	TPA	D	10:54	92%	184	44	140	199	757	
DL-2303	2	PAX	DL	2303	EWR	D	9:46	81%	89	39	50	109	221		0:59	DL-2304	2	PAX	DL	2304	DFW	D	10:45	93%	102	31	70	109	221	
DL-2475	2	PAX	DL	2475	DEN	D	9:55	96%	192	80	112	199	757		1:25	DL-2476	2	PAX	DL	2476	SLC	D	11:20	93%	184	101	84	199	757	
DL-2613	2	PAX	DL	2613	YXE	I	9:55	83%	57	52	6	69	CR7		0:39	DL-2614	2	PAX	DL	2614	ATW	D	10:35	78%	54	47	7	69	CR7	
DL-2279	2	PAX	DL	2279	KEF	I	9:58	97%	271	162	109	281	339		5:37	DL-2280	2	PAX	DL	2280	ATL	D	15:35	99%	279	114	165	281	339	
DL-2437	2	PAX	DL	2437	ATL	D	9:59	97%	233	96	137	240	753		1:10	DL-2438	2	PAX	DL	2438	LAX	D	11:09	91%	218	91	127	240	753	
DL-2701	2	PAX	DL	2701	HLN	D	10:00	83%	63	48	14	76	CR9		1:20	DL-2702	2	PAX	DL	2702	YXE	I	11:20	90%	68	61	7	76	E7W	
DL-2363	2	PAX	DL	2363	BOI	D	10:00	95%	172	136	35	180	739		1:48	DL-2364	2	PAX	DL	2364	FLL	D	11:48	89%	159	43	117	180	739	
DL-2081	2	PAX	DL	2081	DFW	D	10:02	85%	111	41	70	130	223		1:13	DL-2082	2	PAX	DL	2082	DFW	D	11:15	92%	120	40	80	130	223	
DL-2083	2	PAX	DL	2083	BNA	D	10:10	87%	113	[illegible]	67	130	223		1:15	DL-2084	2	PAX	DL	2084	BNA	D	11:25	84%	109	48	61	[illegible]	[illegible]	

DL-2305	2	PAX	DL	2305	RSW	D	10:12	88%	96	31	65	109	221	0:52	DL-2306	2	PAX	DL	2306	RDU	D	11:05	97%	106	40	66	109	221
DL-2529	2	PAX	DL	2529	SLC	D	10:15	88%	170	49	121	192	3N1	1:00	DL-2530	2	PAX	DL	2530	SEA	D	11:15	98%	188	110	78	192	3N1
DL-2467	2	PAX	DL	2467	BZN	D	10:15	95%	189	151	38	199	757	1:40	DL-2468	2	PAX	DL	2468	ATL	D	11:55	99%	197	74	123	199	757
DL-2535	2	PAX	DL	2535	BOS	D	10:17	97%	185	63	123	192	3N1	1:12	DL-2536	2	PAX	DL	2536	JAX	D	11:29	83%	160	58	102	192	3N1
DL-2537	2	PAX	DL	2537	MCO	D	10:26	95%	183	68	115	192	3N1	1:09	DL-2538	2	PAX	DL	2538	MSO	D	11:35	80%	154	123	31	192	3N1
DL-2085	2	PAX	DL	2085	YYC	P	10:27	94%	122	90	32	130	223	1:12	DL-2086	2	PAX	DL	2086	SAT	D	11:40	88%	114	43	71	130	223
DL-2703	2	PAX	DL	2703	BIS	D	10:29	72%	55	44	11	76	E7W	0:53	DL-2704	2	PAX	DL	2704	FAR	D	11:22	75%	57	55	2	76	CR9
DL-2539	2	PAX	DL	2539	SNA	D	10:31	91%	175	88	88	192	3N1	1:28	DL-2540	2	PAX	DL	2540	DCA	D	12:00	96%	184	112	73	192	3N1
DL-2087	2	PAX	DL	2087	YYZ	P	10:32	96%	125	83	42	130	223	1:38	DL-2088	2	PAX	DL	2088	YYC	P	12:10	89%	115	92	23	130	223
DL-2089	2	PAX	DL	2089	BIL	D	10:32	75%	98	77	21	130	223	2:09	DL-2090	2	PAX	DL	2090	STL	D	12:41	89%	115	63	52	130	223
DL-2091	2	PAX	DL	2091	FCA	D	10:35	90%	117	90	28	130	223	2:57	DL-2092	2	PAX	DL	2092	MCI	D	13:32	82%	107	71	36	130	223
DL-2469	2	PAX	DL	2469	BDL	D	10:35	90%	180	119	60	199	757	1:25	DL-2470	2	PAX	DL	2470	ANC	D	12:00	93%	185	142	43	199	757
DL-2471	2	PAX	DL	2471	MSO	D	10:35	84%	167	136	31	199	757	1:29	DL-2472	2	PAX	DL	2472	MIA	D	12:04	95%	189	72	117	199	757
DL-2365	2	PAX	DL	2365	MKE	D	10:37	96%	174	131	43	180	739	1:08	DL-2366	2	PAX	DL	2366	BDL	D	11:45	95%	170	113	58	180	739
DL-2209	2	PAX	DL	2209	ORD	D	10:38	91%	143	60	83	157	320	2:26	DL-2210	2	PAX	DL	2210	CLT	D	13:05	92%	144	74	70	157	320
DL-2367	2	PAX	DL	2367	LGA	D	10:39	96%	173	65	108	180	739	1:06	DL-2368	2	PAX	DL	2368	MKE	D	11:45	87%	157	112	45	180	739
DL-2705	2	PAX	DL	2705	GRR	D	10:39	100%	76	65	11	76	CR9	0:46	DL-2706	2	PAX	DL	2706	GFK	D	11:25	85%	64	44	20	76	E7W
DL-2615	2	PAX	DL	2615	FAR	D	10:40	100%	69	68	1	69	CR7	0:45	DL-2616	2	PAX	DL	2616	EWR	D	11:25	91%	63	24	38	69	CR7
DL-2617	2	PAX	DL	2617	RAP	D	10:41	89%	61	52	10	69	CR7	0:39	DL-2618	2	PAX	DL	2618	MOT	D	11:20	73%	50	35	16	69	CR7
DL-2151	2	PAX	DL	2151	RDU	D	10:42	93%	123	60	62	132	319	0:43	DL-2152	2	PAX	DL	2152	CMH	D	11:25	78%	104	59	44	132	319
DL-2619	2	PAX	DL	2619	CID	D	10:44	80%	55	48	7	69	CR7	0:36	DL-2620	2	PAX	DL	2620	YWG	P	11:20	95%	66	63	3	69	CR7
DL-2257	2	PAX	DL	2257	DTW	D	10:45	98%	188	113	75	192	321	0:45	DL-2258	2	PAX	DL	2258	BOS	D	11:30	97%	187	49	138	192	321
DL-2707	2	PAX	DL	2707	MDW	D	10:45	87%	66	27	39	76	E7W	0:45	DL-2708	2	PAX	DL	2708	FSD	D	11:30	80%	61	43	18	76	E7W
DL-2093	2	PAX	DL	2093	EWR	D	10:51	83%	108	45	63	130	223	3:28	DL-2094	2	PAX	DL	2094	GRB	D	14:19	77%	100	85	15	130	223
DL-2021	2	PAX	DL	2021	OMA	D	10:52	81%	88	68	20	109	221	1:19	DL-2022	2	PAX	DL	2022	SAT	D	12:12	89%	96	40	57	109	221
DL-2709	2	PAX	DL	2709	CLT	D	10:53	88%	67	39	28	76	CR9	1:17	DL-2710	2	PAX	DL	2710	PSC	D	12:10	90%	68	58	11	76	E7W
DL-2153	2	PAX	DL	2153	IND	D	10:53	90%	119	66	53	132	319	0:51	DL-2154	2	PAX	DL	2154	MIA	D	11:45	96%	127	50	77	132	319
DL-2155	2	PAX	DL	2155	ORD	D	10:55	91%	120	48	72	132	319	0:41	DL-2156	2	PAX	DL	2156	ORD	D	11:36	93%	123	37	85	132	319
DL-2711	2	PAX	DL	2711	BNA	D	10:55	88%	67	34	33	76	CR9	1:21	DL-2712	2	PAX	DL	2712	CLE	D	12:16	87%	66	28	38	76	CR9
DL-2871	2	PAX	DL	2871	TYS	D	10:56	72%	54	32	22	76	CR9	0:33	DL-2870	2	PAX	DL	2870	BIL	D	11:30	74%	56	45	11	76	CR9
DL-2713	2	PAX	DL	2713	CVG	D	10:58	95%	73	39	33	76	CR9	1:19	DL-2714	2	PAX	DL	2714	RIC	D	12:17	78%	59	27	33	76	CR9
DL-2023	2	PAX	DL	2023	STL	D	10:59	88%	96	56	41	109	221	1:35	DL-2024	2	PAX	DL	2024	BNA	D	12:34	85%	92	33	59	109	221
DL-2157	2	PAX	DL	2157	MEX	I	11:00	88%	116	29	87	132	319	1:40	DL-2158	2	PAX	DL	2158	MEX	I	12:40	88%	117	29	87	132	319
DL-2545	2	PAX	DL	2545	DCA	D	11:02	90%	173	85	88	192	3N1	1:08	DL-2546	2	PAX	DL	2546	GEG	D	12:10	98%	188	176	12	192	3N1
DL-2159	2	PAX	DL	2159	MCI	D	11:03	72%	94	61	33	132	319	1:52	DL-2160	2	PAX	DL	2160	ATL	D	12:56	99%	131	48	83	132	319
DL-2307	2	PAX	DL	2307	BIS	D	11:10	64%	70	52	17	109	221	1:00	DL-2308	2	PAX	DL	2308	YEG	P	12:10	77%	83	72	12	109	221
DL-2543	2	PAX	DL	2543	TPA	D	11:10	90%	173	38	135	192	3N1	1:00	DL-2544	2	PAX	DL	2544	BOI	D	12:10	99%	190	147	43	192	3N1
DL-2327	2	PAX	DL	2327	BWI	D	11:17	91%	146	68	77	160	738	0:45	DL-2328	2	PAX	DL	2328	FCA	D	12:02	90%	144	111	33	160	738
DL-2017	2	PAX	DL	2017	SDF	D	11:25	82%	89	47	42	109	221	0:58	DL-2018	2	PAX	DL	2018	IAD	D	12:23	86%	93	50	44	109	221
DL-2439	2	PAX	DL	2439	SEA	D	11:30	99%	238	165	73	240	753	1:15	DL-2440	2	PAX	DL	2440	DTW	D	12:45	97%	234	92	142	240	753
DL-2329	2	PAX	DL	2329	JAC	D	11:32	82%	131	90	41	160	738	1:23	DL-2330	2	PAX	DL	2330	BOS	D	12:55	98%	156	48	108	160	738
DL-2715	2	PAX	DL	2715	IAH	D	11:32	90%	68	30	38	76	E7W	1:13	DL-2716	2	PAX	DL	2716	BIS	D	12:45	77%	59	42	17	76	E7W
DL-2019	2	PAX	DL	2019	IAH	D	11:33	82%	90	37	53	109	221	0:54	DL-2020	2	PAX	DL	2020	ORD	D	12:27	94%	102	39	62	109	221
DL-2549	2	PAX	DL	2549	PDX	D	11:43	99%	190	122	68	192	3N1	1:12	DL-2550	2	PAX	DL	2550	MCO	D	12:55	95%	183	69	114	192	3N1
DL-2473	2	PAX	DL	2473	LAX	D	11:45	98%	196	112	84	199	757	1:30	DL-2474	2	PAX	DL	2474	OGG	D	13:15	92%	183	112	71	199	757
DL-2873	2	PAX	DL	2873	MSY	D	11:45	80%	61	31	30	76	CR9	1:00	DL-2876	2	PAX	DL	2876	DAY	D	12:45	75%	57	34	22	76	CR9
DL-2717	2	PAX	DL	2717	ORF	D	11:48	79%	60	31	28	76	CR9	0:56	DL-2718	2	PAX	DL	2718	FSD	D	12:45	83%	63	47	16	76	E7W
DL-2211	2	PAX	DL	2211	DTW	D	11:50	97%	153	85	68	157	320	1:15	DL-2212	2	PAX	DL	2212	IND	D	13:05	91%	142	81	61	157	320
DL-2621	2	PAX	DL	2621	DFW	D	11:56	87%	60	24	36	69	CR7	1:07	DL-2622	2	PAX	DL	2622	EWR	D	13:03	88%	61	25	36	69	CR7
DL-2551	2	PAX	DL	2551	SJC	D	11:57	90%	173	105	68	192	3N1	0:58	DL-2552	2	PAX	DL	2552	SAN	D	12:55	94%	181	95	86	192	3N1
DL-2369	2	PAX	DL	2369	LAS	D	12:00	99%	178	117	60	180	739	1:00	DL-2370	2	PAX	DL	2370	PHL	D	13:00	100%	180	98	82	180	739
DL-2371	2	PAX	DL	2371	MCI	D	12:00	74%	134	89	44	180	739	1:08	DL-2372	2	PAX	DL	2372	GRR	D	13:08	88%	159	122	36	180	739
DL-2553	2	PAX	DL	2553	GEG	D	12:00	98%	189	179	10	192	3N1	1:06	DL-2554	2	PAX	DL	2554	TPA	D	13:06	92%	177	47	130	192	3N1
DL-2875	2	PAX	DL	2875	INL	D	12:02	81%	62	46	16	76	CR9	1:58	DL-2878	2	PAX	DL	2878	SBN	D	14:00	84%	63	37	26	76	CR9
DL-2259	2	PAX	DL	2259	SLC	D	12:05	95%	183	123	60	192	321	0:51	DL-2260	2	PAX	DL	2260	RDU	D	12:56	99%	190	84	107	192	321
DL-2441	2	PAX	DL	2441	SFO	D	12:06	98%	236	109	127	240	753	1:04	DL-2442	2	PAX	DL	2442	ATL	D	13:10	99%	238	100	138	240	753
DL-2477	2	PAX	DL	2477	SAN	D	12:10	97%	193	123	70	199	757	1:20	DL-2478	2	PAX	DL	2478	LAS	D	13:30	95%	190	83	106	199	757
DL-2719	2	PAX	DL	2719	FAR	D	12:10	83%	63	61	2	76	CR9	0:49	DL-2720	2	PAX	DL	2720	DLH	D	13:00	73%	55	46	10	76	CR9
DL-2291	2	PAX	DL	2291	CDG	I	12:13	100%	306	215	91	306	350	TOW/RON	DL-2292	2	PAX	DL	2292	HND	I	11:26	100%	306	240	66	306	350
DL-2723	2	PAX	DL	2723	CLE	D	12:15	82%	63	26	36	76	CR9	0:54	DL-2724	2	PAX	DL	2724	CVG	D	13:09	98%	75	40	35	76	CR9
DL-2623	2	PAX	DL	2623	DLH	D	12:15	82%	57	47	10	69	CR7	1:00	DL-2624	2	PAX	DL	2624	RST	D	13:15	74%	51	47	4	69	CR7
DL-2721	2	PAX	DL	2721	GFK	D	12:15	93%	71	58	12	76	CR9	0:45	DL-2722	2	PAX	DL	2722	CID	D	13:00	73%	56	48	8	76	E7W
DL-2555	2	PAX	DL	2555	YVR	P	12:20	97%	187	142	45	192	3N1	1:10	DL-2556	2	PAX	DL	2556	LAX	D	13:30	92%	176	81	95	192	3N1
DL-2731	2	PAX	DL	2731	OAK	D	12:20	87%	66	40	26	76	E7W	1:10	DL-2732	2	PAX	DL	2732	MDW	D	13:30	91%	69	24	45	76	E7W
DL-2373	2	PAX	DL	2373	PHX	D	12:22	87%	157	74	82	180	739	1:35	DL-2374	2	PAX	DL	2374	BUF	D	13:58	91%	163	100	63	180	739
DL-2557	2	PAX	DL	2557	ATL	D	12:31	97%	187	84	103	192	3N1	1:59	DL-2558	2	PAX	DL	2558	PDX	D	14:30	93%	179	132	48	192	3N1
DL-2559	2	PAX	DL	2559	JAX	D	12:32	88%	169	75	94	192	3N1	1:58	DL-2560	2	PAX	DL	2560	PDX	D	14:30	90%	174	110	63	192	3N1
DL-2725	2	PAX	DL	2725	MDW	D	12:33	84%	64	23	41	76	E7W	0:47	DL-2726	2	PAX	DL	2726	ATW	D	13:20	80%	61	53	8	76	CR9
DL-2625	2	PAX	DL	2625	MOT	D	12:34	72%	49	37	12	69	CR7	0:36	DL-2626	2	PAX	DL	2626	DAY	D	13:10	77%	53	34	20	69	CR7
DL-2483	2	PAX	DL	2483	ATL	D	12:35	97%	194	83	111	199	757	1:13	DL-2484	2	PAX	DL	2484	PIT	D	13:48	53%	106	63	43	199	757
DL-2293	2	PAX	DL	2293	AMS	I	12:38	100%	306	167	139	306	350	3:36	DL-2294	2	PAX	DL	2294	CDG	I	16:14	100%	306	213	93	306	350
DL-2733	2	PAX	DL	2733	GRR	D	12:45	97%	74	60	14	76	E7W	0:45	DL-2734	2	PAX	DL	2734	RAP	D	13:30	75%	57	43	15	76	E7W
DL-2281	2	PAX	DL	2281	LAX	D	12:48	97%	274	119	154	281	339	4:28	DL-2282	2	PAX	DL	2282	CDG	I	17:16	100%	281	196	85	281	339
DL-2479	2	PAX	DL	2479	SAN	D	12:50	94%	187	81	106	199	757	1:10	DL-2480	2	PAX	DL	2480	BWI	D	14:00	77%	153	64	89	199	757
DL-2727	2	PAX	DL	2727	RST	D	12:50	70%	53	49	4	76	E7W	0:40	DL-2728	2	PAX	DL	2728	PVD	D	13:30	89%	67	19	48	76	CR9
DL-2877	2	PAX	DL	2877	ICT	D	12:50	76%	58	37	21	76	CR9	1:12	DL-2880	2	PAX	DL	2880	LSE	D	14:02	79%	60	59	1	76	CR9
DL-2599	2	PAX	DL	2599	EUR1	I	12:50	97%	271	163	108	281	339	3:36	DL-2600	2	PAX	DL	2600	EUR1	I	16:26	97%	273	164	109	281	339
DL-2029	2	PAX	DL	2029	FSD	D	12:51	79%	86	59	27	109	221	1:59	DL-2030	2	PAX	DL	2030	CLE	D	14:50	88%	96	44	52	109	221
DL-2213	2	PAX	DL	2213	PHL	D	12:54	94%	147	81	67	157	320	0:45	DL-2214	2	PAX	DL	2214	LGA	D	13:39	100%	157	52	105	157	320
DL-2165	2	PAX	DL	2165	RAP	D	12:57	66%	87	66	21	132	319	0:47	DL-2166	2	PAX	DL	2166	BDL	D	13:45	98%	130	90	40	132	319
DL-2375	2	PAX	DL	2375	LGA	D	12:58	94%	170	54	116	180	739	1:46	DL-2376	2	PAX	DL	2376	MCI	D	14:44	87%	157	109	48	180	739
DL-2309	2	PAX	DL	2309	YEG	P	13:00	97%	106	90	15	109	221	1:44	DL-2310	2	PAX	DL	2310	OKC	D	14:44	90%	98	68	31	109	221
DL-2729	2	PAX	DL	2729	GRB	D	13:02	82%	62	54	9	76	CR9	0:48	DL-2730	2	PAX	DL	2730	DFW	D	13:50	95%	72	27	45	76	CR9
DL-2025	2	PAX	DL	2025	MSN	D	13:03	92%	100	90	11	109	221	1:12	DL-2026	2	PAX	DL	2026	STL	D	14:15	93%	102	61	41	109	221
DL-2735	2	PAX	DL	2735	OMA	D	13:05	69%	52	37	15	76	E7W	0:45	DL-2736	2	PAX	DL	2736	TVC	D	13:50	78%	59	45	14	76	CR9
DL-2749	2	PAX	DL	2749	FSD	D	13:05	79%	60	41	19	76	E7W	1:46	DL-2750	2	PAX	DL	2750	IAH	D	14:51	95%	72	33	39	76	E7W
DL-2879	2	PAX	DL	2879	SBN	D	13:06	80%	61	34	27	76	CR9	1:12	DL-2884	2	PAX	DL	2884	BRD	D	14:18	75%	57	54	2	76	CR9
DL-2561	2	PAX	DL	2561	SMF	D	13:09	96%	184	118	66	192	3N1	1:42	DL-2562	2	PAX	DL	2562	GEG	D	14:51	90%	172	137	35	192	3N1
DL-2031	2	PAX	DL	2031	JFK	D	13:10	95%	103	35	68	109	221	1:44	DL-2032	2	PAX	DL	2032	CMH	D	14:55	85%	93	59	34	109	221
DL-2881	2	PAX	DL	2881	IMT	D	13:11	70%	53	40	13	76	CR9	1:19	DL-2886	2	PAX	DL	2886	RHI	D	14:30	83%	63	54	9	76	CR9
DL-2739	2	PAX	DL	2739	MEM	D	13:15	87%	66	40	26	76	CR9	0:55	DL-2740	2	PAX	DL	2740	DSM	D	14:10	87%	66	59	7	76	E7W
DL-2883	2	PAX	DL	2883	LNK	D	13:16	81%	62	45	17	76	CR9	1:14	DL-2888	2	PAX	DL	2888	CWA	D	14:30	51%	39	37	2	76	CR9
DL-2283	2	PAX	DL	2283	CDG	I	13:18	100%	281	196	85	281	339	4:32	DL-2284	2	PAX	DL	2284	LHR	I	17:50	100%	281	95	186	281	339
DL-2445	2	PAX	DL	2445	LAX	D	13:25	97%	234	99	135	240	753	1:10	DL-2446	2	PAX	DL	2446	LAX	D	14:35	92%	222	112	110	240	753
DL-2447	2	PAX	DL	2447	DTW	D	13:25	96%	231	100	131	240	753	1:13	DL-2448	2	PAX	DL	2448	DEN	D	14:38	78%	187	87	101	240	753
DL-2741	2	PAX	DL	2741	MSN	D	13:25	84%	64	56	8	76	CR9	0:55	DL-2742	2	PAX	DL	2742	GFK	D	14:20	81%	61	41	20	76	E7W
DL-2377	2	PAX	DL	2377	DEN	D	13:30	96%	173	71	102	180	739	1:40	DL-2378	2	PAX	DL	2378	GRR	D	15:10	90%	162	127	35	180	739
DL-2885	2	PAX	DL	2885	XWA	D	13:31	54%	41	31	11	76	CR9	1:35	DL-2892	2	PAX	DL	2892	IMT	D	15:06	70%	53	42	12	76	CR9
DL-2095	2	PAX	DL	2095	AUS	D	13:34	89%	116	41	75	130	223	1:07	DL-2096	2	PAX	DL	2096	DFW	D	14:41	94%	122	47	75	130	223
DL-2481	2	PAX	DL	2481	SAN	D	13:35	94%	188	84	103	199	757	1:10	DL-2482	2	PAX	DL	2482	PDX	D	14:45	89%	177	102	75	199	757
DL-2563	2	PAX	DL	2563	SFO	D	13:35	99%	189	92	97	192	3N1	1:52	DL-2564	2	PAX	DL	2564	BZN	D	15:27	97%	186	150	37	192	3N1
DL-2737	2	PAX	DL	2737	DAY	D	13:35	70%	54	32	21	76	CR9	0:40	DL-2738	2	PAX	DL	2738	AZO	D	14:15	76%	58	36	22	76	E7W
DL-2295	2	PAX	DL	2295	HND	I	13:36	100%	306	219	87	306	350	3:14	DL-2296	2	PAX	DL	2296	AMS	I	16:50	100%	306	162	144	306	350
DL-2097	2	PAX	DL	2097	BNA	D	13:37	87%	113	46	67	130	223	1:09	DL-2098	2	PAX	DL	2098	YYZ	P	14:46	91%	118	80	38	130	223
DL-2443	2	PAX	DL	2443	SEA	D	13:40	98%	236	148	88	240	753	1:10	DL-2444	2	PAX	DL	2444	JFK	D	14:50	79%	189	57	132	240	753
DL-2887	2	PAX	DL	2887	RHI	D	13:42	88%	67	57	9	76	CR9	1:24	DL-2894	2	PAX	DL	2894	MLI	D	15:06	74%	56	42	15	76	CR9
DL-2027	2	PAX	DL	2027	CMH	D	13:45	91%	99	65	34	109	221	0:59	DL-2028	2	PAX	DL	2028	OMA	D	14:44	81%	88	69	19	109	221
DL-2743	2	PAX	DL	2743	CWA	D	13:45	75%	57	50	7	76	E7W	0:46	DL-2744	2	PAX	DL	2744	MOT	D	14:31	80%	61	45	16	76	CR9
DL-2379	2	PAX	DL	2379	BWI	D	13:45	94%	168	73	95	180	739	1:26	DL-2380	2	PAX	DL	2380	DCA	D	15:11	97%	174	115	59	180	739
DL-2215	2	PAX	DL	2215	LGA	D	13:49	100%	156	61	95	157	320	0:45	DL-2216	2	PAX	DL	2216	DTW	D	14:34	99%	155	83	72	157	320
DL-2099	2	PAX	DL	2099	SAT	D	13:50	86%	112	40	72	130	223	1:02	DL-2100	2	PAX	DL	2100	BIL	D	14:52	86%	111	95	17	130	223
DL-2889	2	PAX	DL	2889	HIB	D	13:50	60%	46	36	10	76	CR9	1:25	DL-2896	2	PAX	DL	2896	LNK	D	15:15	81%	62	43	18	76	CR9
DL-2891	2	PAX	DL	2891	BJI	D	13:54	79%	60	55	5	76	CR9	1:50	DL-2898	2	PAX	DL	2898	INL	D	15:44	84%	64	51	13	76	CR9
DL-2311	2	PAX	DL	2311	RDU	D	13:56	85%	93	38	54	109	221	1:06	DL-2312	2	PAX	DL	2312	MEM	D	15:03	92%	100	61	39	109	221
DL-2033	2	PAX	DL	2033	TVC	D	13:58	82%	89	66	23	109	221	0:57	DL-2034	2	PAX	DL	2034	SDF	D	14:55	83%	91	50	41	109	221
DL-2745	2	PAX	DL	2745	LSE	D	13:58	60%	46	45	1	76	CR9	0:47	DL-2746	2	PAX	DL	2746	BNA	D	14:45	87%	66	30	36	76	CR9
DL-2217	2	PAX	DL	2217	ORD	D	14:03	86%	136	47	89	157	320	0:45	DL-2218	2	PAX	DL	2218	PHX	D	14:48	93%	146	68	78	157	320
DL-2747	2	PAX	DL	2747	DSM	D	14:07	83%	63	56	7	76	CR9	0:48	DL-2748	2	PAX	DL	2748	BIS	D	14:55	83%	63	47	16	76	CR9
DL-2219	2	PAX	DL	2219	YWG	P	14:10	88%	138	114	24	157	320	0:55	DL-2220	2	PAX	DL	2220	OMA	D	15:05	79%	124	95	29	157	320
DL-2261	2	PAX	DL	2261	SLC	D	14:10	95%	182	118	64	192	321	1:15	DL-2262	2	PAX	DL	2262	DTW	D	15:25	98%	188	88	100	192	321
DL-2751	2	PAX	DL	2751	ATW	D	14:10	77%	59	52	7	76	CR9	0:50	DL-2752	2	PAX	DL	2752	YUL	P	15:00	94%	71	46	26	76	CR9
DL-2035	2	PAX	DL	2035	PSC	D	14:13	94%	103	89	14	109	221	1:06	DL-2036	2	PAX	DL	2036	XNA	D	15:19	74%	80	37	44	109	221
DL-2381	2	PAX	DL	2381	LAS	D	14:14	97%	175	90	86	180	739	1:00	DL-2382	2	PAX	DL	2382	SFO	D	15:15	95%	172	89	83	180	739
DL-2485	2	PAX	DL	2485	ANC	D	14:15	100%	199	147	52	199	757	1:05	DL-2486	2	PAX	DL	2486	SEA	D	15:20	99%	197	134	63	199	757
DL-2753	2	PAX	DL	2753	GFK	D	14:15	72%	55	39	15	76	E7W	0:50	DL-2754	2	PAX	DL	2754	ICT	D	15:05	78%	59	39	20	76	E7W
DL-2755	2	PAX	DL	2755	RAP	D	14:15	65%	49	37	12	76	E7W	0:55	DL-2756	2	PAX	DL	2756	MDW	D	15:10	90%	68	26	43	76	E7W
DL-2487	2	PAX	DL	2487	PDX	D	14:17	99%	197	123	74	199	757	2:37	DL-2488	2	PAX	DL	2488	BOS	D	16:54	97%	194	53	141	199	757
DL-2565	2	PAX	DL	2565	BZN	D	14:21	100%	192	153	39	192	3N1	1:09	DL-2566	2	PAX	DL	2566	SLC	D	15:30	95%	182	120	62	192	3N1
DL-2567	2	PAX	DL	2567	GEG	D	14:25	88%	169	125	43	192	3N1	1:20	DL-2568	2	PAX	DL	2568	LAS	D	15:45	73%	139	78	62	192	3N1
DL-2895	2	PAX	DL	2895	ABR	D	14:29	74%	56	53	3	76	CR9	2:21	DL-2924	2	PAX	DL	2924	HIB	D	16:50	53%	40	32	8	76	CR9
DL-2161	2	PAX	DL	2161	MKE	D	14:30	100%	132	101	31	132	319	1:02	DL-2162	2	PAX	DL	2162	IND	D	15:32	90%	118	69	49	132	319
DL-2757	2	PAX	DL	2757	CID	D	14:30	69%	52	44	8	76	E7W	0:50	DL-2758	2	PAX	DL	2758	TVC	D	15:20	54%	41	33	9	76	E7W
DL-2759	2	PAX	DL	2759	MDW	D	14:30	83%	63	20	42	76	E7W	0:59	DL-2760	2	PAX	DL	2760	GFK	D	15:29	80%	61	44	17	76	CR9
DL-2897	2	PAX	DL	2897	BIS	D	14:30	62%	47	35	12	76	CR9	3:28	DL-2906	2	PAX	DL	2906	SBN	D	17:58	86%	65	41	25	76	CR9
DL-2569	2	PAX	DL	2569	DCA	D	14:32	90%	172	80	92	192	3N1	1:03	DL-2570	2	PAX	DL	2570	SMF	D	15:35	90%	174	106	67	192	3N1
DL-2761	2	PAX	DL	2761	BDL	D	14:38	100%	76	54	22	76	CR9	0:52	DL-2762	2	PAX	DL	2762	RAP	D	15:30	76%	58	44	13	76	CR9
DL-2383	2	PAX	DL	2383	PHX	D	14:39	84%	152	55	97	180	739	0:55	DL-2384	2	PAX	DL	2384	MKE	D	15:35	86%	155	113	42	180	739
DL-2627	2	PAX	DL	2627	ATW	D	14:44	76%	52	45	7	69	CR7	1:05	DL-2628	2	PAX	DL	2628	DSM	D	15:49	85%	58	53	6	69	CR7
DL-2763	2	PAX	DL	2763	YYZ	P	14:45	85%	65	38	27	76	E7W	0:51	DL-2764	2	PAX	DL	2764	GRB	D	15:36	79%	60	52	8	76	E7W
DL-2101	2	PAX	DL	2101	CLT	D	14:45	97%	126	68	58	130	223	0:59	DL-2102	2	PAX	DL	2102	EWR	D	15:45	89%	115	49	66	130	223
DL-2103	2	PAX	DL	2103	CVG	D	14:47	90%	117	57	61	130	223	0:58	DL-2104	2	PAX	DL	2104	MSN	D	15:45	77%	100	87	13	130	223
DL-2629	2	PAX	DL	2629	EWR	D	14:49	87%	60	25	35	69	CR7	1:13	DL-2630	2	PAX	DL	2630	SFO	D	16:02	93%	64	23	42	69	CR7
DL-2385	2	PAX	DL	2385	DTW	D	14:54	96%	174	76	98	180	739	1:42	DL-2386	2	PAX	DL	2386	DEN	D	16:36	96%	173	56	118	180	739
DL-2765	2	PAX	DL	2765	FAR	D	15:00	62%	47	45	2	76	E7W	0:58	DL-2766	2	PAX	DL	2766	CID	D	15:58	70%	53	46	8	76	CR9
DL-2387	2	PAX	DL	2387	ATL	D	15:04	96%	173	50	123	180	739	1:56	DL-2388	2	PAX	DL	2388	LGA	D	17:00	92%	166	57	110	180	739
DL-2313	2	PAX	DL	2313	DFW	D	15:05	82%	89	26	63	109	221	0:55	DL-2314	2	PAX	DL	2314	RSW	D	16:00	80%	87	20	68	109	221
DL-2767	2	PAX	DL	2767	MOT	D	15:08	72%	55	41	14	76	CR9	0:57	DL-2768	2	PAX	DL	2768	FSD	D	16:05	83%	63	47	16	76	CR9
DL-2037	2	PAX	DL	2037	STL	D	15:10	84%	91	49	43	109	221	1:06	DL-2038	2	PAX	DL	2038	FAR	D	16:17	80%	87	84	3	109	221
DL-2039	2	PAX	DL	2039	IAH	D	15:15	88%	96	38	58	109	221	1:19	DL-2040	2	PAX	DL	2040	JFK	D	16:34	99%	108	32	76	109	221
DL-2273	2	PAX	DL	2273	EUR2	I	15:18	97%	283	170	113	293	333	3:36	DL-2274	2	PAX	DL	2274	EUR2	I	18:54	97%	284	170	114	293	333
DL-2297	2	PAX	DL	2297	AMS	I	15:18	100%	306	162	144	306	350	3:36	DL-2298	2	PAX	DL	2298	AMS	I	18:54	100%	306	165	141	306	350
DL-2125	2	PAX	DL	2125	DFW	D	15:30	83%	108	24	84	130	223	0:55	DL-2126	2	PAX	DL	2126	YYZ	P	16:25	91%	118	83	35	130	223
DL-2489	2	PAX	DL	2489	MCO	D	15:30	95%	189	57	131	199	757	2:22	DL-2490	2	PAX	DL	2490	ANC	D	17:52	93%	185	147	38	199	757
DL-2801	2	PAX	DL	2801	BIS	D	15:30	72%	55	42	13	76	E7W	0:50	DL-2802	2	PAX	DL	2802	YUL	P	16:20	93%	71	46	25	76	E7W
DL-2819	2	PAX	DL	2819	IAH	D	15:30	93%	71	27	44	76	CR9	0:50	DL-2820	2	PAX	DL	2820	ABR	D	16:20	75%	57	54	3	76	CR9
DL-2041	2	PAX	DL	2041	FAR	D	15:33	67%	73	70	3	109	221	1:06	DL-2042	2	PAX	DL	2042	MSN	D	16:39	77%	84	74	10	109	221
DL-2057	2	PAX	DL	2057	CLE	D	15:45	88%	96	35	61	109	221	0:43	DL-2058	2	PAX	DL	2058	FAR	D	16:28	90%	98	95	3	109	221
DL-2059	2	PAX	DL	2059	SDF	D	15:45	83%	91	44	47	109	221	0:45	DL-2060	2	PAX	DL	2060	SDF	D	16:30	81%	89	50	39	109	221
DL-2105	2	PAX	DL	2105	STL	D	15:45	88%	115	60	55	130	223	1:00	DL-2106	2	PAX	DL	2106	AUS	D	16:45	95%	124	50	74	130	223
DL-2571	2	PAX	DL	2571	BOS	D	15:45	96%	185	53	131	192	3N1	1:58	DL-2572	2	PAX	DL	2572	MCO	D	17:43	95%	182	64	119	192	3N1
DL-2285	2	PAX	DL	2285	LHR	I	15:54	100%	281	99	182	281	339	3:51	DL-2286	2	PAX	DL	2286	SEA	D	19:45	99%	279	206	74	281	339
DL-2769	2	PAX	DL	2769	DLH	D	15:55	72%	55	43	12	76	CR9	0:46	DL-2770	2	PAX	DL	2770	RST	D	16:41	71%	54	49	4	76	CR9

DL-2491	2	PAX	DL	2491	MIA	D	15:56	98%	194	79	115	199	757	1:58	DL-2492	2	PAX	DL	2492	SAN	D	17:54	93%	185	79	106	199	757
DL-2319	2	PAX	DL	2319	OKC	D	16:00	87%	95	62	33	109	221	1:20	DL-2320	2	PAX	DL	2320	IAD	D	17:20	89%	97	55	42	109	221
DL-2417	2	PAX	DL	2417	DCA	D	16:00	88%	158	58	100	180	739	1:25	DL-2418	2	PAX	DL	2418	BWI	D	17:25	94%	169	80	89	180	739
DL-2581	2	PAX	DL	2581	BOI	D	16:00	96%	184	150	34	192	3N1	0:55	DL-2582	2	PAX	DL	2582	GEG	D	16:55	100%	192	190	2	192	3N1
DL-2583	2	PAX	DL	2583	LAX	D	16:00	98%	188	91	97	192	3N1	0:55	DL-2584	2	PAX	DL	2584	SNA	D	16:55	99%	190	102	88	192	3N1
DL-2923	2	PAX	DL	2923	LNK	D	16:00	79%	60	42	19	76	CR9	2:48	DL-2908	2	PAX	DL	2908	LNK	D	18:48	87%	66	49	17	76	CR9
DL-2389	2	PAX	DL	2389	MKE	D	16:00	81%	145	96	49	180	739	1:00	DL-2390	2	PAX	DL	2390	SFO	D	17:00	95%	170	78	93	180	739
DL-2493	2	PAX	DL	2493	TPA	D	16:00	90%	179	45	134	199	757	1:59	DL-2494	2	PAX	DL	2494	FAI	D	17:59	88%	176	138	38	199	757
DL-2331	2	PAX	DL	2331	BOI	D	16:05	94%	150	111	39	160	738	1:02	DL-2332	2	PAX	DL	2332	LAS	D	17:07	95%	153	68	85	160	738
DL-2333	2	PAX	DL	2333	FCA	D	16:05	96%	153	117	37	160	738	1:20	DL-2334	2	PAX	DL	2334	JAC	D	17:25	84%	135	93	42	160	738
DL-2775	2	PAX	DL	2775	BIS	D	16:06	60%	46	33	12	76	E7W	0:54	DL-2776	2	PAX	DL	2776	IAH	D	17:00	88%	67	30	37	76	E7W
DL-2163	2	PAX	DL	2163	FAR	D	16:17	70%	93	90	3	132	319	0:57	DL-2164	2	PAX	DL	2164	PIT	D	17:14	88%	116	72	44	132	319
DL-2169	2	PAX	DL	2169	IND	D	16:18	88%	116	61	55	132	319	1:17	DL-2170	2	PAX	DL	2170	SNA	D	17:35	92%	121	58	63	132	319
DL-2221	2	PAX	DL	2221	LGA	D	16:25	100%	157	50	106	157	320	0:45	DL-2222	2	PAX	DL	2222	ORD	D	17:10	92%	145	59	86	157	320
DL-2773	2	PAX	DL	2773	FSD	D	16:25	84%	64	50	14	76	E7W	1:05	DL-2774	2	PAX	DL	2774	FAR	D	17:30	79%	60	58	2	76	E7W
DL-2777	2	PAX	DL	2777	SDF	D	16:25	78%	60	28	31	76	CR9	1:05	DL-2778	2	PAX	DL	2778	MDW	D	17:30	82%	63	22	40	76	E7W
DL-2223	2	PAX	DL	2223	OMA	D	16:29	73%	115	81	33	157	320	0:47	DL-2224	2	PAX	DL	2224	YWG	P	17:16	100%	157	157	0	157	320
DL-2391	2	PAX	DL	2391	DEN	D	16:29	96%	172	59	113	180	739	0:46	DL-2392	2	PAX	DL	2392	SLC	D	17:15	93%	167	93	74	180	739
DL-2107	2	PAX	DL	2107	RDU	D	16:30	92%	120	53	67	130	223	1:00	DL-2108	2	PAX	DL	2108	RDU	D	17:30	97%	127	57	69	130	223
DL-2573	2	PAX	DL	2573	SLC	D	16:30	93%	178	97	81	192	3N1	1:25	DL-2574	2	PAX	DL	2574	SEA	D	17:55	98%	188	115	73	192	3N1
DL-2771	2	PAX	DL	2771	YYC	P	16:30	92%	70	50	19	76	CR9	1:00	DL-2772	2	PAX	DL	2772	DSM	D	17:30	83%	63	57	6	76	E7W
DL-2779	2	PAX	DL	2779	IAD	D	16:30	89%	68	36	32	76	E7W	1:00	DL-2780	2	PAX	DL	2780	MOT	D	17:30	72%	54	40	15	76	E7W
DL-2225	2	PAX	DL	2225	IND	D	16:31	90%	141	72	69	157	320	0:48	DL-2226	2	PAX	DL	2226	PHL	D	17:19	100%	157	90	67	157	320
DL-2045	2	PAX	DL	2045	XNA	D	16:32	77%	84	41	43	109	221	0:50	DL-2046	2	PAX	DL	2046	TUL	D	17:22	75%	82	52	29	109	221
DL-2781	2	PAX	DL	2781	YXE	I	16:35	84%	64	57	7	76	CR9	1:00	DL-2782	2	PAX	DL	2782	BIS	D	17:35	72%	54	40	15	76	CR9
DL-2393	2	PAX	DL	2393	GRR	D	16:40	80%	144	108	37	180	739	1:00	DL-2394	2	PAX	DL	2394	MKE	D	17:40	82%	148	107	40	180	739
DL-2783	2	PAX	DL	2783	CLE	D	16:40	87%	66	25	41	76	CR9	0:55	DL-2784	2	PAX	DL	2784	FSD	D	17:35	81%	62	45	17	76	E7W
DL-2227	2	PAX	DL	2227	SJC	D	16:41	90%	142	83	59	157	320	0:42	DL-2228	2	PAX	DL	2228	LGA	D	17:23	100%	157	58	99	157	320
DL-2395	2	PAX	DL	2395	MCO	D	16:41	93%	168	28	140	180	739	1:00	DL-2396	2	PAX	DL	2396	DCA	D	17:41	94%	168	73	95	180	739
DL-2903	2	PAX	DL	2903	BIL	D	16:41	88%	67	55	12	76	CR9	2:12	DL-2910	2	PAX	DL	2910	XNA	D	18:53	76%	57	30	28	76	CR9
DL-2785	2	PAX	DL	2785	DSM	D	16:43	92%	70	63	7	76	CR9	0:57	DL-2786	2	PAX	DL	2786	DFW	D	17:40	86%	65	24	41	76	CR9
DL-2787	2	PAX	DL	2787	GFK	D	16:44	81%	62	49	12	76	E7W	0:56	DL-2788	2	PAX	DL	2788	LEX	D	17:40	75%	57	34	24	76	CR9
DL-2167	2	PAX	DL	2167	SNA	D	16:45	90%	119	53	66	132	319	0:47	DL-2168	2	PAX	DL	2168	MSN	D	17:32	81%	107	94	13	132	319
DL-2631	2	PAX	DL	2631	YWG	P	16:46	100%	69	69	-	69	CR7	0:47	DL-2632	2	PAX	DL	2632	CVG	D	17:33	97%	67	36	30	69	CR7
DL-2789	2	PAX	DL	2789	MDW	D	16:49	91%	69	24	45	76	E7w	0:57	DL-2790	2	PAX	DL	2790	CLT	D	17:46	85%	65	34	31	76	CR9
DL-2043	2	PAX	DL	2043	CVG	D	16:50	97%	105	53	53	109	221	0:52	DL-2044	2	PAX	DL	2044	STL	D	17:42	81%	88	50	38	109	221
DL-2633	2	PAX	DL	2633	SFO	D	16:52	98%	68	28	39	69	CR7	1:00	DL-2634	2	PAX	DL	2634	GFK	D	17:52	85%	58	42	16	69	CR7
DL-2791	2	PAX	DL	2791	TVC	D	16:52	85%	65	48	17	76	E7W	0:54	DL-2792	2	PAX	DL	2792	SAT	D	17:46	84%	64	26	37	76	CR9
DL-2047	2	PAX	DL	2047	ORD	D	16:53	99%	108	43	65	109	221	0:42	DL-2048	2	PAX	DL	2048	MCI	D	17:35	76%	82	56	27	109	221
DL-2263	2	PAX	DL	2263	BOS	D	16:53	96%	184	48	136	192	321	1:06	DL-2264	2	PAX	DL	2264	PDX	D	17:59	91%	174	112	63	192	321
DL-2397	2	PAX	DL	2397	PHX	D	16:58	87%	157	76	81	180	739	0:52	DL-2398	2	PAX	DL	2398	DTW	D	17:51	98%	176	74	102	180	739
DL-2109	2	PAX	DL	2109	DFW	D	16:59	93%	120	42	79	130	223	0:56	DL-2110	2	PAX	DL	2110	ATW	D	17:55	77%	101	88	12	130	223
DL-2265	2	PAX	DL	2265	SFO	D	16:59	99%	190	101	89	192	321	1:05	DL-2266	2	PAX	DL	2266	LAX	D	18:04	91%	174	70	104	192	321
DL-2111	2	PAX	DL	2111	GRB	D	17:00	92%	119	103	16	130	223	0:46	DL-2112	2	PAX	DL	2112	MEM	D	17:46	85%	111	67	44	130	223
DL-2793	2	PAX	DL	2793	AZO	D	17:00	80%	61	39	22	76	E7W	0:55	DL-2794	2	PAX	DL	2794	CHS	D	17:55	89%	67	34	34	76	CR9
DL-2905	2	PAX	DL	2905	DAY	D	17:00	82%	62	40	22	76	CR9	2:02	DL-2912	2	PAX	DL	2912	TUL	D	19:02	74%	57	37	20	76	CR9
DL-2449	2	PAX	DL	2449	SEA	D	17:01	99%	237	161	76	240	753	1:13	DL-2450	2	PAX	DL	2450	ATL	D	18:15	99%	237	83	155	240	753
DL-2287	2	PAX	DL	2287	ATL	D	17:02	97%	273	106	166	281	339	3:36	DL-2288	2	PAX	DL	2288	LAX	D	20:38	91%	256	107	149	281	339
DL-2113	2	PAX	DL	2113	MCI	D	17:05	87%	113	78	35	130	223	0:50	DL-2114	2	PAX	DL	2114	EWR	D	17:55	81%	105	43	62	130	223
DL-2575	2	PAX	DL	2575	PDX	D	17:05	99%	190	122	68	192	3N1	2:19	DL-2576	2	PAX	DL	2576	SJC	D	19:24	89%	171	96	75	192	3N1
DL-2495	2	PAX	DL	2495	SAN	D	17:15	95%	188	88	100	199	757	2:10	DL-2496	2	PAX	DL	2496	BZN	D	19:25	100%	199	165	34	199	757
DL-2335	2	PAX	DL	2335	LAS	D	17:22	96%	153	48	105	160	738	1:07	DL-2336	2	PAX	DL	2336	BWI	D	18:29	90%	145	62	82	160	738
DL-2337	2	PAX	DL	2337	BOS	D	17:23	95%	153	26	127	160	738	1:24	DL-2338	2	PAX	DL	2338	AUS	D	18:47	93%	148	60	88	160	738
DL-2229	2	PAX	DL	2229	LGA	D	17:23	100%	157	52	105	157	320	0:45	DL-2230	2	PAX	DL	2230	ORD	D	18:08	83%	131	50	80	157	320
DL-2231	2	PAX	DL	2231	ABQ	D	17:33	87%	137	55	81	157	320	1:09	DL-2232	2	PAX	DL	2232	OMA	D	18:42	76%	119	92	27	157	320
DL-2399	2	PAX	DL	2399	FLL	D	17:36	93%	168	58	110	180	739	1:18	DL-2400	2	PAX	DL	2400	LAS	D	18:54	96%	172	81	91	180	739
DL-2907	2	PAX	DL	2907	LSE	D	17:36	85%	65	63	2	76	CR9	1:54	DL-2914	2	PAX	DL	2914	DLH	D	19:30	87%	66	58	8	76	CR9
DL-2401	2	PAX	DL	2401	DCA	D	17:40	92%	165	92	73	180	739	1:17	DL-2402	2	PAX	DL	2402	BOS	D	18:57	97%	175	46	129	180	739
DL-2909	2	PAX	DL	2909	BRD	D	17:41	82%	63	61	2	76	CR9	1:48	DL-2916	2	PAX	DL	2916	MSY	D	19:30	78%	59	26	33	76	CR9
DL-2171	2	PAX	DL	2171	PIT	D	17:42	80%	106	66	39	132	319	1:00	DL-2172	2	PAX	DL	2172	RIC	D	18:42	75%	99	45	55	132	319
DL-2509	2	PAX	DL	2509	ICN	I	17:44	97%	296	215	81	306	350	TOW/RON	DL-2510	2	PAX	DL	2510	ICN	I	14:38	97%	297	215	81	306	350
DL-2179	2	PAX	DL	2179	MSN	D	17:44	78%	103	88	15	132	319	0:55	DL-2180	2	PAX	DL	2180	RDU	D	18:40	96%	127	60	67	132	319
DL-2115	2	PAX	DL	2115	MSN	D	17:45	86%	112	98	15	130	223	1:21	DL-2116	2	PAX	DL	2116	OKC	D	19:06	93%	121	86	35	130	223
DL-2451	2	PAX	DL	2451	LAX	D	17:46	98%	235	114	121	240	753	1:19	DL-2452	2	PAX	DL	2452	LAX	D	19:05	92%	220	100	120	240	753
DL-2275	2	PAX	DL	2275	AMS	I	17:49	100%	293	155	138	293	333	3:36	DL-2276	2	PAX	DL	2276	AMS	I	21:25	100%	293	152	141	293	333
DL-2911	2	PAX	DL	2911	SBN	D	17:50	86%	66	38	28	76	CR9	2:14	DL-2920	2	PAX	DL	2920	TYS	D	20:05	70%	54	29	25	76	CR9
DL-2913	2	PAX	DL	2913	CWA	D	17:54	61%	46	42	5	76	CR9	2:13	DL-2922	2	PAX	DL	2922	LSE	D	20:07	82%	62	61	1	76	CR9
DL-2233	2	PAX	DL	2233	CLT	D	17:57	83%	130	64	66	157	320	0:57	DL-2234	2	PAX	DL	2234	SJC	D	18:54	81%	126	64	63	157	320
DL-2181	2	PAX	DL	2181	MSY	D	17:57	78%	103	47	56	132	319	0:57	DL-2182	2	PAX	DL	2182	CMH	D	18:55	82%	108	69	39	132	319
DL-2795	2	PAX	DL	2795	IAH	D	18:00	100%	76	35	41	76	E7W	0:57	DL-2796	2	PAX	DL	2796	HLN	D	18:57	80%	61	47	14	76	CR9
DL-2235	2	PAX	DL	2235	ORD	D	18:02	97%	153	54	98	157	320	1:48	DL-2236	2	PAX	DL	2236	PHX	D	19:51	95%	149	85	64	157	320
DL-2797	2	PAX	DL	2797	MOT	D	18:18	77%	58	44	15	76	E7W	0:57	DL-2798	2	PAX	DL	2798	OAK	D	19:15	87%	66	37	29	76	E7W
DL-2497	2	PAX	DL	2497	SFO	D	18:29	99%	196	99	98	199	757	1:10	DL-2498	2	PAX	DL	2498	SAN	D	19:39	94%	187	91	96	199	757
DL-2403	2	PAX	DL	2403	PHL	D	18:30	100%	179	95	84	180	739	0:50	DL-2404	2	PAX	DL	2404	ATL	D	19:20	100%	180	97	82	180	739
DL-2577	2	PAX	DL	2577	SEA	D	18:30	99%	189	123	66	192	3N1	0:59	DL-2578	2	PAX	DL	2578	SLC	D	19:29	98%	188	151	37	192	3N1
DL-2409	2	PAX	DL	2409	MKE	D	18:33	90%	161	110	51	180	739	1:07	DL-2410	2	PAX	DL	2410	BOI	D	19:40	100%	180	169	11	180	739
DL-2315	2	PAX	DL	2315	BHM	D	18:35	83%	91	26	64	109	221	1:00	DL-2316	2	PAX	DL	2316	YEG	P	19:35	100%	109	97	12	109	221
DL-2809	2	PAX	DL	2809	PSC	D	18:35	95%	72	62	10	76	CR9	1:05	DL-2810	2	PAX	DL	2810	LAN	D	19:40	84%	64	42	22	76	E7W
DL-2579	2	PAX	DL	2579	MSO	D	18:35	89%	170	138	32	192	3N1	1:10	DL-2580	2	PAX	DL	2580	BIL	D	19:45	82%	158	134	24	192	3N1
DL-2049	2	PAX	DL	2049	BNA	D	18:39	87%	95	40	55	109	221	1:01	DL-2050	2	PAX	DL	2050	DSM	D	19:40	100%	109	100	9	109	221
DL-2051	2	PAX	DL	2051	FAR	D	18:46	80%	87	84	3	109	221	0:59	DL-2052	2	PAX	DL	2052	IAH	D	19:45	94%	102	51	51	109	221
DL-2405	2	PAX	DL	2405	MCI	D	18:49	79%	142	91	51	180	739	0:46	DL-2406	2	PAX	DL	2406	LAS	D	19:35	98%	176	115	61	180	739
DL-2641	2	PAX	DL	2641	DSM	D	18:49	97%	67	60	7	69	CR7	0:41	DL-2642	2	PAX	DL	2642	BIS	D	19:30	71%	49	36	13	69	CR7
DL-2053	2	PAX	DL	2053	IAD	D	18:50	94%	103	55	47	109	221	1:09	DL-2054	2	PAX	DL	2054	PSC	D	19:59	92%	100	86	14	109	221
DL-2267	2	PAX	DL	2267	DTW	D	18:50	97%	186	95	92	192	321	1:05	DL-2268	2	PAX	DL	2268	SMF	D	19:55	96%	184	117	67	192	321
DL-2407	2	PAX	DL	2407	GRR	D	18:50	83%	149	111	37	180	739	0:47	DL-2408	2	PAX	DL	2408	GTF	D	19:37	71%	128	107	21	180	739
DL-2635	2	PAX	DL	2635	RST	D	18:50	72%	50	46	4	69	CR7	0:45	DL-2636	2	PAX	DL	2636	ICT	D	19:35	81%	56	39	17	69	CR7
DL-2271	2	PAX	DL	2271	JFK	D	18:53	93%	178	29	150	192	321	1:42	DL-2272	2	PAX	DL	2272	DTW	D	20:35	98%	189	98	91	192	321
DL-2919	2	PAX	DL	2919	MLI	D	18:55	80%	61	43	18	76	CR9	1:16	DL-2926	2	PAX	DL	2926	MBS	D	20:12	82%	62	47	15	76	CR9
DL-2269	2	PAX	DL	2269	DCA	D	18:56	93%	178	108	70	192	321	1:24	DL-2270	2	PAX	DL	2270	BOS	D	20:20	97%	187	49	138	192	321
DL-2055	2	PAX	DL	2055	STL	D	18:57	93%	102	53	48	109	221	1:16	DL-2056	2	PAX	DL	2056	BNA	D	20:14	92%	100	49	51	109	221
DL-2499	2	PAX	DL	2499	PIT	D	18:59	53%	105	65	40	199	757	1:01	DL-2500	2	PAX	DL	2500	MSO	D	20:00	85%	168	139	29	199	757
DL-2921	2	PAX	DL	2921	RHI	D	18:59	88%	67	57	10	76	CR9	1:16	DL-2928	2	PAX	DL	2928	FWA	D	20:15	72%	55	34	21	76	CR9
DL-2411	2	PAX	DL	2411	BDL	D	19:01	89%	160	100	59	180	739	0:44	DL-2412	2	PAX	DL	2412	DEN	D	19:45	98%	176	90	86	180	739
DL-2637	2	PAX	DL	2637	YXE	I	19:03	64%	44	40	4	69	CR7	1:12	DL-2638	2	PAX	DL	2638	CWA	D	20:15	76%	52	49	3	69	CR7
DL-2173	2	PAX	DL	2173	CMH	D	19:05	82%	109	66	43	132	319	1:02	DL-2174	2	PAX	DL	2174	ORD	D	20:07	84%	111	50	61	132	319
DL-2419	2	PAX	DL	2419	DTW	D	19:05	95%	171	43	128	180	739	1:25	DL-2420	2	PAX	DL	2420	PHX	D	20:30	93%	168	79	89	180	739
DL-2799	2	PAX	DL	2799	RAP	D	19:05	77%	59	46	13	76	CR9	0:50	DL-2800	2	PAX	DL	2800	ORF	D	19:55	77%	59	29	30	76	CR9
DL-2413	2	PAX	DL	2413	BOS	D	19:05	96%	174	56	118	180	739	0:56	DL-2414	2	PAX	DL	2414	LGA	D	20:01	93%	167	64	102	180	739
DL-2585	2	PAX	DL	2585	GEG	D	19:05	98%	188	176	12	192	3N1	0:55	DL-2586	2	PAX	DL	2586	ATL	D	20:00	100%	191	93	98	192	3N1
DL-2237	2	PAX	DL	2237	YWG	P	19:06	100%	157	156	1	157	320	1:17	DL-2238	2	PAX	DL	2238	ALB	D	20:23	85%	134	88	46	157	320
DL-2811	2	PAX	DL	2811	MDW	D	19:10	94%	71	25	47	76	E7W	0:45	DL-2812	2	PAX	DL	2812	CIU	D	19:55	72%	55	45	10	76	CR9
DL-2117	2	PAX	DL	2117	CVG	D	19:15	95%	124	59	65	130	223	1:05	DL-2118	2	PAX	DL	2118	DFW	D	20:20	94%	122	56	67	130	223
DL-2119	2	PAX	DL	2119	YYC	P	19:15	99%	129	95	34	130	223	0:50	DL-2120	2	PAX	DL	2120	YYC	P	20:05	99%	128	107	21	130	223
DL-2453	2	PAX	DL	2453	ATL	D	19:15	97%	233	90	143	240	753	1:16	DL-2454	2	PAX	DL	2454	SFO	D	20:31	95%	227	102	125	240	753
DL-2289	2	PAX	DL	2289	ATL	D	19:17	95%	268	44	224	281	339	2:09	DL-2290	2	PAX	DL	2290	KEF	I	21:26	100%	281	188	93	281	339
DL-2501	2	PAX	DL	2501	BWI	D	19:17	77%	154	73	81	199	757	0:58	DL-2502	2	PAX	DL	2502	BDL	D	20:15	96%	190	132	58	199	757
DL-2121	2	PAX	DL	2121	BIL	D	19:18	90%	117	95	22	130	223	0:51	DL-2122	2	PAX	DL	2122	FCA	D	20:09	94%	123	98	25	130	223
DL-2587	2	PAX	DL	2587	YVR	P	19:20	95%	182	134	48	192	3N1	0:45	DL-2588	2	PAX	DL	2588	YVR	P	20:05	94%	180	142	38	192	3N1
DL-2123	2	PAX	DL	2123	EWR	D	19:25	89%	115	47	68	130	223	1:00	DL-2124	2	PAX	DL	2124	CVG	D	20:25	96%	125	72	53	130	223
DL-2415	2	PAX	DL	2415	BUF	D	19:25	96%	173	112	60	180	739	0:55	DL-2416	2	PAX	DL	2416	DCA	D	20:20	97%	175	123	52	180	739
DL-2817	2	PAX	DL	2817	FSD	D	19:25	89%	67	57	11	76	CR9	0:45	DL-2818	2	PAX	DL	2818	MOT	D	20:10	70%	53	40	13	76	CR9
DL-2925	2	PAX	DL	2925	INL	D	19:26	82%	62	45	17	76	CR9	1:04	DL-2930	2	PAX	DL	2930	MQT	D	20:30	81%	62	47	15	76	CR9
DL-2317	2	PAX	DL	2317	YEG	P	19:27	83%	90	79	12	109	221	0:53	DL-2318	2	PAX	DL	2318	EWR	D	20:20	84%	92	43	49	109	221
DL-2589	2	PAX	DL	2589	SMF	D	19:28	97%	186	113	73	192	3N1	0:47	DL-2590	2	PAX	DL	2590	JFK	D	20:15	99%	190	59	130	192	3N1
DL-2927	2	PAX	DL	2927	LAN	D	19:31	84%	64	39	25	76	CR9	1:47	DL-2840	2	PAX	DL	2840	RHI	D	21:19	79%	60	52	8	76	CR9
DL-2183	2	PAX	DL	2183	CMH	D	19:32	87%	115	69	46	132	319	0:57	DL-2184	2	PAX	DL	2184	ROC	D	20:30	87%	115	79	36	132	319
DL-2239	2	PAX	DL	2239	SJC	D	19:33	88%	138	78	61	157	320	1:03	DL-2240	2	PAX	DL	2240	PIT	D	20:36	85%	134	85	48	157	320
DL-2175	2	PAX	DL	2175	RSW	D	19:34	90%	119	36	84	132	319	0:44	DL-2176	2	PAX	DL	2176	CLT	D	20:18	91%	120	68	52	132	319
DL-2063	2	PAX	DL	2063	TUL	D	19:35	69%	76	48	28	109	221	1:00	DL-2064	2	PAX	DL	2064	CLE	D	20:35	85%	92	44	48	109	221
DL-2177	2	PAX	DL	2177	PHL	D	19:35	100%	132	73	59	132	319	0:45	DL-2178	2	PAX	DL	2178	PHL	D	20:20	100%	132	81	51	132	319
DL-2185	2	PAX	DL	2185	MIA	D	19:40	97%	129	50	78	132	319	1:03	DL-2186	2	PAX	DL	2186	BUF	D	20:43	93%	123	79	44	132	319
DL-2803	2	PAX	DL	2803	GFK	D	19:40	79%	60	52	8	76	CR9	0:45	DL-2804	2	PAX	DL	2804	TVC	D	20:25	81%	61	49	12	76	E7W
DL-2825	2	PAX	DL	2825	RAP	D	19:44	78%	59	46	13	76	CR9	2:19	DL-2826	2	PAX	DL	2826	BJI	D	22:03	82%	62	57	5	76	CR9
DL-2805	2	PAX	DL	2805	ATW	D	19:45	80%	61	52	9	76	CR9	0:50	DL-2806	2	PAX	DL	2806	MDW	D	20:35	85%	64	25	40	76	CR9
DL-2807	2	PAX	DL	2807	OMA	D	19:45	92%	70	53	17	76	CR9	0:50	DL-2808	2	PAX	DL	2808	PIA	D	20:35	66%	51	36	15	76	CR9
DL-2591	2	PAX	DL	2591	ATL	D	19:45	97%	186	72	114	192	3N1	0:45	DL-2592	2	PAX	DL	2592	SYR	D	20:30	83%	158	104	55	192	3N1
DL-2593	2	PAX	DL	2593	BZN	D	19:45	92%	176	138	38	192	3N1	1:15	DL-2594	2	PAX	DL	2594	PDX	D	21:00	94%	180	133	46	192	3N1
DL-2595	2	PAX	DL	2595	SAN	D	19:45	95%	183	99	85	192	3N1	1:45	DL-2596	2	PAX	DL	2596	SLC	D	21:30	94%	181	113	68	192	3N1
DL-2827	2	PAX	DL	2827	PVD	D	19:45	88%	67	19	48	76	CR9	2:19	DL-2828	2	PAX	DL	2828	FSD	D	22:04	80%	61	42	18	76	CR9
DL-2829	2	PAX	DL	2829	RST	D	19:45	73%	55	51	4	76	E7W	2:21	DL-2830	2	PAX	DL	2830	OMA	D	22:06	73%	55	44	11	76	E7W
DL-2685	2	PAX	DL	2685	CID	D	19:47	77%	58	50	8	76	CR9	1:08	DL-2686	2	PAX	DL	2686	DAY	D	20:55	76%	58	34	23	76	CR9
DL-2433	2	PAX	DL	2433	DEN	D	19:49	77%	184	69	115	240	753	TOW/RON	DL-2434	2	PAX	DL	2434	SEA	D	6:50	95%	228	62	165	240	753
DL-2191	2	PAX	DL	2191	PHX	D	19:58	82%	129	32	97	157	320	TOW/RON	DL-2192	2	PAX	DL	2192	ORD	D	6:50	85%	133	30	103	157	320
DL-2061	2	PAX	DL	2061	MSN	D	20:00	54%	59	46	13	109	221	0:55	DL-2062	2	PAX	DL	2062	IND	D	20:55	91%	100	66	33	109	221
DL-2813	2	PAX	DL	2813	TVC	D	20:00	63%	48	36	11	76	CR9	0:51	DL-2814	2	PAX	DL	2814	DAY	D	20:51	75%	57	36	21	76	CR9
DL-2839	2	PAX	DL	2839	MQT	D	20:04	83%	63	48	15	76	CR9	1:56	DL-2844	2	PAX	DL	2844	RST	D	22:00	73%	55	51	4	76	CR9
DL-2815	2	PAX	DL	2815	ICT	D	20:05	78%	60	37	22	76	CR9	0:55	DL-2816	2	PAX	DL	2816	MLI	D	21:00	73%	55	41	14	76	E7W
DL-2687	2	PAX	DL	2687	FAR	D	20:19	50%	38	36	2	76	E7W	0:40	DL-2688	2	PAX	DL	2688	GRB	D	20:59	79%	60	51	9	76	E7W
DL-2187	2	PAX	DL	2187	IND	D	20:20	90%	119	59	60	132	319	0:51	DL-2188	2	PAX	DL	2188	FAR	D	21:11	73%	96	93	3	132	319
DL-2639	2	PAX	DL	2639	DAY	D	20:29	79%	55	35	20	69	CR7	1:03	DL-2640	2	PAX	DL	2640	YXE	I	21:32	89%	61	56	6	69	CR7
DL-2431	2	PAX	DL	2431	ATL	D	20:30	95%	184	26	158	193	752	TOW/RON	DL-2432	2	PAX	DL	2432	ATL	D	6:30	99%	191	72	120	193	752
DL-2689	2	PAX	DL	2689	FSD	D	20:32	69%	53	26	26	76	E7W	TOW/RON	DL-2690	2	PAX	DL	2690	MDW	D	7:00	94%	71	23	49	76	E7W
DL-2691	2	PAX	DL	2691	DSM	D	20:40	59%	45	37	8	76	E7W	0:50	DL-2692	2	PAX	DL	2692	CWA	D	21:30	73%	56	52	3	76	CR9
DL-2597	2	PAX	DL	2597	MCO	D	20:43	95%	183	62	121	192	3N1	1:12	DL-2598	2	PAX	DL	2598	SFO	D	21:55	95%	182	85	97	192	3N1
DL-2455	2	PAX	DL	2455	JFK	D	20:45	76%	181	56	125	240	753	1:28	DL-2456	2	PAX	DL	2456	SEA	D	22:13	98%	235	143	93	240	753
DL-2193	2	PAX	DL	2193	LGA	D	20:46	93%	146	28	118	157	320	TOW/RON	DL-2194	2	PAX	DL	2194	PHL	D	7:39	88%	138	55	83	157	320
DL-2427	2	PAX	DL	2427	SFO	D	20:49	96%	172	-	172	180	739	1:27	DL-2428	2	PAX	DL	2428	LAS	D	22:16	96%	172	81	91	180	739
DL-2457	2	PAX	DL	2457	SEA	D	20:57	96%	192	71	121	199	757	TOW/RON	DL-2458	2	PAX	DL	2458	MCO	D	6:50	94%	186	40	146	199	757
DL-2127	2	PAX	DL	2127	YYZ	P	21:00	86%	112	61	50	130	223	0:44	DL-2128	2	PAX	DL	2128	DSM	D	21:44	82%	106	96	10	130	223
DL-2823	2	PAX	DL	2823	GRB	D	21:00	86%	66	56	10	76	CR9	1:00	DL-2824	2	PAX	DL	2824	BRD	D	22:00	71%	54	52	2	76	CR9
DL-2189	2	PAX	DL	2189	PIT	D	21:05	69%	91	48	44	132	319	1:21	DL-2190	2	PAX	DL	2190	MSN	D	22:26	73%	96	84	11	132	319
DL-2321	2	PAX	DL	2321	MEM	D	21:05	84%	92	51	41	109	221	1:01	DL-2322	2	PAX	DL	2322	DLH	D	22:06	66%	72	60	12	109	221
DL-2507	2	PAX	DL	2507	LAS	D	21:05	98%	194	101	93	199	757	1:21	DL-2508	2	PAX	DL	2508	PDX	D	22:26	90%	179	112	68	199	757
DL-2841	2	PAX	DL	2841	SBN	D	21:05	76%	58	32	26	76	CR9	TOW/RON	DL-2834	2	PAX	DL	2834	XWA	D	8:40	65%	50	44	6	76	CR9
DL-2843	2	PAX	DL	2843	XWA	D	21:05	67%	51	44	7	76	CR9	TOW/RON	DL-2836	2	PAX	DL	2836	AZO	D	8:45	75%	57	36	21	76	CR9
DL-2421	2	PAX	DL	2421	DEN	D	21:06	94%	170	35	135	180	739	TOW/RON	DL-2422	2	PAX	DL	2422	MCI	D	6:40	82%	148	104	44	180	739
DL-2423	2	PAX	DL	2423	MKE	D	21:07	66%	119	66	53	180	739	0:53	DL-2424	2	PAX	DL	2424	GRR	D	22:00	83%	149	117	32	180	739
DL-2821	2	PAX	DL	2821	RIC	D	21:10	81%	62	31	31	76	CR9	0:50	DL-2822	2	PAX	DL	2822	ATW	D	22:00	75%	57	50	7	76	CR9
DL-2693	2	PAX	DL	2693	YUL	P	21:10	91%	69	42	27	76	CR9	TOW/RON	DL-2694	2	PAX	DL	2694	IAH	D	6:50	92%	70	28	42	76	CR9
DL-2001	2	PAX	DL	2001	MCI	D	21:11	57%	62	30	32	109	221	TOW/RON	DL-2002	2	PAX	DL	2002	STL	D	6:55	73%	80	30	50	109	221
DL-2195	2	PAX	DL	2195	OMA	D	[illegible]	[illegible]	90	55	35	157	320	TOW/RON	DL-2196	2	PAX	DL	2196	YWG	P	8:45	75%	117	91	27	[illegible]	320

DL-2459	2	PAX	DL	2459	ANC	D	21:15	100%	199	139	60	199	757
DL-2003	2	PAX	DL	2003	SAT	D	21:16	86%	94	28	66	109	221
DL-2695	2	PAX	DL	2695	MOT	D	21:18	53%	40	25	15	76	E7W
DL-2531	2	PAX	DL	2531	GEG	D	21:18	82%	157	93	63	192	3N1
DL-2503	2	PAX	DL	2503	SLC	D	21:20	95%	189	125	64	199	757
DL-2505	2	PAX	DL	2505	PDX	D	21:20	100%	199	154	45	199	757
DL-2065	2	PAX	DL	2065	STL	D	21:20	71%	78	27	51	109	221
DL-2697	2	PAX	DL	2697	IAH	D	21:20	83%	63	18	45	76	CR9
DL-2699	2	PAX	DL	2699	MDW	D	21:20	82%	62	13	49	76	E7W
DL-2533	2	PAX	DL	2533	SFO	D	21:22	97%	187	44	143	192	3N1
DL-2541	2	PAX	DL	2541	LAX	D	21:23	96%	184	44	140	192	3N1
DL-2131	2	PAX	DL	2131	BDL	D	21:24	77%	101	56	46	132	319
DL-2129	2	PAX	DL	2129	AUS	D	21:25	89%	116	39	77	130	223
DL-2241	2	PAX	DL	2241	SNA	D	21:25	93%	147	67	80	157	320
DL-2197	2	PAX	DL	2197	ORD	D	21:25	84%	132	29	103	157	320
DL-2199	2	PAX	DL	2199	PHX	D	21:25	82%	128	31	97	157	320
DL-2643	2	PAX	DL	2643	EWR	D	21:30	78%	54	16	38	69	CR7
DL-2201	2	PAX	DL	2201	PHL	D	21:38	77%	121	45	77	157	320
DL-2547	2	PAX	DL	2547	PDX	D	22:06	95%	182	-	182	192	3N1
DL-2243	2	PAX	DL	2243	LAS	D	22:12	72%	138	48	91	192	321
DL-2511	2	PAX	DL	2511	SEA	D	22:50	93%	179	-	179	192	3N1
DL-2513	2	PAX	DL	2513	ATL	D	22:53	94%	181	-	181	192	3N1
DL-2435	2	PAX	DL	2435	LAX	D	23:05	94%	226	-	226	240	753
DL-2425	2	PAX	DL	2425	LAS	D	23:24	93%	168	-	168	180	739
DL-2429	2	PAX	DL	2429	SLC	D	23:58	84%	151	-	151	180	739
EI-1153	2	PAX	EI	2035	DUB	P	16:55	94%	174	17	156	184	32Q
F9-1187	2	PAX	F9	2049	TTN	D	7:49	98%	225	3	222	230	321
F9-1189	2	PAX	F9	2043	DEN	D	9:03	85%	196	1	195	230	321
F9-1191	2	PAX	F9	2037	AUS	D	10:07	99%	227	2	225	230	321
F9-1185	2	PAX	F9	2041	COS	D	15:19	99%	178	-	178	180	320
F9-1193	2	PAX	F9	2045	DEN	D	17:59	85%	153	1	153	180	32N
F9-1195	2	PAX	F9	2047	MCO	D	18:54	91%	164	-	164	180	32N
F9-1183	2	PAX	F9	2039	CLE	D	21:30	91%	163	0	163	180	320
FI-1197	2	PAX	FI	2051	KEF	I	18:05	82%	181	1	180	220	7M9
KL-2947	2	PAX	KL	2053	AMS	I	11:20	99%	340	153	187	344	781
NK-1165	2	PAX	NK	2067	LAS	D	6:15	99%	180	0	180	182	32A
NK-1157	2	PAX	NK	2065	IAH	D	12:03	99%	148	10	138	150	319
NK-1159	2	PAX	NK	2055	ATL	D	13:31	97%	146	2	143	150	319
NK-1171	2	PAX	NK	2071	MCO	D	13:51	99%	226	4	222	228	3N1
NK-1173	2	PAX	NK	2063	DTW	D	14:07	79%	180	10	170	228	3N1
NK-1167	2	PAX	NK	2057	BWI	D	14:49	99%	180	0	180	182	32N
NK-1161	2	PAX	NK	2059	DEN	D	19:23	99%	148	3	145	150	319
NK-1169	2	PAX	NK	2073	MYR	D	19:36	99%	180	4	176	182	32N
NK-1163	2	PAX	NK	2061	DFW	D	20:34	96%	143	0	143	150	319
NK-1155	2	PAX	NK	2069	LAX	D	23:59	96%	143	-	143	150	319
SY-1199	2	PAX	SY	2157	SFO	D	0:03	87%	162	-	162	186	738
SY-1201	2	PAX	SY	2131	PHX	D	4:51	89%	165	37	129	186	738
SY-1203	2	PAX	SY	2121	PDX	D	5:06	89%	165	53	112	186	738
SY-1205	2	PAX	SY	2075	ANC	D	5:10	91%	170	56	114	186	738
SY-1207	2	PAX	SY	2151	SEA	D	5:11	92%	172	82	90	186	738
SY-1209	2	PAX	SY	2107	LAX	D	5:16	90%	168	43	124	186	738
SY-1211	2	PAX	SY	2141	SAN	D	5:26	92%	171	49	122	186	738
SY-1221	2	PAX	SY	2093	DCA	D	7:00	92%	172	56	116	186	738
SY-1223	2	PAX	SY	2117	ORD	D	7:15	90%	168	42	126	186	738
SY-1225	2	PAX	SY	2089	BOS	D	7:45	90%	167	59	109	186	738
SY-1227	2	PAX	SY	2077	ATL	D	7:50	91%	170	24	146	186	738
SY-1229	2	PAX	SY	2135	RSW	D	7:50	90%	168	29	139	186	738
SY-1231	2	PAX	SY	2097	DEN	D	7:55	90%	167	24	143	186	738
SY-1233	2	PAX	SY	2103	LAS	D	12:05	91%	170	65	104	186	738
SY-1235	2	PAX	SY	2099	DEN	D	12:20	90%	167	24	143	186	738
SY-1237	2	PAX	SY	2109	LAX	D	12:30	90%	168	43	124	186	738
SY-1239	2	PAX	SY	2133	PHX	D	12:30	89%	165	37	129	186	738
SY-1241	2	PAX	SY	2123	PDX	D	12:35	89%	165	53	112	186	738
SY-1243	2	PAX	SY	2081	AUS	D	12:39	91%	170	20	150	186	738
SY-1245	2	PAX	SY	2091	BOS	D	13:45	90%	167	59	109	186	738
SY-1247	2	PAX	SY	2127	PHL	D	13:55	91%	169	53	116	186	738
SY-1249	2	PAX	SY	2101	EWR	D	14:00	96%	178	112	66	186	738
SY-1251	2	PAX	SY	2153	SEA	D	14:00	92%	172	82	90	186	738
SY-1253	2	PAX	SY	2137	RSW	D	14:03	90%	168	29	139	186	738
SY-1255	2	PAX	SY	2085	BNA	D	14:10	89%	166	31	135	186	738
SY-1257	2	PAX	SY	2113	MCO	D	14:10	90%	167	31	137	186	738
SY-1259	2	PAX	SY	2159	SFO	D	14:36	93%	174	82	92	186	738
SY-1261	2	PAX	SY	2105	LAS	D	15:31	91%	170	65	104	186	738
SY-1263	2	PAX	SY	2079	ATL	D	16:48	91%	170	24	146	186	738
SY-1265	2	PAX	SY	2143	SAN	D	17:01	92%	171	49	122	186	738
SY-1267	2	PAX	SY	2147	SAT	D	18:00	90%	168	20	147	186	738
SY-1269	2	PAX	SY	2125	PDX	D	18:26	89%	165	53	112	186	738
SY-1271	2	PAX	SY	2111	LAX	D	18:31	90%	168	43	124	186	738
SY-1273	2	PAX	SY	2087	BNA	D	19:01	89%	166	31	135	186	738
SY-1275	2	PAX	SY	2119	ORD	D	19:06	90%	168	42	126	186	738
SY-1277	2	PAX	SY	2095	DCA	D	19:45	92%	172	56	116	186	738
SY-1279	2	PAX	SY	2129	PHL	D	20:00	91%	169	53	116	186	738
SY-1281	2	PAX	SY	2115	MCO	D	21:00	88%	163	-	163	186	738
SY-1283	2	PAX	SY	2139	RSW	D	21:15	88%	164	-	164	186	738
SY-1213	2	PAX	SY	2155	SEA	D	22:51	85%	159	-	159	186	738
SY-1215	2	PAX	SY	2149	SAT	D	23:10	89%	165	-	165	186	738
SY-1217	2	PAX	SY	2083	AUS	D	23:11	90%	168	-	168	186	738
SY-1219	2	PAX	SY	2145	SAN	D	23:30	89%	165	-	165	186	738
UA-1115	2	PAX	UA	2195	ORD	D	0:22	91%	150	6	144	166	7M8
UA-1117	2	PAX	UA	2215	SFO	D	5:23	75%	124	10	114	166	7M8
UA-1099	2	PAX	UA	2197	ORD	D	7:31	91%	116	5	111	128	319
UA-1101	2	PAX	UA	2169	EWR	D	8:08	92%	117	2	115	128	319
UA-1107	2	PAX	UA	2199	ORD	D	9:31	91%	136	6	130	150	320
UA-1137	2	PAX	UA	2181	IAD	D	10:01	99%	75	1	74	76	E7W
UA-1111	2	PAX	UA	2161	DEN	D	10:34	94%	168	3	165	179	739
UA-1123	2	PAX	UA	2185	IAH	D	10:52	86%	60	1	59	70	E70
UA-1139	2	PAX	UA	2171	EWR	D	11:02	92%	70	1	68	76	E7W
UA-1125	2	PAX	UA	2201	ORD	D	11:46	91%	63	3	61	70	E70
UA-1141	2	PAX	UA	2173	EWR	D	12:49	92%	70	1	68	76	E7W
UA-1143	2	PAX	UA	2187	IAH	D	12:57	86%	65	1	64	76	E7W
UA-1109	2	PAX	UA	2163	DEN	D	13:55	94%	156	3	153	166	738
UA-1145	2	PAX	UA	2203	ORD	D	14:25	91%	69	3	66	76	E7W
UA-1119	2	PAX	UA	2189	IAH	D	14:44	86%	143	2	141	166	7M8
UA-1095	2	PAX	UA	2217	SFO	D	15:52	75%	81	6	75	109	221
UA-1147	2	PAX	UA	2165	DEN	D	16:18	94%	71	1	70	76	E7W
UA-1103	2	PAX	UA	2205	ORD	D	17:00	91%	116	5	111	128	319
UA-1127	2	PAX	UA	2191	IAH	D	17:06	86%	60	1	59	70	E70
UA-1121	2	PAX	UA	2207	ORD	D	17:30	91%	162	7	155	179	7M9
UA-1097	2	PAX	UA	2175	EWR	D	17:34	92%	100	2	98	109	221
UA-1149	2	PAX	UA	2177	EWR	D	18:25	92%	70	1	68	76	E7W
UA-1151	2	PAX	UA	2209	ORD	D	19:32	91%	69	3	66	76	E7W
UA-1129	2	PAX	UA	2183	IAD	D	19:45	99%	75	1	74	76	E7W
UA-1131	2	PAX	UA	2211	ORD	D	21:18	91%	69	3	66	76	E7W
UA-1133	2	PAX	UA	2193	IAH	D	22:46	86%	65	1	64	76	E7W
UA-1105	2	PAX	UA	2213	ORD	D	22:48	91%	136	6	130	150	320
UA-1135	2	PAX	UA	2179	EWR	D	23:14	92%	70	1	68	76	E7W
UA-1113	2	PAX	UA	2167	DEN	D	23:18	94%	118	2	116	126	73G
WN-1327	2	PAX	WN	2237	DEN	D	1:20	99%	173	3	170	175	7M8
WN-1295	2	PAX	WN	2239	DEN	D	7:30	99%	141	2	139	143	73W
WN-1285	2	PAX	WN	2253	MDW	D	8:10	75%	132	2	130	175	73H
WN-1297	2	PAX	WN	2233	DAL	D	9:15	95%	136	2	134	143	73W
WN-1299	2	PAX	WN	2223	BNA	D	9:22	70%	100	1	99	143	73W
WN-1301	2	PAX	WN	2227	BWI	D	9:47	93%	133	1	132	143	73W
WN-1303	2	PAX	WN	2255	MDW	D	10:12	75%	107	2	106	143	73W
WN-1305	2	PAX	WN	2219	ATL	D	10:20	95%	136	1	135	143	73W
WN-1307	2	PAX	WN	2273	STL	D	11:15	82%	117	2	115	143	73W
WN-1309	2	PAX	WN	2257	MDW	D	11:42	75%	107	2	106	143	73W
WN-1335	2	PAX	WN	2249	MCI	D	12:51	99%	173	6	168	175	7M8
WN-1311	2	PAX	WN	2269	PHX	D	13:22	99%	141	2	140	143	73W
WN-1313	2	PAX	WN	2225	BNA	D	14:22	70%	100	1	99	143	73W
WN-1337	2	PAX	WN	2241	DEN	D	14:55	99%	173	3	170	175	7M8
WN-1315	2	PAX	WN	2221	ATL	D	15:40	95%	136	1	135	143	73W
WN-1317	2	PAX	WN	2259	MDW	D	16:57	75%	107	2	106	143	73W
WN-1319	2	PAX	WN	2229	BWI	D	17:00	93%	133	1	132	143	73W
WN-1339	2	PAX	WN	2275	STL	D	17:27	82%	143	3	140	175	7M8
WN-1287	2	PAX	WN	2261	MDW	D	18:15	75%	132	2	130	175	73H
WN-1321	2	PAX	WN	2243	DEN	D	18:30	99%	141	2	139	143	73W
WN-1323	2	PAX	WN	2235	DAL	D	18:40	95%	136	2	134	143	73W
WN-1325	2	PAX	WN	2263	MDW	D	19:35	75%	107	2	106	143	73W
WN-1341	2	PAX	WN	2245	DEN	D	19:42	99%	173	3	170	175	7M8
WN-1343	2	PAX	WN	2265	MDW	D	21:00	75%	132	2	130	175	7M8
WN-1289	2	PAX	WN	2231	BWI	D	21:20	93%	133	1	132	143	73W
WN-1291	2	PAX	WN	2277	STL	D	21:50	82%	117	2	115	143	73W
WN-1293	2	PAX	WN	2251	MCI	D	22:00	99%	142	5	137	143	73W
WN-1329	2	PAX	WN	2247	DEN	D	22:45	99%	173	3	170	175	7M8
WN-1331	2	PAX	WN	2271	PHX	D	23:30	99%	173	2	171	175	7M8
WN-1333	2	PAX	WN	2267	MDW	D	23:50	75%	132	2	130	175	7M8

TOW/RON	DL-2460	2	PAX	DL	2460	DEN	D	6:59	95%	190	38	152	199	757
TOW/RON	DL-2004	2	PAX	DL	2004	MSN	D	7:05	51%	56	43	13	109	221
0:47	DL-2696	2	PAX	DL	2696	OMA	D	22:05	76%	58	43	15	76	CR9
TOW/RON	DL-2532	2	PAX	DL	2532	SMF	D	7:20	93%	179	105	74	192	3N1
0:50	DL-2504	2	PAX	DL	2504	LAX	D	22:10	91%	180	72	109	199	757
1:05	DL-2506	2	PAX	DL	2506	SAN	D	22:25	94%	187	96	92	199	757
0:50	DL-2066	2	PAX	DL	2066	STL	D	22:10	74%	80	48	32	109	221
1:00	DL-2698	2	PAX	DL	2698	RST	D	22:20	72%	55	50	4	76	CR9
0:50	DL-2700	2	PAX	DL	2700	RAP	D	22:10	72%	54	39	15	76	E7W
TOW/RON	DL-2534	2	PAX	DL	2534	YVR	P	7:25	94%	180	136	44	192	3N1
TOW/RON	DL-2542	2	PAX	DL	2542	ANC	D	7:15	94%	181	141	40	192	3N1
TOW/RON	DL-2132	2	PAX	DL	2132	CMH	D	6:50	82%	108	66	42	132	319
0:40	DL-2130	2	PAX	DL	2130	GRB	D	22:05	74%	97	83	14	130	223
0:50	DL-2242	2	PAX	DL	2242	YWG	P	22:15	95%	150	143	7	157	320
TOW/RON	DL-2198	2	PAX	DL	2198	LGA	D	8:55	100%	157	42	115	157	320
TOW/RON	DL-2200	2	PAX	DL	2200	LGA	D	9:59	100%	157	48	109	157	320
0:45	DL-2644	2	PAX	DL	2644	RAP	D	22:15	69%	47	36	12	69	CR7
TOW/RON	DL-2202	2	PAX	DL	2202	ORD	D	10:31	97%	152	56	96	157	320
TOW/RON	DL-2548	2	PAX	DL	2548	DCA	D	6:50	96%	184	112	72	192	3N1
TOW/RON	DL-2244	2	PAX	DL	2244	DTW	D	6:30	96%	184	31	153	192	321
TOW/RON	DL-2512	2	PAX	DL	2512	ATL	D	5:30	94%	181	-	181	192	3N1
TOW/RON	DL-2514	2	PAX	DL	2514	ATL	D	6:30	98%	188	19	169	192	3N1
TOW/RON	DL-2436	2	PAX	DL	2436	SEA	D	8:50	98%	234	131	103	240	753
TOW/RON	DL-2426	2	PAX	DL	2426	PHX	D	6:55	92%	165	63	103	180	739
TOW/RON	DL-2430	2	PAX	DL	2430	MKE	D	7:30	82%	148	109	39	180	739
1:50	EI-1154	2	PAX	EI	2036	DUB	P	18:45	95%	175	17	157	184	32Q
0:58	F9-1188	2	PAX	F9	2044	DEN	D	8:47	88%	203	1	202	230	321
0:58	F9-1190	2	PAX	F9	2040	CLE	D	10:01	99%	229	-	229	230	321
0:58	F9-1192	2	PAX	F9	2038	AUS	D	11:05	100%	229	0	229	230	321
0:58	F9-1186	2	PAX	F9	2042	COS	D	16:17	100%	179	-	179	180	320
0:51	F9-1194	2	PAX	F9	2050	TTN	D	18:50	90%	162	-	162	180	32N
0:59	F9-1196	2	PAX	F9	2046	DEN	D	19:53	88%	159	1	158	180	32N
TOW/RON	F9-1184	2	PAX	F9	2048	MCO	D	8:00	92%	165	-	165	180	320
1:15	FI-1198	2	PAX	FI	2052	KEF	I	19:20	83%	182	1	181	220	7M9
3:40	KL-2948	2	PAX	KL	2054	AMS	I	15:00	100%	342	154	188	344	781
1:15	NK-1166	2	PAX	NK	2074	MYR	D	7:30	100%	181	-	181	182	32A
1:38	NK-1158	2	PAX	NK	2060	DEN	D	13:41	100%	149	4	145	150	319
1:38	NK-1160	2	PAX	NK	2056	ATL	D	15:09	93%	139	3	136	150	319
1:09	NK-1172	2	PAX	NK	2072	MCO	D	15:00	100%	227	2	225	228	3N1
0:58	NK-1174	2	PAX	NK	2064	DTW	D	15:05	79%	181	13	168	228	3N1
1:48	NK-1168	2	PAX	NK	2058	BWI	D	16:37	100%	181	1	180	182	32N
0:50	NK-1162	2	PAX	NK	2066	IAH	D	20:13	100%	149	10	139	150	319
1:48	NK-1170	2	PAX	NK	2068	LAS	D	21:24	100%	181	7	174	182	32N
1:01	NK-1164	2	PAX	NK	2062	DFW	D	21:35	92%	138	8	131	150	319
TOW/RON	NK-1156	2	PAX	NK	2070	LAX	D	6:32	96%	144	0	144	150	319
5:57	SY-1200	2	PAX	SY	2158	SFO	D	6:00	93%	174	-	174	186	738
1:19	SY-1202	2	PAX	SY	2152	SEA	D	6:10	92%	171	-	171	186	738
1:19	SY-1204	2	PAX	SY	2136	RSW	D	6:25	90%	168	20	148	186	738
1:28	SY-1206	2	PAX	SY	2078	ATL	D	6:39	90%	167	21	146	186	738
1:28	SY-1208	2	PAX	SY	2114	MCO	D	6:40	89%	166	20	146	186	738
1:34	SY-1210	2	PAX	SY	2090	BOS	D	6:50	90%	167	58	109	186	738
1:28	SY-1212	2	PAX	SY	2102	EWR	D	6:54	92%	171	56	115	186	738
1:30	SY-1222	2	PAX	SY	2108	LAX	D	8:30	92%	172	23	149	186	738
1:22	SY-1224	2	PAX	SY	2142	SAN	D	8:37	92%	172	17	155	186	738
1:02	SY-1226	2	PAX	SY	2148	SAT	D	8:47	91%	169	14	155	186	738
1:12	SY-1228	2	PAX	SY	2122	PDX	D	9:02	91%	168	55	114	186	738
1:40	SY-1230	2	PAX	SY	2116	MCO	D	9:30	89%	166	20	146	186	738
1:35	SY-1232	2	PAX	SY	2130	PHL	D	9:30	91%	169	73	96	186	738
1:25	SY-1234	2	PAX	SY	2138	RSW	D	13:30	90%	168	20	148	186	738
1:15	SY-1236	2	PAX	SY	2094	DCA	D	13:35	92%	171	55	116	186	738
1:15	SY-1238	2	PAX	SY	2088	BNA	D	13:45	88%	163	28	135	186	738
2:25	SY-1240	2	PAX	SY	2118	ORD	D	14:55	88%	164	39	125	186	738
2:25	SY-1242	2	PAX	SY	2154	SEA	D	15:00	92%	171	85	86	186	738
2:31	SY-1244	2	PAX	SY	2144	SAN	D	15:10	92%	172	42	129	186	738
1:30	SY-1246	2	PAX	SY	2150	SAT	D	15:15	91%	169	14	155	186	738
1:20	SY-1248	2	PAX	SY	2160	SFO	D	15:15	93%	174	85	89	186	738
1:20	SY-1250	2	PAX	SY	2082	AUS	D	15:20	92%	172	14	157	186	738
1:25	SY-1252	2	PAX	SY	2110	LAX	D	15:25	92%	172	57	115	186	738
1:27	SY-1254	2	PAX	SY	2092	BOS	D	15:30	90%	167	58	109	186	738
2:14	SY-1256	2	PAX	SY	2076	ANC	D	16:24	92%	171	56	115	186	738
3:09	SY-1258	2	PAX	SY	2124	PDX	D	17:19	91%	168	55	114	186	738
3:48	SY-1260	2	PAX	SY	2080	ATL	D	18:24	90%	167	21	146	186	738
3:08	SY-1262	2	PAX	SY	2140	RSW	D	18:39	90%	168	20	148	186	738
2:00	SY-1264	2	PAX	SY	2096	DCA	D	18:49	92%	171	55	116	186	738
2:14	SY-1266	2	PAX	SY	2120	ORD	D	19:15	88%	164	39	125	186	738
2:14	SY-1268	2	PAX	SY	2106	LAS	D	20:14	91%	170	57	113	186	738
1:53	SY-1270	2	PAX	SY	2132	PHX	D	20:19	89%	166	46	120	186	738
2:00	SY-1272	2	PAX	SY	2146	SAN	D	20:31	92%	172	42	129	186	738
1:33	SY-1274	2	PAX	SY	2112	LAX	D	20:34	92%	172	57	115	186	738
1:43	SY-1276	2	PAX	SY	2100	DEN	D	20:49	92%	172	40	132	186	738
1:09	SY-1278	2	PAX	SY	2156	SEA	D	20:54	92%	171	85	86	186	738
1:10	SY-1280	2	PAX	SY	2126	PDX	D	21:10	91%	168	55	114	186	738
0:45	SY-1282	2	PAX	SY	2084	AUS	D	21:45	92%	172	14	157	186	738
0:45	SY-1284	2	PAX	SY	2134	PHX	D	22:00	89%	166	46	120	186	738
TOW/RON	SY-1214	2	PAX	SY	2086	BNA	D	6:58	88%	163	28	135	186	738
TOW/RON	SY-1216	2	PAX	SY	2128	PHL	D	7:14	91%	169	11	157	186	738
TOW/RON	SY-1218	2	PAX	SY	2098	DEN	D	7:45	92%	172	13	158	186	738
TOW/RON	SY-1220	2	PAX	SY	2104	LAS	D	8:05	91%	170	23	147	186	738
4:38	UA-1116	2	PAX	UA	2196	ORD	D	5:00	91%	151	6	145	166	7M8
1:02	UA-1118	2	PAX	UA	2216	SFO	D	6:25	75%	125	10	115	166	7M8
1:04	UA-1100	2	PAX	UA	2202	ORD	D	8:35	91%	117	5	112	128	319
0:37	UA-1102	2	PAX	UA	2172	EWR	D	8:45	88%	112	2	110	128	319
0:49	UA-1108	2	PAX	UA	2204	ORD	D	10:20	91%	137	6	131	150	320
2:03	UA-1138	2	PAX	UA	2174	EWR	D	12:04	88%	67	1	65	76	E7W
0:58	UA-1112	2	PAX	UA	2164	DEN	D	11:32	92%	165	4	161	179	739
0:21	UA-1124	2	PAX	UA	2188	IAH	D	11:13	93%	65	1	64	70	E70
1:13	UA-1140	2	PAX	UA	2184	IAD	D	12:15	100%	76	1	74	76	E7W
1:24	UA-1126	2	PAX	UA	2206	ORD	D	13:10	91%	64	3	61	70	E70
0:36	UA-1142	2	PAX	UA	2176	EWR	D	13:25	88%	67	1	65	76	E7W
1:12	UA-1144	2	PAX	UA	2190	IAH	D	14:09	93%	71	1	70	76	E7W
1:48	UA-1110	2	PAX	UA	2210	ORD	D	15:43	91%	151	6	145	166	738
0:52	UA-1146	2	PAX	UA	2208	ORD	D	15:17	91%	69	3	66	76	E7W
1:16	UA-1120	2	PAX	UA	2192	IAH	D	16:00	93%	155	2	152	166	7M8
0:35	UA-1096	2	PAX	UA	2178	EWR	D	16:27	88%	96	2	94	109	221
0:46	UA-1148	2	PAX	UA	2166	DEN	D	17:04	92%	70	2	68	76	E7W
1:48	UA-1104	2	PAX	UA	2168	DEN	D	18:48	92%	118	3	115	128	319
0:53	UA-1128	2	PAX	UA	2194	IAH	D	17:59	93%	65	1	64	70	E70
2:19	UA-1122	2	PAX	UA	2214	ORD	D	19:50	91%	163	7	156	179	7M9
0:35	UA-1098	2	PAX	UA	2218	SFO	D	18:09	75%	82	6	75	109	221
0:30	UA-1150	2	PAX	UA	2212	ORD	D	18:55	91%	69	3	66	76	E7W
0:38	UA-1152	2	PAX	UA	2180	EWR	D	20:10	88%	67	1	65	76	E7W
TOW/RON	UA-1130	2	PAX	UA	2170	EWR	D	6:00	88%	67	1	65	76	E7W
TOW/RON	UA-1132	2	PAX	UA	2200	ORD	D	7:30	91%	69	3	66	76	E7W
TOW/RON	UA-1134	2	PAX	UA	2186	IAH	D	8:00	93%	71	1	70	76	E7W
TOW/RON	UA-1106	2	PAX	UA	2198	ORD	D	6:35	91%	137	6	131	150	320
TOW/RON	UA-1136	2	PAX	UA	2182	IAD	D	8:16	100%	76	1	74	76	E7W
TOW/RON	UA-1114	2	PAX	UA	2162	DEN	D	6:00	92%	116	3	113	126	73G
4:10	WN-1328	2	PAX	WN	2254	MDW	D	5:30	75%	132	2	130	175	7M8
0:45	WN-1296	2	PAX	WN	2228	BWI	D	8:15	94%	134	1	133	143	73W
0:45	WN-1286	2	PAX	WN	2240	DEN	D	8:55	97%	169	2	167	175	73H
0:45	WN-1298	2	PAX	WN	2242	DEN	D	10:00	97%	138	2	136	143	73W
0:45	WN-1300	2	PAX	WN	2250	MCI	D	10:07	95%	136	7	129	143	73W
0:45	WN-1302	2	PAX	WN	2236	DAL	D	10:32	96%	137	3	134	143	73W
0:45	WN-1304	2	PAX	WN	2230	BWI	D	10:57	94%	134	1	133	143	73W
0:50	WN-1306	2	PAX	WN	2244	DEN	D	11:10	97%	138	2	136	143	73W
0:45	WN-1308	2	PAX	WN	2258	MDW	D	12:00	75%	108	1	106	143	73W
0:45	WN-1310	2	PAX	WN	2276	STL	D	12:27	81%	116	4	112	143	73W
0:48	WN-1336	2	PAX	WN	2246	DEN	D	13:39	97%	169	2	167	175	7M8
0:45	WN-1312	2	PAX	WN	2224	BNA	D	14:07	70%	101	1	100	143	73W
0:45	WN-1314	2	PAX	WN	2260	MDW	D	15:07	75%	108	1	106	143	73W
0:40	WN-1338	2	PAX	WN	2222	ATL	D	15:35	96%	167	1	166	175	7M8
0:45	WN-1316	2	PAX	WN	2262	MDW	D	16:25	75%	108	1	106	143	73W
0:45	WN-1318	2	PAX	WN	2252	MCI	D	17:42	95%	136	7	129	143	73W
0:45	WN-1320	2	PAX	WN	2232	BWI	D	17:45	94%	134	1	133	143	73W
0:45	WN-1340	2	PAX	WN	2226	BNA	D	18:12	70%	123	1	122	175	7M8
0:40	WN-1288	2	PAX	WN	2264	MDW	D	18:55	75%	132	2	130	175	73H
0:55	WN-1322	2	PAX	WN	2278	STL	D	19:25	81%	116	4	112	143	73W
1:40	WN-1324	2	PAX	WN	2248	DEN	D	20:20	97%	138	2	136	143	73W
1:45	WN-1326	2	PAX	WN	2268	MDW	D	21:20	75%	108	1	106	143	73W
0:45	WN-1342	2	PAX	WN	2266	MDW	D	20:27	75%	132	2	130	175	7M8
0:45	WN-1344	2	PAX	WN	2272	PHX	D	21:45	95%	167	3	163	175	7M8
TOW/RON	WN-1290	2	PAX	WN	2270	PHX	D	5:40	95%	136	3	134	143	73W
TOW/RON	WN-1292	2	PAX	WN	2274	STL	D	6:10	81%	116	4	112	143	73W
TOW/RON	WN-1294	2	PAX	WN	2220	ATL	D	6:30	96%	137	1	136	143	73W
TOW/RON	WN-1330	2	PAX	WN	2238	DEN	D	5:55	97%	169	2	167	175	7M8
TOW/RON	WN-1332	2	PAX	WN	2256	MDW	D	7:00	75%	132	2	130	175	7M8
TOW/RON	WN-1334	2	PAX	WN	2234	DAL	D	7:30	96%	168	4	164	175	7M8

PAL 3 Alternate 2 Spring

	2	PAX															2	PAX												
INBOUND																OUTBOUND														
A_CODE	A_DAY	A_TYPE	A_MAIR	A_FLT#	A_MKT	A_D/I/F	A_TIME	A_LF	A_PAX	A_CX	A_OD	A_STS	A_EQP	A_GATE	G_TIME	D_CODE	D_DAY	D_TYPE	D_MAIR	D_FLT#	D_MKT	D_D/I/F	D_TIME	D_LF	D_PAX	D_CX	D_OD	D_STS	D_EQP	D_GATE
3E-3029	2	PAX	3E	3029	MCW	D	10:25	54%	4	0	4	8	CNC		0:45	3E-3030	2	PAX	3E	3030	MCW	D	11:10	48%	4	0	4	8	CNC	
3E-3031	2	PAX	3E	3031	IWD	D	13:05	83%	7	0	7	8	CNC		1:40	3E-3032	2	PAX	3E	3032	IWD	D	14:45	70%	6	0	6	8	CNC	
3E-3033	2	PAX	3E	3033	FOD	D	14:05	62%	5	0	5	8	CNC		1:25	3E-3034	2	PAX	3E	3034	FOD	D	15:30	61%	5	0	5	8	CNC	
3E-3035	2	PAX	3E	3035	MCW	D	15:15	54%	4	0	4	8	CNC		0:45	3E-3036	2	PAX	3E	3036	MCW	D	16:00	48%	4	0	4	8	CNC	
4B-3037	2	PAX	4B	3037	TVF	D	7:45	56%	5	0	4	8	PL2		0:40	4B-3038	2	PAX	4B	3038	TVF	D	8:25	60%	5	0	5	8	PL2	
4B-3039	2	PAX	4B	3039	TVF	D	11:25	56%	5	0	4	8	PL2		3:05	4B-3040	2	PAX	4B	3040	TVF	D	14:30	60%	5	0	5	8	PL2	
4B-3041	2	PAX	4B	3041	TVF	D	17:30	56%	5	0	4	8	PL2		0:40	4B-3042	2	PAX	4B	3042	TVF	D	18:10	60%	5	0	5	8	PL2	
AA-2065	2	PAX	AA	2065	PHX	D	0:03	93%	161	4	157	172	7M8		5:57	AA-2066	2	PAX	AA	2066	PHX	D	6:00	94%	162	3	159	172	7M8	
AA-2067	2	PAX	AA	2067	CLT	D	0:33	87%	150	3	147	172	7M8		5:46	AA-2068	2	PAX	AA	2068	CLT	D	6:19	93%	160	2	158	172	7M8	
AA-2069	2	PAX	AA	2069	PHX	D	5:12	93%	161	4	157	172	7M8		2:00	AA-2070	2	PAX	AA	2070	PHX	D	7:12	86%	149	4	144	172	7M8	
AA-2095	2	PAX	AA	2095	LGA	D	8:34	77%	58	2	57	76	E75		2:26	AA-2096	2	PAX	AA	2096	LGA	D	11:00	77%	58	1	57	76	E75	
AA-2037	2	PAX	AA	2037	ORD	D	8:36	76%	122	5	117	160	73H		0:46	AA-2038	2	PAX	AA	2038	ORD	D	9:22	96%	153	5	149	160	73H	
AA-2039	2	PAX	AA	2039	CLT	D	9:27	74%	119	3	116	160	73H		0:45	AA-2040	2	PAX	AA	2040	CLT	D	10:12	92%	147	2	146	160	73H	
AA-2041	2	PAX	AA	2041	DFW	D	9:43	88%	141	4	137	160	73H		1:24	AA-2042	2	PAX	AA	2042	DFW	D	11:07	89%	142	2	140	160	73H	
AA-2017	2	PAX	AA	2017	PHL	D	10:37	76%	83	2	80	109	221		1:30	AA-2020	2	PAX	AA	2020	ORD	D	12:07	99%	108	3	104	109	221	
AA-2071	2	PAX	AA	2071	PHX	D	11:00	87%	149	4	145	172	7M8		1:10	AA-2072	2	PAX	AA	2072	CLT	D	12:10	89%	152	2	151	172	7M8	
AA-2019	2	PAX	AA	2019	MIA	D	11:35	90%	99	2	97	109	221		0:39	AA-2022	2	PAX	AA	2022	MIA	D	12:14	95%	104	1	102	109	221	
AA-2021	2	PAX	AA	2021	ORD	D	11:36	94%	103	4	99	109	221		0:48	AA-2024	2	PAX	AA	2024	DCA	D	12:24	78%	85	1	83	109	221	
AA-2023	2	PAX	AA	2023	DCA	D	11:51	71%	77	2	75	109	221		4:09	AA-2026	2	PAX	AA	2026	ORD	D	16:00	99%	108	3	104	109	221	
AA-2043	2	PAX	AA	2043	DFW	D	12:38	98%	157	5	152	160	73H		0:41	AA-2044	2	PAX	AA	2044	DFW	D	13:19	96%	154	2	152	160	73H	
AA-2073	2	PAX	AA	2073	CLT	D	13:23	80%	138	3	135	172	7M8		1:22	AA-2074	2	PAX	AA	2074	PHX	D	14:45	94%	162	3	159	172	7M8	
AA-2075	2	PAX	AA	2075	PHX	D	13:50	93%	161	4	157	172	7M8		2:05	AA-2076	2	PAX	AA	2076	ORD	D	15:55	77%	132	4	128	172	7M8	
AA-2045	2	PAX	AA	2045	DFW	D	14:36	88%	141	4	137	160	73H		0:46	AA-2046	2	PAX	AA	2046	DFW	D	15:22	89%	142	2	140	160	73H	
AA-2047	2	PAX	AA	2047	CLT	D	15:03	74%	119	3	116	160	73H		0:45	AA-2048	2	PAX	AA	2048	CLT	D	15:48	92%	147	2	146	160	73H	
AA-2097	2	PAX	AA	2097	PHL	D	15:22	82%	62	2	61	76	E75		0:43	AA-2098	2	PAX	AA	2098	PHL	D	16:05	83%	63	1	62	76	E75	
AA-2025	2	PAX	AA	2025	ORD	D	15:30	94%	103	4	99	109	221		2:10	AA-2028	2	PAX	AA	2028	MIA	D	17:40	86%	93	1	93	109	221	
AA-2049	2	PAX	AA	2049	DFW	D	15:30	97%	155	4	151	160	73H		1:20	AA-2050	2	PAX	AA	2050	DFW	D	16:50	96%	153	2	151	160	73H	
AA-2051	2	PAX	AA	2051	CLT	D	16:32	88%	140	2	138	160	73H		0:58	AA-2052	2	PAX	AA	2052	CLT	D	17:30	85%	136	1	135	160	73H	
AA-2099	2	PAX	AA	2099	DCA	D	16:56	71%	54	1	52	76	E75		0:40	AA-2100	2	PAX	AA	2100	LGA	D	17:36	72%	55	1	53	76	E75	
AA-2027	2	PAX	AA	2027	MIA	D	17:00	86%	94	2	92	109	221		TOW/RON	AA-2016	2	PAX	AA	2016	PHL	D	6:07	82%	90	2	88	109	221	
AA-2101	2	PAX	AA	2101	LGA	D	17:01	70%	53	2	51	76	E75		0:48	AA-2102	2	PAX	AA	2102	DCA	D	17:49	78%	59	1	58	76	E75	
AA-2077	2	PAX	AA	2077	DFW	D	17:05	88%	152	4	148	172	7M8		0:55	AA-2078	2	PAX	AA	2078	PHX	D	18:00	94%	162	3	159	172	7M8	
AA-2079	2	PAX	AA	2079	ORD	D	17:05	89%	153	6	147	172	7M8		1:23	AA-2080	2	PAX	AA	2080	DFW	D	18:28	89%	153	3	151	172	7M8	
AA-2081	2	PAX	AA	2081	PHX	D	17:30	93%	161	4	157	172	7M8		2:17	AA-2082	2	PAX	AA	2082	ORD	D	19:47	77%	132	4	128	172	7M8	
AA-2083	2	PAX	AA	2083	PHX	D	20:01	93%	161	4	157	172	7M8		0:59	AA-2084	2	PAX	AA	2084	PHX	D	21:00	88%	151	4	147	172	7M8	
AA-2031	2	PAX	AA	2031	DFW	D	21:01	88%	141	4	137	160	73H		TOW/RON	AA-2032	2	PAX	AA	2032	CLT	D	5:01	82%	131	1	131	160	73H	
AA-2059	2	PAX	AA	2059	ORD	D	21:56	89%	153	6	147	172	7M8		TOW/RON	AA-2060	2	PAX	AA	2060	PHX	D	5:05	94%	162	3	159	172	7M8	
AA-2033	2	PAX	AA	2033	CLT	D	22:12	87%	138	2	137	160	73H		TOW/RON	AA-2034	2	PAX	AA	2034	DFW	D	5:07	89%	142	2	140	160	73H	
AA-2091	2	PAX	AA	2091	LGA	D	22:32	70%	53	2	51	76	E75		TOW/RON	AA-2092	2	PAX	AA	2092	DCA	D	7:06	78%	59	1	58	76	E75	
AA-2015	2	PAX	AA	2015	PHL	D	22:51	76%	83	2	80	109	221		TOW/RON	AA-2018	2	PAX	AA	2018	PHL	D	11:30	82%	90	2	88	109	221	
AA-2035	2	PAX	AA	2035	DFW	D	23:16	88%	141	4	137	160	73H		TOW/RON	AA-2036	2	PAX	AA	2036	DFW	D	6:51	89%	142	2	140	160	73H	
AA-2061	2	PAX	AA	2061	MIA	D	23:24	94%	162	3	159	172	7M8		TOW/RON	AA-2062	2	PAX	AA	2062	MIA	D	5:07	97%	166	2	164	172	7M8	
AA-2063	2	PAX	AA	2063	ORD	D	23:42	89%	153	6	147	172	7M8		TOW/RON	AA-2064	2	PAX	AA	2064	ORD	D	5:50	77%	132	4	128	172	7M8	
AA-2093	2	PAX	AA	2093	DCA	D	23:50	71%	54	1	52	76	E75		TOW/RON	AA-2094	2	PAX	AA	2094	LGA	D	7:06	72%	55	1	53	76	E75	
AC-2109	2	PAX	AC	2109	YYZ	I	10:11	72%	55	1	54	76	E75		0:39	AC-2110	2	PAX	AC	2110	YYZ	I	10:50	80%	61	1	60	76	E75	
AC-2111	2	PAX	AC	2111	YYZ	I	15:56	72%	55	1	54	76	E75		0:39	AC-2112	2	PAX	AC	2112	YYZ	I	16:35	80%	61	1	60	76	E75	
AC-2107	2	PAX	AC	2107	YYZ	I	21:26	72%	55	1	54	76	E75		TOW/RON	AC-2108	2	PAX	AC	2108	YYZ	I	6:30	80%	61	1	60	76	E75	
AS-2125	2	PAX	AS	2125	SAN	D	11:45	84%	64	0	64	76	E75		0:45	AS-2126	2	PAX	AS	2126	SAN	D	12:30	83%	63	0	63	76	E75	
AS-2117	2	PAX	AS	2117	SEA	D	11:51	94%	150	4	146	159	7M8		0:59	AS-2118	2	PAX	AS	2118	SEA	D	12:50	88%	140	1	139	159	7M8	
AS-2127	2	PAX	AS	2127	PDX	D	13:20	93%	71	2	69	76	E75		0:45	AS-2128	2	PAX	AS	2128	PDX	D	14:05	94%	71	2	70	76	E75	
AS-2119	2	PAX	AS	2119	SEA	D	15:10	89%	141	4	137	159	7M8		1:00	AS-2120	2	PAX	AS	2120	SEA	D	16:10	93%	148	3	145	159	7M8	
AS-2129	2	PAX	AS	2129	PDX	D	16:00	87%	66	2	63	76	E75		1:00	AS-2130	2	PAX	AS	2130	PDX	D	17:00	87%	66	2	64	76	E75	
AS-2121	2	PAX	AS	2121	SAN	D	16:45	94%	150	4	146	159	7M8		0:50	AS-2122	2	PAX	AS	2122	SAN	D	17:35	91%	144	2	142	159	7M8	
AS-2115	2	PAX	AS	2115	SEA	D	23:05	94%	150	5	145	159	7M8		TOW/RON	AS-2116	2	PAX	AS	2116	SEA	D	7:00	89%	142	3	139	159	7M8	
B6-2133	2	PAX	B6	2133	BOS	D	9:43	77%	115	10	106	150	320		0:40	B6-2134	2	PAX	B6	2134	BOS	D	10:23	82%	123	9	114	150	320	
B6-2135	2	PAX	B6	2135	BOS	D	17:01	77%	115	10	106	150	320		0:45	B6-2136	2	PAX	B6	2136	BOS	D	17:46	82%	123	9	114	150	320	
B6-2137	2	PAX	B6	2137	BOS	D	18:41	89%	134	2	132	150	320		0:34	B6-2138	2	PAX	B6	2138	BOS	D	19:15	91%	137	1	137	150	320	
B6-2139	2	PAX	B6	2139	BOS	D	23:28	77%	115	10	106	150	320		TOW/RON	B6-2140	2	PAX	B6	2140	BOS	D	5:40	82%	123	9	114	150	320	
DL-2313	2	PAX	DL	2313	RSW	D	0:32	89%	172	0	172	192	3N1		6:36	DL-2314	2	PAX	DL	2314	MCO	D	7:08	93%	178	54	123	192	3N1	
DL-2643	2	PAX	DL	2643	PSP	D	5:22	90%	134	41	93	150	32N		3:38	DL-2644	2	PAX	DL	2644	MZT	I	9:00	89%	134	72	62	150	32N	
DL-2315	2	PAX	DL	2315	PHX	D	5:29	90%	172	53	119	192	321		1:46	DL-2316	2	PAX	DL	2316	RSW	D	7:15	95%	182	41	141	192	321	
DL-2645	2	PAX	DL	2645	SEA	D	5:43	89%	133	71	62	150	32N		3:27	DL-2646	2	PAX	DL	2646	MEX	I	9:10	88%	132	33	99	150	32N	
DL-2331	2	PAX	DL	2331	SAN	D	5:45	95%	183	87	95	192	3N1		3:10	DL-2332	2	PAX	DL	2332	SFO	D	8:55	91%	176	59	117	192	3N1	
DL-2647	2	PAX	DL	2647	LAS	D	5:45	91%	136	49	87	150	32N		4:15	DL-2648	2	PAX	DL	2648	MIA	D	10:00	91%	136	54	82	150	32N	
DL-2317	2	PAX	DL	2317	PDX	D	5:46	91%	174	112	62	192	3N1		2:14	DL-2318	2	PAX	DL	2318	ATL	D	8:00	97%	187	62	125	192	3N1	
DL-2481	2	PAX	DL	2481	HNL	D	5:48	92%	282	111	171	306	350		7:02	DL-2482	2	PAX	DL	2482	ICN	I	12:50	97%	297	215	81	306	350	
DL-2319	2	PAX	DL	2319	ANC	D	5:53	95%	183	157	25	192	3N1		2:07	DL-2320	2	PAX	DL	2320	LAS	D	8:00	90%	174	79	95	192	3N1	
DL-2321	2	PAX	DL	2321	SFO	D	5:57	87%	167	57	110	192	3N1		2:03	DL-2322	2	PAX	DL	2322	MCO	D	8:00	95%	182	58	124	192	3N1	
DL-2505	2	PAX	DL	2505	FSD	D	6:01	59%	107	100	6	180	739		2:50	DL-2506	2	PAX	DL	2506	LGA	D	8:51	85%	154	53	101	180	739	
DL-2649	2	PAX	DL	2649	LAX	D	6:08	91%	136	50	86	150	32N		4:02	DL-2650	2	PAX	DL	2650	TPA	D	10:10	93%	139	35	103	150	32N	
DL-2751	2	PAX	DL	2751	DLH	D	6:10	88%	67	66	1	76	CR9		1:02	DL-2752	2	PAX	DL	2752	EWR	D	7:12	74%	56	21	35	76	CR9	
DL-2177	2	PAX	DL	2177	FAR	D	6:14	86%	112	106	6	130	223		2:36	DL-2178	2	PAX	DL	2178	DTW	D	8:50	89%	116	46	69	130	223	
DL-2455	2	PAX	DL	2455	OGG	D	6:15	92%	257	181	76	281	339		6:09	DL-2456	2	PAX	DL	2456	HND	I	12:24	89%	250	193	56	281	339	
DL-2753	2	PAX	DL	2753	RST	D	6:15	87%	66	64	3	76	CR9		1:05	DL-2754	2	PAX	DL	2754	MSN	D	7:20	61%	46	39	7	76	CR9	
DL-2953	2	PAX	DL	2953	BJI	D	6:19	0.77	59	55	4	76	CR9		1:11	DL-2758	2	PAX	DL	2758	CHS	D	7:30	89%	67	34	34	76	CR9	
DL-2019	2	PAX	DL	2019	GFK	D	6:20	80%	88	80	8	109	221		2:25	DL-2018	2	PAX	DL	2018	CLE	D	8:45	87%	95	44	51	109	221	
DL-2755	2	PAX	DL	2755	ABR	D	6:20	76%	57	54	3	76	CR9		1:10	DL-2756	2	PAX	DL	2756	FAR	D	7:30	88%	67	63	4	76	CR9	
DL-2757	2	PAX	DL	2757	BIS	D	6:39	49%	38	33	4	76	CR9		0:56	DL-2760	2	PAX	DL	2760	BOI	D	7:35	97%	74	43	30	76	CR9	
DL-2759	2	PAX	DL	2759	MOT	D	6:39	80%	61	55	6	76	CR9		2:06	DL-2762	2	PAX	DL	2762	YEG	I	8:45	63%	48	41	7	76	CR9	
DL-2021	2	PAX	DL	2021	ROC	D	7:34	62%	68	48	20	109	221		1:11	DL-2020	2	PAX	DL	2020	MEM	D	8:45	82%	89	50	40	109	221	
DL-2507	2	PAX	DL	2507	GRR	D	7:39	76%	137	100	37	180	739		1:16	DL-2508	2	PAX	DL	2508	BZN	D	8:55	84%	151	113	38	180	739	
DL-2509	2	PAX	DL	2509	MKE	D	7:39	69%	125	77	48	180	739		1:21	DL-2510	2	PAX	DL	2510	CZM	I	9:00	89%	161	86	74	180	739	
DL-2511	2	PAX	DL	2511	FSD	D	7:40	84%	152	142	9	180	739		1:20	DL-2512	2	PAX	DL	2512	PVR	I	9:00	89%	161	86	74	180	739	
DL-2651	2	PAX	DL	2651	MSN	D	7:44	80%	120	102	18	150	32N		2:31	DL-2652	2	PAX	DL	2652	MSY	D	10:15	90%	136	47	89	150	32N	
DL-2513	2	PAX	DL	2513	OMA	D	7:46	71%	127	94	33	180	739		1:19	DL-2514	2	PAX	DL	2514	PHX	D	9:05	94%	169	51	119	180	739	
DL-2515	2	PAX	DL	2515	BWI	D	7:47	60%	109	43	66	180	739		1:28	DL-2516	2	PAX	DL	2516	LAS	D	9:15	92%	165	59	106	180	739	
DL-2179	2	PAX	DL	2179	ORD	D	7:49	86%	112	49	63	130	223		1:01	DL-2180	2	PAX	DL	2180	MDW	D	8:50	76%	98	26	72	130	223	
DL-2761	2	PAX	DL	2761	MDW	D	7:49	79%	60	16	44	76	CR9		0:56	DL-2954	2	PAX	DL	2954	ALB	D	8:45	0.83	63	39	24	76	CR9	
DL-2653	2	PAX	DL	2653	MCI	D	7:51	58%	86	48	38	150	32N		2:38	DL-2654	2	PAX	DL	2654	DTW	D	10:29	92%	138	55	82	150	32N	
DL-2023	2	PAX	DL	2023	SDF	D	7:51	81%	89	47	41	109	221		0:59	DL-2022	2	PAX	DL	2022	BIL	D	8:50	79%	86	70	16	109	221	
DL-2025	2	PAX	DL	2025	DLH	D	7:52	88%	96	94	2	109	221		0:58	DL-2026	2	PAX	DL	2026	CMH	D	8:50	95%	103	52	52	109	221	
DL-2323	2	PAX	DL	2323	BOS	D	7:53	69%	133	57	76	192	3N1		0:43	DL-2324	2	PAX	DL	2324	SLC	D	8:36	94%	180	84	96	192	3N1	
DL-2955	2	PAX	DL	2955	LNK	D	7:53	0.86	65	49	17	76	CR9		0:52	DL-2956	2	PAX	DL	2956	LNK	D	8:45	0.84	64	48	16	76	CR9	
DL-2181	2	PAX	DL	2181	STL	D	7:54	60%	77	35	42	130	223		1:01	DL-2182	2	PAX	DL	2182	SAT	D	8:55	91%	119	45	74	130	223	
DL-2763	2	PAX	DL	2763	CLE	D	7:54	81%	62	29	33	76	CR9		0:51	DL-2958	2	PAX	DL	2958	XNA	D	8:45	0.63	48	27	21	76	CR9	
DL-2655	2	PAX	DL	2655	CMH	D	7:57	63%	95	48	47	150	32N		2:48	DL-2656	2	PAX	DL	2656	MCO	D	10:45	95%	142	45	97	150	32N	
DL-2765	2	PAX	DL	2765	BUF	D	7:58	61%	46	26	20	76	CR9		0:47	DL-2764	2	PAX	DL	2764	CLT	D	8:45	85%	64	28	36	76	CR9	
DL-2183	2	PAX	DL	2183	FAR	D	7:59	86%	112	106	6	130	223		1:01	DL-2184	2	PAX	DL	2184	MKE	D	9:00	83%	108	66	42	130	223	
DL-2185	2	PAX	DL	2185	GRB	D	7:59	95%	124	106	18	130	223		1:06	DL-2186	2	PAX	DL	2186	FAR	D	9:05	77%	100	94	6	130	223	
DL-2187	2	PAX	DL	2187	LEX	D	7:59	72%	94	63	31	130	223		1:06	DL-2188	2	PAX	DL	2188	ORD	D	9:05	87%	113	35	78	130	223	
DL-2517	2	PAX	DL	2517	DCA	D	7:59	64%	115	52	63	180	739		1:56	DL-2518	2	PAX	DL	2518	LGA	D	9:55	85%	153	53	101	180	739	
DL-2027	2	PAX	DL	2027	PHL	D	7:59	94%	103	64	39	109	221		0:51	DL-2028	2	PAX	DL	2028	STL	D	8:50	83%	90	40	50	109	221	
DL-2029	2	PAX	DL	2029	PIT	D	7:59	80%	87	45	41	109	221		0:51	DL-2030	2	PAX	DL	2030	TUL	D	8:50	72%	78	37	41	109	221	
DL-2031	2	PAX	DL	2031	YYZ	I	7:59	79%	86	45	41	109	221		0:56	DL-2032	2	PAX	DL	2032	BNA	D	8:55	96%	105	42	63	109	221	
DL-2767	2	PAX	DL	2767	CIU	D	7:59	75%	57	49	9	76	CR9		0:46	DL-2766	2	PAX	DL	2766	DLH	D	8:45	89%	68	67	1	76	CR9	
DL-2189	2	PAX	DL	2189	YWG	I	8:00	82%	107	99	8	130	223		1:10	DL-2190	2	PAX	DL	2190	AUS	D	9:10	94%	122	35	88	130	223	
DL-2957	2	PAX	DL	2957	MBS	D	8:00	0.73	55	41	14	76	CR9		0:50	DL-2768	2	PAX	DL	2768	PIT	D	8:50	84%	64	33	31	76	CR9	
DL-2769	2	PAX	DL	2769	AZO	D	8:00	79%	60	42	18	76	CR9		0:55	DL-2960	2	PAX	DL	2960	MOT	D	8:55	0.86	65	59	6	76	CR9	
DL-2959	2	PAX	DL	2959	LSE	D	8:01	0.87	66	65	1	76	CR9		0:54	DL-2770	2	PAX	DL	2770	BDL	D	8:55	87%	66	41	25	76	CR9	
DL-2771	2	PAX	DL	2771	BRD	D	8:02	60%	46	44	2	76	CR9		0:53	DL-2772	2	PAX	DL	2772	OMA	D	8:55	84%	64	47	17	76	CR9	
DL-2773	2	PAX	DL	2773	XNA	D	8:02	68%	52	29	23	76	CR9		0:58	DL-2774	2	PAX	DL	2774	BWI	D	9:00	81%	62	24	38	76	CR9	
DL-2191	2	PAX	DL	2191	BNA	D	8:04	92%	119	48	71	130	223		1:06	DL-2192	2	PAX	DL	2192	DFW	D	9:10	94%	122	41	81	130	223	
DL-2193	2	PAX	DL	2193	CLT	D	8:04	71%	93	41	51	130	223		1:06	DL-2194	2	PAX	DL	2194	INL	D	9:10	37%	48	44	4	130	223	
DL-2033	2	PAX	DL	2033	CID	D	8:06	75%	82	62	20	109	221		0:54	DL-2034	2	PAX	DL	2034	YYC	I	9:00	93%	101	81	20	109	221	
DL-2035	2	PAX	DL	2035	DAY	D	8:07	71%	77	41	36	109	221		0:54	DL-2036	2	PAX	DL	2036	IAD	D	9:01	78%	85	44	40	109	221	
DL-2961	2	PAX	DL	2961	SBN	D	8:07	0.84	64	41	23	76	CR9		0:53	DL-2780	2	PAX	DL	2780	MLI	D	9:00	74%	56	42	15	76	CR9	
DL-2775	2	PAX	DL	2775	RDU	D	8:07	60%	45	21	25	76	CR9		0:58	DL-2962	2	PAX	DL	2962	FSD	D	9:05	0.96	73	68	4	76	CR9	
DL-2779	2	PAX	DL	2779	CHS	D	8:09	88%	67	34	33	76	CR9		0:56	DL-2776	2	PAX	DL	2776	YWG	I	9:05	80%	61	56	5	76	CR9	
DL-2777	2	PAX	DL	2777	YUL	I	8:09	70%	53	37	16	76	CR9		1:01	DL-2782	2	PAX	DL	2782	RAP	D	9:10	92%	70	51	19	76	CR9	
DL-2195	2	PAX	DL	2195	EWR	D	8:10	64%	83	32	51	130	223		1:05	DL-2196	2	PAX	DL	2196	YVR	I	9:15	82%	107	79	28	130	223	
DL-2781	2	PAX	DL	2781	ATW	D	8:12	90%	68	53	15	76	CR9		1:03	DL-2784	2	PAX	DL	2784	YXE	I	9:15	55%	42	37	5	76	CR9	
DL-2591	2	PAX	DL	2591	DTW	D	8:13	76%	182	74	108	240	753		1:49	DL-2592	2	PAX	DL	2592	ATL	D	10:02	92%	221	64	158	240	753	
DL-2963	2	PAX	DL	2963	FWA	D	8:13	0.81	62	39	23	76	CR9		1:17	DL-2778	2	PAX	DL	2778	RST	D	9:30	77%	59	56	3	76	CR9	
DL-2965	2	PAX	DL	2965	HIB	D	8:13	0.54	41	39	3	76	CR9		1:42	DL-2786	2	PAX	DL	2786	ATW	D	9:55	86%	66	51	14	76	CR9	
DL-2967	2	PAX	DL	2967	LAN	D	8:13	0.82	62	37	26	76	CR9		1:42	DL-2788	2	PAX	DL	2788	DSM	D	9:55	73%	55	48	8	76	CR9	
DL-2969	2	PAX	DL	2969	MQT	D	8:13	0.88	67	58	9	76	CR9		1:42	DL-2790	2	PAX	DL	2790	IND	D	9:55	82%	63	31	32	76	CR9	
DL-2783	2	PAX	DL	2783	CWA	D	8:13	83%	63	58	4	76	CR9		1:42	DL-2792	2	PAX	DL	2792	MDW	D	9:55	76%	57	15	42	76	CR9	
DL-2197	2	PAX	DL	2197	CVG	D	8:15	77%	101	57	44	130	223		1:45	DL-2198	2	PAX	DL	2198	ORD	D	10:00	87%	113	35	78	130	223	
DL-2325	2	PAX	DL	2325	ATL	D	8:15	98%	188	100	88	192	3N1		1:05	DL-2326	2	PAX	DL	2326	RSW	D	9:20	83%	160	36	124	192	3N1	
DL-2519	2	PAX	DL	2519	LGA	D	8:15	75%	135	47	88	180	739		1:50	DL-2520	2	PAX	DL	2520	CZM	I	10:05	84%	151	41	110	180	739	
DL-2657	2	PAX	DL	2657	BIS	D	8:15	72%	108	95	13	150	32N		2:45	DL-2658	2	PAX	DL	2658	SFO	D	11:00	92%	138	54	85	150	32N	
DL-2037	2	PAX	DL	2037	DSM	D	8:15	74%	80	69	11	109	221		0:55	DL-2038	2	PAX	DL	2038	IAH	D	9:10	89%	97	39	58	109	221	
DL-2039	2	PAX	DL	2039	IND	D	8:15	88%	96	48	48	109	221		1:43	DL-2040	2	PAX	DL	2040	SDF	D	9:58	82%	89	47	42	109	221	
DL-2971	2	PAX	DL	2971	RHI	D	8:15	0.67	51	48	3	76	CR9		1:40	DL-2794	2	PAX	DL	2794	YYZ	I	9:55	88%	67	35	32	76	CR9	
DL-2785	2	PAX	DL	2785	BDL	D	8:15	98%	74	54	20	76	CR9		1:45	DL-2796	2	PAX	DL	2796	CID	D	10:00	82%	62	47	15	76	CR9	
DL-2787	2	PAX	DL	2787	ICT	D	8:15	85%	64	40	24	76	CR9		1:50	DL-2972	2	PAX	DL	2972	MCI	D	10:05	0.90	68	38	31	76	CR9	
DL-2789	2	PAX	DL	2789	MLI	D	8:15	75%	57	42	15	76	CR9		1:56	DL-2798	2	PAX	DL	2798	EWR	D	10:11	83%	63	24	39	76	CR9	
DL-2791	2	PAX	DL	2791	RIC	D	8:15	74%	57	30	26	76	CR9		2:00	DL-2800	2	PAX	DL	2800	JFK	D	10:15	86%	65	23	43	76	CR9	
DL-2793	2	PAX	DL	2793	XWA	D	8:15	61%	46	37	9	76	CR9		3:00	DL-2974	2	PAX	DL	2974	HIB	D	11:15	0.56	43	40	3	76	CR9	
DL-2349	2	PAX	DL	2349	RSW	D	8:30	96%	185	43	142	192	3N1		1:25	DL-2350	2	PAX	DL	2350	BOS	D	9:55	91%	175	74	101	192	3N1	
DL-2329	2	PAX	DL	2329	FLL	D	8:45	94%	180	65	114	192	3N1		1:00	DL-2330	2	PAX	DL	2330	SEA	D	9:45	95%	182	96	86	192	3N1	
DL-2593	2	PAX	DL	2593	MCO	D	8:50	85%	204	64	140	240	753		1:20	DL-2594	2	PAX	DL	2594	CUN	I	10:10	96%	231	83	149	240	753	
DL-2659	2	PAX	DL	2659	DFW	D	8:51	75%	112	38	74	150	32N		2:24	DL-2660	2	PAX	DL	2660	JAC	D	11:15	85%	127	86	41	150	32N	
DL-2795	2	PAX	DL	2795	YXE	I	8:54	77%	58	53	6	76	CR9		2:21	DL-2806	2	PAX	DL	2806	BIS	D	11:15	83%	63	56	8	76	CR9	
DL-2327	2	PAX	DL	2327	DEN	D	9:00	93%	179	70	109	192	3N1		1:25	DL-2328	2	PAX	DL	2328	LAX	D	10:25	93%	178	65	114	192	3N1	
DL-2521	2	PAX	DL	2521	LGA	D	9:00	87%	157	53	104	180	739		1:05	DL-2522	2	PAX	DL	2522	MZT	I	10:05	80%	144	52	92	180	739	
DL-2523	2	PAX	DL	2523	AUS	D	9:04	90%	162	47	115	180	739		1:16	DL-2524	2	PAX	DL	2524	DCA	D	10:20	91%	165	74	91	180	739	
DL-2595	2	PAX	DL	2595	ATL	D	9:04	90%	216	64	153	240	753		2:11	DL-2596	2	PAX	DL	2596	SLC	D	11:15	87%	208	97	111	240	753	
DL-2199	2	PAX	DL	2199	BIL	D	9:05	85%	111	94	17	130	223		2:10	DL-2200	2	PAX	DL	2200	DFW	D	11:15	96%	125	42	83	130	223	
DL-2051	2	PAX	DL	2051	IAD	D	9:05	75%	82	43	39	109	221		0:55	DL-2042	2	PAX	DL	2042	GRB	D	10:00	89%	97	83	14	109	221	
DL-2201	2	PAX	DL	2201	MSO	D	9:09	79%	102	85	17	130	223		2:06	DL-2202	2	PAX	DL	2202	EWR	D	11:15	84%	110	51	59	130	223	
DL-2203	2	PAX	DL	2203	SYR	D	9:10	60%	78	57	21	130	223		2:05	DL-2204	2	PAX	DL	2204	YVR	I	11:15	91%	119	89	30	130	223	
DL-2797	2	PAX	DL	2797	RAP	D	9:10	85%	65	47	18	76	CR9		2:05	DL-2802	2	PAX	DL	2802	BJI	D	11:15	78%	59	55	4	76	CR9	
DL-2041	2	PAX	DL	2041	SAT	D	9:12	86%	94	36	58	109	221		0:48	DL-2044	2	PAX	DL	2044	JAX	D	10:00	96%	105	22	83	109	221	
DL-2799	2	PAX	DL	2799	GFK	D	[illegible]	84%	64	58	6	76	CR9		2:02	DL-2804	2	PAX	DL	2804	FSD	D	11:15	96%	73	68	4	76	CR9	
DL-2597	2	PAX	DL	[illegible]	[illegible]	D	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	240	753		[illegible]	DL-2598	2	PAX	DL	2598	LAX	D	11:34	96%	230	84	147	[illegible]	[illegible]	

DL-2043	2	PAX	DL	2043	ORD	D	9:18	88%	96	31	65	109	221	0:47	DL-2046	2	PAX	DL	2046	CVG	D	10:05	83%	90	51	40	109	221
DL-2801	2	PAX	DL	2801	IAH	D	9:18	78%	60	24	35	76	CR9	2:02	DL-2808	2	PAX	DL	2808	GFK	D	11:20	90%	68	62	6	76	CR9
DL-2045	2	PAX	DL	2045	HLN	D	9:19	82%	90	75	14	109	221	0:46	DL-2048	2	PAX	DL	2048	GRR	D	10:05	86%	93	68	25	109	221
DL-2047	2	PAX	DL	2047	OKC	D	9:21	76%	83	51	32	109	221	0:44	DL-2050	2	PAX	DL	2050	MSN	D	10:05	86%	94	80	14	109	221
DL-2803	2	PAX	DL	2803	GTF	D	9:22	85%	65	54	11	76	CR9	1:58	DL-2810	2	PAX	DL	2810	YWG	I	11:20	86%	66	61	5	76	CR9
DL-2205	2	PAX	DL	2205	JFK	D	9:23	82%	106	38	68	130	223	1:57	DL-2206	2	PAX	DL	2206	FAR	D	11:20	88%	114	108	6	130	223
DL-2525	2	PAX	DL	2525	BZN	D	9:24	81%	146	110	36	180	739	0:59	DL-2526	2	PAX	DL	2526	PVR	I	10:23	96%	174	52	122	180	739
DL-2207	2	PAX	DL	2207	DTW	D	9:25	91%	118	48	70	130	223	1:58	DL-2208	2	PAX	DL	2208	SNA	D	11:23	94%	123	52	70	130	223
DL-2527	2	PAX	DL	2527	BOI	D	9:25	90%	163	123	39	180	739	0:59	DL-2528	2	PAX	DL	2528	MBJ	I	10:24	87%	157	56	101	180	739
DL-2049	2	PAX	DL	2049	DSM	D	9:25	74%	80	69	11	109	221	0:45	DL-2052	2	PAX	DL	2052	PHL	D	10:10	91%	99	45	54	109	221
DL-2805	2	PAX	DL	2805	TYS	D	9:25	69%	52	34	18	76	CR9	1:58	DL-2812	2	PAX	DL	2812	OMA	D	11:23	84%	64	47	17	76	CR9
DL-2661	2	PAX	DL	2661	BOS	D	9:30	96%	145	45	99	150	32N	1:50	DL-2662	2	PAX	DL	2662	SAN	D	11:20	97%	145	68	76	150	32N
DL-2209	2	PAX	DL	2209	CLT	D	9:44	71%	93	41	51	130	223	1:43	DL-2210	2	PAX	DL	2210	HRL	D	11:27	89%	115	61	54	130	223
DL-2599	2	PAX	DL	2599	RSW	D	9:53	92%	221	51	170	240	753	1:42	DL-2600	2	PAX	DL	2600	LAS	D	11:35	92%	220	79	142	240	753
DL-2663	2	PAX	DL	2663	LGA	D	10:02	71%	107	37	69	150	32N	1:38	DL-2664	2	PAX	DL	2664	DTW	D	11:40	92%	138	55	82	150	32N
DL-2665	2	PAX	DL	2665	PHL	D	10:10	80%	120	56	65	150	32N	1:35	DL-2666	2	PAX	DL	2666	BOI	D	11:45	97%	146	110	36	150	32N
DL-2053	2	PAX	DL	2053	MOT	D	10:14	82%	89	81	9	109	221	1:01	DL-2054	2	PAX	DL	2054	SJC	D	11:15	91%	99	53	46	109	221
DL-2667	2	PAX	DL	2667	BOS	D	10:15	69%	104	45	60	150	32N	1:46	DL-2668	2	PAX	DL	2668	SFO	D	12:01	91%	137	46	91	150	32N
DL-2529	2	PAX	DL	2529	DCA	D	10:17	86%	155	70	85	180	739	1:13	DL-2530	2	PAX	DL	2530	SEA	D	11:30	97%	175	93	82	180	739
DL-2367	2	PAX	DL	2367	TPA	D	10:19	91%	175	53	122	192	3N1	0:41	DL-2368	2	PAX	DL	2368	PUJ	I	11:00	92%	177	69	108	192	3N1
DL-2211	2	PAX	DL	2211	YWG	I	10:20	88%	114	94	20	130	223	1:08	DL-2212	2	PAX	DL	2212	PSP	D	11:28	96%	125	53	72	130	223
DL-2369	2	PAX	DL	2369	SLC	D	10:20	93%	178	98	80	192	3N1	1:00	DL-2370	2	PAX	DL	2370	PHX	D	11:20	96%	185	55	130	192	3N1
DL-2055	2	PAX	DL	2055	BHM	D	10:20	85%	93	32	61	109	221	1:00	DL-2056	2	PAX	DL	2056	MOT	D	11:20	86%	94	85	9	109	221
DL-2057	2	PAX	DL	2057	MEM	D	10:24	78%	85	47	37	109	221	0:56	DL-2058	2	PAX	DL	2058	SMF	D	11:20	94%	102	61	41	109	221
DL-2807	2	PAX	DL	2807	MSN	D	10:26	94%	71	61	11	76	CR9	1:04	DL-2814	2	PAX	DL	2814	RST	D	11:30	85%	64	62	3	76	CR9
DL-2213	2	PAX	DL	2213	DFW	D	10:28	88%	115	39	75	130	223	1:02	DL-2214	2	PAX	DL	2214	BIL	D	11:30	87%	113	96	18	130	223
DL-2059	2	PAX	DL	2059	IAH	D	10:29	85%	92	38	55	109	221	1:06	DL-2060	2	PAX	DL	2060	YYC	I	11:35	93%	101	81	20	109	221
DL-2371	2	PAX	DL	2371	DEN	D	10:30	97%	186	89	97	192	3N1	0:55	DL-2372	2	PAX	DL	2372	PDX	D	11:25	97%	186	119	67	192	3N1
DL-2531	2	PAX	DL	2531	BDL	D	10:30	77%	139	87	52	180	739	1:20	DL-2532	2	PAX	DL	2532	GEG	D	11:50	91%	163	137	26	180	739
DL-2669	2	PAX	DL	2669	MKE	D	10:30	81%	121	74	47	150	32N	1:45	DL-2670	2	PAX	DL	2670	SEA	D	12:15	96%	144	59	85	150	32N
DL-2809	2	PAX	DL	2809	FAR	D	10:32	78%	59	56	3	76	CR9	1:18	DL-2816	2	PAX	DL	2816	YEG	I	11:50	92%	70	62	9	76	CR9
DL-2373	2	PAX	DL	2373	PHX	D	10:35	89%	170	94	77	192	321	1:08	DL-2374	2	PAX	DL	2374	ATL	D	11:43	92%	177	51	126	192	321
DL-2601	2	PAX	DL	2601	ATL	D	10:36	90%	216	64	153	240	753	2:19	DL-2602	2	PAX	DL	2602	RSW	D	12:55	89%	213	48	166	240	753
DL-2671	2	PAX	DL	2671	MIA	D	10:37	96%	145	59	86	150	32N	2:03	DL-2672	2	PAX	DL	2672	BZN	D	12:40	92%	137	108	29	150	32N
DL-2811	2	PAX	DL	2811	CMH	D	10:37	87%	66	33	33	76	CR9	1:38	DL-2818	2	PAX	DL	2818	GTF	D	12:15	66%	50	41	9	76	CR9
DL-2673	2	PAX	DL	2673	ORD	D	10:38	92%	139	44	94	150	32N	2:02	DL-2674	2	PAX	DL	2674	SNA	D	12:40	95%	142	70	72	150	32N
DL-2061	2	PAX	DL	2061	CLE	D	10:40	95%	104	49	55	109	221	1:05	DL-2062	2	PAX	DL	2062	FCA	D	11:45	88%	96	69	27	109	221
DL-2215	2	PAX	DL	2215	EWR	D	10:41	64%	83	32	51	130	223	0:49	DL-2216	2	PAX	DL	2216	TUS	D	11:30	93%	120	53	68	130	223
DL-2063	2	PAX	DL	2063	CVG	D	10:42	76%	83	47	36	109	221	1:03	DL-2064	2	PAX	DL	2064	IAH	D	11:45	84%	92	37	55	109	221
DL-2375	2	PAX	DL	2375	MCO	D	10:43	92%	177	55	121	192	3N1	1:02	DL-2376	2	PAX	DL	2376	DEN	D	11:45	93%	179	69	110	192	3N1
DL-2065	2	PAX	DL	2065	ORF	D	10:43	70%	76	40	35	109	221	1:43	DL-2066	2	PAX	DL	2066	RIC	D	12:26	80%	87	46	41	109	221
DL-2217	2	PAX	DL	2217	RDU	D	10:45	84%	109	50	59	130	223	0:50	DL-2218	2	PAX	DL	2218	MSO	D	11:35	80%	104	83	21	130	223
DL-2067	2	PAX	DL	2067	GRR	D	10:45	89%	97	71	26	109	221	1:56	DL-2162	2	PAX	DL	2162	YYZ	I	12:41	91%	99	51	47	109	221
DL-2069	2	PAX	DL	2069	PIT	D	10:45	80%	87	45	41	109	221	2:00	DL-2068	2	PAX	DL	2068	IND	D	12:45	82%	90	44	45	109	221
DL-2813	2	PAX	DL	2813	MDW	D	10:50	79%	60	16	44	76	CR9	1:55	DL-2820	2	PAX	DL	2820	GRB	D	12:45	89%	67	58	10	76	CR9
DL-2533	2	PAX	DL	2533	DTW	D	10:53	93%	167	68	99	180	739	1:52	DL-2534	2	PAX	DL	2534	LGA	D	12:45	85%	154	53	101	180	739
DL-2219	2	PAX	DL	2219	STL	D	10:54	60%	77	35	42	130	223	0:47	DL-2220	2	PAX	DL	2220	HDN	D	11:41	72%	93	64	29	130	223
DL-2535	2	PAX	DL	2535	MCI	D	10:59	67%	121	67	54	180	739	1:51	DL-2536	2	PAX	DL	2536	BWI	D	12:50	92%	166	65	101	180	739
DL-2221	2	PAX	DL	2221	LAS	D	11:00	91%	118	43	75	130	223	1:00	DL-2222	2	PAX	DL	2222	AUS	D	12:00	95%	123	47	76	130	223
DL-2815	2	PAX	DL	2815	DLH	D	11:05	88%	67	66	1	76	CR9	1:45	DL-2822	2	PAX	DL	2822	BDL	D	12:50	87%	66	41	25	76	CR9
DL-2353	2	PAX	DL	2353	SLC	D	11:15	93%	178	98	80	192	3N1	1:30	DL-2354	2	PAX	DL	2354	ATL	D	12:45	89%	170	49	121	192	3N1
DL-2377	2	PAX	DL	2377	ATL	D	11:15	97%	186	73	113	192	3N1	1:45	DL-2378	2	PAX	DL	2378	DEN	D	13:00	96%	185	61	124	192	3N1
DL-2675	2	PAX	DL	2675	MEX	I	11:15	88%	132	34	98	150	32N	1:30	DL-2676	2	PAX	DL	2676	LAX	D	12:45	86%	129	47	82	150	32N
DL-2677	2	PAX	DL	2677	BWI	D	11:17	91%	137	65	72	150	32N	1:33	DL-2678	2	PAX	DL	2678	PVD	D	12:50	89%	133	37	96	150	32N
DL-2071	2	PAX	DL	2071	IND	D	11:17	88%	96	48	48	109	221	1:28	DL-2070	2	PAX	DL	2070	PIT	D	12:45	89%	97	50	46	109	221
DL-2817	2	PAX	DL	2817	HDN	D	11:27	87%	66	49	17	76	CR9	1:23	DL-2824	2	PAX	DL	2824	DLH	D	12:50	89%	68	67	1	76	CR9
DL-2351	2	PAX	DL	2351	RSW	D	11:30	96%	185	43	142	192	3N1	1:15	DL-2352	2	PAX	DL	2352	LAS	D	12:45	90%	174	79	95	192	3N1
DL-2161	2	PAX	DL	2161	YYZ	I	11:30	79%	86	45	41	109	221	1:20	DL-2072	2	PAX	DL	2072	GFK	D	12:50	90%	98	89	9	109	221
DL-2679	2	PAX	DL	2679	JAC	D	11:32	82%	123	84	38	150	32N	1:23	DL-2680	2	PAX	DL	2680	ORD	D	12:55	86%	129	40	89	150	32N
DL-2147	2	PAX	DL	2147	IAH	D	11:34	84%	92	37	54	109	221	1:22	DL-2074	2	PAX	DL	2074	STL	D	12:56	89%	98	44	54	109	221
DL-2819	2	PAX	DL	2819	YYC	I	11:36	91%	69	55	14	76	CR9	1:14	DL-2826	2	PAX	DL	2826	MDW	D	12:50	76%	57	15	42	76	CR9
DL-2379	2	PAX	DL	2379	SFO	D	11:41	87%	167	57	110	192	3N1	1:19	DL-2380	2	PAX	DL	2380	FLL	D	13:00	88%	169	47	123	192	3N1
DL-2457	2	PAX	DL	2457	SEA	D	11:43	94%	265	141	123	281	339	3:37	DL-2458	2	PAX	DL	2458	MCO	D	15:20	93%	260	80	180	281	339
DL-2381	2	PAX	DL	2381	PHX	D	11:44	93%	178	55	124	192	3N1	1:21	DL-2382	2	PAX	DL	2382	SAN	D	13:05	95%	182	103	79	192	3N1
DL-2681	2	PAX	DL	2681	MSY	D	11:45	80%	120	61	59	150	32N	1:15	DL-2682	2	PAX	DL	2682	MEX	I	13:00	88%	132	33	99	150	32N
DL-2821	2	PAX	DL	2821	JAX	D	11:45	90%	68	33	35	76	CR9	1:10	DL-2976	2	PAX	DL	2976	SBN	D	12:55	0.83	63	40	23	76	CR9
DL-2223	2	PAX	DL	2223	DEN	D	11:50	92%	120	47	73	130	223	0:55	DL-2224	2	PAX	DL	2224	YXE	I	12:45	79%	103	93	10	130	223
DL-2459	2	PAX	DL	2459	LAX	D	11:51	88%	247	91	156	281	339	4:34	DL-2460	2	PAX	DL	2460	CDG	I	16:25	96%	271	189	82	281	339
DL-2683	2	PAX	DL	2683	SMF	D	11:54	95%	142	85	57	150	32N	1:11	DL-2684	2	PAX	DL	2684	MCO	D	13:05	91%	136	42	95	150	32N
DL-2537	2	PAX	DL	2537	GEG	D	11:55	95%	170	144	27	180	739	0:55	DL-2538	2	PAX	DL	2538	MIA	D	12:50	96%	174	46	128	180	739
DL-2225	2	PAX	DL	2225	YVR	I	11:56	94%	122	91	31	130	223	0:54	DL-2226	2	PAX	DL	2226	RDU	D	12:50	78%	101	46	56	130	223
DL-2383	2	PAX	DL	2383	PDX	D	11:56	91%	174	112	62	192	3N1	1:14	DL-2384	2	PAX	DL	2384	DTW	D	13:10	88%	170	68	101	192	3N1
DL-2823	2	PAX	DL	2823	YEG	I	11:58	93%	71	62	9	76	CR9	0:57	DL-2828	2	PAX	DL	2828	CVG	D	12:55	83%	63	35	28	76	CR9
DL-2385	2	PAX	DL	2385	MCO	D	12:00	95%	182	60	122	192	3N1	1:10	DL-2386	2	PAX	DL	2386	TPA	D	13:10	97%	185	55	131	192	3N1
DL-2975	2	PAX	DL	2975	INL	D	12:00	0.39	29	27	2	76	CR9	1:00	DL-2830	2	PAX	DL	2830	BIS	D	13:00	83%	63	56	8	76	CR9
DL-2073	2	PAX	DL	2073	PSC	D	12:03	96%	105	92	13	109	221	0:54	DL-2076	2	PAX	DL	2076	IAD	D	12:57	78%	85	44	40	109	221
DL-2825	2	PAX	DL	2825	FSD	D	12:04	94%	72	67	4	76	CR9	1:16	DL-2832	2	PAX	DL	2832	ATW	D	13:20	86%	66	51	14	76	CR9
DL-2227	2	PAX	DL	2227	FAR	D	12:05	94%	122	115	7	130	223	0:55	DL-2228	2	PAX	DL	2228	DFW	D	13:00	96%	125	42	83	130	223
DL-2229	2	PAX	DL	2229	MKE	D	12:05	88%	115	70	44	130	223	1:16	DL-2230	2	PAX	DL	2230	CLT	D	13:21	85%	110	49	61	130	223
DL-2603	2	PAX	DL	2603	SAN	D	12:06	95%	228	109	119	240	753	2:19	DL-2604	2	PAX	DL	2604	DEN	D	14:25	92%	221	85	136	240	753
DL-2387	2	PAX	DL	2387	ATL	D	12:12	92%	176	52	124	192	3N1	1:18	DL-2388	2	PAX	DL	2388	PHX	D	13:30	93%	178	77	101	192	3N1
DL-2827	2	PAX	DL	2827	IMT	D	12:12	76%	57	49	8	76	CR9	1:13	DL-2978	2	PAX	DL	2978	AZO	D	13:25	0.69	52	36	16	76	CR9
DL-2461	2	PAX	DL	2461	CDG	I	12:13	98%	275	194	81	281	339	5:17	DL-2462	2	PAX	DL	2462	CDG	I	17:30	100%	281	196	85	281	339
DL-2539	2	PAX	DL	2539	SLC	D	12:14	93%	168	79	89	180	739	0:46	DL-2540	2	PAX	DL	2540	SJD	I	13:00	90%	162	73	89	180	739
DL-2541	2	PAX	DL	2541	BOS	D	12:15	96%	174	57	117	180	739	1:00	DL-2542	2	PAX	DL	2542	SLC	D	13:15	92%	165	87	78	180	739
DL-2231	2	PAX	DL	2231	CVG	D	12:15	77%	101	57	44	130	223	1:20	DL-2232	2	PAX	DL	2232	BNA	D	13:35	95%	124	49	74	130	223
DL-2075	2	PAX	DL	2075	BNA	D	12:15	87%	95	40	55	109	221	1:04	DL-2078	2	PAX	DL	2078	GRR	D	13:19	86%	93	68	25	109	221
DL-2829	2	PAX	DL	2829	OMA	D	12:15	86%	65	48	17	76	CR9	1:15	DL-2834	2	PAX	DL	2834	FSD	D	13:30	96%	73	68	4	76	CR9
DL-2077	2	PAX	DL	2077	JFK	D	12:20	95%	103	36	67	109	221	1:05	DL-2148	2	PAX	DL	2148	ROC	D	13:25	77%	84	60	25	109	221
DL-2483	2	PAX	DL	2483	AMS	I	12:27	96%	294	164	131	306	350	3:09	DL-2484	2	PAX	DL	2484	ATL	D	15:36	85%	259	74	184	306	350
DL-2485	2	PAX	DL	2485	EUR1	I	12:27	97%	295	179	117	306	350	4:23	DL-2486	2	PAX	DL	2486	AMS	I	16:50	98%	301	158	143	306	350
DL-2233	2	PAX	DL	2233	SNA	D	12:34	90%	117	50	66	130	223	1:46	DL-2234	2	PAX	DL	2234	AUS	D	14:20	94%	122	35	88	130	223
DL-2831	2	PAX	DL	2831	MDW	D	12:35	79%	60	16	44	76	CR9	0:55	DL-2838	2	PAX	DL	2838	TYS	D	13:30	71%	54	28	25	76	CR9
DL-2079	2	PAX	DL	2079	STL	D	12:38	86%	93	42	51	109	221	0:53	DL-2080	2	PAX	DL	2080	MCI	D	13:31	91%	99	55	45	109	221
DL-2355	2	PAX	DL	2355	SFO	D	12:40	87%	167	57	110	192	3N1	1:00	DL-2356	2	PAX	DL	2356	PUJ	I	13:40	93%	178	50	128	192	3N1
DL-2981	2	PAX	DL	2981	MOT	D	12:41	0.80	61	55	6	76	CR9	0:49	DL-2836	2	PAX	DL	2836	XNA	D	13:30	74%	56	26	30	76	CR9
DL-2081	2	PAX	DL	2081	BIL	D	12:45	75%	82	65	17	109	221	0:55	DL-2082	2	PAX	DL	2082	OMA	D	13:40	85%	93	68	25	109	221
DL-2833	2	PAX	DL	2833	XNA	D	12:45	75%	57	28	29	76	CR9	1:13	DL-2980	2	PAX	DL	2980	BUF	D	13:58	0.90	69	42	27	76	CR9
DL-2083	2	PAX	DL	2083	GRB	D	12:49	87%	95	82	14	109	221	0:56	DL-2084	2	PAX	DL	2084	CLE	D	13:45	87%	95	44	51	109	221
DL-2835	2	PAX	DL	2835	YWG	I	12:49	87%	66	61	5	76	CR9	1:10	DL-2840	2	PAX	DL	2840	SAT	D	13:59	91%	69	26	43	76	CR9
DL-2235	2	PAX	DL	2235	ORD	D	12:50	87%	114	36	77	130	223	1:30	DL-2236	2	PAX	DL	2236	CWA	D	14:20	82%	107	99	8	130	223
DL-2389	2	PAX	DL	2389	SAN	D	12:50	94%	181	80	101	192	3N1	0:55	DL-2390	2	PAX	DL	2390	ATL	D	13:45	97%	187	62	125	192	3N1
DL-2837	2	PAX	DL	2837	ATW	D	12:50	90%	68	53	15	76	CR9	1:30	DL-2982	2	PAX	DL	2982	ICT	D	14:20	0.85	64	40	24	76	CR9
DL-2391	2	PAX	DL	2391	DCA	D	12:55	86%	165	75	91	192	3N1	0:50	DL-2392	2	PAX	DL	2392	LAX	D	13:45	90%	173	68	104	192	3N1
DL-2085	2	PAX	DL	2085	MSN	D	12:59	82%	90	76	13	109	221	0:53	DL-2086	2	PAX	DL	2086	MKE	D	13:52	91%	100	61	39	109	221
DL-2839	2	PAX	DL	2839	DSM	D	12:59	80%	61	52	8	76	CR9	1:23	DL-2984	2	PAX	DL	2984	IAH	D	14:22	0.88	67	27	40	76	CR9
DL-2087	2	PAX	DL	2087	TUS	D	13:00	88%	96	48	48	109	221	0:55	DL-2088	2	PAX	DL	2088	FAR	D	13:55	88%	96	90	5	109	221
DL-2685	2	PAX	DL	2685	LAX	D	13:01	90%	135	50	85	150	32N	0:44	DL-2686	2	PAX	DL	2686	MSN	D	13:45	87%	130	110	20	150	32N
DL-2623	2	PAX	DL	2623	LAS	D	13:05	91%	217	79	139	240	753	2:31	DL-2624	2	PAX	DL	2624	SFO	D	15:36	91%	220	74	146	240	753
DL-2237	2	PAX	DL	2237	DTW	D	13:06	91%	118	48	70	130	223	1:14	DL-2238	2	PAX	DL	2238	YYZ	I	14:20	91%	118	61	56	130	223
DL-2841	2	PAX	DL	2841	CID	D	13:08	83%	63	48	16	76	CR9	1:17	DL-2842	2	PAX	DL	2842	RHI	D	14:25	64%	49	46	3	76	CR9
DL-2393	2	PAX	DL	2393	LGA	D	13:12	71%	137	48	89	192	3N1	0:48	DL-2394	2	PAX	DL	2394	MCO	D	14:00	95%	182	58	124	192	3N1
DL-2089	2	PAX	DL	2089	IND	D	13:12	88%	96	48	48	109	221	1:00	DL-2090	2	PAX	DL	2090	CMH	D	14:12	95%	103	52	52	109	221
DL-2843	2	PAX	DL	2843	RAP	D	13:13	88%	67	49	18	76	CR9	1:13	DL-2844	2	PAX	DL	2844	SDF	D	14:26	84%	64	34	30	76	CR9
DL-2091	2	PAX	DL	2091	DFW	D	13:15	94%	103	35	68	109	221	1:05	DL-2092	2	PAX	DL	2092	JFK	D	14:20	86%	94	33	61	109	221
DL-2605	2	PAX	DL	2605	SEA	D	13:17	89%	213	114	99	240	753	1:38	DL-2606	2	PAX	DL	2606	SEA	D	14:55	97%	233	124	110	240	753
DL-2687	2	PAX	DL	2687	OAK	D	13:20	87%	130	79	52	150	32N	1:02	DL-2688	2	PAX	DL	2688	BZN	D	14:22	84%	126	94	32	150	32N
DL-2395	2	PAX	DL	2395	SAN	D	13:27	95%	182	87	95	192	3N1	0:55	DL-2396	2	PAX	DL	2396	PHX	D	14:22	92%	177	53	124	192	3N1
DL-2093	2	PAX	DL	2093	SJC	D	13:27	90%	98	60	38	109	221	1:02	DL-2094	2	PAX	DL	2094	DFW	D	14:29	92%	100	34	67	109	221
DL-2095	2	PAX	DL	2095	IAH	D	13:30	86%	93	38	55	109	221	1:00	DL-2096	2	PAX	DL	2096	OKC	D	14:30	87%	94	58	37	109	221
DL-2983	2	PAX	DL	2983	CWA	D	13:31	0.83	63	58	4	76	CR9	0:59	DL-2986	2	PAX	DL	2986	LSE	D	14:30	0.83	63	62	1	76	CR9
DL-2397	2	PAX	DL	2397	SLC	D	13:32	93%	178	84	94	192	3N1	0:58	DL-2398	2	PAX	DL	2398	PDX	D	14:30	93%	179	119	60	192	3N1
DL-2487	2	PAX	DL	2487	HND	I	13:32	88%	268	209	60	306	350	3:18	DL-2488	2	PAX	DL	2488	EUR1	I	16:50	97%	297	178	119	306	350
DL-2097	2	PAX	DL	2097	CMH	D	13:32	81%	88	45	44	109	221	1:04	DL-2098	2	PAX	DL	2098	MEM	D	14:36	82%	89	50	40	109	221
DL-2239	2	PAX	DL	2239	JFK	D	13:34	82%	106	38	68	130	223	1:01	DL-2240	2	PAX	DL	2240	DSM	D	14:35	78%	101	87	14	130	223
DL-2845	2	PAX	DL	2845	RST	D	13:37	87%	66	64	3	76	CR9	0:58	DL-2988	2	PAX	DL	2988	BRD	D	14:35	0.64	49	46	2	76	CR9
DL-2689	2	PAX	DL	2689	SFO	D	13:38	87%	130	45	86	150	32N	1:32	DL-2690	2	PAX	DL	2690	ORD	D	15:10	86%	129	40	89	150	32N
DL-2099	2	PAX	DL	2099	GRR	D	13:42	95%	104	76	28	109	221	1:03	DL-2100	2	PAX	DL	2100	CLT	D	14:45	94%	102	55	47	109	221
DL-2241	2	PAX	DL	2241	RDU	D	13:44	84%	109	50	59	130	223	1:26	DL-2242	2	PAX	DL	2242	YWG	I	15:10	90%	117	108	9	130	223
DL-2985	2	PAX	DL	2985	HIB	D	13:45	0.54	41	39	3	76	CR9	1:00	DL-3016	2	PAX	DL	3016	ABR	D	14:45	0.81	61	58	3	76	CR9
DL-2399	2	PAX	DL	2399	LAX	D	13:45	97%	187	80	107	192	3N1	0:45	DL-2400	2	PAX	DL	2400	SLC	D	14:30	87%	167	78	89	192	3N1
DL-2101	2	PAX	DL	2101	TUL	D	13:46	77%	84	40	44	109	221	1:24	DL-2102	2	PAX	DL	2102	EWR	D	15:10	83%	90	34	56	109	221
DL-2543	2	PAX	DL	2543	BWI	D	13:47	83%	149	59	90	180	739	1:23	DL-2544	2	PAX	DL	2544	PHL	D	15:10	84%	151	69	82	180	739
DL-2401	2	PAX	DL	2401	MCO	D	13:49	92%	177	55	121	192	3N1	0:51	DL-2402	2	PAX	DL	2402	LAX	D	14:40	93%	178	65	114	192	3N1
DL-2103	2	PAX	DL	2103	MCI	D	13:49	64%	70	39	31	109	221	1:21	DL-2104	2	PAX	DL	2104	PIT	D	15:10	84%	91	47	44	109	221
DL-2463	2	PAX	DL	2463	CDG	I	13:50	99%	278	196	82	281	339	4:05	DL-2464	2	PAX	DL	2464	LAX	D	17:55	92%	259	94	165	281	339
DL-2545	2	PAX	DL	2545	BOS	D	13:50	89%	160	69	92	180	739	1:15	DL-2546	2	PAX	DL	2546	GEG	D	15:05	92%	166	139	27	180	739
DL-2607	2	PAX	DL	2607	ATL	D	13:50	90%	216	64	153	240	753	1:35	DL-2608	2	PAX	DL	2608	LAS	D	15:25	92%	220	79	142	240	753
DL-2105	2	PAX	DL	2105	MEM	D	13:50	78%	85	47	37	109	221	1:20	DL-2106	2	PAX	DL	2106	STL	D	15:10	93%	102	45	56	109	221
DL-2107	2	PAX	DL	2107	PHL	D	13:50	83%	90	42	49	109	221	1:30	DL-2108	2	PAX	DL	2108	BDL	D	15:20	87%	95	59	36	109	221
DL-2847	2	PAX	DL	2847	BJI	D	13:50	77%	59	55	4	76	CR9	1:02	DL-2846	2	PAX	DL	2846	MOT	D	14:52	86%	65	59	6	76	CR9
DL-2849	2	PAX	DL	2849	EWR	D	13:50	82%	62	24	38	76	CR9	1:02	DL-2848	2	PAX	DL	2848	RST	D	14:52	85%	64	62	3	76	CR9
DL-2851	2	PAX	DL	2851	MDW	D	13:50	79%	60	16	44	76	CR9	1:20	DL-2850	2	PAX	DL	2850	MDW	D	15:10	76%	57	15	42	76	CR9
DL-2853	2	PAX	DL	2853	PIT	D	13:50	80%	60	32	29	76	CR9	1:25	DL-3010	2	PAX	DL	3010	XWA	D	15:15	0.51	39	33	6	76	CR9
DL-2855	2	PAX	DL	2855	FSD	D	13:55	94%	72	67	4	76	CR9	1:20	DL-2854	2	PAX	DL	2854	BIS	D	15:15	83%	63	56	8	76	CR9
DL-2403	2	PAX	DL	2403	DEN	D	13:58	92%	177	69	108	192	3N1	0:47	DL-2404	2	PAX	DL	2404	ATL	D	14:45	97%	187	62	125	192	3N1
DL-3015	2	PAX	DL	3015	ALB	D	14:00	0.85	65	42	22	76	CR9	1:15	DL-2852	2	PAX	DL	2852	DAY	D	15:15	82%	62	33	29	76	CR9
DL-2243	2	PAX	DL	2243	FAR	D	14:04	78%	101	96	6	130	223	1:11	DL-2244	2	PAX	DL	2244	GRR	D	15:15	88%	114	83	31	130	223
DL-2547	2	PAX	DL	2547	LGA	D	14:06	83%	150	52	97	180	739	1:04	DL-2548	2	PAX	DL	2548	BOS	D	15:10	91%	164	69	95	180	739
DL-2249	2	PAX	DL	2249	CLT	D	14:10	71%	93	41	51	130	223	0:50	DL-2250	2	PAX	DL	2250	FAR	D	15:00	91%	119	112	7	130	223
DL-2857	2	PAX	DL	2857	BOI	D	14:10	90%	68	51	17	76	CR9	1:06	DL-2856	2	PAX	DL	2856	RDU	D	15:16	93%	70	30	40	76	CR9
DL-2245	2	PAX	DL	2245	SNA	D	14:17	90%	117	50	66	130	223	1:09	DL-2246	2	PAX	DL	2246	MCI	D	15:26	88%	115	63	52	130	223
DL-2549	2	PAX	DL	2549	PDX	D	14:17	99%	178	112	66	180	739	0:53	DL-2550	2	PAX	DL	2550	LGA	D	15:10	79%	143	49	94	180	739
DL-2859	2	PAX	DL	2859	IAD	D	14:20	75%	57	30	27	76	CR9	0:59	DL-2858	2	PAX	DL	2858	CLE	D	15:19	89%	68	32	36	76	CR9
DL-2109	2	PAX	DL	2109	BNA	D	14:21	92%	100	40	60	109	221	1:23	DL-2110	2	PAX	DL	2110	BNA	D	15:44	96%	105	42	63	109	221
DL-2405	2	PAX	DL	2405	LAX	D	14:23	94%	180	66	114	192	3N1	0:52	DL-2406	2	PAX	DL	2406	DCA	D	15:15	91%	176	78	97	192	3N1
DL-2407	2	PAX	DL	2407	PHX	D	14:24	93%	178	55	124	192	3N1	0:51	DL-2408	2	PAX	DL	2408	MSN	D	15:15	86%	166	141	25	192	3N1
DL-2989	2	PAX	DL	2989	XWA	D	14:25	0.61	46	37	9	76	CR9	0:55	DL-2860	2	PAX	DL	2860	CMH	D	15:20	94%	71	36	36	76	CR9
DL-2247	2	PAX	DL	2247	AUS	D	14:27	90%	117	34	83	130	223	1:33	DL-2248	2	PAX	DL	2248	FAR	D	16:00	91%	119	112	7	130	223
DL-2551	2	PAX	DL	2551	BZN	D	14:30	91%	164	123	41	180	739	0:55	DL-2552	2	PAX	DL	2552	MKE	D	15:25	92%	165	101	64	180	739
DL-2691	2	PAX	DL	2691	SEA	D	14:30	98%	147	91	56	150	32N	0:45	DL-2692	2	PAX	DL	2692	IND	D	15:15	88%	132	65	67	150	32N
DL-2863	2	PAX	DL	2863	CHS	D	14:30	88%	67	34	33	76	CR9	[illegible]	DL-2862	2	PAX	DL	2862	IMT	D	15:21	67%	51	44	7	[illegible]	CR9

DL-2861	2	PAX	DL	2861	GFK	D	14:30	84%	64	58	6	76	CR9	0:55	DL-3012	2	PAX	DL	3012	CWA	D	15:25	0.82	63	58	5	76	CR9
DL-2865	2	PAX	DL	2865	OMA	D	14:32	86%	65	48	17	76	CR9	0:58	DL-2864	2	PAX	DL	2864	GFK	D	15:30	90%	68	62	6	76	CR9
DL-2409	2	PAX	DL	2409	LAS	D	14:38	91%	174	63	111	192	3N1	1:11	DL-2410	2	PAX	DL	2410	DTW	D	15:49	88%	170	68	101	192	3N1
DL-2251	2	PAX	DL	2251	DFW	D	14:39	95%	123	42	81	130	223	1:21	DL-2252	2	PAX	DL	2252	YWG	I	16:00	90%	117	108	9	130	223
DL-2465	2	PAX	DL	2465	AMS	I	14:40	91%	256	140	116	281	339	3:20	DL-2466	2	PAX	DL	2466	SEA	D	18:00	94%	264	140	124	281	339
DL-2111	2	PAX	DL	2111	SDF	D	14:40	89%	97	52	45	109	221	2:20	DL-2112	2	PAX	DL	2112	PHL	D	17:00	90%	98	50	48	109	221
DL-2991	2	PAX	DL	2991	ABR	D	14:40	0.76	57	54	3	76	CR9	0:50	DL-2866	2	PAX	DL	2866	OMA	D	15:30	86%	65	48	17	76	CR9
DL-2411	2	PAX	DL	2411	ATL	D	14:45	95%	183	53	130	192	3N1	1:15	DL-2412	2	PAX	DL	2412	LAX	D	16:00	91%	175	73	101	192	3N1
DL-2867	2	PAX	DL	2867	BIS	D	14:45	83%	63	56	7	76	CR9	0:51	DL-2868	2	PAX	DL	2868	GRB	D	15:36	89%	67	58	10	76	CR9
DL-2693	2	PAX	DL	2693	DTW	D	14:51	91%	137	56	81	150	32N	1:39	DL-2694	2	PAX	DL	2694	BOS	D	16:30	97%	146	38	108	150	32N
DL-2695	2	PAX	DL	2695	TPA	D	14:55	91%	136	35	101	150	32N	2:40	DL-2696	2	PAX	DL	2696	BIS	D	17:35	70%	104	92	12	150	32N
DL-2869	2	PAX	DL	2869	YWG	I	14:58	81%	61	57	5	76	CR9	0:47	DL-2870	2	PAX	DL	2870	JAX	D	15:45	81%	62	23	39	76	CR9
DL-2413	2	PAX	DL	2413	CUN	I	15:00	82%	158	107	51	192	3N1	1:30	DL-2414	2	PAX	DL	2414	DTW	D	16:30	97%	187	71	116	192	3N1
DL-2871	2	PAX	DL	2871	YEG	I	15:00	90%	68	59	10	76	CR9	0:48	DL-2872	2	PAX	DL	2872	ATW	D	15:48	86%	66	51	14	76	CR9
DL-2873	2	PAX	DL	2873	YXE	I	15:00	80%	61	55	6	76	CR9	0:55	DL-2992	2	PAX	DL	2992	CID	D	15:55	0.82	62	47	15	76	CR9
DL-2875	2	PAX	DL	2875	MOT	D	15:01	80%	61	55	6	76	CR9	1:03	DL-2874	2	PAX	DL	2874	INL	D	16:04	37%	28	26	2	76	CR9
DL-2113	2	PAX	DL	2113	BHM	D	15:05	83%	91	27	64	109	221	2:25	DL-2154	2	PAX	DL	2154	PSC	D	17:30	87%	95	82	13	109	221
DL-2877	2	PAX	DL	2877	YYZ	I	15:09	82%	62	33	29	76	CR9	1:01	DL-2994	2	PAX	DL	2994	CVG	D	16:10	0.83	63	35	28	76	CR9
DL-2879	2	PAX	DL	2879	DLH	D	15:13	88%	67	66	1	76	CR9	1:02	DL-2876	2	PAX	DL	2876	FSD	D	16:15	96%	73	68	4	76	CR9
DL-2253	2	PAX	DL	2253	ORD	D	15:17	87%	114	36	77	130	223	1:43	DL-2254	2	PAX	DL	2254	GRB	D	17:00	83%	108	92	16	130	223
DL-2697	2	PAX	DL	2697	MSY	D	15:19	90%	135	47	88	150	32N	2:16	DL-2698	2	PAX	DL	2698	DFW	D	17:35	94%	141	47	94	150	32N
DL-2115	2	PAX	DL	2115	YYC	I	15:20	95%	104	75	29	109	221	2:10	DL-2114	2	PAX	DL	2114	JFK	D	17:30	99%	108	32	76	109	221
DL-2347	2	PAX	DL	2347	DEN	D	15:30	77%	147	56	91	192	3N1	1:00	DL-2348	2	PAX	DL	2348	RSW	D	16:30	95%	182	41	141	192	3N1
DL-2361	2	PAX	DL	2361	MCO	D	15:30	95%	182	56	125	192	3N1	1:00	DL-2362	2	PAX	DL	2362	DCA	D	16:30	90%	174	78	96	192	3N1
DL-2415	2	PAX	DL	2415	PHX	D	15:30	85%	163	64	98	192	321	1:07	DL-2416	2	PAX	DL	2416	ATL	D	16:37	89%	170	49	121	192	321
DL-2363	2	PAX	DL	2363	SFO	D	15:32	98%	189	80	108	192	3N1	1:03	DL-2364	2	PAX	DL	2364	FLL	D	16:35	91%	175	46	129	192	3N1
DL-2365	2	PAX	DL	2365	ATL	D	15:37	92%	176	52	124	192	3N1	1:03	DL-2366	2	PAX	DL	2366	PHX	D	16:40	92%	177	72	104	192	3N1
DL-2883	2	PAX	DL	2883	GRB	D	15:37	87%	66	57	10	76	CR9	0:53	DL-2878	2	PAX	DL	2878	DLH	D	16:30	89%	68	67	1	76	CR9
DL-2699	2	PAX	DL	2699	BOS	D	15:45	96%	144	43	102	150	32N	1:50	DL-2700	2	PAX	DL	2700	ORD	D	17:35	86%	129	40	89	150	32N
DL-2625	2	PAX	DL	2625	LAS	D	15:50	91%	217	79	139	240	753	1:46	DL-2626	2	PAX	DL	2626	SLC	D	17:36	87%	208	97	111	240	753
DL-2885	2	PAX	DL	2885	GFK	D	15:54	84%	64	58	6	76	CR9	0:42	DL-2880	2	PAX	DL	2880	RAP	D	16:36	92%	70	51	19	76	CR9
DL-2553	2	PAX	DL	2553	MIA	D	15:58	96%	174	47	126	180	739	0:57	DL-2554	2	PAX	DL	2554	RST	D	16:55	85%	152	146	7	180	739
DL-2609	2	PAX	DL	2609	CUN	I	16:00	92%	221	80	141	240	753	1:40	DL-2610	2	PAX	DL	2610	DTW	D	17:40	92%	220	89	132	240	753
DL-2153	2	PAX	DL	2153	PIT	D	16:00	88%	95	50	46	109	221	1:37	DL-2116	2	PAX	DL	2116	STL	D	17:37	93%	102	45	56	109	221
DL-2255	2	PAX	DL	2255	SNA	D	16:00	87%	113	55	59	130	223	1:30	DL-2256	2	PAX	DL	2256	DLH	D	17:30	87%	113	111	2	130	223
DL-2701	2	PAX	DL	2701	SEA	D	16:00	97%	146	73	73	150	32N	1:40	DL-2702	2	PAX	DL	2702	JAC	D	17:40	84%	126	89	37	150	32N
DL-2887	2	PAX	DL	2887	FSD	D	16:01	94%	72	67	4	76	CR9	0:39	DL-2884	2	PAX	DL	2884	HDN	D	16:40	86%	65	34	31	76	CR9
DL-2703	2	PAX	DL	2703	FLL	D	16:06	96%	144	39	106	150	32N	1:34	DL-2704	2	PAX	DL	2704	RSW	D	17:40	89%	133	30	104	150	32N
DL-2467	2	PAX	DL	2467	LHR	I	16:14	77%	217	87	130	281	339	1:50	DL-2468	2	PAX	DL	2468	LHR	I	18:04	81%	228	90	138	281	339
DL-2889	2	PAX	DL	2889	ATW	D	16:20	90%	68	53	15	76	CR9	1:10	DL-2882	2	PAX	DL	2882	FSD	D	17:30	82%	63	49	14	76	CR9
DL-2555	2	PAX	DL	2555	LGA	D	16:22	83%	150	52	97	180	739	1:28	DL-2556	2	PAX	DL	2556	DCA	D	17:50	91%	165	74	91	180	739
DL-2257	2	PAX	DL	2257	RDU	D	16:30	92%	120	54	66	130	223	1:05	DL-2258	2	PAX	DL	2258	EWR	D	17:35	71%	92	35	58	130	223
DL-2557	2	PAX	DL	2557	DCA	D	16:30	86%	155	70	85	180	739	1:20	DL-2558	2	PAX	DL	2558	MKE	D	17:50	81%	145	88	57	180	739
DL-2881	2	PAX	DL	2881	BDL	D	16:30	70%	54	33	20	76	CR9	1:10	DL-2886	2	PAX	DL	2886	OMA	D	17:40	86%	65	48	17	76	CR9
DL-2117	2	PAX	DL	2117	CLE	D	16:33	95%	104	49	55	109	221	1:07	DL-2118	2	PAX	DL	2118	SAT	D	17:40	89%	97	37	61	109	221
DL-2119	2	PAX	DL	2119	IAH	D	16:33	85%	92	38	55	109	221	1:11	DL-2120	2	PAX	DL	2120	CLT	D	17:44	85%	92	41	51	109	221
DL-2705	2	PAX	DL	2705	MSN	D	16:37	95%	143	121	22	150	32N	1:06	DL-2706	2	PAX	DL	2706	LGA	D	17:43	85%	128	44	84	150	32N
DL-2259	2	PAX	DL	2259	BIL	D	16:40	85%	111	94	17	130	223	1:00	DL-2260	2	PAX	DL	2260	LEX	D	17:40	77%	100	59	41	130	223
DL-2559	2	PAX	DL	2559	SJD	I	16:40	99%	177	45	133	180	739	1:15	DL-2560	2	PAX	DL	2560	BOS	D	17:55	91%	164	69	95	180	739
DL-2419	2	PAX	DL	2419	PHX	D	16:42	90%	172	53	119	192	3N1	1:03	DL-2418	2	PAX	DL	2418	ATL	D	17:45	92%	177	51	126	192	3N1
DL-2121	2	PAX	DL	2121	PHL	D	16:42	85%	93	43	50	109	221	1:03	DL-2122	2	PAX	DL	2122	AUS	D	17:45	94%	102	29	73	109	221
DL-3017	2	PAX	DL	3017	SBN	D	16:42	0.84	64	41	23	76	CR9	1:03	DL-2888	2	PAX	DL	2888	GFK	D	17:45	90%	68	62	6	76	CR9
DL-2611	2	PAX	DL	2611	LAX	D	16:43	97%	232	85	146	240	753	1:33	DL-2612	2	PAX	DL	2612	TPA	D	18:16	81%	194	57	136	240	753
DL-2707	2	PAX	DL	2707	JAC	D	16:45	81%	122	82	40	150	32N	1:00	DL-2708	2	PAX	DL	2708	MIA	D	17:45	91%	136	54	82	150	32N
DL-2891	2	PAX	DL	2891	BIS	D	16:46	83%	63	56	7	76	CR9	0:59	DL-2890	2	PAX	DL	2890	MDW	D	17:45	76%	57	15	42	76	CR9
DL-2893	2	PAX	DL	2893	MDW	D	16:47	79%	60	16	44	76	CR9	0:59	DL-2892	2	PAX	DL	2892	FAR	D	17:46	88%	67	63	4	76	CR9
DL-2421	2	PAX	DL	2421	DEN	D	16:49	92%	177	69	108	192	321	0:57	DL-2422	2	PAX	DL	2422	MCI	D	17:46	79%	151	83	68	192	321
DL-2469	2	PAX	DL	2469	ATL	D	16:50	91%	255	75	180	281	339	2:42	DL-2470	2	PAX	DL	2470	AMS	I	19:32	100%	281	164	117	281	339
DL-2709	2	PAX	DL	2709	DTW	D	16:50	93%	140	57	83	150	32N	1:00	DL-2710	2	PAX	DL	2710	LAS	D	17:50	92%	138	49	88	150	32N
DL-2895	2	PAX	DL	2895	EWR	D	16:50	82%	63	24	39	76	CR9	1:00	DL-2894	2	PAX	DL	2894	IAH	D	17:50	89%	68	27	41	76	CR9
DL-2261	2	PAX	DL	2261	YVR	I	16:51	97%	127	95	32	130	223	0:53	DL-2262	2	PAX	DL	2262	SNA	D	17:44	94%	123	52	70	130	223
DL-2711	2	PAX	DL	2711	LAS	D	16:51	91%	136	49	87	150	32N	1:08	DL-2712	2	PAX	DL	2712	SAN	D	17:59	97%	145	68	76	150	32N
DL-2123	2	PAX	DL	2123	GRR	D	16:52	89%	97	71	26	109	221	0:53	DL-2124	2	PAX	DL	2124	OKC	D	17:45	80%	87	53	34	109	221
DL-2125	2	PAX	DL	2125	HDN	D	16:52	85%	93	64	29	109	221	0:58	DL-2126	2	PAX	DL	2126	DSM	D	17:50	78%	85	73	12	109	221
DL-2613	2	PAX	DL	2613	TPA	D	16:54	91%	218	66	152	240	753	1:21	DL-2614	2	PAX	DL	2614	MCO	D	18:15	88%	211	65	146	240	753
DL-2713	2	PAX	DL	2713	ORD	D	16:54	92%	139	44	94	150	32N	1:05	DL-2714	2	PAX	DL	2714	SMF	D	17:59	92%	138	82	56	150	32N
DL-2423	2	PAX	DL	2423	PDX	D	16:55	97%	187	120	67	192	3N1	0:53	DL-2424	2	PAX	DL	2424	ANC	D	17:48	90%	173	149	24	192	3N1
DL-2561	2	PAX	DL	2561	CVG	D	16:55	93%	167	94	73	180	739	1:05	DL-2562	2	PAX	DL	2562	PDX	D	18:00	94%	169	126	43	180	739
DL-2127	2	PAX	DL	2127	IND	D	16:57	88%	96	48	48	109	221	0:55	DL-2128	2	PAX	DL	2128	MEM	D	17:52	82%	89	50	40	109	221
DL-2129	2	PAX	DL	2129	JAX	D	16:57	94%	102	22	80	109	221	1:03	DL-2130	2	PAX	DL	2130	RDU	D	18:00	91%	99	44	55	109	221
DL-2425	2	PAX	DL	2425	MCO	D	16:58	92%	177	55	121	192	321	1:06	DL-2426	2	PAX	DL	2426	PHX	D	18:04	94%	181	54	127	192	321
DL-2427	2	PAX	DL	2427	SAN	D	16:59	95%	183	87	95	192	3N1	1:06	DL-2428	2	PAX	DL	2428	SFO	D	18:05	91%	176	59	117	192	3N1
DL-2715	2	PAX	DL	2715	BZN	D	16:59	100%	150	120	30	150	32N	1:01	DL-2716	2	PAX	DL	2716	FLL	D	18:00	88%	132	37	96	150	32N
DL-2897	2	PAX	DL	2897	FAR	D	16:59	78%	59	56	3	76	CR9	0:56	DL-2898	2	PAX	DL	2898	CHS	D	17:55	89%	67	34	34	76	CR9
DL-2131	2	PAX	DL	2131	MKE	D	17:00	95%	103	63	40	109	221	1:30	DL-2132	2	PAX	DL	2132	BHM	D	18:30	84%	92	32	60	109	221
DL-2133	2	PAX	DL	2133	OMA	D	17:00	85%	93	68	24	109	221	1:30	DL-2134	2	PAX	DL	2134	BZN	D	18:30	97%	106	87	19	109	221
DL-2429	2	PAX	DL	2429	LAX	D	17:01	97%	185	79	106	192	3N1	1:29	DL-2430	2	PAX	DL	2430	ATL	D	18:30	99%	190	70	120	192	3N1
DL-2135	2	PAX	DL	2135	STL	D	17:01	94%	103	46	56	109	221	1:29	DL-2136	2	PAX	DL	2136	SBN	D	18:30	90%	98	58	40	109	221
DL-2563	2	PAX	DL	2563	BOS	D	17:02	89%	160	69	92	180	739	1:28	DL-2564	2	PAX	DL	2564	SLC	D	18:30	93%	168	98	70	180	739
DL-2899	2	PAX	DL	2899	CWA	D	17:03	83%	63	58	4	76	CR9	0:52	DL-2896	2	PAX	DL	2896	RIC	D	17:55	80%	61	32	28	76	CR9
DL-2263	2	PAX	DL	2263	DFW	D	17:05	94%	123	42	81	130	223	1:25	DL-2264	2	PAX	DL	2264	YWG	I	18:30	86%	112	100	13	130	223
DL-2471	2	PAX	DL	2471	SEA	D	17:05	94%	265	141	123	281	339	2:54	DL-2472	2	PAX	DL	2472	SEA	D	19:59	94%	264	140	124	281	339
DL-2137	2	PAX	DL	2137	MCI	D	17:05	93%	101	56	45	109	221	1:25	DL-2138	2	PAX	DL	2138	TUS	D	18:30	89%	97	66	31	109	221
DL-3025	2	PAX	DL	3025	AZO	D	17:05	0.79	60	42	18	76	CR9	0:55	DL-2900	2	PAX	DL	2900	BDL	D	18:00	89%	67	46	22	76	CR9
DL-2473	2	PAX	DL	2473	AMS	I	17:07	98%	274	166	109	281	339	3:53	DL-2474	2	PAX	DL	2474	PDX	D	21:00	94%	263	195	68	281	339
DL-2901	2	PAX	DL	2901	RST	D	17:12	87%	66	64	3	76	CR9	0:48	DL-2902	2	PAX	DL	2902	PIT	D	18:00	78%	60	36	24	76	CR9
DL-2477	2	PAX	DL	2477	ASIA	I	17:15	97%	296	215	80	306	339	TOW/RON	DL-2478	2	PAX	DL	2478	HNL	D	11:15	93%	286	111	175	306	339
DL-2479	2	PAX	DL	2479	ICN	I	17:15	97%	296	215	80	306	350	TOW/RON	DL-2480	2	PAX	DL	2480	ASIA	I	12:50	97%	297	215	81	306	350
DL-TOW	2	PAX	DL	TOW	TOW	TOW	17:15						CR9	0:50	DL-3026	2	PAX	DL	3026	RHI	D	18:05	0.64	49	46	3	76	CR9
DL-2359	2	PAX	DL	2359	CUN	I	17:30	97%	185	67	118	192	3N1	1:30	DL-2360	2	PAX	DL	2360	BOS	D	19:00	88%	168	71	97	192	3N1
DL-2717	2	PAX	DL	2717	MBJ	I	17:30	93%	139	105	34	150	32N	0:59	DL-2718	2	PAX	DL	2718	BWI	D	18:29	90%	134	54	80	150	32N
DL-2345	2	PAX	DL	2345	PDX	D	18:00	97%	187	120	67	192	321	1:00	DL-2346	2	PAX	DL	2346	LAX	D	19:00	89%	172	56	116	192	321
DL-2357	2	PAX	DL	2357	PUJ	I	18:00	93%	178	51	127	192	3N1	1:30	DL-2358	2	PAX	DL	2358	PDX	D	19:30	97%	186	119	67	192	3N1
DL-2431	2	PAX	DL	2431	DEN	D	18:00	95%	183	61	122	192	3N1	1:00	DL-2432	2	PAX	DL	2432	DEN	D	19:00	94%	181	68	112	192	3N1
DL-2433	2	PAX	DL	2433	LAS	D	18:00	92%	177	75	102	192	3N1	1:26	DL-2434	2	PAX	DL	2434	ATL	D	19:26	89%	170	49	121	192	3N1
DL-2435	2	PAX	DL	2435	LAX	D	18:00	98%	188	99	89	192	3N1	1:30	DL-2436	2	PAX	DL	2436	PHX	D	19:30	92%	177	72	104	192	3N1
DL-2565	2	PAX	DL	2565	LGA	D	18:00	100%	180	60	120	180	739	1:00	DL-2566	2	PAX	DL	2566	LGA	D	19:00	92%	165	64	102	180	739
DL-2719	2	PAX	DL	2719	MZT	I	18:00	97%	146	56	90	150	32N	1:15	DL-2720	2	PAX	DL	2720	CMH	D	19:15	82%	123	78	44	150	32N
DL-2265	2	PAX	DL	2265	AUS	D	18:15	83%	108	29	78	130	223	1:20	DL-2266	2	PAX	DL	2266	BIL	D	19:35	87%	113	96	18	130	223
DL-2437	2	PAX	DL	2437	DCA	D	18:15	92%	176	99	77	192	3N1	1:43	DL-2438	2	PAX	DL	2438	GRR	D	19:58	83%	158	124	34	192	3N1
DL-2139	2	PAX	DL	2139	MSN	D	18:15	82%	90	76	13	109	221	1:31	DL-2140	2	PAX	DL	2140	HLN	D	19:46	73%	79	66	13	109	221
DL-2903	2	PAX	DL	2903	GTF	D	18:15	77%	58	49	10	76	CR9	0:45	DL-TOW	2	PAX	DL	TOW	TOW	TOW	19:00						CR9
DL-2905	2	PAX	DL	2905	YXE	I	18:15	77%	58	53	6	76	CR9	1:00	DL-3028	2	PAX	DL	3028	ABR	D	19:15	0.81	61	58	3	76	CR9
DL-2907	2	PAX	DL	2907	MOT	D	18:18	79%	60	47	13	76	CR9	1:12	DL-2904	2	PAX	DL	2904	DFW	D	19:30	94%	71	32	39	76	CR9
DL-2141	2	PAX	DL	2141	CLT	D	18:23	71%	78	35	43	109	221	1:32	DL-2142	2	PAX	DL	2142	ORF	D	19:55	78%	85	41	44	109	221
DL-2909	2	PAX	DL	2909	FCA	D	18:23	92%	70	50	20	76	CR9	1:07	DL-2906	2	PAX	DL	2906	YYC	I	19:30	90%	68	54	14	76	CR9
DL-2143	2	PAX	DL	2143	CMH	D	18:24	89%	97	60	37	109	221	1:47	DL-2144	2	PAX	DL	2144	ORD	D	20:11	87%	95	30	65	109	221
DL-2567	2	PAX	DL	2567	CZM	I	18:25	87%	156	87	69	180	739	1:15	DL-2568	2	PAX	DL	2568	BOI	D	19:40	100%	180	161	19	180	739
DL-2721	2	PAX	DL	2721	TPA	D	18:26	91%	136	35	101	150	32N	1:04	DL-2722	2	PAX	DL	2722	MSY	D	19:30	78%	117	52	65	150	32N
DL-2911	2	PAX	DL	2911	YEG	I	18:27	93%	71	62	9	76	CR9	1:08	DL-2908	2	PAX	DL	2908	ICT	D	19:35	85%	64	40	24	76	CR9
DL-2475	2	PAX	DL	2475	ATL	D	18:28	92%	258	76	182	281	339	3:39	DL-2476	2	PAX	DL	2476	AMS	I	22:07	94%	264	143	120	281	339
DL-3027	2	PAX	DL	3027	DAY	D	18:29	0.85	64	42	23	76	CR9	1:06	DL-2910	2	PAX	DL	2910	LNK	D	19:35	84%	64	48	16	76	CR9
DL-2913	2	PAX	DL	2913	CLE	D	18:29	81%	62	29	33	76	CR9	1:06	DL-2912	2	PAX	DL	2912	YEG	I	19:35	92%	70	62	9	76	CR9
DL-2287	2	PAX	DL	2287	SAT	D	18:30	86%	112	43	69	130	223	1:15	DL-2288	2	PAX	DL	2288	STL	D	19:45	79%	102	61	42	130	223
DL-2439	2	PAX	DL	2439	SEA	D	18:30	99%	189	124	65	192	3N1	1:28	DL-2440	2	PAX	DL	2440	SAN	D	19:58	92%	176	83	93	192	3N1
DL-2441	2	PAX	DL	2441	SLC	D	18:30	91%	176	87	88	192	3N1	1:33	DL-2442	2	PAX	DL	2442	LGA	D	20:03	79%	152	52	100	192	3N1
DL-2723	2	PAX	DL	2723	MCO	D	18:30	95%	142	47	96	150	32N	1:20	DL-2724	2	PAX	DL	2724	OAK	D	19:50	87%	131	73	58	150	32N
DL-2267	2	PAX	DL	2267	JFK	D	18:31	82%	106	38	68	130	223	1:04	DL-2268	2	PAX	DL	2268	SNA	D	19:35	95%	123	64	59	130	223
DL-2915	2	PAX	DL	2915	BIS	D	18:32	80%	61	48	13	76	CR9	1:05	DL-2914	2	PAX	DL	2914	GTF	D	19:37	71%	54	46	9	76	CR9
DL-2145	2	PAX	DL	2145	RIC	D	18:33	74%	81	43	38	109	221	1:42	DL-2998	2	PAX	DL	2998	BDL	D	20:15	0.69	75	47	28	109	221
DL-2269	2	PAX	DL	2269	MSO	D	18:35	88%	114	93	22	130	223	1:21	DL-2270	2	PAX	DL	2270	YVR	I	19:56	92%	119	90	29	130	223
DL-2443	2	PAX	DL	2443	RSW	D	18:38	96%	185	43	142	192	3N1	1:26	DL-2444	2	PAX	DL	2444	DEN	D	20:04	92%	177	68	108	192	3N1
DL-2569	2	PAX	DL	2569	PHL	D	18:38	80%	144	67	78	180	739	1:02	DL-2570	2	PAX	DL	2570	FSD	D	19:40	93%	167	157	10	180	739
DL-2271	2	PAX	DL	2271	BNA	D	18:39	91%	118	57	60	130	223	1:21	DL-2272	2	PAX	DL	2272	MSO	D	20:00	77%	101	84	17	130	223
DL-2571	2	PAX	DL	2571	GEG	D	18:39	95%	170	144	27	180	739	1:06	DL-2572	2	PAX	DL	2572	GEG	D	19:45	100%	180	174	6	180	739
DL-2615	2	PAX	DL	2615	CUN	I	18:39	98%	235	85	150	240	753	1:41	DL-2616	2	PAX	DL	2616	BOS	D	20:20	91%	218	62	156	240	753
DL-2917	2	PAX	DL	2917	DSM	D	18:39	74%	56	48	8	76	CR9	1:01	DL-2916	2	PAX	DL	2916	DLH	D	19:40	89%	68	67	1	76	CR9
DL-2919	2	PAX	DL	2919	GFK	D	18:39	84%	64	58	6	76	CR9	1:01	DL-2918	2	PAX	DL	2918	XNA	D	19:40	76%	58	30	28	76	CR9
DL-2573	2	PAX	DL	2573	PVR	I	18:40	89%	161	102	59	180	739	1:50	DL-2574	2	PAX	DL	2574	OMA	D	20:30	69%	123	91	33	180	739
DL-2273	2	PAX	DL	2273	HRL	D	18:44	93%	120	65	56	130	223	1:31	DL-2274	2	PAX	DL	2274	BNA	D	20:15	93%	121	60	61	130	223
DL-2921	2	PAX	DL	2921	DLH	D	18:44	82%	62	52	10	76	CR9	1:01	DL-2996	2	PAX	DL	2996	IAH	D	19:45	0.91	69	34	35	76	CR9
DL-2445	2	PAX	DL	2445	FLL	D	18:45	96%	185	49	135	192	3N1	1:30	DL-2446	2	PAX	DL	2446	RSW	D	20:15	83%	160	36	124	192	3N1
DL-2725	2	PAX	DL	2725	MIA	D	18:45	96%	145	59	86	150	32N	1:09	DL-2726	2	PAX	DL	2726	PSP	D	19:54	86%	130	81	49	150	32N
DL-2995	2	PAX	DL	2995	ICT	D	18:45	0.85	64	40	24	76	CR9	1:08	DL-2920	2	PAX	DL	2920	YXE	I	19:53	79%	60	54	6	76	CR9
DL-2275	2	PAX	DL	2275	FAR	D	18:46	85%	111	107	4	130	223	1:29	DL-2276	2	PAX	DL	2276	JFK	D	20:15	86%	112	39	73	130	223
DL-2277	2	PAX	DL	2277	DFW	D	18:49	94%	123	42	81	130	223	1:31	DL-2278	2	PAX	DL	2278	CLT	D	20:20	85%	110	49	61	130	223
DL-2997	2	PAX	DL	2997	ATW	D	18:49	0.90	68	53	15	76	CR9	1:11	DL-2922	2	PAX	DL	2922	MOT	D	20:00	81%	62	49	13	76	CR9
DL-2923	2	PAX	DL	2923	OMA	D	18:49	92%	70	54	16	76	CR9	1:26	DL-3002	2	PAX	DL	3002	FWA	D	20:15	0.74	56	34	22	76	CR9
DL-2279	2	PAX	DL	2279	GRR	D	18:54	91%	118	86	32	130	223	1:26	DL-2280	2	PAX	DL	2280	RDU	D	20:20	78%	101	46	56	130	223
DL-2727	2	PAX	DL	2727	SJC	D	18:54	92%	138	82	56	150	32N	1:11	DL-2728	2	PAX	DL	2728	LAX	D	20:05	92%	137	62	75	150	32N
DL-2149	2	PAX	DL	2149	IAD	D	18:54	75%	82	43	39	109	221	1:31	DL-2146	2	PAX	DL	2146	IAD	D	20:25	78%	85	44	40	109	221
DL-2151	2	PAX	DL	2151	STL	D	18:54	86%	94	42	51	109	221	1:33	DL-2150	2	PAX	DL	2150	SDF	D	20:27	84%	92	49	43	109	221
DL-2999	2	PAX	DL	2999	INL	D	18:54	0.39	29	27	2	76	CR9	1:21	DL-2924	2	PAX	DL	2924	CWA	D	20:15	82%	62	59	3	76	CR9
DL-2577	2	PAX	DL	2577	MZT	I	18:59	97%	175	65	110	180	739	1:21	DL-2578	2	PAX	DL	2578	CVG	D	20:20	80%	143	80	63	180	739
DL-2729	2	PAX	DL	2729	ORD	D	18:59	92%	139	44	94	150	32N	1:21	DL-2730	2	PAX	DL	2730	DCA	D	20:20	78%	118	53	65	150	32N
DL-2447	2	PAX	DL	2447	DTW	D	19:00	91%	175	71	104	192	3N1	1:32	DL-2448	2	PAX	DL	2448	PHX	D	20:32	92%	177	53	124	192	3N1
DL-2449	2	PAX	DL	2449	LAX	D	19:00	99%	189	101	89	192	3N1	1:30	DL-2450	2	PAX	DL	2450	SLC	D	20:30	94%	181	113	68	192	3N1
DL-2731	2	PAX	DL	2731	BOI	D	19:00	96%	144	117	27	150	32N	1:20	DL-2732	2	PAX	DL	2732	PHL	D	20:20	100%	150	96	54	150	32N
DL-2733	2	PAX	DL	2733	MSY	D	19:00	90%	135	47	88	150	32N	1:30	DL-2734	2	PAX	DL	2734	SJC	D	20:30	86%	128	67	61	150	32N
DL-2925	2	PAX	DL	2925	RST	D	19:08	87%	66	64	3	76	CR9	1:07	DL-2926	2	PAX	DL	2926	TYS	D	20:15	71%	54	35	19	76	CR9
DL-2343	2	PAX	DL	2343	PHX	D	19:09	87%	168	77	91	192	321	1:11	DL-2344	2	PAX	DL	2344	SLC	D	20:20	92%	176	93	83	192	321
DL-2927	2	PAX	DL	2927	MDW	D	19:10	94%	71	25	46	76	CR9	1:05	DL-2928	2	PAX	DL	2928	YUL	I	20:15	87%	66	46	20	76	CR9
DL-2735	2	PAX	DL	2735	SFO	D	19:15	98%	148	66	82	150	32N	1:16	DL-2736	2	PAX	DL	2736	SFO	D	20:31	95%	142	68	74	150	32N
DL-2157	2	PAX	DL	2157	YYC	I	19:15	99%	108	80	28	109	221	1:15	DL-2152	2	PAX	DL	2152	BUF	D	20:30	71%	77	44	33	109	221
DL-2929	2	PAX	DL	2929	XNA	D	19:15	77%	59	29	30	76	CR9	1:08	DL-2930	2	PAX	DL	2930	ALB	D	20:23	72%	55	35	20	76	CR9
DL-2579	2	PAX	DL	2579	BWI	D	19:17	77%	139	67	72	180	739	1:29	DL-2580	2	PAX	DL	2580	BWI	D	20:46	68%	123	48	75	180	739
DL-2281	2	PAX	DL	2281	TUS	D	19:20	92%	119	53	67	130	223	1:08	DL-2282	2	PAX	DL	2282	FAR	D	20:28	91%	119	112	7	130	223
DL-2737	2	PAX	DL	2737	MEX	I	19:20	88%	132	34	98	150	32N	1:20	DL-2738	2	PAX	DL	2738	MCI	D	20:40	84%	126	88	38	150	32N
DL-2581	2	PAX	DL	2581	CZM	I	19:25	88%	159	44	115	180	739	3:00	DL-2582	2	PAX	DL	2582	MKE	D	22:25	81%	145	88	57	180	739
DL-3001	2	PAX	DL	3001	BUF	D	19:25	0.96	73	48	25	76	CR9	1:01	DL-3004	2	PAX	DL	3004	LSE	D	20:26	0.89	67	66	2	76	CR9
DL-2931	2	PAX	DL	2931	FSD	D	19:25	89%	67	57	10	76	CR9	1:05	DL-3006	2	PAX	DL	3006	HIB	D	20:30	0.56	43	40	3	76	CR9
DL-2739	2	PAX	DL	2739	IND	D	19:27	81%	122	61	61	150	32N	1:16	DL-2740	2	PAX	DL	2740	LAS	D	20:43	92%	138	49	88	150	32N

DL-2159	2	PAX	DL	2159	SMF	D	19:28	98%	106	66	40	109	221	1:07	DL-2158	2	PAX	DL	2158	CID	D	20:35	75%	82	62	20	109	221
DL-2283	2	PAX	DL	2283	YVR	I	19:30	94%	122	86	36	130	223	1:00	DL-2284	2	PAX	DL	2284	SYR	D	20:30	65%	84	61	23	130	223
DL-2285	2	PAX	DL	2285	YWG	I	19:30	96%	124	116	8	130	223	1:29	DL-2286	2	PAX	DL	2286	DTW	D	20:59	76%	99	40	59	130	223
DL-2933	2	PAX	DL	2933	TYS	D	19:30	80%	61	38	23	76	CR9	1:00	DL-3020	2	PAX	DL	3020	MBS	D	20:30	0.71	54	38	15	76	CR9
DL-2169	2	PAX	DL	2169	PSP	D	19:39	99%	128	55	73	130	223	TOW/RON	DL-2170	2	PAX	DL	2170	JFK	D	6:50	86%	112	39	73	130	223
DL-2171	2	PAX	DL	2171	SNA	D	19:39	90%	117	50	66	130	223	TOW/RON	DL-2172	2	PAX	DL	2172	STL	D	6:50	63%	81	36	45	130	223
DL-2621	2	PAX	DL	2621	ATL	D	19:40	90%	217	64	153	240	753	1:35	DL-2622	2	PAX	DL	2622	DEN	D	21:15	93%	223	86	137	240	753
DL-2935	2	PAX	DL	2935	GRB	D	19:40	86%	66	56	10	76	E7W	1:00	DL-2936	2	PAX	DL	2936	AZO	D	20:40	69%	52	36	16	76	E7W
DL-2165	2	PAX	DL	2165	MEM	D	19:41	78%	85	47	37	109	221	0:55	DL-2160	2	PAX	DL	2160	PIT	D	20:36	88%	96	61	35	109	221
DL-3007	2	PAX	DL	3007	LNK	D	19:42	0.86	65	49	17	76	CR9	0:48	DL-3022	2	PAX	DL	3022	MQT	D	20:30	0.72	55	48	7	76	CR9
DL-2937	2	PAX	DL	2937	RAP	D	19:44	88%	67	49	18	76	CR9	0:51	DL-2932	2	PAX	DL	2932	ATW	D	20:35	86%	66	51	14	76	CR9
DL-3019	2	PAX	DL	3019	BRD	D	19:45	0.60	46	44	2	76	CR9	0:50	DL-2934	2	PAX	DL	2934	PIA	D	20:35	87%	66	45	22	76	CR9
DL-3021	2	PAX	DL	3021	RHI	D	19:45	0.67	51	48	3	76	CR9	0:55	DL-3024	2	PAX	DL	3024	LAN	D	20:40	0.76	58	34	24	76	CR9
DL-2173	2	PAX	DL	2173	CVG	D	19:45	77%	101	57	44	130	223	TOW/RON	DL-2174	2	PAX	DL	2174	RDU	D	7:03	78%	101	46	56	130	223
DL-2175	2	PAX	DL	2175	MCI	D	19:45	77%	101	64	37	130	223	TOW/RON	DL-2176	2	PAX	DL	2176	SNA	D	8:00	95%	123	61	62	130	223
DL-2743	2	PAX	DL	2743	PVD	D	19:45	88%	132	38	94	150	32N	2:40	DL-2744	2	PAX	DL	2744	LAX	D	22:25	86%	129	47	82	150	32N
DL-3005	2	PAX	DL	3005	CID	D	19:47	0.77	58	50	8	76	CR9	0:58	DL-3008	2	PAX	DL	3008	XWA	D	20:45	0.65	50	44	6	76	CR9
DL-3023	2	PAX	DL	3023	LSE	D	19:55	0.87	66	65	1	76	CR9	0:50	DL-2938	2	PAX	DL	2938	CIU	D	20:45	67%	51	43	8	76	CR9
DL-2583	2	PAX	DL	2583	PVR	I	19:58	97%	175	53	122	180	739	2:28	DL-2584	2	PAX	DL	2584	PDX	D	22:26	93%	167	107	60	180	739
DL-2333	2	PAX	DL	2333	PHX	D	20:00	82%	157	40	117	192	321	TOW/RON	DL-2334	2	PAX	DL	2334	ANC	D	9:00	92%	177	137	39	192	321
DL-2489	2	PAX	DL	2489	SLC	D	20:00	91%	165	82	83	180	350	TOW/RON	DL-2490	2	PAX	DL	2490	DTW	D	6:15	88%	159	0	159	180	350
DL-2745	2	PAX	DL	2745	SEA	D	20:00	97%	145	73	72	150	32N	2:25	DL-2746	2	PAX	DL	2746	SAN	D	22:25	93%	139	65	74	150	32N
DL-2939	2	PAX	DL	2939	ALB	D	20:08	64%	49	31	18	76	CR9	0:42	DL-2940	2	PAX	DL	2940	CLE	D	20:50	85%	64	31	34	76	CR9
DL-2941	2	PAX	DL	2941	PIA	D	20:09	84%	63	43	20	76	CR9	0:42	DL-2942	2	PAX	DL	2942	DAY	D	20:51	80%	61	39	22	76	CR9
DL-2335	2	PAX	DL	2335	DTW	D	20:30	95%	183	77	106	192	3N1	TOW/RON	DL-2336	2	PAX	DL	2336	DEN	D	9:00	93%	179	69	110	192	3N1
DL-2337	2	PAX	DL	2337	LAS	D	20:30	96%	184	59	125	192	3N1	TOW/RON	DL-2338	2	PAX	DL	2338	MCO	D	9:00	93%	178	54	123	192	3N1
DL-2943	2	PAX	DL	2943	FSD	D	20:32	62%	47	28	19	76	CR9	0:43	DL-2944	2	PAX	DL	2944	MDW	D	21:15	85%	64	25	40	76	CR9
DL-2339	2	PAX	DL	2339	ATL	D	20:45	95%	183	53	130	192	3N1	TOW/RON	DL-2340	2	PAX	DL	2340	SAN	D	9:00	97%	186	88	98	192	3N1
DL-2575	2	PAX	DL	2575	MKE	D	20:45	92%	166	102	64	180	739	0:57	DL-2576	2	PAX	DL	2576	FSD	D	21:42	71%	128	120	8	180	739
DL-2167	2	PAX	DL	2167	RDU	D	20:45	96%	105	47	58	109	221	1:40	DL-2164	2	PAX	DL	2164	DSM	D	22:25	78%	85	73	12	109	221
DL-2747	2	PAX	DL	2747	BOS	D	20:46	89%	134	57	76	150	32N	1:59	DL-2748	2	PAX	DL	2748	MSN	D	22:45	67%	101	85	15	150	32N
DL-2945	2	PAX	DL	2945	FAR	D	20:48	78%	59	56	3	76	CR9	0:43	DL-2946	2	PAX	DL	2946	BIS	D	21:31	83%	63	55	7	76	CR9
DL-2001	2	PAX	DL	2001	BNA	D	20:54	92%	100	40	60	109	221	1:31	DL-2166	2	PAX	DL	2166	MOT	D	22:25	73%	79	71	8	109	221
DL-2617	2	PAX	DL	2617	RSW	D	20:56	97%	232	53	178	240	753	1:35	DL-2618	2	PAX	DL	2618	LAS	D	22:31	98%	235	84	151	240	753
DL-2341	2	PAX	DL	2341	TPA	D	20:57	92%	177	53	123	192	3N1	TOW/RON	DL-2342	2	PAX	DL	2342	TPA	D	9:00	95%	182	54	128	192	3N1
DL-2627	2	PAX	DL	2627	SNA	D	21:00	87%	131	63	68	150	753	TOW/RON	DL-2628	2	PAX	DL	2628	ATL	D	6:20	92%	138	0	138	150	753
DL-2741	2	PAX	DL	2741	BZN	D	21:00	91%	136	103	34	150	32N	1:15	DL-2742	2	PAX	DL	2742	SEA	D	22:15	95%	142	79	63	150	32N
DL-2003	2	PAX	DL	2003	CLT	D	21:00	79%	86	37	49	109	221	1:31	DL-2156	2	PAX	DL	2156	IND	D	22:31	92%	101	70	31	109	221
DL-2947	2	PAX	DL	2947	BDL	D	21:00	89%	67	43	25	76	CR9	1:25	DL-2948	2	PAX	DL	2948	BJI	D	22:25	78%	59	55	4	76	CR9
DL-2309	2	PAX	DL	2309	DCA	D	21:01	86%	165	75	91	192	3N1	TOW/RON	DL-2310	2	PAX	DL	2310	SFO	D	7:00	87%	168	29	139	192	3N1
DL-2491	2	PAX	DL	2491	MBJ	I	21:02	86%	155	56	99	180	739	TOW/RON	DL-2492	2	PAX	DL	2492	BOS	D	6:50	91%	164	69	95	180	739
DL-2629	2	PAX	DL	2629	MCO	D	21:03	85%	128	40	88	150	32N	TOW/RON	DL-2630	2	PAX	DL	2630	BOS	D	6:50	91%	137	58	79	150	32N
DL-2949	2	PAX	DL	2949	PIT	D	21:05	69%	52	28	25	76	CR9	1:20	DL-2950	2	PAX	DL	2950	BRD	D	22:25	64%	49	46	2	76	CR9
DL-2493	2	PAX	DL	2493	MKE	D	21:08	69%	125	77	48	180	739	TOW/RON	DL-2494	2	PAX	DL	2494	LGA	D	6:50	85%	154	53	101	180	739
DL-2951	2	PAX	DL	2951	OMA	D	21:10	68%	51	38	13	76	CR9	1:20	DL-2952	2	PAX	DL	2952	RAP	D	22:30	81%	62	45	17	76	CR9
DL-2155	2	PAX	DL	2155	SDF	D	21:15	81%	89	47	41	109	221	1:25	DL-2168	2	PAX	DL	2168	GFK	D	22:40	83%	91	83	8	109	221
DL-2311	2	PAX	DL	2311	ANC	D	21:15	98%	188	118	70	192	3N1	TOW/RON	DL-2312	2	PAX	DL	2312	PUJ	I	7:05	96%	185	51	133	192	3N1
DL-2631	2	PAX	DL	2631	FLL	D	21:16	94%	140	51	89	150	32N	TOW/RON	DL-2632	2	PAX	DL	2632	FLL	D	7:00	91%	136	36	101	150	32N
DL-2495	2	PAX	DL	2495	GEG	D	21:18	78%	140	82	58	180	739	TOW/RON	DL-2496	2	PAX	DL	2496	ORD	D	6:50	86%	155	49	107	180	739
DL-2633	2	PAX	DL	2633	MIA	D	21:19	93%	140	38	102	150	32N	TOW/RON	DL-2634	2	PAX	DL	2634	MBJ	I	7:00	87%	130	49	81	150	32N
DL-2635	2	PAX	DL	2635	ORD	D	21:21	92%	139	44	94	150	32N	TOW/RON	DL-2636	2	PAX	DL	2636	TPA	D	7:15	93%	139	35	103	150	32N
DL-2637	2	PAX	DL	2637	SAN	D	21:25	93%	139	57	82	150	32N	TOW/RON	DL-2638	2	PAX	DL	2638	SEA	D	7:45	94%	141	26	116	150	32N
DL-2163	2	PAX	DL	2163	OKC	D	21:25	82%	89	55	34	109	221	TOW/RON	DL-2002	2	PAX	DL	2002	ORD	D	5:30	86%	94	0	94	109	221
DL-2619	2	PAX	DL	2619	SLC	D	21:26	94%	226	106	120	240	753	TOW/RON	DL-2620	2	PAX	DL	2620	ATL	D	7:25	92%	221	64	158	240	753
DL-2585	2	PAX	DL	2585	LAX	D	21:27	90%	216	80	137	240	739	TOW/RON	DL-2586	2	PAX	DL	2586	LAX	D	6:50	92%	221	80	141	240	739
DL-2005	2	PAX	DL	2005	JFK	D	21:27	82%	89	32	57	109	221	TOW/RON	DL-2004	2	PAX	DL	2004	IAH	D	6:50	88%	96	38	57	109	221
DL-2639	2	PAX	DL	2639	MCI	D	21:28	48%	73	40	32	150	32N	TOW/RON	DL-2640	2	PAX	DL	2640	MSY	D	8:50	90%	136	47	89	150	32N
DL-2451	2	PAX	DL	2451	MCO	D	21:30	95%	182	60	122	192	3N1	1:15	DL-2452	2	PAX	DL	2452	PHX	D	22:45	92%	177	53	124	192	3N1
DL-2303	2	PAX	DL	2303	PUJ	I	21:31	89%	171	49	122	192	3N1	TOW/RON	DL-2304	2	PAX	DL	2304	PHX	D	6:55	92%	177	53	124	192	3N1
DL-2749	2	PAX	DL	2749	MDW	D	21:32	79%	60	16	44	76	32N	TOW/RON	DL-2750	2	PAX	DL	2750	MDW	D	6:55	76%	57	15	42	76	32N
DL-2497	2	PAX	DL	2497	LGA	D	21:34	75%	135	47	88	180	739	TOW/RON	DL-2498	2	PAX	DL	2498	MCI	D	6:55	55%	99	54	44	180	739
DL-2453	2	PAX	DL	2453	ATL	D	21:35	91%	256	75	181	281	3N1	TOW/RON	DL-2454	2	PAX	DL	2454	OGG	D	11:15	92%	258	157	101	281	3N1
DL-2641	2	PAX	DL	2641	SFO	D	21:35	87%	130	45	86	150	32N	TOW/RON	DL-2642	2	PAX	DL	2642	MIA	D	8:55	96%	145	38	106	150	32N
DL-2007	2	PAX	DL	2007	STL	D	21:37	86%	94	42	51	109	221	TOW/RON	DL-2006	2	PAX	DL	2006	IND	D	6:55	82%	90	44	45	109	221
DL-2009	2	PAX	DL	2009	IAH	D	21:39	85%	92	38	55	109	221	TOW/RON	DL-2008	2	PAX	DL	2008	GRR	D	7:00	65%	71	52	19	109	221
DL-2305	2	PAX	DL	2305	DTW	D	21:41	91%	175	71	104	192	3N1	TOW/RON	DL-2306	2	PAX	DL	2306	SLC	D	6:55	87%	167	78	89	192	3N1
DL-2011	2	PAX	DL	2011	DFW	D	21:42	95%	103	35	68	109	221	TOW/RON	DL-2010	2	PAX	DL	2010	PHL	D	7:21	79%	86	39	47	109	221
DL-2307	2	PAX	DL	2307	PHX	D	21:47	93%	178	55	124	192	3N1	TOW/RON	DL-2308	2	PAX	DL	2308	DEN	D	7:00	92%	177	68	108	192	3N1
DL-2013	2	PAX	DL	2013	BDL	D	21:50	0.70	77	48	29	109	221	TOW/RON	DL-2012	2	PAX	DL	2012	DFW	D	7:22	96%	105	35	70	109	221
DL-2015	2	PAX	DL	2015	EWR	D	21:51	82%	90	0	90	109	221	TOW/RON	DL-2014	2	PAX	DL	2014	BNA	D	7:25	84%	91	35	56	109	221
DL-2499	2	PAX	DL	2499	SEA	D	21:52	92%	166	0	166	180	739	TOW/RON	DL-2500	2	PAX	DL	2500	SJD	I	7:05	87%	156	38	118	180	739
DL-2289	2	PAX	DL	2289	AUS	D	21:53	90%	173	0	173	192	3N1	TOW/RON	DL-2290	2	PAX	DL	2290	ATL	D	5:20	89%	170	0	170	192	3N1
DL-2017	2	PAX	DL	2017	SAT	D	21:54	84%	91	0	91	109	221	TOW/RON	DL-2016	2	PAX	DL	2016	BHM	D	8:45	85%	92	29	64	109	221
DL-2291	2	PAX	DL	2291	DEN	D	21:55	93%	179	0	179	192	3N1	TOW/RON	DL-2292	2	PAX	DL	2292	CUN	I	6:00	93%	178	0	178	192	3N1
DL-2501	2	PAX	DL	2501	PDX	D	22:06	95%	170	0	170	180	739	TOW/RON	DL-2502	2	PAX	DL	2502	CVG	D	8:14	83%	149	84	66	180	739
DL-2503	2	PAX	DL	2503	SJD	I	22:20	92%	165	0	165	180	739	TOW/RON	DL-2504	2	PAX	DL	2504	ATL	D	8:50	92%	166	48	118	180	739
DL-2587	2	PAX	DL	2587	LAS	D	22:58	91%	217	0	217	240	753	TOW/RON	DL-2588	2	PAX	DL	2588	DCA	D	7:00	91%	219	98	121	240	753
DL-2293	2	PAX	DL	2293	ATL	D	23:00	92%	176	0	176	192	3N1	TOW/RON	DL-2294	2	PAX	DL	2294	MCO	D	6:00	93%	178	0	178	192	3N1
DL-2295	2	PAX	DL	2295	PUJ	I	23:00	92%	176	0	176	192	3N1	TOW/RON	DL-2296	2	PAX	DL	2296	LAS	D	6:50	91%	175	63	113	192	3N1
DL-2297	2	PAX	DL	2297	LAX	D	23:16	94%	180	0	180	192	3N1	TOW/RON	DL-2298	2	PAX	DL	2298	SEA	D	6:50	84%	162	86	76	192	3N1
DL-2299	2	PAX	DL	2299	PHX	D	23:51	93%	178	0	178	192	3N1	TOW/RON	DL-2300	2	PAX	DL	2300	CUN	I	6:55	96%	185	66	119	192	3N1
DL-2301	2	PAX	DL	2301	SLC	D	23:59	93%	178	0	178	192	3N1	TOW/RON	DL-2302	2	PAX	DL	2302	MKE	D	6:55	57%	109	67	43	192	3N1
DL-2589	2	PAX	DL	2589	ATL	D	23:59	91%	218	0	218	240	753	TOW/RON	DL-2590	2	PAX	DL	2590	CUN	I	9:00	96%	231	83	149	240	753
F9-3337	2	PAX	F9	3337	TPA	D	9:30	97%	175	2	173	180	321	1:00	F9-3338	2	PAX	F9	3338	TPA	D	10:30	99%	178	0	177	180	321
F9-3339	2	PAX	F9	3339	MCO	D	9:36	97%	175	2	173	180	32N	1:00	F9-3340	2	PAX	F9	3340	MCO	D	10:36	99%	178	0	177	180	32N
F9-3341	2	PAX	F9	3341	DEN	D	10:51	95%	171	2	170	180	32N	0:45	F9-3342	2	PAX	F9	3342	DEN	D	11:36	98%	177	0	177	180	32N
F9-3343	2	PAX	F9	3343	TPA	D	13:33	91%	164	2	163	180	32N	1:00	F9-3344	2	PAX	F9	3344	TPA	D	14:33	100%	179	0	179	180	32N
F9-3345	2	PAX	F9	3345	MCO	D	14:00	91%	164	0	164	180	32N	1:00	F9-3346	2	PAX	F9	3346	MCO	D	15:00	92%	165	0	165	180	32N
F9-3347	2	PAX	F9	3347	DEN	D	18:00	87%	157	2	155	180	32N	1:53	F9-3348	2	PAX	F9	3348	DEN	D	19:53	91%	164	1	163	180	32N
F9-3335	2	PAX	F9	3335	DEN	D	23:42	95%	219	2	216	230	CRJ	TOW/RON	F9-3336	2	PAX	F9	3336	DEN	D	5:45	95%	219	0	219	230	CRJ
FI-3349	2	PAX	FI	3349	KEF	I	18:05	65%	104	3	101	160	32N	1:25	FI-3350	2	PAX	FI	3350	KEF	I	19:30	84%	134	3	131	160	32N
KL-3043	2	PAX	KL	3043	AMS	I	19:40	87%	298	141	158	344	781	2:35	KL-3044	2	PAX	KL	3044	AMS	I	22:15	82%	282	131	150	344	781
NK-3355	2	PAX	NK	3355	FLL	D	0:52	99%	148	2	146	150	319	6:08	NK-3356	2	PAX	NK	3356	MCO	D	7:00	100%	150	3	147	150	319
NK-3377	2	PAX	NK	3377	LAS	D	6:38	90%	164	4	161	182	319	1:22	NK-3378	2	PAX	NK	3378	RSW	D	8:00	99%	180	2	178	182	319
NK-3385	2	PAX	NK	3385	DTW	D	8:53	78%	177	9	168	228	3N1	0:50	NK-3386	2	PAX	NK	3386	PHX	D	9:43	99%	226	1	226	228	3N1
NK-3387	2	PAX	NK	3387	BWI	D	10:28	69%	157	2	155	228	3N1	0:50	NK-3388	2	PAX	NK	3388	ATL	D	11:18	96%	219	4	215	228	3N1
NK-3357	2	PAX	NK	3357	FLL	D	10:30	97%	145	4	141	150	319	1:00	NK-3358	2	PAX	NK	3358	FLL	D	11:30	97%	146	3	143	150	319
NK-3359	2	PAX	NK	3359	RSW	D	11:00	97%	145	4	141	150	319	1:00	NK-3360	2	PAX	NK	3360	RSW	D	12:00	97%	146	3	143	150	319
NK-3361	2	PAX	NK	3361	LAS	D	12:00	97%	146	2	144	150	319	1:00	NK-3362	2	PAX	NK	3362	LAS	D	13:00	98%	146	6	140	150	319
NK-3363	2	PAX	NK	3363	MCO	D	12:00	98%	147	4	143	150	319	1:00	NK-3364	2	PAX	NK	3364	MCO	D	13:00	97%	146	1	144	150	319
NK-3365	2	PAX	NK	3365	PHX	D	12:00	98%	147	3	143	150	319	1:00	NK-3366	2	PAX	NK	3366	PHX	D	13:00	97%	146	3	143	150	319
NK-3389	2	PAX	NK	3389	MSY	D	12:59	91%	208	3	205	228	3N1	0:46	NK-3390	2	PAX	NK	3390	MSY	D	13:45	97%	222	1	221	228	3N1
NK-3367	2	PAX	NK	3367	MCO	D	14:52	98%	148	4	143	150	319	1:03	NK-3368	2	PAX	NK	3368	TPA	D	15:55	100%	150	0	149	150	319
NK-3369	2	PAX	NK	3369	RSW	D	16:02	95%	143	3	140	150	319	0:53	NK-3370	2	PAX	NK	3370	LAS	D	16:55	99%	149	2	147	150	319
NK-3371	2	PAX	NK	3371	ATL	D	16:17	95%	142	4	138	150	319	0:55	NK-3372	2	PAX	NK	3372	BWI	D	17:12	98%	147	0	147	150	319
NK-3373	2	PAX	NK	3373	PHX	D	17:15	100%	150	2	148	150	319	0:50	NK-3374	2	PAX	NK	3374	DTW	D	18:05	83%	125	5	120	150	319
NK-3391	2	PAX	NK	3391	TPA	D	18:02	95%	217	3	214	228	3N1	0:45	NK-3392	2	PAX	NK	3392	TPA	D	18:47	99%	225	1	224	228	3N1
NK-3379	2	PAX	NK	3379	LAX	D	18:21	98%	178	7	171	182	32N	0:46	NK-3380	2	PAX	NK	3380	LAX	D	19:07	98%	179	6	173	182	32N
NK-3353	2	PAX	NK	3353	ATL	D	21:20	97%	145	3	142	150	781	TOW/RON	NK-3354	2	PAX	NK	3354	ATL	D	7:00	93%	139	3	136	150	781
NK-3381	2	PAX	NK	3381	LAS	D	23:33	90%	206	4	201	228	32N	TOW/RON	NK-3382	2	PAX	NK	3382	FLL	D	0:30	98%	224	1	224	228	32N
NK-3383	2	PAX	NK	3383	TPA	D	23:40	91%	209	3	206	228	3N1	TOW/RON	NK-3384	2	PAX	NK	3384	LAS	D	6:00	99%	226	3	224	228	3N1
SY-3425	2	PAX	SY	3425	SFO	D	0:03	87%	162	0	162	186	738	7:27	SY-3426	2	PAX	SY	3426	MYR	D	7:30	91%	169	2	167	186	738
SY-3427	2	PAX	SY	3427	PVR	I	0:25	83%	153	0	153	186	738	7:10	SY-3428	2	PAX	SY	3428	RSW	D	7:35	90%	167	18	149	186	738
SY-3429	2	PAX	SY	3429	SJD	I	1:05	91%	169	0	169	186	738	7:00	SY-3430	2	PAX	SY	3430	MCO	D	8:05	97%	181	3	178	186	738
SY-3431	2	PAX	SY	3431	LAS	D	5:00	93%	172	6	166	186	738	3:20	SY-3432	2	PAX	SY	3432	LAS	D	8:20	92%	170	37	133	186	738
SY-3433	2	PAX	SY	3433	PHX	D	5:04	91%	168	3	165	186	738	3:21	SY-3434	2	PAX	SY	3434	MIA	D	8:25	96%	179	2	177	186	738
SY-3435	2	PAX	SY	3435	LAX	D	5:25	93%	173	11	162	186	738	3:15	SY-3436	2	PAX	SY	3436	MBJ	I	8:40	80%	149	1	149	186	738
SY-3437	2	PAX	SY	3437	DCA	D	7:15	92%	172	57	115	186	738	1:35	SY-3438	2	PAX	SY	3438	SAT	D	8:50	91%	169	14	155	186	738
SY-3439	2	PAX	SY	3439	PHL	D	7:15	91%	169	54	115	186	738	2:00	SY-3440	2	PAX	SY	3440	PDX	D	9:15	91%	168	55	114	186	738
SY-3441	2	PAX	SY	3441	BOS	D	7:45	90%	167	60	108	186	738	1:40	SY-3442	2	PAX	SY	3442	MZT	I	9:25	79%	146	0	146	186	738
SY-3443	2	PAX	SY	3443	RSW	D	8:37	90%	168	20	148	186	738	2:03	SY-3444	2	PAX	SY	3444	LIR	I	10:40	81%	151	0	150	186	738
SY-3445	2	PAX	SY	3445	MCO	D	10:55	93%	173	4	169	186	738	1:00	SY-3446	2	PAX	SY	3446	PVR	I	11:55	88%	164	0	163	186	738
SY-3447	2	PAX	SY	3447	DEN	D	11:20	90%	167	22	145	186	738	1:00	SY-3448	2	PAX	SY	3448	SJD	I	12:20	91%	169	0	169	186	738
SY-3449	2	PAX	SY	3449	PDX	D	12:35	89%	165	54	111	186	738	1:00	SY-3450	2	PAX	SY	3450	ATL	D	13:35	90%	167	21	146	186	738
SY-3451	2	PAX	SY	3451	AUS	D	12:39	91%	170	21	149	186	738	1:06	SY-3452	2	PAX	SY	3452	BNA	D	13:45	88%	163	28	135	186	738
SY-3453	2	PAX	SY	3453	BOS	D	13:45	90%	167	60	108	186	738	1:05	SY-3454	2	PAX	SY	3454	MCO	D	14:50	97%	181	3	178	186	738
SY-3455	2	PAX	SY	3455	DCA	D	14:00	92%	172	57	115	186	738	0:55	SY-3456	2	PAX	SY	3456	ORD	D	14:55	88%	164	39	125	186	738
SY-3457	2	PAX	SY	3457	EWR	D	14:00	96%	178	112	66	186	738	1:00	SY-3458	2	PAX	SY	3458	SEA	D	15:00	92%	171	85	86	186	738
SY-3459	2	PAX	SY	3459	MYR	D	14:00	94%	175	78	97	186	738	1:10	SY-3460	2	PAX	SY	3460	PVR	I	15:10	92%	171	30	141	186	738
SY-3461	2	PAX	SY	3461	SEA	D	14:00	94%	174	65	109	186	738	1:10	SY-3462	2	PAX	SY	3462	SAN	D	15:10	92%	171	7	164	186	738
SY-3463	2	PAX	SY	3463	BNA	D	14:10	89%	166	32	134	186	738	1:05	SY-3464	2	PAX	SY	3464	SAT	D	15:15	91%	169	14	155	186	738
SY-3465	2	PAX	SY	3465	RSW	D	14:12	94%	176	3	173	186	738	1:03	SY-3466	2	PAX	SY	3466	SFO	D	15:15	93%	174	85	89	186	738
SY-3467	2	PAX	SY	3467	PHX	D	14:19	91%	168	3	165	186	738	1:01	SY-3468	2	PAX	SY	3468	AUS	D	15:20	92%	172	14	157	186	738
SY-3469	2	PAX	SY	3469	SRQ	D	14:25	90%	168	30	138	186	738	1:05	SY-3470	2	PAX	SY	3470	EWR	D	15:30	92%	171	56	115	186	738
SY-3471	2	PAX	SY	3471	SFO	D	14:30	93%	174	82	91	186	738	1:25	SY-3472	2	PAX	SY	3472	RSW	D	15:55	98%	182	1	180	186	738
SY-3473	2	PAX	SY	3473	CZM	I	14:50	79%	147	0	147	186	738	1:10	SY-3474	2	PAX	SY	3474	BOS	D	16:00	90%	167	48	119	186	738
SY-3475	2	PAX	SY	3475	MIA	D	15:20	94%	174	3	171	186	738	0:40	SY-3476	2	PAX	SY	3476	SJD	I	16:00	90%	167	48	119	186	738
SY-3477	2	PAX	SY	3477	NAS	I	15:20	90%	168	30	138	186	738	0:50	SY-3478	2	PAX	SY	3478	PHX	D	16:10	96%	178	2	177	186	738
SY-3479	2	PAX	SY	3479	LAS	D	15:21	93%	172	6	166	186	738	1:14	SY-3480	2	PAX	SY	3480	LAS	D	16:35	96%	178	4	174	186	738
SY-3481	2	PAX	SY	3481	MCO	D	15:40	93%	173	4	169	186	738	1:45	SY-3482	2	PAX	SY	3482	MCO	D	17:25	97%	181	3	178	186	738
SY-3483	2	PAX	SY	3483	CUN	I	16:20	92%	171	2	169	186	738	1:25	SY-3484	2	PAX	SY	3484	RSW	D	17:45	98%	182	1	180	186	738
SY-3485	2	PAX	SY	3485	MIA	D	16:45	94%	174	3	171	186	738	2:15	SY-3486	2	PAX	SY	3486	PHL	D	19:00	91%	169	73	96	186	738
SY-3487	2	PAX	SY	3487	SAT	D	18:00	90%	168	21	146	186	738	1:05	SY-3488	2	PAX	SY	3488	DCA	D	19:05	92%	171	55	116	186	738
SY-3489	2	PAX	SY	3489	PDX	D	18:05	89%	165	54	111	186	738	2:10	SY-3490	2	PAX	SY	3490	PHX	D	20:15	97%	180	2	178	186	738
SY-3491	2	PAX	SY	3491	MZT	I	18:15	91%	170	2	168	186	738	2:40	SY-3492	2	PAX	SY	3492	LAX	D	20:55	97%	181	10	171	186	738
SY-3493	2	PAX	SY	3493	BNA	D	18:50	89%	166	32	134	186	738	2:20	SY-3494	2	PAX	SY	3494	PDX	D	21:10	91%	168	55	114	186	738
SY-3495	2	PAX	SY	3495	MBJ	I	18:55	82%	152	2	150	186	738	2:35	SY-3496	2	PAX	SY	3496	LAS	D	21:30	96%	178	4	174	186	738
SY-3497	2	PAX	SY	3497	ORD	D	18:55	90%	168	43	125	186	738	2:50	SY-3498	2	PAX	SY	3498	AUS	D	21:45	92%	172	14	157	186	738
SY-3397	2	PAX	SY	3397	ATL	D	19:50	91%	170	0	170	186	3N1	TOW/RON	SY-3398	2	PAX	SY	3398	CZM	I	6:00	87%	162	0	162	186	3N1
SY-3399	2	PAX	SY	3399	PVR	I	21:10	85%	159	0	159	186	738	TOW/RON	SY-3400	2	PAX	SY	3400	SFO	D	6:00	93%	174	0	174	186	738
SY-3401	2	PAX	SY	3401	SJD	I	21:30	91%	169	0	169	186	738	TOW/RON	SY-3402	2	PAX	SY	3402	SEA	D	6:10	92%	171	0	171	186	738
SY-3403	2	PAX	SY	3403	MCO	D	22:25	93%	173	0	173	186	738	TOW/RON	SY-3404	2	PAX	SY	3404	RSW	D	6:20	98%	182	0	182	186	738
SY-3405	2	PAX	SY	3405	LIR	I	22:26	87%	163	0	163	186	738	TOW/RON	SY-3406	2	PAX	SY	3406	DEN	D	6:30	92%	171	22	149	186	738
SY-3407	2	PAX	SY	3407	RSW	D	22:32	94%	176	0	176	186	738	TOW/RON	SY-3408	2	PAX	SY	3408	NAS	I	6:30	91%	169	2	167	186	738
SY-3409	2	PAX	SY	3409	SEA	D	22:51	88%	163	0	163	186	738	TOW/RON	SY-3410	2	PAX	SY	3410	BOS	D	6:50	90%	167	58	109	186	738
SY-3411	2	PAX	SY	3411	EWR	D	23:00	87%	162	0	162	186	738	TOW/RON	SY-3412	2	PAX	SY	3412	SRQ	D	6:50	91%	169	2	167	186	738
SY-3413	2	PAX	SY	3413	SAT	D	23:10	89%	165	0	165	186	738	TOW/RON	SY-3414	2	PAX	SY	3414	EWR	D	7:00	92%	171	56	115	186	738
SY-3415	2	PAX	SY	3415	AUS	D	23:11	90%	168	0	168	186	738	TOW/RON	SY-3416	2	PAX	SY	3416	MIA	D	7:00	96%	179	2	177	186	738
SY-3417	2	PAX	SY	3417	PHX	D	23:19	91%	168	0	168	186	738	TOW/RON	SY-3418	2	PAX	SY	3418	BNA	D	7:05	88%	163	28	135	186	738
SY-3419	2	PAX	SY	3419	SAN	D	23:30	89%	165	0	165	186	738	TOW/RON	SY-3420	2	PAX	SY	3420	PHX	D	7:05	96%	178	2	177	186	738
SY-3421	2	PAX	SY	3421	RSW	D	23:44	94%	176	0	176	186	738	TOW/RON	SY-3422	2	PAX	SY	3422	DCA	D	7:10	92%	171	55	116	186	738
SY-3423	2	PAX	SY	3423	LAS	D	23:56	93%	172	0	172	186	738	TOW/RON	SY-3424	2	PAX	SY	3424	CUN	I	7:25	93%	173	0	172	186	738

UA-3531	2	PAX	UA	3531	SFO	D	0:15	93%	102	4	97	109	221	7:55	UA-3532	2	PAX	UA	3532	IAH	D	8:10	95%	103	2	102	109	221
UA-3533	2	PAX	UA	3533	ORD	D	7:31	86%	94	5	89	109	221	1:14	UA-3534	2	PAX	UA	3534	ORD	D	8:45	91%	100	4	96	109	221
UA-3587	2	PAX	UA	3587	IAH	D	9:00	88%	67	2	65	76	7M8	1:30	UA-3588	2	PAX	UA	3588	IAH	D	10:30	92%	70	1	69	76	7M8
UA-3573	2	PAX	UA	3573	ORD	D	9:23	93%	155	5	149	166	7M8	0:52	UA-3574	2	PAX	UA	3574	ORD	D	10:15	89%	148	4	144	166	7M8
UA-3589	2	PAX	UA	3589	EWR	D	9:46	86%	65	2	63	76	E7W	1:41	UA-3590	2	PAX	UA	3590	ORD	D	11:27	92%	70	2	68	76	E7W
UA-3535	2	PAX	UA	3535	IAD	D	10:14	79%	86	3	83	109	221	2:06	UA-3536	2	PAX	UA	3536	IAD	D	12:20	92%	100	3	97	109	221
UA-3591	2	PAX	UA	3591	IAH	D	10:27	82%	62	2	60	76	E7W	1:58	UA-3592	2	PAX	UA	3592	EWR	D	12:25	94%	71	2	69	76	E7W
UA-3575	2	PAX	UA	3575	DEN	D	10:43	92%	153	7	146	166	7M8	0:54	UA-3576	2	PAX	UA	3576	DEN	D	11:37	89%	148	5	142	166	7M8
UA-3593	2	PAX	UA	3593	ORD	D	11:49	96%	73	3	70	76	E7W	1:11	UA-3594	2	PAX	UA	3594	IAH	D	13:00	93%	71	1	70	76	E7W
UA-3537	2	PAX	UA	3537	IAH	D	12:27	88%	96	2	93	109	221	0:46	UA-3538	2	PAX	UA	3538	ORD	D	13:13	92%	100	3	98	109	221
UA-3539	2	PAX	UA	3539	EWR	D	12:59	86%	94	4	90	109	221	0:36	UA-3540	2	PAX	UA	3540	EWR	D	13:35	94%	102	3	99	109	221
UA-3577	2	PAX	UA	3577	DEN	D	14:09	92%	153	7	146	166	7M8	1:11	UA-3578	2	PAX	UA	3578	ORD	D	15:20	91%	151	4	147	166	7M8
UA-3541	2	PAX	UA	3541	ORD	D	14:31	96%	104	4	101	109	221	0:44	UA-3542	2	PAX	UA	3542	EWR	D	15:15	94%	102	3	99	109	221
UA-3557	2	PAX	UA	3557	IAH	D	14:50	96%	124	3	121	130	223	0:45	UA-3558	2	PAX	UA	3558	IAH	D	15:35	94%	122	2	120	130	223
UA-3559	2	PAX	UA	3559	ORD	D	16:14	96%	125	4	121	130	223	0:42	UA-3560	2	PAX	UA	3560	ORD	D	16:56	93%	121	3	117	130	223
UA-3579	2	PAX	UA	3579	DEN	D	16:18	92%	153	7	146	166	7M8	0:42	UA-3580	2	PAX	UA	3580	DEN	D	17:00	92%	153	6	147	166	7M8
UA-3543	2	PAX	UA	3543	SFO	D	16:47	93%	102	4	97	109	221	0:38	UA-3544	2	PAX	UA	3544	SFO	D	17:25	94%	103	3	99	109	221
UA-3545	2	PAX	UA	3545	EWR	D	17:01	86%	94	4	90	109	221	0:39	UA-3546	2	PAX	UA	3546	IAH	D	17:40	92%	100	2	99	109	221
UA-3547	2	PAX	UA	3547	IAH	D	17:13	98%	107	3	104	109	221	0:37	UA-3548	2	PAX	UA	3548	IAD	D	17:50	88%	96	3	93	109	221
UA-3595	2	PAX	UA	3595	ORD	D	17:36	93%	71	2	68	76	E7W	0:54	UA-3596	2	PAX	UA	3596	ORD	D	18:30	92%	70	2	68	76	E7W
UA-3581	2	PAX	UA	3581	DEN	D	18:40	94%	156	4	152	166	7M8	0:50	UA-3582	2	PAX	UA	3582	DEN	D	19:30	92%	153	3	149	166	7M8
UA-3597	2	PAX	UA	3597	EWR	D	19:31	86%	65	2	63	76	E7W	0:39	UA-3598	2	PAX	UA	3598	EWR	D	20:10	74%	56	2	54	76	E7W
UA-3565	2	PAX	UA	3565	ORD	D	19:32	93%	184	9	175	198	7M1	0:50	UA-3566	2	PAX	UA	3566	DEN	D	20:22	80%	159	6	153	198	7M1
UA-3549	2	PAX	UA	3549	IAD	D	19:43	92%	101	4	97	109	221	0:47	UA-3550	2	PAX	UA	3550	IAH	D	20:30	93%	101	2	100	109	221
UA-3527	2	PAX	UA	3527	IAH	D	19:45	88%	96	2	94	109	738	TOW/RON	UA-3528	2	PAX	UA	3528	EWR	D	6:00	74%	80	2	78	109	738
UA-3569	2	PAX	UA	3569	ORD	D	21:18	90%	150	5	145	166	7M1	TOW/RON	UA-3570	2	PAX	UA	3570	ORD	D	5:30	89%	148	4	144	166	7M1
UA-3555	2	PAX	UA	3555	IAH	D	21:33	96%	124	3	121	130	221	TOW/RON	UA-3556	2	PAX	UA	3556	IAH	D	5:40	94%	122	2	120	130	221
UA-3571	2	PAX	UA	3571	ORD	D	22:58	93%	155	5	149	166	7M8	TOW/RON	UA-3572	2	PAX	UA	3572	ORD	D	7:30	91%	151	4	147	166	7M8
UA-3563	2	PAX	UA	3563	DEN	D	23:24	88%	175	8	167	198	223	TOW/RON	UA-3564	2	PAX	UA	3564	DEN	D	6:14	80%	159	6	153	198	223
UA-3529	2	PAX	UA	3529	EWR	D	23:50	86%	94	4	90	109	221	TOW/RON	UA-3530	2	PAX	UA	3530	SFO	D	7:15	94%	103	3	99	109	221
WN-3637	2	PAX	WN	3637	OAK	D	0:05	85%	149	0	149	175	7M8	6:55	WN-3638	2	PAX	WN	3638	DAL	D	7:00	89%	156	1	154	175	7M8
WN-3639	2	PAX	WN	3639	PHX	D	0:10	96%	168	3	165	175	7M8	6:55	WN-3640	2	PAX	WN	3640	STL	D	7:05	72%	126	2	124	175	7M8
WN-3641	2	PAX	WN	3641	MDW	D	8:05	78%	137	4	133	175	7M8	0:35	WN-3642	2	PAX	WN	3642	MDW	D	8:40	76%	132	3	129	175	7M8
WN-3605	2	PAX	WN	3605	DAL	D	9:15	95%	136	4	133	143	73W	0:45	WN-3606	2	PAX	WN	3606	DAL	D	10:00	96%	137	3	134	143	73W
WN-3607	2	PAX	WN	3607	MDW	D	10:00	76%	109	3	107	143	73W	0:45	WN-3608	2	PAX	WN	3608	OAK	D	10:45	89%	127	0	127	143	73W
WN-3643	2	PAX	WN	3643	DEN	D	10:20	75%	131	4	127	175	7M8	0:50	WN-3644	2	PAX	WN	3644	DEN	D	11:10	84%	148	3	144	175	7M8
WN-3645	2	PAX	WN	3645	ATL	D	10:30	85%	149	2	147	175	7M8	0:50	WN-3646	2	PAX	WN	3646	LAS	D	11:20	100%	175	3	172	175	7M8
WN-3647	2	PAX	WN	3647	BWI	D	10:35	78%	136	3	133	175	7M8	0:40	WN-3648	2	PAX	WN	3648	MDW	D	11:15	76%	132	3	129	175	7M8
WN-3609	2	PAX	WN	3609	MCI	D	11:45	59%	84	4	81	143	73W	0:45	WN-3610	2	PAX	WN	3610	PHX	D	12:30	98%	141	1	140	143	73W
WN-3611	2	PAX	WN	3611	MDW	D	12:15	78%	112	3	108	143	73W	0:40	WN-3612	2	PAX	WN	3612	BNA	D	12:55	84%	120	1	119	143	73W
WN-3649	2	PAX	WN	3649	STL	D	13:20	72%	126	3	123	175	7M8	0:45	WN-3650	2	PAX	WN	3650	MDW	D	14:05	76%	132	3	129	175	7M8
WN-3651	2	PAX	WN	3651	PHX	D	13:25	96%	168	3	165	175	7M8	0:50	WN-3652	2	PAX	WN	3652	DEN	D	14:15	85%	149	3	146	175	7M8
WN-3653	2	PAX	WN	3653	DEN	D	13:35	91%	158	5	153	175	7M8	0:40	WN-3654	2	PAX	WN	3654	OAK	D	14:15	86%	150	3	147	175	7M8
WN-3613	2	PAX	WN	3613	LAS	D	14:15	90%	129	2	127	143	73W	0:45	WN-3614	2	PAX	WN	3614	LAS	D	15:00	91%	130	1	129	143	73W
WN-3655	2	PAX	WN	3655	MDW	D	14:50	78%	137	4	133	175	7M8	0:35	WN-3656	2	PAX	WN	3656	MDW	D	15:25	76%	132	3	129	175	7M8
WN-3657	2	PAX	WN	3657	BNA	D	14:55	83%	145	3	142	175	7M8	0:35	WN-3658	2	PAX	WN	3658	ATL	D	15:30	92%	161	1	161	175	7M8
WN-3615	2	PAX	WN	3615	DEN	D	17:00	97%	139	4	135	143	73W	0:45	WN-3616	2	PAX	WN	3616	MCI	D	17:45	63%	90	3	87	143	73W
WN-3617	2	PAX	WN	3617	MDW	D	17:00	78%	112	3	108	143	73W	0:45	WN-3618	2	PAX	WN	3618	MDW	D	17:45	76%	108	2	106	143	73W
WN-3619	2	PAX	WN	3619	ATL	D	17:15	86%	123	2	122	143	73W	0:45	WN-3620	2	PAX	WN	3620	ATL	D	18:00	96%	137	1	136	143	73W
WN-3659	2	PAX	WN	3659	STL	D	17:30	72%	126	3	123	175	7M8	0:45	WN-3660	2	PAX	WN	3660	BWI	D	18:15	80%	139	2	137	175	7M8
WN-3661	2	PAX	WN	3661	OAK	D	17:40	85%	149	0	149	175	7M8	0:45	WN-3662	2	PAX	WN	3662	STL	D	18:25	76%	133	7	126	175	7M8
WN-3621	2	PAX	WN	3621	DAL	D	18:50	81%	116	2	114	143	73W	0:40	WN-3622	2	PAX	WN	3622	DEN	D	19:30	90%	128	3	125	143	73W
WN-3663	2	PAX	WN	3663	MDW	D	18:50	84%	147	5	142	175	7M8	0:45	WN-3664	2	PAX	WN	3664	PHX	D	19:35	98%	172	2	171	175	7M8
WN-3665	2	PAX	WN	3665	DEN	D	19:45	91%	158	5	153	175	7M8	0:50	WN-3666	2	PAX	WN	3666	MDW	D	20:35	76%	132	3	129	175	7M8
WN-3599	2	PAX	WN	3599	MCI	D	20:25	59%	84	4	81	143	E7W	TOW/RON	WN-3600	2	PAX	WN	3600	MCI	D	5:05	63%	90	3	87	143	E7W
WN-3623	2	PAX	WN	3623	LAS	D	21:30	90%	129	3	126	143	73W	0:45	WN-3624	2	PAX	WN	3624	DEN	D	22:15	96%	137	2	135	143	73W
WN-3601	2	PAX	WN	3601	ATL	D	21:40	95%	136	2	134	143	73W	TOW/RON	WN-3602	2	PAX	WN	3602	PHX	D	5:35	98%	141	1	140	143	73W
WN-3631	2	PAX	WN	3631	PHX	D	21:40	96%	168	3	165	175	73W	TOW/RON	WN-3632	2	PAX	WN	3632	DEN	D	5:30	84%	148	3	144	175	73W
WN-3633	2	PAX	WN	3633	BWI	D	22:00	66%	115	3	112	175	7M8	TOW/RON	WN-3634	2	PAX	WN	3634	ATL	D	6:05	92%	161	1	161	175	7M8
WN-3603	2	PAX	WN	3603	MDW	D	22:30	78%	112	3	108	143	73W	TOW/RON	WN-3604	2	PAX	WN	3604	MDW	D	5:40	76%	108	2	106	143	73W
WN-3635	2	PAX	WN	3635	DEN	D	23:35	91%	158	5	153	175	7M8	TOW/RON	WN-3636	2	PAX	WN	3636	BWI	D	6:40	85%	148	2	146	175	7M8
SY-2131	2	PAX	SY	2131	PHL	D	7:15	91%	169	53	116	186	738	1:15	SY-2132	2	PAX	SY	2132	PHX	D	8:30	89%	166	18	147	186	738
SY-2133	2	PAX	SY	2133	BOS	D	7:45	90%	167	59	109	186	738	0:45	SY-2134	2	PAX	SY	2134	SAN	D	8:30	92%	172	17	155	186	738
SY-2135	2	PAX	SY	2135	ATL	D	7:55	91%	170	24	146	186	738	0:55	SY-2136	2	PAX	SY	2136	AUS	D	8:50	92%	172	14	157	186	738
SY-2137	2	PAX	SY	2137	MCO	D	8:00	90%	167	31	137	186	738	0:50	SY-2138	2	PAX	SY	2138	SAT	D	8:50	91%	169	14	155	186	738
SY-2139	2	PAX	SY	2139	RSW	D	8:00	90%	168	29	139	186	738	1:15	SY-2140	2	PAX	SY	2140	PDX	D	9:15	91%	168	55	114	186	738
SY-2141	2	PAX	SY	2141	DEN	D	9:50	90%	167	24	143	186	738	3:40	SY-2142	2	PAX	SY	2142	BOS	D	13:30	90%	167	58	109	186	738
SY-2143	2	PAX	SY	2143	LAS	D	12:00	91%	170	65	104	186	738	1:30	SY-2144	2	PAX	SY	2144	MCO	D	13:30	89%	166	20	146	186	738
SY-2145	2	PAX	SY	2145	SAT	D	12:05	90%	168	20	147	186	738	1:25	SY-2146	2	PAX	SY	2146	PHL	D	13:30	91%	169	73	96	186	738
SY-2147	2	PAX	SY	2147	DEN	D	12:20	90%	167	24	143	186	738	1:10	SY-2148	2	PAX	SY	2148	RSW	D	13:30	90%	168	20	148	186	738
SY-2149	2	PAX	SY	2149	PHX	D	12:30	89%	165	37	129	186	738	1:05	SY-2150	2	PAX	SY	2150	ATL	D	13:35	90%	167	21	146	186	738
SY-2151	2	PAX	SY	2151	LAX	D	12:30	90%	168	43	124	186	738	1:05	SY-2152	2	PAX	SY	2152	DCA	D	13:35	92%	171	55	116	186	738
SY-2153	2	PAX	SY	2153	PDX	D	12:35	89%	165	53	112	186	738	1:10	SY-2154	2	PAX	SY	2154	BNA	D	13:45	88%	163	28	135	186	738
SY-2155	2	PAX	SY	2155	SFO	D	12:35	93%	174	82	92	186	738	2:20	SY-2156	2	PAX	SY	2156	ORD	D	14:55	88%	164	39	125	186	738
SY-2157	2	PAX	SY	2157	AUS	D	12:39	91%	170	20	150	186	738	2:21	SY-2158	2	PAX	SY	2158	SEA	D	15:00	92%	171	85	86	186	738
SY-2159	2	PAX	SY	2159	BOS	D	13:45	90%	167	59	109	186	738	1:25	SY-2160	2	PAX	SY	2160	SAN	D	15:10	92%	172	42	129	186	738
SY-2161	2	PAX	SY	2161	PHL	D	13:55	91%	169	53	116	186	738	1:20	SY-2162	2	PAX	SY	2162	SAT	D	15:15	91%	169	14	155	186	738
SY-2163	2	PAX	SY	2163	DCA	D	14:00	92%	172	56	116	186	738	1:15	SY-2164	2	PAX	SY	2164	SFO	D	15:15	93%	174	85	89	186	738
SY-2165	2	PAX	SY	2165	EWR	D	14:00	96%	178	112	66	186	738	1:20	SY-2166	2	PAX	SY	2166	AUS	D	15:20	92%	172	14	157	186	738
SY-2167	2	PAX	SY	2167	SEA	D	14:00	92%	172	82	90	186	738	1:25	SY-2168	2	PAX	SY	2168	LAX	D	15:25	92%	172	57	115	186	738
SY-2169	2	PAX	SY	2169	RSW	D	14:03	90%	168	29	139	186	738	1:27	SY-2170	2	PAX	SY	2170	BOS	D	15:30	90%	167	58	109	186	738
SY-2171	2	PAX	SY	2171	BNA	D	14:10	89%	166	31	135	186	738	1:20	SY-2172	2	PAX	SY	2172	EWR	D	15:30	92%	171	56	115	186	738
SY-2173	2	PAX	SY	2173	MCO	D	14:10	90%	167	31	137	186	738	1:20	SY-2174	2	PAX	SY	2174	LAS	D	15:30	91%	170	57	113	186	738
SY-2175	2	PAX	SY	2175	SFO	D	14:30	93%	174	82	92	186	738	2:00	SY-2176	2	PAX	SY	2176	ANC	D	16:30	92%	171	56	115	186	738
SY-2177	2	PAX	SY	2177	LAS	D	15:25	91%	170	65	104	186	738	2:00	SY-2178	2	PAX	SY	2178	PDX	D	17:25	91%	168	55	114	186	738
SY-2179	2	PAX	SY	2179	ORD	D	16:00	90%	168	42	126	186	738	3:00	SY-2180	2	PAX	SY	2180	ATL	D	19:00	90%	167	21	146	186	738
SY-2181	2	PAX	SY	2181	ATL	D	16:25	91%	170	24	146	186	738	2:35	SY-2182	2	PAX	SY	2182	PHL	D	19:00	91%	169	73	96	186	738
SY-2183	2	PAX	SY	2183	BNA	D	16:30	89%	166	31	135	186	738	2:30	SY-2184	2	PAX	SY	2184	RSW	D	19:00	90%	168	20	148	186	738
SY-2185	2	PAX	SY	2185	SAN	D	16:45	92%	171	49	122	186	738	2:20	SY-2186	2	PAX	SY	2186	DCA	D	19:05	92%	171	55	116	186	738
SY-2187	2	PAX	SY	2187	SAT	D	18:00	90%	168	20	147	186	738	1:15	SY-2188	2	PAX	SY	2188	MCO	D	19:15	89%	166	20	146	186	738
SY-2189	2	PAX	SY	2189	PDX	D	18:05	89%	165	53	112	186	738	1:10	SY-2190	2	PAX	SY	2190	ORD	D	19:15	88%	164	39	125	186	738
SY-2191	2	PAX	SY	2191	LAX	D	18:15	90%	168	43	124	186	738	2:20	SY-2192	2	PAX	SY	2192	LAS	D	20:35	91%	170	57	113	186	738
SY-2193	2	PAX	SY	2193	AUS	D	18:30	91%	170	20	150	186	738	2:05	SY-2194	2	PAX	SY	2194	PHX	D	20:35	89%	166	46	120	186	738
SY-2195	2	PAX	SY	2195	PHX	D	18:30	89%	165	37	129	186	738	2:15	SY-2196	2	PAX	SY	2196	SAN	D	20:45	92%	172	42	129	186	738
SY-2197	2	PAX	SY	2197	BNA	D	18:50	89%	166	31	135	186	738	2:00	SY-2198	2	PAX	SY	2198	LAX	D	20:50	92%	172	57	115	186	738
SY-2199	2	PAX	SY	2199	ORD	D	18:55	90%	168	42	126	186	738	2:00	SY-2200	2	PAX	SY	2200	SFO	D	20:55	93%	174	85	89	186	738
SY-2201	2	PAX	SY	2201	DCA	D	19:45	92%	172	56	116	186	738	1:15	SY-2202	2	PAX	SY	2202	DEN	D	21:00	92%	172	40	132	186	738
SY-2203	2	PAX	SY	2203	ATL	D	19:50	91%	170	24	146	186	738	1:15	SY-2204	2	PAX	SY	2204	SEA	D	21:05	92%	171	85	86	186	738
SY-2205	2	PAX	SY	2205	PHL	D	20:00	91%	169	53	116	186	738	1:10	SY-2206	2	PAX	SY	2206	PDX	D	21:10	91%	168	55	114	186	738
SY-2207	2	PAX	SY	2207	BOS	D	20:05	90%	167	59	109	186	738	1:40	SY-2208	2	PAX	SY	2208	AUS	D	21:45	92%	172	14	157	186	738
SY-2209	2	PAX	SY	2209	MCO	D	21:00	88%	163	-	163	186	738	1:00	SY-2210	2	PAX	SY	2210	PHX	D	22:00	89%	166	46	120	186	738
SY-2211	2	PAX	SY	2211	RSW	D	21:15	88%	164	-	164	186	738	0:45	SY-2212	2	PAX	SY	2212	SAT	D	22:00	91%	169	14	155	186	738
WN-2407	2	PAX	WN	2407	PHX	D	1:15	99%	141	2	140	143	73W	4:25	WN-2408	2	PAX	WN	2408	PHX	D	5:40	95%	136	3	134	143	73W
WN-2431	2	PAX	WN	2431	DEN	D	1:20	99%	173	3	170	175	7M8	6:10	WN-2432	2	PAX	WN	2432	DAL	D	7:30	96%	168	4	164	175	7M8
WN-2433	2	PAX	WN	2433	MDW	D	8:10	75%	132	2	130	175	7M8	0:45	WN-2434	2	PAX	WN	2434	DEN	D	8:55	97%	169	2	167	175	7M8
WN-2435	2	PAX	WN	2435	DEN	D	9:00	99%	173	3	170	175	7M8	0:45	WN-2436	2	PAX	WN	2436	MCI	D	9:45	95%	166	8	158	175	7M8
WN-2437	2	PAX	WN	2437	DAL	D	9:15	95%	167	3	164	175	7M8	0:45	WN-2438	2	PAX	WN	2438	DEN	D	10:00	97%	169	2	167	175	7M8
WN-2439	2	PAX	WN	2439	BNA	D	9:45	70%	122	1	122	175	7M8	0:45	WN-2440	2	PAX	WN	2440	DAL	D	10:30	96%	168	4	164	175	7M8
WN-2409	2	PAX	WN	2409	BWI	D	9:50	93%	133	1	132	143	73W	0:55	WN-2410	2	PAX	WN	2410	BWI	D	10:45	94%	134	1	133	143	73W
WN-2441	2	PAX	WN	2441	ATL	D	10:20	95%	166	1	165	175	7M8	0:45	WN-2442	2	PAX	WN	2442	MDW	D	11:05	75%	132	2	130	175	7M8
WN-2443	2	PAX	WN	2443	MDW	D	10:25	75%	132	2	130	175	7M8	0:45	WN-2444	2	PAX	WN	2444	DEN	D	11:10	97%	169	2	167	175	7M8
WN-2445	2	PAX	WN	2445	MCI	D	10:50	99%	173	6	168	175	7M8	0:45	WN-2446	2	PAX	WN	2446	STL	D	11:35	81%	141	4	137	175	7M8
WN-2411	2	PAX	WN	2411	STL	D	12:10	82%	117	2	115	143	73W	0:40	WN-2412	2	PAX	WN	2412	BNA	D	12:50	70%	101	1	100	143	73W
WN-2413	2	PAX	WN	2413	MDW	D	12:35	75%	107	2	106	143	73W	0:45	WN-2414	2	PAX	WN	2414	MDW	D	13:20	75%	108	1	106	143	73W
WN-2447	2	PAX	WN	2447	DEN	D	13:55	99%	173	3	170	175	7M8	0:45	WN-2448	2	PAX	WN	2448	DEN	D	14:40	97%	169	2	167	175	7M8
WN-2415	2	PAX	WN	2415	PHX	D	14:40	99%	141	2	140	143	73W	0:45	WN-2416	2	PAX	WN	2416	MDW	D	15:25	75%	108	1	106	143	73W
WN-2449	2	PAX	WN	2449	MDW	D	14:50	75%	132	2	130	175	7M8	0:45	WN-2450	2	PAX	WN	2450	ATL	D	15:35	96%	167	1	166	175	7M8
WN-2451	2	PAX	WN	2451	MDW	D	15:55	75%	132	2	130	175	7M8	1:05	WN-2452	2	PAX	WN	2452	MDW	D	17:00	75%	132	2	130	175	7M8
WN-2417	2	PAX	WN	2417	BNA	D	16:10	70%	100	1	99	143	73W	0:45	WN-2418	2	PAX	WN	2418	PHX	D	16:55	95%	136	3	134	143	73W
WN-2419	2	PAX	WN	2419	ATL	D	16:40	95%	136	1	135	143	73W	0:45	WN-2420	2	PAX	WN	2420	MCI	D	17:25	95%	136	7	129	143	73W
WN-2453	2	PAX	WN	2453	BWI	D	17:00	93%	163	2	161	175	7M8	0:45	WN-2454	2	PAX	WN	2454	BWI	D	17:45	94%	164	2	163	175	7M8
WN-2421	2	PAX	WN	2421	MDW	D	17:15	75%	107	2	106	143	73W	0:45	WN-2422	2	PAX	WN	2422	ATL	D	18:00	96%	137	1	136	143	73W
WN-2455	2	PAX	WN	2455	STL	D	17:35	82%	143	3	140	175	7M8	0:30	WN-2456	2	PAX	WN	2456	BNA	D	18:05	70%	123	1	122	175	7M8
WN-2457	2	PAX	WN	2457	DEN	D	18:30	99%	173	3	170	175	7M8	0:45	WN-2458	2	PAX	WN	2458	STL	D	19:15	81%	141	4	137	175	7M8
WN-2459	2	PAX	WN	2459	DAL	D	18:50	95%	167	3	164	175	7M8	0:45	WN-2460	2	PAX	WN	2460	MDW	D	19:35	75%	132	2	130	175	7M8
WN-2461	2	PAX	WN	2461	MDW	D	19:35	75%	132	2	130	175	7M8	0:45	WN-2462	2	PAX	WN	2462	DEN	D	20:20	97%	169	2	167	175	7M8
WN-2463	2	PAX	WN	2463	DEN	D	20:35	99%	173	3	170	175	7M8	0:45	WN-2464	2	PAX	WN	2464	MDW	D	21:20	75%	132	2	130	175	7M8
WN-2465	2	PAX	WN	2465	MDW	D	21:00	75%	132	2	130	175	7M8	0:45	WN-2466	2	PAX	WN	2466	PHX	D	21:45	95%	167	3	163	175	7M8
WN-2423	2	PAX	WN	2423	BWI	D	21:20	93%	133	1	132	143	73W	0:40	WN-2424	2	PAX	WN	2424	MDW	D	22:00	75%	108	1	106	143	73W
B6-2001	2	PAX	B6	2001	BOS	D	23:12	89%	134	1	133	150	320	TOW/RON	B6-2002	3	PAX	B6	2002	BOS	D	5:45	91%	137	1	137	150	320
F9-2019	2	PAX	F9	2019	CLE	D	21:30	91%	163	0	163	180	32N	TOW/RON	F9-2020	3	PAX	F9	2020	MCO	D	8:00	92%	165	-	165	180	32N
SY-2101	2	PAX	SY	2101	SEA	D	22:51	85%	159	-	159	186	738	TOW/RON	SY-2102	3	PAX	SY	2102	SFO	D	6:00	93%	174	-	174	186	738
SY-2103	2	PAX	SY	2103	EWR	D	23:00	87%	162	-	162	186	738	TOW/RON	SY-2104	3	PAX	SY	2104	SEA	D	6:10	92%	171	-	171	186	738
SY-2105	2	PAX	SY	2105	LAS	D	23:00	86%	159	-	159	186	738	TOW/RON	SY-2106	3	PAX	SY	2106	RSW	D	6:25	90%	168	20	148	186	738
SY-2107	2	PAX	SY	2107	SAT	D	23:10	89%	165	-	165	186	738	TOW/RON	SY-2108	3	PAX	SY	2108	MCO	D	6:40	89%	166	20	146	186	738
SY-2109	2	PAX	SY	2109	AUS	D	23:11	90%	168	-	168	186	738	TOW/RON	SY-2110	3	PAX	SY	2110	BOS	D	6:50	90%	167	58	109	186	738
SY-2111	2	PAX	SY	2111	SAN	D	23:30	89%	165	-	165	186	738	TOW/RON	SY-2112	3	PAX	SY	2112	ATL	D	7:00	90%	167	21	146	186	738
WN-2401	2	PAX	WN	2401	ATL	D	21:40	95%	136	1	135	143	73W	TOW/RON	WN-2402	3	PAX	WN	2402	BWI	D	6:45	94%	134	1	133	143	73W
WN-2403	2	PAX	WN	2403	STL	D	21:50	82%	117	2	115	143	73W	TOW/RON	WN-2404	3	PAX	WN	2404	STL	D	6:10	81%	116	4	112	143	73W
WN-2405	2	PAX	WN	2405	MCI	D	22:00	99%	142	5	137	143	73W	TOW/RON	WN-2406	3	PAX	WN	2406	ATL	D	6:30	96%	137	1	136	143	73W
WN-2425	2	PAX	WN	2425	DEN	D	22:45	99%	173	3	170	175	7M8	TOW/RON	WN-2426	3	PAX	WN	2426	MDW	D	5:30	75%	132	2	130	175	7M8
WN-2427	2	PAX	WN	2427	PHX	D	23:30	99%	173	2	171	175	7M8	TOW/RON	WN-2428	3	PAX	WN	2428	DEN	D	5:55	97%	169	2	167	175	7M8
WN-2429	2	PAX	WN	2429	MDW	D	23:50	75%	132	2	130	175	7M8	TOW/RON	WN-2430	3	PAX	WN	2430	MDW	D	7:00	75%	132	2	130	175	7M8
B6-2001	1	PAX	B6	2001	BOS	D	23:12	89%	134	1	133	150	320	TOW/RON	B6-2002	2	PAX	B6	2002	BOS	D	5:45	91%	137	1	137	150	320
F9-2019	1	PAX	F9	2019	CLE	D	21:30	91%	163	0	163	180	32N	TOW/RON	F9-2020	2	PAX	F9	2020	MCO	D	8:00	92%	165	-	165	180	32N
SY-2101	1	PAX	SY	2101	SEA	D	22:51	85%	159	-	159	186	738	TOW/RON	SY-2102	2	PAX	SY	2102	SFO	D	6:00	93%	174	-	174	186	738
SY-2103	1	PAX	SY	2103	EWR	D	23:00	87%	162	-	162	186	738	TOW/RON	SY-2104	2	PAX	SY	2104	SEA	D	6:10	92%	171	-	171	186	738
SY-2105	1	PAX	SY	2105	LAS	D	23:00	86%	159	-	159	186	738	TOW/RON	SY-2106	2	PAX	SY	2106	RSW	D	6:25	90%	168	20	148	186	738
SY-2107	1	PAX	SY	2107	SAT	D	23:10	89%	165	-	165	186	738	TOW/RON	SY-2108	2	PAX	SY	2108	MCO	D	6:40	89%	166	20	146	186	738
SY-2109	1	PAX	SY	2109	AUS	D	23:11	90%	168	-	168	186	738	TOW/RON	SY-2110	2	PAX	SY	2110	BOS	D	6:50	90%	167	58	109	186	738
SY-2111	1	PAX	SY	2111	SAN	D	23:30	89%	165	-	165	186	738	TOW/RON	SY-2112	2	PAX	SY	2112	ATL	D	7:00	90%	167	21	146	186	738
WN-2401	1	PAX	WN	2401	ATL	D	21:40	95%	136	1	135	143	73W	TOW/RON	WN-2402	2	PAX	WN	2402	BWI	D	6:45	94%	134	1	133	143	73W
WN-2403	1	PAX	WN	2403	STL	D	21:50	82%	117	2	115	143	73W	TOW/RON	WN-2404	2	PAX	WN	2404	STL	D	6:10	81%	116	4	112	143	73W
WN-2405	1	PAX	WN	2405	MCI	D	22:00	99%	142	5	137	143	73W	TOW/RON	WN-2406	2	PAX	WN	2406	ATL	D	6:30	96%	137	1	136	143	73W
WN-2425	1	PAX	WN	2425	DEN	D	22:45	99%	173	3	170	175	7M8	TOW/RON	WN-2426	2	PAX	WN	2426	MDW	D	5:30	75%	132	2	130	175	7M8
WN-2427	1	PAX	WN	2427	PHX	D	23:30	99%	173	2	171	175	7M8	TOW/RON	WN-2428	2	PAX	WN	2428	DEN	D	5:55	97%	169	2	167	175	7M8
WN-2429	1	PAX	WN	2429	MDW	D	23:50	75%	132	2	130	175	7M8	TOW/RON	WN-2430	2	PAX	WN	2430	MDW	D	7:00	75%	132	2	130	175	7M8

PAL 3 Alternate 2 Summer

	A_DAY: 2	A_TYPE: PAX	INBOUND			D_DAY: 2	D_TYPE: PAX	OUTBOUND

A_CODE	A_DAY	A_TYPE	A_MAIR	A_FLT#	A_MKT	A_D/I/P	A_TIME	A_LF	A_PAX	A_CX	A_OD	A_STS	A_EQP	A_GATE	G_TIME	D_CODE	D_DAY	D_TYPE	D_MAIR	D_FLT#	D_MKT	D_D/I/P	D_TIME	D_LF	D_PAX	D_CX	D_OD	D_STS	D_EQP	D_GATE
3E-1001	2	PAX	3E	1001	MCW	D	10:25	58%	5	-	5	8	CNC		0:45	3E-1002	2	PAX	3E	1002	MCW	D	11:10	54%	4	-	4	8	CNC	
3E-1003	2	PAX	3E	1003	IWD	D	13:05	99%	8	-	8	8	CNC		1:40	3E-1004	2	PAX	3E	1004	IWD	D	14:45	100%	8	-	8	8	CNC	
3E-1005	2	PAX	3E	1005	FOD	D	14:05	54%	4	-	4	8	CNC		1:25	3E-1006	2	PAX	3E	1006	FOD	D	15:30	80%	6	-	6	8	CNC	
3E-1007	2	PAX	3E	1007	MCW	D	15:15	58%	5	-	5	8	CNC		0:45	3E-1008	2	PAX	3E	1008	MCW	D	16:00	54%	4	-	4	8	CNC	
4B-1009	2	PAX	4B	1009	TVF	D	7:45	75%	6	0	6	8	PL2		0:40	4B-1010	2	PAX	4B	1010	TVF	D	8:25	78%	6	0	6	8	PL2	
4B-1011	2	PAX	4B	1011	TVF	D	11:25	75%	6	0	6	8	PL2		3:05	4B-1012	2	PAX	4B	1012	TVF	D	14:30	78%	6	0	6	8	PL2	
4B-1013	2	PAX	4B	1013	TVF	D	17:30	75%	6	0	6	8	PL2		0:40	4B-1014	2	PAX	4B	1014	TVF	D	18:10	78%	6	0	6	8	PL2	
AA-1047	2	PAX	AA	1047	ORD	D	8:29	91%	145	6	139	160	73H		0:48	AA-1048	2	PAX	AA	1048	ORD	D	9:17	86%	137	6	131	160	73H	
AA-1083	2	PAX	AA	1083	LGA	D	8:34	73%	55	1	54	76	E75		0:33	AA-1084	2	PAX	AA	1084	LGA	D	9:07	73%	56	1	55	76	E75	
AA-1049	2	PAX	AA	1049	CLT	D	9:00	87%	140	1	139	160	73H		1:00	AA-1050	2	PAX	AA	1050	CLT	D	10:00	84%	134	1	133	160	73H	
AA-1051	2	PAX	AA	1051	DFW	D	9:46	97%	155	3	153	160	73H		1:04	AA-1052	2	PAX	AA	1052	DFW	D	10:50	96%	153	2	151	160	73H	
AA-1019	2	PAX	AA	1019	PHL	D	10:13	79%	86	1	85	109	221		0:41	AA-1020	2	PAX	AA	1020	PHL	D	10:54	80%	87	1	85	109	221	
AA-1053	2	PAX	AA	1053	CLT	D	11:07	87%	140	1	139	160	73H		0:47	AA-1054	2	PAX	AA	1054	CLT	D	11:54	84%	134	1	133	160	73H	
AA-1021	2	PAX	AA	1021	PHL	D	11:13	79%	86	1	85	109	221		0:40	AA-1022	2	PAX	AA	1022	PHL	D	11:53	80%	87	1	85	109	221	
AA-1023	2	PAX	AA	1023	MIA	D	11:28	90%	98	1	97	109	221		0:32	AA-1024	2	PAX	AA	1024	MIA	D	12:00	90%	98	1	97	109	221	
AA-1025	2	PAX	AA	1025	ORD	D	11:47	91%	99	4	95	109	221		0:32	AA-1026	2	PAX	AA	1026	ORD	D	12:19	86%	93	4	89	109	221	
AA-1085	2	PAX	AA	1085	DCA	D	11:55	87%	66	1	65	76	E75		0:35	AA-1086	2	PAX	AA	1086	DCA	D	12:30	86%	65	1	64	76	E75	
AA-1055	2	PAX	AA	1055	DFW	D	12:38	97%	155	3	153	160	73H		0:41	AA-1056	2	PAX	AA	1056	DFW	D	13:19	96%	153	2	151	160	73H	
AA-1057	2	PAX	AA	1057	ORD	D	13:37	91%	145	6	139	160	73H		0:46	AA-1058	2	PAX	AA	1058	ORD	D	14:23	86%	137	6	131	160	73H	
AA-1059	2	PAX	AA	1059	PHX	D	13:46	88%	140	3	138	160	73H		1:02	AA-1060	2	PAX	AA	1060	PHX	D	14:48	88%	141	4	137	160	73H	
AA-1087	2	PAX	AA	1087	LGA	D	14:10	73%	55	1	54	76	E75		1:10	AA-1088	2	PAX	AA	1088	LGA	D	15:20	73%	56	1	55	76	E75	
AA-1061	2	PAX	AA	1061	CLT	D	14:25	87%	140	1	139	160	73H		0:50	AA-1062	2	PAX	AA	1062	CLT	D	15:15	84%	134	1	133	160	73H	
AA-1079	2	PAX	AA	1079	DFW	D	14:39	97%	167	3	164	172	7M8		0:45	AA-1080	2	PAX	AA	1080	DFW	D	15:24	96%	164	2	162	172	7M8	
AA-1063	2	PAX	AA	1063	ORD	D	15:04	91%	145	6	139	160	73H		0:45	AA-1064	2	PAX	AA	1064	ORD	D	15:49	86%	137	6	131	160	73H	
AA-1027	2	PAX	AA	1027	PHL	D	15:22	79%	86	1	85	109	221		0:43	AA-1028	2	PAX	AA	1028	PHL	D	16:05	80%	87	1	85	109	221	
AA-1065	2	PAX	AA	1065	DFW	D	15:30	97%	155	3	153	160	73H		1:20	AA-1066	2	PAX	AA	1066	DFW	D	16:50	96%	153	2	151	160	73H	
AA-1067	2	PAX	AA	1067	CLT	D	16:32	87%	140	1	139	160	73H		0:58	AA-1068	2	PAX	AA	1068	CLT	D	17:30	84%	134	1	133	160	73H	
AA-1029	2	PAX	AA	1029	ORD	D	16:45	91%	99	4	95	109	221		0:45	AA-1030	2	PAX	AA	1030	ORD	D	17:30	86%	93	4	89	109	221	
AA-1089	2	PAX	AA	1089	LGA	D	16:49	73%	55	1	54	76	E75		0:31	AA-1090	2	PAX	AA	1090	LGA	D	17:20	73%	56	1	55	76	E75	
AA-1069	2	PAX	AA	1069	DFW	D	17:07	97%	155	3	153	160	73H		0:58	AA-1070	2	PAX	AA	1070	PHX	D	18:05	88%	141	4	137	160	73H	
AA-1091	2	PAX	AA	1091	DCA	D	17:22	87%	66	1	65	76	E75		0:30	AA-1092	2	PAX	AA	1092	DCA	D	17:52	86%	65	1	64	76	E75	
AA-1071	2	PAX	AA	1071	PHX	D	17:35	88%	140	3	138	160	73H		0:46	AA-1072	2	PAX	AA	1072	DFW	D	18:21	96%	153	2	151	160	73H	
AA-1093	2	PAX	AA	1093	LGA	D	18:10	73%	55	1	54	76	E75		1:10	AA-1094	2	PAX	AA	1094	LGA	D	19:20	73%	56	1	55	76	E75	
AA-1073	2	PAX	AA	1073	ORD	D	18:31	91%	145	6	139	160	73H		0:54	AA-1074	2	PAX	AA	1074	ORD	D	19:25	86%	137	6	131	160	73H	
AA-1075	2	PAX	AA	1075	DFW	D	19:00	97%	155	3	153	160	73H		2:00	AA-1076	2	PAX	AA	1076	PHX	D	21:00	88%	141	4	137	160	73H	
AC-1097	2	PAX	AC	1097	YYZ	P	10:04	92%	70	7	63	76	E75		0:41	AC-1098	2	PAX	AC	1098	YYZ	P	10:45	93%	71	7	64	76	E75	
AC-1099	2	PAX	AC	1099	YYZ	P	15:54	92%	70	7	63	76	E75		0:41	AC-1100	2	PAX	AC	1100	YYZ	P	16:35	93%	71	7	64	76	E75	
AC-1101	2	PAX	AC	1101	YYZ	P	17:10	92%	70	7	63	76	E75		1:50	AC-1102	2	PAX	AC	1102	YYZ	P	19:00	93%	71	7	64	76	E75	
AF-1103	2	PAX	AF	1103	CDG	I	15:45	96%	310	168	142	324	359		4:00	AF-1104	2	PAX	AF	1104	CDG	I	19:45	94%	304	165	139	324	359	
AF-1105	2	PAX	AF	1105	CDG	I	17:00	96%	310	168	142	324	359		4:00	AF-1106	2	PAX	AF	1106	CDG	I	21:00	94%	304	165	139	324	359	
AS-1115	2	PAX	AS	1115	SAN	D	11:45	84%	64	-	64	76	E75		0:52	AS-1116	2	PAX	AS	1116	SAN	D	12:37	85%	64	-	64	76	E75	
AS-1107	2	PAX	AS	1107	SEA	D	11:51	90%	143	1	142	159	7M8		0:59	AS-1108	2	PAX	AS	1108	SEA	D	12:50	88%	140	1	139	159	7M8	
AS-1113	2	PAX	AS	1113	SEA	D	13:43	90%	161	2	159	178	7M9		1:06	AS-1114	2	PAX	AS	1114	SEA	D	14:49	88%	157	2	156	178	7M9	
AS-1117	2	PAX	AS	1117	PDX	D	15:18	84%	64	2	62	76	E75		0:45	AS-1118	2	PAX	AS	1118	PDX	D	16:03	85%	64	2	63	76	E75	
AS-1109	2	PAX	AS	1109	SEA	D	17:45	90%	143	1	142	159	7M8		0:57	AS-1110	2	PAX	AS	1110	SEA	D	18:42	88%	140	1	139	159	7M8	
AS-1119	2	PAX	AS	1119	SAN	D	19:56	84%	64	-	64	76	E75		0:34	AS-1120	2	PAX	AS	1120	SAN	D	20:30	85%	64	-	64	76	E75	
DL-3669	2	PAX	DL	3669	ATL	D	0:11	94%	181	0	181	192	3N1		7:34	DL-3670	2	PAX	DL	3670	SEA	D	7:45	94%	181	33	148	192	3N1	
DL-3671	2	PAX	DL	3671	LAX	D	5:15	97%	186	70	116	192	3N1		2:45	DL-3672	2	PAX	DL	3672	SFO	D	8:00	92%	177	42	135	192	3N1	
DL-3397	2	PAX	DL	3397	LAS	D	5:18	97%	174	77	97	180	739		2:57	DL-3398	2	PAX	DL	3398	GEG	D	8:15	81%	146	91	55	180	739	
DL-3357	2	PAX	DL	3357	HNL	D	5:32	97%	298	213	85	306	350		5:48	DL-3358	2	PAX	DL	3358	HNL	D	11:20	95%	290	176	114	306	350	
DL-3673	2	PAX	DL	3673	SFO	D	5:40	98%	188	65	123	192	3N1		3:05	DL-3674	2	PAX	DL	3674	DTW	D	8:45	97%	187	68	119	192	3N1	
DL-3675	2	PAX	DL	3675	SMF	D	5:43	79%	152	88	64	192	3N1		3:02	DL-3676	2	PAX	DL	3676	LAX	D	8:45	90%	172	59	113	192	3N1	
DL-3399	2	PAX	DL	3399	PHX	D	5:47	84%	152	55	97	180	739		2:58	DL-3400	2	PAX	DL	3400	GEG	D	8:45	86%	154	111	43	180	739	
DL-3525	2	PAX	DL	3525	SJC	D	5:52	80%	120	71	49	150	32N		2:58	DL-3526	2	PAX	DL	3526	PIT	D	8:50	84%	125	70	55	150	32N	
DL-3345	2	PAX	DL	3345	SEA	D	5:53	98%	275	160	116	281	339		6:56	DL-3346	2	PAX	DL	3346	LAX	D	12:49	91%	256	106	149	281	339	
DL-3193	2	PAX	DL	3193	FSD	D	6:00	81%	105	77	29	130	223		2:00	DL-3194	2	PAX	DL	3194	SLC	D	8:00	86%	112	22	90	130	223	
DL-3677	2	PAX	DL	3677	PDX	D	6:00	99%	190	128	63	192	3N1		2:45	DL-3678	2	PAX	DL	3678	SLC	D	8:45	91%	175	85	91	192	3N1	
DL-3527	2	PAX	DL	3527	FAI	D	6:00	91%	137	109	28	150	32N		2:55	DL-3528	2	PAX	DL	3528	LGA	D	8:55	100%	150	41	109	150	32N	
DL-3195	2	PAX	DL	3195	FAR	D	6:08	73%	95	92	3	130	223		2:37	DL-3196	2	PAX	DL	3196	BIS	D	8:45	71%	93	62	31	130	223	
DL-3679	2	PAX	DL	3679	ANC	D	6:09	100%	192	150	42	192	3N1		1:46	DL-3680	2	PAX	DL	3680	ATL	D	7:55	99%	190	71	119	192	3N1	
DL-3681	2	PAX	DL	3681	LAX	D	6:12	99%	190	120	70	192	3N1		2:48	DL-3682	2	PAX	DL	3682	ANC	D	9:00	93%	179	137	41	192	3N1	
DL-3975	2	PAX	DL	3975	GFK	D	6:15	94%	72	57	14	76	E7W		2:40	DL-3976	2	PAX	DL	3976	CID	D	8:55	68%	51	43	8	76	E7W	
DL-3347	2	PAX	DL	3347	OGG	D	6:15	92%	257	180	77	281	339		6:55	DL-3348	2	PAX	DL	3348	ATL	D	13:10	99%	279	117	162	281	339	
DL-3197	2	PAX	DL	3197	DLH	D	6:20	68%	89	70	19	130	223		2:10	DL-3198	2	PAX	DL	3198	DFW	D	8:30	93%	121	38	84	130	223	
DL-3007	2	PAX	DL	3007	BIS	D	6:20	66%	72	57	15	109	221		2:25	DL-3008	2	PAX	DL	3008	ALB	D	8:45	83%	90	56	34	109	221	
DL-3683	2	PAX	DL	3683	DTW	D	6:20	96%	184	73	111	192	3N1		2:50	DL-3684	2	PAX	DL	3684	LAS	D	9:10	95%	182	71	111	192	3N1	
DL-3199	2	PAX	DL	3199	GRB	D	6:56	73%	94	80	15	130	223		1:54	DL-3200	2	PAX	DL	3200	BIL	D	8:50	74%	96	77	19	130	223	
DL-3009	2	PAX	DL	3009	ATW	D	6:57	63%	69	57	12	109	221		1:48	DL-3010	2	PAX	DL	3010	BHM	D	8:45	85%	92	29	64	109	221	
DL-3011	2	PAX	DL	3011	OMA	D	7:14	78%	85	66	19	109	221		1:31	DL-3012	2	PAX	DL	3012	IAD	D	8:45	82%	89	45	44	109	221	
DL-3201	2	PAX	DL	3201	YYZ	P	7:43	81%	106	62	44	130	223		1:12	DL-3202	2	PAX	DL	3202	MIA	D	8:55	89%	116	44	72	130	223	
DL-3529	2	PAX	DL	3529	FAR	D	7:44	70%	105	102	4	150	32N		1:16	DL-3530	2	PAX	DL	3530	RAP	D	9:00	71%	106	76	30	150	32N	
DL-3401	2	PAX	DL	3401	GRR	D	7:45	79%	143	110	33	180	739		1:00	DL-3402	2	PAX	DL	3402	PHX	D	8:45	91%	165	57	108	180	739	
DL-3203	2	PAX	DL	3203	CID	D	7:46	65%	84	71	13	130	223		1:14	DL-3204	2	PAX	DL	3204	MKE	D	9:00	82%	107	71	36	130	223	
DL-3403	2	PAX	DL	3403	MKE	D	7:48	83%	150	108	42	180	739		1:07	DL-3404	2	PAX	DL	3404	DEN	D	8:55	97%	174	63	111	180	739	
DL-3531	2	PAX	DL	3531	MSN	D	7:48	75%	113	98	15	150	32N		1:15	DL-3532	2	PAX	DL	3532	BZN	D	9:03	88%	132	101	31	150	32N	
DL-3205	2	PAX	DL	3205	ORD	D	7:49	83%	107	45	62	130	223		1:16	DL-3206	2	PAX	DL	3206	AUS	D	9:05	97%	126	46	79	130	223	
DL-3533	2	PAX	DL	3533	YWG	P	7:50	100%	149	146	4	150	32N		1:23	DL-3534	2	PAX	DL	3534	FLL	D	9:13	89%	133	35	97	150	32N	
DL-3535	2	PAX	DL	3535	DCA	D	7:51	93%	140	90	50	150	32N		1:24	DL-3536	2	PAX	DL	3536	FAI	D	9:15	87%	131	100	31	150	32N	
DL-3013	2	PAX	DL	3013	IAD	D	7:52	90%	98	55	43	109	221		0:53	DL-3014	2	PAX	DL	3014	RDU	D	8:45	97%	106	40	66	109	221	
DL-3015	2	PAX	DL	3015	STL	D	7:54	81%	88	52	36	109	221		0:51	DL-3016	2	PAX	DL	3016	SYR	D	8:45	80%	87	54	34	109	221	
DL-3979	2	PAX	DL	3979	BIS	D	7:54	67%	51	41	10	76	E7W		1:06	DL-3980	2	PAX	DL	3980	ICT	D	9:00	73%	56	34	22	76	E7W	
DL-3981	2	PAX	DL	3981	ICT	D	7:56	75%	57	38	19	76	E7W		1:14	DL-3982	2	PAX	DL	3982	GFK	D	9:10	72%	55	36	19	76	E7W	
DL-3017	2	PAX	DL	3017	ALB	D	7:59	86%	94	63	31	109	221		0:46	DL-3018	2	PAX	DL	3018	YWG	P	8:45	75%	81	63	18	109	221	
DL-3207	2	PAX	DL	3207	CLT	D	7:59	83%	108	57	51	130	223		1:06	DL-3208	2	PAX	DL	3208	CMH	D	9:05	78%	102	58	44	130	223	
DL-3209	2	PAX	DL	3209	PHL	D	7:59	93%	120	71	49	130	223		1:11	DL-3210	2	PAX	DL	3210	MEX	I	9:10	88%	115	29	86	130	223	
DL-3685	2	PAX	DL	3685	RDU	D	7:59	84%	162	71	91	192	3N1		1:11	DL-3686	2	PAX	DL	3686	SFO	D	9:10	94%	180	69	111	192	3N1	
DL-3537	2	PAX	DL	3537	PIT	D	7:59	79%	119	77	41	150	32N		1:16	DL-3538	2	PAX	DL	3538	SMF	D	9:15	90%	135	76	59	150	32N	
DL-3983	2	PAX	DL	3983	LEX	D	7:59	72%	55	37	18	76	E7W		1:16	DL-3984	2	PAX	DL	3984	RST	D	9:15	68%	52	45	7	76	E7W	
DL-3405	2	PAX	DL	3405	LGA	D	8:00	89%	160	58	102	180	739		1:00	DL-3406	2	PAX	DL	3406	BWI	D	9:00	96%	173	66	107	180	739	
DL-3407	2	PAX	DL	3407	MCI	D	8:00	68%	123	80	42	180	739		1:00	DL-3408	2	PAX	DL	3408	MCO	D	9:00	94%	170	46	123	180	739	
DL-3211	2	PAX	DL	3211	BIL	D	8:00	75%	98	79	19	130	223		1:10	DL-3212	2	PAX	DL	3212	MSN	D	9:10	71%	92	78	14	130	223	
DL-3213	2	PAX	DL	3213	EWR	D	8:00	79%	103	46	57	130	223		1:15	DL-3214	2	PAX	DL	3214	SNA	D	9:15	94%	122	53	69	130	223	
DL-3687	2	PAX	DL	3687	DTW	D	8:03	97%	186	97	90	192	3N1		1:07	DL-3688	2	PAX	DL	3688	TPA	D	9:10	92%	177	43	135	192	3N1	
DL-3019	2	PAX	DL	3019	BNA	D	8:04	88%	95	44	52	109	221		0:42	DL-3020	2	PAX	DL	3020	CLE	D	8:46	87%	95	38	57	109	221	
DL-3021	2	PAX	DL	3021	CLE	D	8:04	83%	90	37	53	109	221		0:46	DL-3022	2	PAX	DL	3022	TVC	D	8:50	74%	81	60	21	109	221	
DL-3023	2	PAX	DL	3023	CVG	D	8:04	89%	97	52	46	109	221		0:51	DL-3024	2	PAX	DL	3024	CLT	D	8:55	90%	98	46	52	109	221	
DL-3025	2	PAX	DL	3025	ROC	D	8:04	84%	91	63	28	109	221		0:51	DL-3026	2	PAX	DL	3026	RSW	D	8:55	84%	91	19	72	109	221	
DL-3985	2	PAX	DL	3985	SBN	D	8:04	76%	58	32	26	76	E7W		1:11	DL-3986	2	PAX	DL	3986	YXE	I	9:15	55%	42	37	5	76	E7W	
DL-3027	2	PAX	DL	3027	DAY	D	8:06	71%	78	48	29	109	221		0:59	DL-3028	2	PAX	DL	3028	FAR	D	9:05	69%	75	72	3	109	221	
DL-3029	2	PAX	DL	3029	MDW	D	8:07	79%	86	30	56	109	221		0:58	DL-3030	2	PAX	DL	3030	ORD	D	9:05	93%	101	31	70	109	221	
DL-3689	2	PAX	DL	3689	BWI	D	8:09	93%	178	76	102	192	3N1		1:16	DL-3690	2	PAX	DL	3690	LAX	D	9:25	89%	172	56	116	192	3N1	
DL-3031	2	PAX	DL	3031	RIC	D	8:10	73%	80	39	41	109	221		0:55	DL-3032	2	PAX	DL	3032	SAT	D	9:05	88%	95	36	59	109	221	
DL-3033	2	PAX	DL	3033	SYR	D	8:13	87%	94	63	31	109	221		0:57	DL-3034	2	PAX	DL	3034	FSD	D	9:10	70%	76	38	38	109	221	
DL-3035	2	PAX	DL	3035	BDL	D	8:15	98%	107	77	29	109	221		1:00	DL-3036	2	PAX	DL	3036	RIC	D	9:15	77%	84	35	49	109	221	
DL-3037	2	PAX	DL	3037	DSM	D	8:15	89%	97	88	9	109	221		1:15	DL-3038	2	PAX	DL	3038	DSM	D	9:30	78%	85	74	10	109	221	
DL-3691	2	PAX	DL	3691	ATL	D	8:15	98%	188	100	89	192	3N1		1:15	DL-3692	2	PAX	DL	3692	ATL	D	9:30	99%	190	71	119	192	3N1	
DL-3039	2	PAX	DL	3039	SDF	D	8:15	82%	89	47	42	109	221		1:35	DL-3040	2	PAX	DL	3040	IND	D	9:50	91%	99	54	45	109	221	
DL-3539	2	PAX	DL	3539	MCO	D	8:26	95%	143	54	89	150	32N		0:49	DL-3540	2	PAX	DL	3540	YVR	P	9:15	82%	123	91	32	150	32N	
DL-3131	2	PAX	DL	3131	RSW	D	8:48	90%	98	29	69	109	221		1:11	DL-3132	2	PAX	DL	3132	BDL	D	9:59	89%	97	65	31	109	221	
DL-3541	2	PAX	DL	3541	MKE	D	8:55	82%	123	89	34	150	32N		1:04	DL-3542	2	PAX	DL	3542	LGA	D	9:59	100%	150	46	104	150	32N	
DL-3041	2	PAX	DL	3041	SAT	D	8:57	71%	77	30	48	109	221		0:53	DL-3042	2	PAX	DL	3042	SDF	D	9:50	82%	89	46	43	109	221	
DL-3693	2	PAX	DL	3693	DEN	D	8:57	96%	184	70	114	192	3N1		0:53	DL-3694	2	PAX	DL	3694	BOS	D	9:50	97%	187	48	139	192	3N1	
DL-3695	2	PAX	DL	3695	BIL	D	8:58	68%	130	100	30	192	3N1		0:57	DL-3696	2	PAX	DL	3696	ATL	D	9:55	99%	191	84	107	192	3N1	
DL-3409	2	PAX	DL	3409	AUS	D	8:59	80%	145	48	97	180	739		1:11	DL-3410	2	PAX	DL	3410	DTW	D	10:10	98%	176	78	98	180	739	
DL-3043	2	PAX	DL	3043	IAH	D	9:00	82%	90	37	53	109	221		1:00	DL-3044	2	PAX	DL	3044	CVG	D	10:00	98%	107	55	52	109	221	
DL-3411	2	PAX	DL	3411	DTW	D	9:00	97%	174	84	90	180	739		1:10	DL-3412	2	PAX	DL	3412	MCO	D	10:10	95%	170	53	117	180	739	
DL-3697	2	PAX	DL	3697	ATL	D	9:04	97%	187	76	110	192	3N1		0:57	DL-3698	2	PAX	DL	3698	JFK	D	10:01	99%	189	53	137	192	3N1	
DL-3215	2	PAX	DL	3215	DFW	D	9:05	80%	104	36	68	130	223		0:45	DL-3216	2	PAX	DL	3216	YYC	P	9:50	90%	117	94	23	130	223	
DL-3413	2	PAX	DL	3413	LGA	D	9:05	87%	157	52	105	180	739		1:25	DL-3414	2	PAX	DL	3414	DCA	D	10:30	96%	173	105	68	180	739	
DL-3045	2	PAX	DL	3045	GTF	D	9:09	74%	80	67	13	109	221		0:51	DL-3046	2	PAX	DL	3046	STL	D	10:00	90%	99	51	47	109	221	
DL-3415	2	PAX	DL	3415	BUF	D	9:10	94%	168	112	57	180	739		1:30	DL-3416	2	PAX	DL	3416	PDX	D	10:40	90%	162	99	63	180	739	
DL-3417	2	PAX	DL	3417	CMH	D	9:10	79%	142	85	57	180	739		2:07	DL-3418	2	PAX	DL	3418	YVR	P	11:17	85%	153	116	38	180	739	
DL-3047	2	PAX	DL	3047	HLN	D	9:14	83%	90	69	21	109	221		0:52	DL-3048	2	PAX	DL	3048	EWR	D	10:06	91%	99	38	61	109	221	
DL-3219	2	PAX	DL	3219	OKC	D	9:15	67%	87	59	28	130	223		0:45	DL-3220	2	PAX	DL	3220	MCI	D	10:00	83%	108	69	39	130	223	
DL-3323	2	PAX	DL	3323	BOS	D	9:15	97%	186	65	121	192	321		1:15	DL-3324	2	PAX	DL	3324	PDX	D	10:30	90%	174	110	63	192	321	
DL-3543	2	PAX	DL	3543	RAP	D	9:25	64%	96	73	23	150	32N		1:00	DL-3544	2	PAX	DL	3544	MSY	D	10:25	77%	116	46	70	150	32N	
DL-3699	2	PAX	DL	3699	BOS	D	9:30	96%	185	57	128	192	3N1		1:45	DL-3700	2	PAX	DL	3700	LAX	D	11:15	90%	174	68	106	192	3N1	
DL-3217	2	PAX	DL	3217	DSM	D	9:36	76%	99	87	11	130	223		1:00	DL-3218	2	PAX	DL	3218	JAX	D	10:36	83%	108	39	69	130	223	
DL-3221	2	PAX	DL	3221	EWR	D	9:46	81%	106	47	59	130	223		0:45	DL-3222	2	PAX	DL	3222	ORD	D	10:31	97%	126	46	80	130	223	
DL-3359	2	PAX	DL	3359	KEF	I	9:58	97%	296	177	119	306	350		1:28	DL-3360	2	PAX	DL	3360	HND	I	11:26	100%	306	240	66	306	350	
DL-3701	2	PAX	DL	3701	JFK	D	10:00	94%	181	56	126	192	3N1		1:00	DL-3702	2	PAX	DL	3702	SEA	D	11:00	98%	188	110	78	192	3N1	
DL-3223	2	PAX	DL	3223	DFW	D	10:02	85%	111	41	70	130	223		0:45	DL-3224	2	PAX	DL	3224	PHL	D	10:47	100%	130	70	60	130	223	
DL-3159	2	PAX	DL	3159	CLE	D	10:15	88%	96	35	61	109	221		1:00	DL-3160	2	PAX	DL	3160	IAD	D	11:15	84%	91	52	39	109	221	
DL-3299	2	PAX	DL	3299	MCI	D	10:15	79%	102	66	36	130	223		1:00	DL-3300	2	PAX	DL	3300	EWR	D	11:15	84%	110	51	59	130	223	
DL-4003	2	PAX	DL	4003	FSD	D	10:15	84%	64	49	15	76	E7W		1:00	DL-4004	2	PAX	DL	4004	RST	D	11:15	72%	55	48	7	76	E7W	
DL-3703	2	PAX	DL	3703	BZN	D	10:15	95%	182	146	36	192	3N1		1:05	DL-3704	2	PAX	DL	3704	SLC	D	11:20	93%	178	97	81	192	3N1	
DL-4005	2	PAX	DL	4005	YXE	I	10:15	83%	63	57	6	76	E7W		1:05	DL-4006	2	PAX	DL	4006	MOT	D	11:20	73%	55	38	17	76	E7W	
DL-3705	2	PAX	DL	3705	BOS	D	10:17	97%	185	63	123	192	3N1		1:08	DL-3706	2	PAX	DL	3706	DEN	D	11:25	97%	186	72	114	192	3N1	
DL-3049	2	PAX	DL	3049	BHM	D	10:20	85%	93	32	61	109	221		0:55	DL-3050	2	PAX	DL	3050	JAC	D	11:15	85%	92	63	30	109	221	
DL-3545	2	PAX	DL	3545	BOI	D	10:20	95%	143	113	30	150	32N		0:55	DL-3546	2	PAX	DL	3546	SJC	D	11:15	84%	126	60	66	150	32N	
DL-4007	2	PAX	DL	4007	GFK	D	10:20	79%	60	47	13	76	E7W		1:00	DL-4008	2	PAX	DL	4008	RAP	D	11:20	72%	54	39	15	76	E7W	
DL-3051	2	PAX	DL	3051	YWG	P	10:20	88%	95	79	17	109	221		1:02	DL-3052	2	PAX	DL	3052	FAR	D	11:22	75%	82	78	3	109	221	
DL-3707	2	PAX	DL	3707	SLC	D	10:20	93%	178	97	81	192	3N1		1:05	DL-3708	2	PAX	DL	3708	SFO	D	11:25	94%	181	75	106	192	3N1	
DL-3053	2	PAX	DL	3053	OMA	D	10:24	81%	88	68	20	109	221		1:07	DL-3054	2	PAX	DL	3054	IAH	D	11:31	92%	100	41	60	109	221	
DL-3055	2	PAX	DL	3055	CLT	D	10:25	88%	96	55	40	109	221		1:45	DL-3056	2	PAX	DL	3056	GTF	D	12:10	66%	72	58	14	109	221	
DL-3709	2	PAX	DL	3709	MCO	D	10:26	95%	183	68	115	192	3N1		1:04	DL-3710	2	PAX	DL	3710	BOS	D	11:30	97%	187	49	138	192	3N1	
DL-4009	2	PAX	DL	4009	BIS	D	10:29	72%	55	44	11	76	E7W		0:52	DL-4010	2	PAX	DL	4010	ICT	D	11:21	74%	56	35	21	76	E7W	
DL-3487	2	PAX	DL	3487	ATL	D	10:29	97%	233	96	137	240	753		0:59	DL-3488	2	PAX	DL	3488	ATL	D	11:28	99%	237	80	157	240	753	
DL-3225	2	PAX	DL	3225	STL	D	10:30	88%	115	66	48	130	223		0:45	DL-3226	2	PAX	DL	3226	DFW	D	11:15	92%	120	40	80	130	223	
DL-3057	2	PAX	DL	3057	CVG	D	10:30	95%	104	56	48	109	221		1:40	DL-3058	2	PAX	DL	3058	PSC	D	12:10	83%	91	77	14	109	221	
DL-3419	2	PAX	DL	3419	DEN	D	10:30	97%	174	83	92	180	739		1:40	DL-3420	2	PAX	DL	3420	BOI	D	12:10	99%	179	138	41	180	739	
DL-3547	2	PAX	DL	3547	FCA	D	10:35	90%	136	104	32	150	32N		0:45	DL-3548	2	PAX	DL	3548	SMF	D	11:20	93%	140	82	58	150	32N	
DL-3549	2	PAX	DL	3549	MSO	D	10:35	84%	126	102	23	150	32N		1:00	DL-3550	2	PAX	DL	3550	FCA	D	11:35	90%	135	104	31	150	32N	
DL-3551	2	PAX	DL	3551	PHX	D	10:35	89%	133	73	60	150	32N		1:00	DL-3552	2	PAX	DL	3552	MSO	D	11:35	80%	120	96	24	150	32N	
DL-3711	2	PAX	DL	3711	BDL	D	10:35	90%	173	115	58	192	3N1		1:05	DL-3712	2	PAX	DL	3712	LAS	D	11:40	95%	183	80	103	192	3N1	
DL-3059	2	PAX	DL	3059	MSN	D	10:36	92%	100	90	11	109	221		2:09	DL-3060	2	PAX	DL	3060	CLE	D	12:45	87%	94	40	54	109	221	
DL-3553	2	PAX	DL	3553	MKE	D	10:37	96%	145	109	36	150	32N		1:33	DL-3554	2	PAX	DL	3554	ABQ	D	12:10	78%	117	50	66	150	32N	
DL-3227	2	PAX	DL	3227	FLL	D	10:39	93%	121	45	75	130	223		0:45	DL-3228	2	PAX	DL	3228	MIA	D	11:24	89%	116	46	70	130	223	
DL-4011	2	PAX	DL	4011	GRR	D	10:39	100%	76	65	11	76	E7W		0:46	DL-4012	2	PAX	DL	4012	GFK	D	11:25	76%	58	40	18	76	E7W	
DL-3421	2	PAX	DL	3421	LGA	D	10:39	96%	173	65	108	180	739		1:31	DL-3422	2	PAX	DL	3422	GEG	D	12:10	98%	176	165	11	180	739	
DL-3229	2	PAX	DL	3229	IND	D	10:40	90%	117	65	52	130	223		0:45	DL-3230	2	PAX	DL	3230	BNA	D	11:25	84%	109	48	61	130	223	
DL-4013	2	PAX	DL	4013	FAR	D	10:40	100%	76	74	2	76	E7W		0:50	DL-4014	2	PAX	DL	4014	FSD	D	11:30	80%	61	43	18	76	E7W	
DL-3231	2	PAX	DL	3231	MIA	D	10:45	97%	126	54	71	130	223		0:45	DL-3232	2	PAX	DL	3232	SNA	D	11:30	95%	124	57	67	130	223	
DL-3423	2	PAX	DL	3423	DTW	D	10:45	98%	176	105	71	180	739		1:00	DL-3424	2	PAX	DL	3424	BDL	D	11:45	95%	170	113	58	180	739	
DL-3233	2	PAX	DL	3233	RDU	D	10:45	93%	121	60	61	130	223		1:15	DL-3234	2	PAX	DL	3234	AUS	D	12:00	95%	123	47	76	130	223	
DL-3555	2	PAX	DL	3555	ORD	D	10:45	91%	136	57	79	150	32N		1:25	DL-3556	2	PAX	DL	3556	PHX	D	12:10	92%	138	53	85	150	32N	
DL-3557	2	PAX	DL	3557	PHL	D	10:45	90%	136	75	61	150	32N		2:00	DL-3558	2	PAX	DL	3558	MKE	D	12:45	87%	131	94	37	150	32N	
DL-3559	2	PAX	DL	3559	TPA	D	10:45	89%	134	40	94	150	32N		2:05	DL-3560	2	PAX	DL	3560	PVD	D	12:50	89%	133	37	96	150	32N	
DL-3235	2	PAX	DL	3235	MEX	I	11:15	88%	114	29	86	130	223		0:55	DL-3236	2	PAX	DL	3236	YYC	P	12:10	89%	115	92	23	130	223	
DL-3713	2	PAX	DL	3713	ATL	D	11:15	97%	186	72	114	192	3N1		0:55	DL-3714	2	PAX	DL	3714	ANC	D	12:10	94%	181	141	40	192	3N1	
DL-3325	2	PAX	DL	3325	DCA	D	11:20	91%	175	92	82	192	321		1:30	DL-3326	2	PAX	DL	3326	DCA	D	12:50	96%	184	112	72	192	321	
DL-3715	2	PAX	DL	3715	SEA	D	11:30	99%	190	132	58	192	3N1		0:45	DL-3716	2	PAX	DL	3716	SEA	D	12:15	96%	185	76	109	192	3N1	
DL-3061	2	PAX	DL	3061	IAH	D	11:32	90%	98	43	55	109	221		1:13	DL-3062	2	PAX	DL	3062	ROC	D	12:45	86%	94	62	32	109	221	
DL-3063	2	PAX	DL	3063	[illegible]	D	11:32	82%	89	61	28	109	221		[illegible]	DL-3064	2	PAX	DL	3064	EWR	D	12:50	88%	96	39	57	109	221	

DL-3717	2	PAX	DL	3717	BOS	D	11:40	96%	185	56	129	192	3N1
DL-3065	2	PAX	DL	3065	CMH	D	11:40	91%	99	65	34	109	221
DL-3067	2	PAX	DL	3067	ORF	D	11:42	79%	86	45	41	109	221
DL-3327	2	PAX	DL	3327	PDX	D	11:43	99%	190	122	68	192	321
DL-3163	2	PAX	DL	3163	SDF	D	11:45	83%	91	44	47	109	221
DL-3719	2	PAX	DL	3719	LAX	D	11:45	98%	189	108	81	192	3N1
DL-4023	2	PAX	DL	4023	RST	D	11:45	70%	53	48	6	76	E7W
DL-3069	2	PAX	DL	3069	JAX	D	11:45	90%	98	47	51	109	221
DL-3425	2	PAX	DL	3425	BWI	D	11:45	91%	164	77	87	180	739
DL-3071	2	PAX	DL	3071	MSY	D	11:45	80%	87	44	43	109	221
DL-3133	2	PAX	DL	3133	CVG	D	11:50	97%	105	53	53	109	221
DL-3073	2	PAX	DL	3073	PIT	D	11:50	92%	100	70	30	109	221
DL-3721	2	PAX	DL	3721	DEN	D	11:55	96%	185	77	108	192	3N1
DL-3427	2	PAX	DL	3427	LAS	D	12:00	99%	178	117	60	180	739
DL-3429	2	PAX	DL	3429	MCI	D	12:00	74%	134	89	44	180	739
DL-3431	2	PAX	DL	3431	PHX	D	12:00	87%	157	74	82	180	739
DL-3561	2	PAX	DL	3561	BOI	D	12:00	93%	139	97	42	150	32N
DL-3723	2	PAX	DL	3723	GEG	D	12:00	98%	189	179	10	192	3N1
DL-3075	2	PAX	DL	3075	FAR	D	12:00	83%	90	87	3	109	221
DL-3433	2	PAX	DL	3433	DCA	D	12:02	90%	162	80	83	180	739
DL-3077	2	PAX	DL	3077	FSD	D	12:02	79%	86	59	27	109	221
DL-3725	2	PAX	DL	3725	SLC	D	12:05	95%	183	123	60	192	3N1
DL-3237	2	PAX	DL	3237	MSN	D	12:06	84%	110	96	13	130	223
DL-3489	2	PAX	DL	3489	SFO	D	12:06	98%	236	109	127	240	753
DL-3239	2	PAX	DL	3239	BIS	D	12:10	64%	83	63	20	130	223
DL-3241	2	PAX	DL	3241	SNA	D	12:10	88%	114	57	57	130	223
DL-3727	2	PAX	DL	3727	SAN	D	12:10	97%	186	119	67	192	3N1
DL-3563	2	PAX	DL	3563	ORD	D	12:12	92%	138	56	82	150	32N
DL-3361	2	PAX	DL	3361	CDG	I	12:13	100%	306	215	91	306	350
DL-4025	2	PAX	DL	4025	DLH	D	12:15	82%	62	51	11	76	E7W
DL-3243	2	PAX	DL	3243	BNA	D	12:15	87%	113	47	67	130	223
DL-3245	2	PAX	DL	3245	DTW	D	12:15	97%	127	71	56	130	223
DL-3247	2	PAX	DL	3247	MKE	D	12:15	100%	130	100	30	130	223
DL-4029	2	PAX	DL	4029	LSE	D	12:15	60%	46	45	1	76	E7W
DL-3079	2	PAX	DL	3079	RSW	D	12:15	88%	96	31	65	109	221
DL-3081	2	PAX	DL	3081	TVC	D	12:15	82%	89	66	23	109	221
DL-3565	2	PAX	DL	3565	JFK	D	12:20	95%	142	49	93	150	32N
DL-3363	2	PAX	DL	3363	AMS	I	12:27	100%	306	167	139	306	350
DL-3365	2	PAX	DL	3365	EUR1	I	12:27	97%	295	178	118	306	350
DL-4031	2	PAX	DL	4031	ICT	D	12:30	76%	58	37	21	76	E7W
DL-3567	2	PAX	DL	3567	MCO	D	12:30	95%	143	54	89	150	32N
DL-3569	2	PAX	DL	3569	MSO	D	12:30	87%	130	106	24	150	32N
DL-3571	2	PAX	DL	3571	YVR	P	12:30	97%	146	111	35	150	32N
DL-3083	2	PAX	DL	3083	CLE	D	12:30	82%	90	38	52	109	221
DL-3729	2	PAX	DL	3729	ATL	D	12:31	97%	187	84	103	192	3N1
DL-4033	2	PAX	DL	4033	MDW	D	12:33	84%	64	23	41	76	E7W
DL-3573	2	PAX	DL	3573	YYC	P	12:35	94%	141	104	37	150	32N
DL-3085	2	PAX	DL	3085	ABQ	D	12:35	87%	95	42	53	109	221
DL-3483	2	PAX	DL	3483	BOS	D	12:40	96%	174	56	118	180	739
DL-3249	2	PAX	DL	3249	BIL	D	12:45	75%	98	77	21	130	223
DL-4039	2	PAX	DL	4039	XNA	D	12:46	75%	57	28	29	76	E7W
DL-3491	2	PAX	DL	3491	LAX	D	12:48	97%	234	102	132	240	753
DL-3493	2	PAX	DL	3493	SAN	D	12:50	94%	226	98	128	240	753
DL-3435	2	PAX	DL	3435	LGA	D	12:58	94%	170	54	116	180	739
DL-3437	2	PAX	DL	3437	BWI	D	13:00	100%	180	78	102	180	739
DL-3087	2	PAX	DL	3087	YEG	P	13:00	97%	106	90	15	109	221
DL-3575	2	PAX	DL	3575	SMF	D	13:09	96%	144	92	52	150	32N
DL-3731	2	PAX	DL	3731	PDX	D	13:17	99%	190	119	71	192	3N1
DL-3349	2	PAX	DL	3349	CDG	I	13:18	100%	281	196	85	281	339
DL-3577	2	PAX	DL	3577	OAK	D	13:20	87%	130	78	52	150	32N
DL-3251	2	PAX	DL	3251	EWR	D	13:22	83%	108	45	63	130	223
DL-3733	2	PAX	DL	3733	JFK	D	13:24	94%	181	52	129	192	3N1
DL-3351	2	PAX	DL	3351	SEA	D	13:26	98%	277	173	103	281	339
DL-3579	2	PAX	DL	3579	SJC	D	13:27	90%	135	82	53	150	32N
DL-3439	2	PAX	DL	3439	DEN	D	13:30	96%	173	71	102	180	739
DL-3089	2	PAX	DL	3089	ORD	D	13:30	91%	99	40	59	109	221
DL-4043	2	PAX	DL	4043	XWA	D	13:31	54%	41	31	11	76	E7W
DL-4045	2	PAX	DL	4045	DAY	D	13:35	70%	54	32	21	76	E7W
DL-3735	2	PAX	DL	3735	SFO	D	13:35	99%	189	92	97	192	3N1
DL-3495	2	PAX	DL	3495	SAN	D	13:35	94%	226	102	125	240	753
DL-3367	2	PAX	DL	3367	HND	I	13:36	100%	306	219	87	306	350
DL-3253	2	PAX	DL	3253	MCI	D	13:39	72%	93	60	33	130	223
DL-3255	2	PAX	DL	3255	PHL	D	13:39	94%	122	67	55	130	223
DL-3581	2	PAX	DL	3581	RAP	D	13:40	66%	99	75	24	150	32N
DL-3257	2	PAX	DL	3257	CMH	D	13:44	82%	107	65	43	130	223
DL-3259	2	PAX	DL	3259	AUS	D	13:45	85%	111	39	72	130	223
DL-3315	2	PAX	DL	3315	MIA	D	13:45	97%	127	49	77	130	223
DL-3497	2	PAX	DL	3497	LAX	D	13:45	97%	234	99	135	240	753
DL-3441	2	PAX	DL	3441	BWI	D	13:45	94%	168	73	95	180	739
DL-3091	2	PAX	DL	3091	YWG	P	13:45	88%	96	79	16	109	221
DL-3737	2	PAX	DL	3737	BOS	D	13:46	96%	184	47	137	192	3N1
DL-4047	2	PAX	DL	4047	MEM	D	13:47	87%	66	40	26	76	E7W
DL-3739	2	PAX	DL	3739	ATL	D	13:49	97%	187	80	107	192	3N1
DL-3261	2	PAX	DL	3261	CVG	D	13:50	90%	117	57	61	130	223
DL-3583	2	PAX	DL	3583	PIT	D	13:50	80%	120	75	45	150	32N
DL-3443	2	PAX	DL	3443	LAS	D	13:51	97%	175	90	86	180	739
DL-4049	2	PAX	DL	4049	CWA	D	13:55	75%	57	50	7	76	E7W
DL-3093	2	PAX	DL	3093	DSM	D	14:00	83%	90	80	10	109	221
DL-3585	2	PAX	DL	3585	LGA	D	14:00	100%	149	59	91	150	32N
DL-3741	2	PAX	DL	3741	LAX	D	14:00	97%	187	79	107	192	3N1
DL-3095	2	PAX	DL	3095	PSC	D	14:02	94%	103	89	14	109	221
DL-3587	2	PAX	DL	3587	BOI	D	14:10	94%	141	104	37	150	32N
DL-3445	2	PAX	DL	3445	PHX	D	14:10	84%	152	55	97	180	739
DL-3589	2	PAX	DL	3589	SLC	D	14:10	95%	142	92	50	150	32N
DL-3263	2	PAX	DL	3263	RDU	D	14:14	85%	110	46	65	130	223
DL-3097	2	PAX	DL	3097	STL	D	14:15	84%	91	49	43	109	221
DL-3743	2	PAX	DL	3743	ANC	D	14:15	100%	192	142	50	192	3N1
DL-3265	2	PAX	DL	3265	SNA	D	14:16	81%	106	48	58	130	223
DL-4051	2	PAX	DL	4051	FSD	D	14:18	79%	60	41	19	76	E7W
DL-3267	2	PAX	DL	3267	DFW	D	14:18	82%	106	31	75	130	223
DL-3591	2	PAX	DL	3591	BZN	D	14:21	100%	150	119	31	150	32N
DL-3269	2	PAX	DL	3269	ORD	D	14:22	86%	112	39	74	130	223
DL-3099	2	PAX	DL	3099	IAH	D	14:25	88%	96	38	58	109	221
DL-3447	2	PAX	DL	3447	GEG	D	14:25	88%	158	118	41	180	739
DL-4055	2	PAX	DL	4055	RAP	D	14:29	65%	49	37	12	76	E7W
DL-3271	2	PAX	DL	3271	BNA	D	14:30	87%	113	46	67	130	223
DL-3273	2	PAX	DL	3273	YYC	P	14:30	92%	119	86	33	130	223
DL-3101	2	PAX	DL	3101	IND	D	14:30	88%	96	50	45	109	221
DL-4061	2	PAX	DL	4061	CID	D	14:30	69%	52	44	8	76	E7W
DL-3747	2	PAX	DL	3747	SEA	D	14:30	98%	189	116	73	192	3N1
DL-3449	2	PAX	DL	3449	DTW	D	14:35	96%	174	76	98	180	739
DL-3369	2	PAX	DL	3369	AMS	I	14:41	100%	306	158	148	306	350
DL-3371	2	PAX	DL	3371	EUR2	I	14:41	97%	295	178	118	306	350
DL-3329	2	PAX	DL	3329	PDX	D	14:43	99%	190	119	71	192	321
DL-3103	2	PAX	DL	3103	SAT	D	14:45	72%	79	28	50	109	221
DL-3105	2	PAX	DL	3105	SYR	D	14:45	86%	94	62	32	109	221
DL-3473	2	PAX	DL	3473	GRR	D	14:50	83%	149	111	37	180	739
DL-3499	2	PAX	DL	3499	ATL	D	14:50	96%	231	67	164	240	753
DL-4065	2	PAX	DL	4065	YEG	P	14:58	83%	63	55	8	76	E7W
DL-3107	2	PAX	DL	3107	CLT	D	15:00	97%	105	57	49	109	221
DL-3109	2	PAX	DL	3109	FAR	D	15:00	62%	68	65	3	109	221
DL-3593	2	PAX	DL	3593	FCA	D	15:00	94%	141	107	33	150	32N
DL-3111	2	PAX	DL	3111	BHM	D	15:05	83%	91	26	64	109	221
DL-4067	2	PAX	DL	4067	MOT	D	15:08	72%	55	41	14	76	E7W
DL-4069	2	PAX	DL	4069	DLH	D	15:12	72%	55	43	12	76	E7W
DL-4071	2	PAX	DL	4071	FSD	D	15:23	84%	64	50	14	76	E7W
DL-3745	2	PAX	DL	3745	MCO	D	15:30	95%	182	55	127	192	3N1
DL-3501	2	PAX	DL	3501	ATL	D	15:30	97%	232	78	154	240	753
DL-3749	2	PAX	DL	3749	SLC	D	15:30	92%	177	90	87	192	3N1
DL-3275	2	PAX	DL	3275	STL	D	15:45	88%	115	60	55	130	223
DL-3751	2	PAX	DL	3751	BOS	D	15:45	96%	185	53	131	192	3N1
DL-3353	2	PAX	DL	3353	LHR	I	15:54	100%	281	99	182	281	339
DL-3595	2	PAX	DL	3595	MKE	D	16:00	81%	121	80	40	150	32N
DL-3753	2	PAX	DL	3753	SEA	D	16:00	97%	187	93	94	192	3N1
DL-3755	2	PAX	DL	3755	TPA	D	16:00	90%	172	43	129	192	3N1
DL-4073	2	PAX	DL	4073	BIS	D	16:06	60%	46	33	12	76	E7W
DL-3113	2	PAX	DL	3113	SDF	D	16:25	78%	85	41	45	109	221
DL-3757	2	PAX	DL	3757	DEN	D	16:29	96%	184	63	121	192	3N1
DL-3115	2	PAX	DL	3115	ALB	D	16:30	85%	93	60	32	109	221
DL-3117	2	PAX	DL	3117	IAD	D	16:30	89%	97	51	46	109	221
DL-3597	2	PAX	DL	3597	JFK	D	16:30	94%	142	44	98	150	32N
DL-4075	2	PAX	DL	4075	ICT	D	16:30	76%	58	36	21	76	E7W
DL-3119	2	PAX	DL	3119	RDU	D	16:30	92%	100	45	56	109	221
DL-3451	2	PAX	DL	3451	GEG	D	16:30	89%	160	121	38	180	739
DL-3121	2	PAX	DL	3121	RIC	D	16:30	75%	81	38	44	109	221
DL-3759	2	PAX	DL	3759	LAX	D	16:30	98%	188	92	96	192	3N1
DL-3761	2	PAX	DL	3761	SLC	D	16:30	93%	178	97	81	192	3N1
DL-3453	2	PAX	DL	3453	DCA	D	16:33	90%	161	75	86	180	739
DL-3123	2	PAX	DL	3123	FAR	D	16:33	67%	73	70	3	109	221
DL-3599	2	PAX	DL	3599	LGA	D	16:35	100%	150	48	102	150	32N
DL-3355	2	PAX	DL	3355	DTW	D	16:35	96%	271	117	154	281	339
DL-3763	2	PAX	DL	3763	LAS	D	16:37	98%	188	103	85	192	3N1
DL-3125	2	PAX	DL	3125	EWR	D	16:39	87%	94	39	55	109	221
DL-3455	2	PAX	DL	3455	GRR	D	16:40	80%	144	108	37	180	739
DL-3127	2	PAX	DL	3127	CLE	D	16:40	87%	95	36	59	109	221
DL-3457	2	PAX	DL	3457	MCO	D	16:41	93%	168	28	140	180	739
DL-3601	2	PAX	DL	3601	OMA	D	16:44	73%	110	78	32	150	32N
DL-3277	2	PAX	DL	3277	IND	D	16:45	90%	117	60	57	130	223
DL-3129	2	PAX	DL	3129	JAC	D	16:45	81%	88	59	29	109	221
DL-3279	2	PAX	DL	3279	JAX	D	16:49	88%	114	51	64	130	223
DL-4079	2	PAX	DL	4079	MDW	D	16:49	91%	69	24	45	76	E7W
DL-3281	2	PAX	DL	3281	MIA	D	16:50	98%	127	51	75	130	223
DL-4081	2	PAX	DL	4081	RST	D	16:50	72%	55	49	6	76	E7W
DL-3603	2	PAX	DL	3603	YVR	P	16:51	97%	146	109	37	150	32N
DL-3605	2	PAX	DL	3605	SJC	D	16:52	90%	135	79	56	150	32N
DL-4083	2	PAX	DL	4083	TVC	D	16:52	85%	65	48	17	76	E7W
DL-3135	2	PAX	DL	3135	ORD	D	16:53	99%	108	43	65	109	221
DL-3503	2	PAX	DL	3503	BOS	D	16:53	96%	230	60	170	240	753
DL-3283	2	PAX	DL	3283	PHL	D	16:54	100%	130	72	58	130	223
DL-3459	2	PAX	DL	3459	PHX	D	16:54	87%	157	76	81	180	739
DL-3607	2	PAX	DL	3607	FCA	D	16:55	96%	144	109	34	150	32N
DL-3765	2	PAX	DL	3765	SEA	D	16:57	99%	190	129	61	192	3N1
DL-3609	2	PAX	DL	3609	SMF	D	16:59	98%	147	91	56	150	32N
DL-3285	2	PAX	DL	3285	DFW	D	16:59	93%	120	42	79	130	223
DL-3767	2	PAX	DL	3767	BZN	D	16:59	100%	192	153	39	192	3N1
DL-3505	2	PAX	DL	3505	SAN	D	16:59	95%	227	106	121	240	753
DL-3769	2	PAX	DL	3769	SFO	D	16:59	99%	190	101	89	192	3N1
DL-3137	2	PAX	DL	3137	MCI	D	17:00	87%	94	65	29	109	221
DL-3331	2	PAX	DL	3331	PDX	D	17:00	99%	190	122	68	192	321
DL-36[illegible]	2	PAX	DL	[illegible]	ABQ	D	17:00	87%	[illegible]	53	78	150	32N

0:50	DL-3718	2	PAX	DL	3718	ATL	D	12:30	99%	190	71	119	192	3N1
1:10	DL-3066	2	PAX	DL	3066	FAR	D	12:50	82%	90	87	3	109	221
1:10	DL-3068	2	PAX	DL	3068	IAD	D	12:52	84%	92	49	43	109	221
1:22	DL-3328	2	PAX	DL	3328	SAN	D	13:05	95%	182	103	79	192	321
0:50	DL-3164	2	PAX	DL	3164	SDF	D	12:35	81%	89	50	39	109	221
0:55	DL-3720	2	PAX	DL	3720	BZN	D	12:40	92%	176	138	38	192	3N1
1:00	DL-4024	2	PAX	DL	4024	RIC	D	12:45	78%	59	27	33	76	E7W
1:09	DL-3070	2	PAX	DL	3070	ORD	D	12:54	94%	102	39	62	109	221
1:10	DL-3426	2	PAX	DL	3426	LGA	D	12:55	100%	180	59	121	180	739
1:15	DL-3072	2	PAX	DL	3072	RAP	D	13:00	75%	82	61	21	109	221
0:50	DL-3134	2	PAX	DL	3134	GRB	D	12:40	75%	82	70	12	109	221
1:25	DL-3074	2	PAX	DL	3074	CVG	D	13:15	98%	107	58	50	109	221
1:00	DL-3722	2	PAX	DL	3722	MCO	D	12:55	95%	183	69	114	192	3N1
1:00	DL-3428	2	PAX	DL	3428	DEN	D	13:00	96%	174	57	117	180	739
1:00	DL-3430	2	PAX	DL	3430	DTW	D	13:00	97%	174	54	120	180	739
1:00	DL-3432	2	PAX	DL	3432	LAS	D	13:00	95%	172	77	95	180	739
1:00	DL-3562	2	PAX	DL	3562	JFK	D	13:00	99%	148	47	101	150	32N
1:06	DL-3724	2	PAX	DL	3724	TPA	D	13:06	92%	177	47	130	192	3N1
1:19	DL-3076	2	PAX	DL	3076	SAT	D	13:19	89%	96	40	57	109	221
1:06	DL-3434	2	PAX	DL	3434	GRR	D	13:08	88%	159	122	36	180	739
1:30	DL-3078	2	PAX	DL	3078	MCI	D	13:32	82%	90	60	30	109	221
1:25	DL-3726	2	PAX	DL	3726	LAX	D	13:30	92%	176	81	95	192	3N1
0:46	DL-3238	2	PAX	DL	3238	RDU	D	12:52	99%	129	57	72	130	223
1:00	DL-3490	2	PAX	DL	3490	BWI	D	13:06	77%	184	77	108	240	753
0:45	DL-3240	2	PAX	DL	3240	CLT	D	12:55	92%	120	61	58	130	223
0:45	DL-3242	2	PAX	DL	3242	IND	D	12:55	91%	118	67	51	130	223
1:50	DL-3728	2	PAX	DL	3728	ATL	D	14:00	99%	190	77	114	192	3N1
0:48	DL-3564	2	PAX	DL	3564	PHL	D	13:00	100%	150	82	68	150	32N
2:25	DL-3362	2	PAX	DL	3362	ASIA	I	14:38	97%	297	215	81	306	350
0:32	DL-4026	2	PAX	DL	4026	CID	D	12:47	73%	56	48	8	76	E7W
0:40	DL-3244	2	PAX	DL	3244	STL	D	12:55	89%	115	63	52	130	223
0:45	DL-3246	2	PAX	DL	3246	CMH	D	13:00	82%	106	65	41	130	223
0:45	DL-3248	2	PAX	DL	3248	MEX	I	13:00	88%	115	29	86	130	223
0:48	DL-4030	2	PAX	DL	4030	MDW	D	13:03	91%	69	24	45	76	E7W
1:30	DL-3080	2	PAX	DL	3080	BNA	D	13:45	73%	80	28	51	109	221
2:15	DL-3082	2	PAX	DL	3082	RSW	D	14:30	82%	90	21	69	109	221
1:00	DL-3566	2	PAX	DL	3566	BOS	D	13:20	98%	146	45	102	150	32N
2:11	DL-3364	2	PAX	DL	3364	ICN	I	14:38	97%	297	215	81	306	350
3:58	DL-3366	2	PAX	DL	3366	CDG	I	16:25	100%	306	213	93	306	350
0:55	DL-4032	2	PAX	DL	4032	AZO	D	13:25	76%	58	36	22	76	E7W
1:00	DL-3568	2	PAX	DL	3568	PHX	D	13:30	93%	139	60	79	150	32N
1:00	DL-3570	2	PAX	DL	3570	SLC	D	13:30	95%	142	92	50	150	32N
1:05	DL-3572	2	PAX	DL	3572	OMA	D	13:35	79%	118	91	28	150	32N
2:21	DL-3084	2	PAX	DL	3084	IAH	D	14:51	95%	103	47	56	109	221
1:49	DL-3730	2	PAX	DL	3730	SEA	D	14:20	99%	190	129	60	192	3N1
0:57	DL-4034	2	PAX	DL	4034	TVC	D	13:30	78%	59	45	14	76	E7W
1:34	DL-3574	2	PAX	DL	3574	AUS	D	14:09	95%	143	57	85	150	32N
2:16	DL-3086	2	PAX	DL	3086	MEM	D	14:51	92%	100	61	39	109	221
1:05	DL-3484	2	PAX	DL	3484	MKE	D	13:45	82%	148	109	39	180	739
0:45	DL-3250	2	PAX	DL	3250	YYZ	P	13:30	89%	116	77	39	130	223
1:00	DL-4040	2	PAX	DL	4040	GFK	D	13:46	69%	53	35	17	76	E7W
1:00	DL-3492	2	PAX	DL	3492	JFK	D	13:48	79%	189	57	132	240	753
0:58	DL-3494	2	PAX	DL	3494	PIT	D	13:48	53%	128	76	52	240	753
1:00	DL-3436	2	PAX	DL	3436	BUF	D	13:58	91%	163	100	63	180	739
1:00	DL-3438	2	PAX	DL	3438	SFO	D	14:00	93%	168	60	108	180	739
2:04	DL-3088	2	PAX	DL	3088	STL	D	15:04	93%	102	61	41	109	221
1:11	DL-3576	2	PAX	DL	3576	MCO	D	14:20	95%	143	56	87	150	32N
1:13	DL-3732	2	PAX	DL	3732	PDX	D	14:30	93%	179	132	48	192	3N1
2:17	DL-3350	2	PAX	DL	3350	ATL	D	15:35	99%	279	114	165	281	339
1:07	DL-3578	2	PAX	DL	3578	OKC	D	14:27	90%	136	93	42	150	32N
0:45	DL-3252	2	PAX	DL	3252	MSN	D	14:07	77%	100	87	13	130	223
1:06	DL-3734	2	PAX	DL	3734	SLC	D	14:30	95%	182	120	62	192	3N1
4:04	DL-3352	2	PAX	DL	3352	CDG	I	17:30	100%	281	196	85	281	339
1:03	DL-3580	2	PAX	DL	3580	PHX	D	14:30	93%	140	65	75	150	32N
0:57	DL-3440	2	PAX	DL	3440	BZN	D	14:27	97%	175	140	34	180	739
1:35	DL-3090	2	PAX	DL	3090	CLE	D	15:05	88%	96	44	52	109	221
0:59	DL-4044	2	PAX	DL	4044	FSD	D	14:30	87%	66	54	12	76	E7W
0:56	DL-4046	2	PAX	DL	4046	MOT	D	14:31	80%	61	45	16	76	E7W
1:00	DL-3736	2	PAX	DL	3736	LAX	D	14:35	92%	178	89	88	192	3N1
1:03	DL-3496	2	PAX	DL	3496	DEN	D	14:38	78%	187	87	101	240	753
3:14	DL-3368	2	PAX	DL	3368	AMS	I	16:50	100%	306	146	160	306	350
0:45	DL-3254	2	PAX	DL	3254	DFW	D	14:24	94%	122	47	75	130	223
0:45	DL-3256	2	PAX	DL	3256	DTW	D	14:24	99%	128	68	60	130	223
1:20	DL-3582	2	PAX	DL	3582	ORD	D	15:00	92%	138	56	82	150	32N
0:45	DL-3258	2	PAX	DL	3258	YYZ	P	14:29	91%	118	80	38	130	223
0:45	DL-3260	2	PAX	DL	3260	MIA	D	14:30	90%	117	49	68	130	223
1:00	DL-3316	2	PAX	DL	3316	CID	D	14:45	74%	96	83	13	130	223
1:00	DL-3498	2	PAX	DL	3498	LAS	D	14:45	73%	174	97	77	240	753
1:06	DL-3442	2	PAX	DL	3442	GEG	D	14:51	90%	161	128	33	180	739
1:20	DL-3092	2	PAX	DL	3092	CMH	D	15:05	85%	93	59	34	109	221
1:14	DL-3738	2	PAX	DL	3738	BOS	D	15:00	97%	187	56	131	192	3N1
0:48	DL-4048	2	PAX	DL	4048	BIS	D	14:35	83%	63	47	16	76	E7W
1:26	DL-3740	2	PAX	DL	3740	SFO	D	15:15	95%	183	95	89	192	3N1
0:55	DL-3262	2	PAX	DL	3262	CLT	D	14:45	94%	122	65	57	130	223
1:15	DL-3584	2	PAX	DL	3584	PHL	D	15:05	100%	150	86	64	150	32N
1:19	DL-3444	2	PAX	DL	3444	GRR	D	15:10	90%	162	127	35	180	739
1:05	DL-4050	2	PAX	DL	4050	DAY	D	15:00	77%	59	37	22	76	E7W
1:05	DL-3094	2	PAX	DL	3094	SDF	D	15:05	83%	91	50	41	109	221
1:10	DL-3586	2	PAX	DL	3586	LGA	D	15:10	100%	150	55	95	150	32N
2:00	DL-3742	2	PAX	DL	3742	LAX	D	16:00	91%	175	73	101	192	3N1
1:13	DL-3096	2	PAX	DL	3096	BDL	D	15:15	98%	107	74	33	109	221
1:01	DL-3588	2	PAX	DL	3588	DCA	D	15:11	97%	145	96	49	150	32N
1:15	DL-3446	2	PAX	DL	3446	DTW	D	15:25	98%	176	83	94	180	739
1:15	DL-3590	2	PAX	DL	3590	MSN	D	15:25	81%	122	107	15	150	32N
0:46	DL-3264	2	PAX	DL	3264	EWR	D	15:00	89%	115	49	66	130	223
1:01	DL-3098	2	PAX	DL	3098	CVG	D	15:16	97%	105	58	48	109	221
1:45	DL-3744	2	PAX	DL	3744	SEA	D	16:00	98%	189	119	70	192	3N1
0:44	DL-3266	2	PAX	DL	3266	PIT	D	15:00	88%	114	71	44	130	223
0:42	DL-4052	2	PAX	DL	4052	TUL	D	15:00	75%	57	36	20	76	E7W
0:45	DL-3268	2	PAX	DL	3268	YWG	P	15:03	100%	130	130	0	130	223
1:24	DL-3592	2	PAX	DL	3592	TPA	D	15:45	89%	134	36	98	150	32N
0:45	DL-3270	2	PAX	DL	3270	MCI	D	15:07	87%	113	79	35	130	223
1:00	DL-3100	2	PAX	DL	3100	BNA	D	15:25	87%	95	44	51	109	221
1:10	DL-3448	2	PAX	DL	3448	MKE	D	15:35	86%	155	113	42	180	739
0:41	DL-4056	2	PAX	DL	4056	MDW	D	15:10	90%	68	26	43	76	E7W
0:46	DL-3272	2	PAX	DL	3272	RDU	D	15:16	97%	127	57	69	130	223
0:50	DL-3274	2	PAX	DL	3274	IND	D	15:20	90%	117	68	49	130	223
1:00	DL-3102	2	PAX	DL	3102	OMA	D	15:30	81%	88	69	19	109	221
1:00	DL-4062	2	PAX	DL	4062	RAP	D	15:30	76%	58	44	13	76	E7W
2:15	DL-3748	2	PAX	DL	3748	ATL	D	16:45	99%	190	74	116	192	3N1
1:55	DL-3450	2	PAX	DL	3450	LGA	D	16:30	92%	166	57	110	180	739
2:09	DL-3370	2	PAX	DL	3370	EUR1	I	16:50	97%	297	178	119	306	350
4:51	DL-3372	2	PAX	DL	3372	AMS	I	19:32	100%	306	165	141	306	350
1:17	DL-3330	2	PAX	DL	3330	BOS	D	16:00	97%	187	51	136	192	321
1:00	DL-3104	2	PAX	DL	3104	JAX	D	15:45	81%	89	33	55	109	221
1:03	DL-3106	2	PAX	DL	3106	FAR	D	15:48	80%	87	84	3	109	221
1:00	DL-3474	2	PAX	DL	3474	BUF	D	15:50	93%	168	107	60	180	739
1:40	DL-3500	2	PAX	DL	3500	ATL	D	16:30	99%	237	83	155	240	753
1:07	DL-4066	2	PAX	DL	4066	FSD	D	16:05	83%	63	47	16	76	E7W
1:00	DL-3108	2	PAX	DL	3108	MCI	D	16:00	78%	85	57	28	109	221
1:00	DL-3110	2	PAX	DL	3110	MEM	D	16:00	88%	96	57	39	109	221
1:00	DL-3594	2	PAX	DL	3594	MCO	D	16:00	95%	143	52	91	150	32N
0:55	DL-3112	2	PAX	DL	3112	RSW	D	16:00	80%	87	20	68	109	221
1:03	DL-4068	2	PAX	DL	4068	DLH	D	16:11	70%	53	44	9	76	E7W
1:29	DL-4070	2	PAX	DL	4070	RST	D	16:41	71%	54	47	6	76	E7W
2:07	DL-4072	2	PAX	DL	4072	FAR	D	17:30	79%	60	58	2	76	E7W
1:00	DL-3746	2	PAX	DL	3746	DTW	D	16:30	97%	187	71	116	192	3N1
1:30	DL-3502	2	PAX	DL	3502	SAN	D	17:00	93%	223	96	127	240	753
1:30	DL-3750	2	PAX	DL	3750	BOS	D	17:00	97%	187	48	139	192	3N1
0:45	DL-3276	2	PAX	DL	3276	FLL	D	16:30	86%	112	32	80	130	223
1:15	DL-3752	2	PAX	DL	3752	DEN	D	17:00	96%	185	59	126	192	3N1
1:56	DL-3354	2	PAX	DL	3354	LHR	I	17:50	100%	281	95	186	281	339
1:00	DL-3596	2	PAX	DL	3596	PHL	D	17:00	90%	135	69	66	150	32N
1:30	DL-3754	2	PAX	DL	3754	SFO	D	17:30	95%	182	83	99	192	3N1
1:35	DL-3756	2	PAX	DL	3756	SLC	D	17:35	93%	178	100	79	192	3N1
1:24	DL-4074	2	PAX	DL	4074	MDW	D	17:30	82%	63	22	40	76	E7W
1:05	DL-3114	2	PAX	DL	3114	IAH	D	17:30	88%	95	42	53	109	221
1:14	DL-3758	2	PAX	DL	3758	MCO	D	17:43	95%	182	64	119	192	3N1
1:00	DL-3116	2	PAX	DL	3116	MSN	D	17:30	77%	84	74	10	109	221
1:00	DL-3118	2	PAX	DL	3118	STL	D	17:30	81%	88	50	38	109	221
1:00	DL-3598	2	PAX	DL	3598	JFK	D	17:30	99%	148	43	104	150	32N
1:00	DL-4076	2	PAX	DL	4076	MOT	D	17:30	72%	54	40	15	76	E7W
1:05	DL-3120	2	PAX	DL	3120	MCI	D	17:35	76%	82	56	27	109	221
1:08	DL-3452	2	PAX	DL	3452	BWI	D	17:38	90%	163	70	93	180	739
1:10	DL-3122	2	PAX	DL	3122	JAC	D	17:40	84%	92	64	29	109	221
1:22	DL-3760	2	PAX	DL	3760	ANC	D	17:52	93%	179	142	37	192	3N1
1:25	DL-3762	2	PAX	DL	3762	SEA	D	17:55	98%	188	115	73	192	3N1
1:07	DL-3454	2	PAX	DL	3454	MKE	D	17:40	82%	148	107	40	180	739
1:11	DL-3124	2	PAX	DL	3124	RIC	D	17:44	75%	82	37	45	109	221
0:57	DL-3600	2	PAX	DL	3600	ORD	D	17:32	83%	125	48	77	150	32N
3:10	DL-3356	2	PAX	DL	3356	SEA	D	19:45	99%	279	206	74	281	339
1:20	DL-3764	2	PAX	DL	3764	BOS	D	17:57	97%	187	49	138	192	3N1
1:07	DL-3126	2	PAX	DL	3126	CLT	D	17:46	85%	93	49	44	109	221
1:01	DL-3456	2	PAX	DL	3456	DCA	D	17:41	94%	168	73	95	180	739
1:06	DL-3128	2	PAX	DL	3128	SAT	D	17:46	84%	91	38	53	109	221
1:13	DL-3458	2	PAX	DL	3458	LAS	D	17:54	96%	172	81	91	180	739
0:51	DL-3602	2	PAX	DL	3602	SMF	D	17:35	90%	136	83	53	150	32N
0:45	DL-3278	2	PAX	DL	3278	BIL	D	17:30	75%	98	81	16	130	223
1:15	DL-3130	2	PAX	DL	3130	ABQ	D	18:00	75%	82	36	46	109	221
0:46	DL-3280	2	PAX	DL	3280	SNA	D	17:35	92%	119	58	62	130	223
0:46	DL-4080	2	PAX	DL	4080	FSD	D	17:35	81%	62	45	17	76	E7W
0:50	DL-3282	2	PAX	DL	3282	DFW	D	17:40	86%	112	42	70	130	223
0:50	DL-4082	2	PAX	DL	4082	LEX	D	17:40	75%	57	34	24	76	E7W
0:54	DL-3604	2	PAX	DL	3604	OMA	D	17:45	76%	113	88	26	150	32N
0:59	DL-3606	2	PAX	DL	3606	DTW	D	17:51	98%	147	61	85	150	32N
1:00	DL-4084	2	PAX	DL	4084	GFK	D	17:52	73%	56	40	16	76	E7W
1:07	DL-3136	2	PAX	DL	3136	PIT	D	18:00	78%	86	52	34	109	221
1:32	DL-3504	2	PAX	DL	3504	ATL	D	18:25	100%	240	130	110	240	753
1:01	DL-3284	2	PAX	DL	3284	EWR	D	17:55	81%	105	43	62	130	223
1:01	DL-3460	2	PAX	DL	3460	AUS	D	17:55	93%	167	68	99	180	739
1:00	DL-3608	2	PAX	DL	3608	SJC	D	17:55	81%	121	61	60	150	32N
1:02	DL-3766	2	PAX	DL	3766	PDX	D	17:59	91%	174	112	63	192	3N1
1:00	DL-3610	2	PAX	DL	3610	FAI	D	17:59	88%	133	104	29	150	32N
1:01	DL-3286	2	PAX	DL	3286	RDU	D	18:00	91%	118	52	66	130	223
1:05	DL-3768	2	PAX	DL	3768	LAX	D	18:04	91%	174	70	104	192	3N1
1:27	DL-3506	2	PAX	DL	3506	SAN	D	18:26	94%	225	110	115	240	753
1:31	DL-3770	2	PAX	DL	3770	ATL	D	18:30	99%	190	70	120	192	3N1
1:00	DL-3138	2	PAX	DL	3138	BHM	D	18:00	84%	91	41	50	109	221
1:00	DL-3332	2	PAX	DL	3332	PDX	D	18:00	94%	180	134	46	[illegible]	321
[illegible]	DL-3612	2	PAX	DL	3612	MSO	D	18:00	79%	119	97	22	150	[illegible]

DL-3373	2	PAX	DL	3373	AMS	I	17:07	100%	306	162	144	306	350	2:25	DL-3374	2	PAX	DL	3374	EUR2	I	19:32	97%	297	178	119	306	350
DL-3375	2	PAX	DL	3375	EUR3	I	17:07	97%	295	178	118	306	350	5:00	DL-3376	2	PAX	DL	3376	AMS	I	22:07	100%	306	155	151	306	350
DL-3461	2	PAX	DL	3461	DTW	D	17:15	96%	172	59	113	180	739	1:00	DL-3462	2	PAX	DL	3462	LAS	D	18:15	98%	176	115	61	180	739
DL-4091	2	PAX	DL	4091	FSD	D	17:15	86%	66	53	13	76	E7W	1:00	DL-4092	2	PAX	DL	4092	DLH	D	18:15	87%	66	58	8	76	E7W
DL-3771	2	PAX	DL	3771	ANC	D	17:30	100%	192	145	47	192	3N1	0:59	DL-3772	2	PAX	DL	3772	SLC	D	18:29	98%	188	151	37	192	3N1
DL-3613	2	PAX	DL	3613	FLL	D	17:30	93%	140	48	92	150	32N	1:00	DL-3614	2	PAX	DL	3614	SLC	D	18:30	93%	140	82	58	150	32N
DL-3463	2	PAX	DL	3463	SFO	D	17:35	98%	177	74	103	180	739	1:00	DL-3464	2	PAX	DL	3464	LGA	D	18:35	93%	167	64	102	180	739
DL-3377	2	PAX	DL	3377	Asia	I	17:44	97%	296	215	81	306	350	4:23	DL-3378	2	PAX	DL	3378	EUR3	I	22:07	97%	297	178	119	306	350
DL-3287	2	PAX	DL	3287	MSN	D	17:45	86%	112	98	15	130	223	1:15	DL-3288	2	PAX	DL	3288	DTW	D	19:00	98%	128	65	63	130	223
DL-3789	2	PAX	DL	3789	ATL	D	17:45	97%	186	72	114	192	3N1	1:15	DL-3790	2	PAX	DL	3790	RDU	D	19:00	96%	185	87	97	192	3N1
DL-3475	2	PAX	DL	3475	MKE	D	17:53	90%	161	110	51	180	739	1:00	DL-3476	2	PAX	DL	3476	DEN	D	18:53	98%	176	82	93	180	739
DL-3615	2	PAX	DL	3615	LGA	D	18:00	100%	150	49	101	150	32N	1:00	DL-3616	2	PAX	DL	3616	LGA	D	19:00	92%	138	53	85	150	32N
DL-3773	2	PAX	DL	3773	LAX	D	18:00	98%	188	98	90	192	3N1	1:30	DL-3774	2	PAX	DL	3774	BZN	D	19:30	100%	192	159	33	192	3N1
DL-3379	2	PAX	DL	3379	ICN	I	18:04	97%	296	215	81	306	350	4:06	DL-3380	2	PAX	DL	3380	KEF	I	22:10	100%	306	205	101	306	350
DL-3467	2	PAX	DL	3467	DEN	D	18:05	95%	172	56	115	180	739	1:00	DL-3468	2	PAX	DL	3468	PHX	D	19:05	93%	168	79	89	180	739
DL-3465	2	PAX	DL	3465	DCA	D	18:15	92%	165	92	73	180	739	1:00	DL-3466	2	PAX	DL	3466	CMH	D	19:15	82%	147	94	53	180	739
DL-3289	2	PAX	DL	3289	AUS	D	18:15	83%	108	28	79	130	223	1:10	DL-3290	2	PAX	DL	3290	OKC	D	19:25	93%	121	86	35	130	223
DL-3139	2	PAX	DL	3139	GTF	D	18:15	77%	84	70	14	109	221	1:15	DL-3140	2	PAX	DL	3140	HLN	D	19:30	80%	87	67	21	109	221
DL-3291	2	PAX	DL	3291	SLC	D	18:15	95%	124	83	41	130	223	1:15	DL-3292	2	PAX	DL	3292	DFW	D	19:30	94%	122	56	67	130	223
DL-3293	2	PAX	DL	3293	SNA	D	18:15	89%	116	55	61	130	223	1:20	DL-3294	2	PAX	DL	3294	SNA	D	19:35	100%	130	70	60	130	223
DL-3469	2	PAX	DL	3469	PDX	D	18:15	100%	179	129	50	180	739	2:20	DL-3470	2	PAX	DL	3470	DTW	D	20:35	98%	177	92	85	180	739
DL-4093	2	PAX	DL	4093	MOT	D	18:18	77%	58	44	15	76	E7W	1:12	DL-4094	2	PAX	DL	4094	GFK	D	19:30	93%	71	56	15	76	E7W
DL-3295	2	PAX	DL	3295	CMH	D	18:24	87%	113	68	45	130	223	1:47	DL-3296	2	PAX	DL	3296	ORD	D	20:11	84%	109	49	60	130	223
DL-3775	2	PAX	DL	3775	SFO	D	18:29	99%	190	95	94	192	3N1	1:16	DL-3776	2	PAX	DL	3776	BIL	D	19:45	82%	158	134	24	192	3N1
DL-3141	2	PAX	DL	3141	RAP	D	18:30	77%	84	66	18	109	221	1:00	DL-3142	2	PAX	DL	3142	MSY	D	19:30	78%	85	38	47	109	221
DL-3777	2	PAX	DL	3777	SEA	D	18:30	99%	189	123	66	192	3N1	1:15	DL-3778	2	PAX	DL	3778	DEN	D	19:45	98%	188	96	92	192	3N1
DL-3297	2	PAX	DL	3297	YYZ	P	18:30	87%	114	64	50	130	223	1:46	DL-3298	2	PAX	DL	3298	CLT	D	20:16	91%	118	67	52	130	223
DL-3617	2	PAX	DL	3617	MSO	D	18:35	89%	133	108	25	150	32N	0:54	DL-3618	2	PAX	DL	3618	PHX	D	19:29	95%	142	81	61	150	32N
DL-3619	2	PAX	DL	3619	MSN	D	18:36	78%	117	100	17	150	32N	0:54	DL-3620	2	PAX	DL	3620	MKE	D	19:30	100%	150	120	30	150	32N
DL-3143	2	PAX	DL	3143	BNA	D	18:39	87%	95	40	55	109	221	0:51	DL-3144	2	PAX	DL	3144	YWG	P	19:30	86%	94	84	11	109	221
DL-3621	2	PAX	DL	3621	PHL	D	18:44	100%	149	79	70	150	32N	0:46	DL-3622	2	PAX	DL	3622	SJC	D	19:30	89%	134	75	59	150	32N
DL-4103	2	PAX	DL	4103	GFK	D	18:44	79%	60	52	8	76	E7W	1:31	DL-4104	2	PAX	DL	4104	CWA	D	20:15	76%	57	54	3	76	E7W
DL-3145	2	PAX	DL	3145	ROC	D	18:45	86%	93	63	30	109	221	0:50	DL-3146	2	PAX	DL	3146	YEG	P	19:35	100%	109	97	12	109	221
DL-3507	2	PAX	DL	3507	JFK	D	18:45	76%	181	56	125	240	753	1:20	DL-3508	2	PAX	DL	3508	LAX	D	20:05	92%	220	100	120	240	753
DL-3147	2	PAX	DL	3147	FAR	D	18:46	80%	87	84	3	109	221	0:51	DL-3148	2	PAX	DL	3148	GTF	D	19:37	71%	77	65	13	109	221
DL-3149	2	PAX	DL	3149	IAD	D	18:49	94%	103	55	47	109	221	0:51	DL-3150	2	PAX	DL	3150	DSM	D	19:40	100%	109	100	9	109	221
DL-3471	2	PAX	DL	3471	DTW	D	18:50	97%	175	89	86	180	739	1:50	DL-3472	2	PAX	DL	3472	MCI	D	20:40	82%	148	104	44	180	739
DL-3151	2	PAX	DL	3151	STL	D	18:54	93%	102	53	48	109	221	0:51	DL-3152	2	PAX	DL	3152	IAH	D	19:45	94%	102	51	51	109	221
DL-3623	2	PAX	DL	3623	MSY	D	18:55	78%	117	53	64	150	32N	0:40	DL-3624	2	PAX	DL	3624	YYC	P	19:35	99%	148	124	24	150	32N
DL-3625	2	PAX	DL	3625	ORD	D	18:55	97%	146	52	94	150	32N	0:45	DL-3626	2	PAX	DL	3626	BOI	D	19:40	100%	150	141	9	150	32N
DL-3779	2	PAX	DL	3779	SLC	D	18:55	95%	182	117	65	192	3N1	0:50	DL-3780	2	PAX	DL	3780	GEG	D	19:45	100%	192	190	2	192	3N1
DL-3153	2	PAX	DL	3153	PSC	D	18:55	95%	103	88	15	109	221	1:00	DL-3154	2	PAX	DL	3154	ORF	D	19:55	77%	84	42	43	109	221
DL-3301	2	PAX	DL	3301	CLT	D	18:55	83%	107	53	54	130	223	1:25	DL-3302	2	PAX	DL	3302	PHL	D	20:20	100%	130	80	50	130	223
DL-3509	2	PAX	DL	3509	PIT	D	18:59	53%	126	79	48	240	753	1:21	DL-3510	2	PAX	DL	3510	BOS	D	20:20	97%	233	61	172	240	753
DL-3627	2	PAX	DL	3627	OKC	D	19:00	68%	102	67	35	150	32N	0:50	DL-3628	2	PAX	DL	3628	OAK	D	19:50	87%	131	73	58	150	32N
DL-3781	2	PAX	DL	3781	ATL	D	19:00	97%	186	64	122	192	3N1	0:55	DL-3782	2	PAX	DL	3782	SMF	D	19:55	96%	184	117	67	192	3N1
DL-3477	2	PAX	DL	3477	BOI	D	19:00	96%	173	140	32	180	739	0:58	DL-3478	2	PAX	DL	3478	GRR	D	19:58	83%	149	117	32	180	739
DL-3783	2	PAX	DL	3783	LAX	D	19:00	98%	188	91	97	192	3N1	1:00	DL-3784	2	PAX	DL	3784	ATL	D	20:00	100%	191	93	98	192	3N1
DL-3629	2	PAX	DL	3629	PHX	D	19:09	87%	130	59	70	150	32N	0:47	DL-3630	2	PAX	DL	3630	YVR	P	19:56	90%	135	107	29	150	32N
DL-3785	2	PAX	DL	3785	SFO	D	19:15	98%	189	83	106	192	3N1	1:00	DL-3786	2	PAX	DL	3786	BDL	D	20:15	96%	183	127	56	192	3N1
DL-3303	2	PAX	DL	3303	CVG	D	19:15	95%	124	59	65	130	223	1:10	DL-3304	2	PAX	DL	3304	CVG	D	20:25	96%	125	72	53	130	223
DL-3305	2	PAX	DL	3305	YYC	P	19:15	99%	129	95	34	130	223	1:10	DL-3306	2	PAX	DL	3306	YYZ	P	20:25	91%	118	83	35	130	223
DL-3333	2	PAX	DL	3333	DCA	D	19:15	93%	178	108	70	192	321	1:45	DL-3334	2	PAX	DL	3334	DCA	D	21:00	95%	183	99	84	192	321
DL-3511	2	PAX	DL	3511	BWI	D	19:17	77%	185	88	97	240	753	1:14	DL-3512	2	PAX	DL	3512	SFO	D	20:31	95%	227	102	125	240	753
DL-3631	2	PAX	DL	3631	SLC	D	19:20	95%	143	95	48	150	32N	0:40	DL-3632	2	PAX	DL	3632	MSO	D	20:00	85%	127	105	22	150	32N
DL-3307	2	PAX	DL	3307	MEX	I	19:20	88%	114	29	86	130	223	1:08	DL-3308	2	PAX	DL	3308	FAR	D	20:28	90%	117	114	3	130	223
DL-4113	2	PAX	DL	4113	YXE	I	19:20	64%	48	44	5	76	E7W	1:27	DL-4114	2	PAX	DL	4114	AZO	D	20:47	75%	57	36	21	76	E7W
DL-3335	2	PAX	DL	3335	PDX	D	19:21	100%	192	149	43	192	321	1:39	DL-3336	2	PAX	DL	3336	PDX	D	21:00	94%	180	133	46	192	321
DL-3787	2	PAX	DL	3787	LAS	D	19:25	98%	187	98	90	192	3N1	0:50	DL-3788	2	PAX	DL	3788	JFK	D	20:15	99%	190	59	130	192	3N1
DL-3309	2	PAX	DL	3309	EWR	D	19:25	89%	115	47	68	130	223	1:34	DL-3310	2	PAX	DL	3310	GRB	D	20:59	74%	97	83	14	130	223
DL-4115	2	PAX	DL	4115	FSD	D	19:25	89%	67	57	11	76	E7W	2:33	DL-4116	2	PAX	DL	4116	GFK	D	21:58	72%	55	41	14	76	E7W
DL-3633	2	PAX	DL	3633	SMF	D	19:28	97%	145	88	57	150	32N	0:47	DL-3634	2	PAX	DL	3634	FCA	D	20:15	94%	142	113	28	150	32N
DL-3155	2	PAX	DL	3155	IAH	D	19:30	93%	102	39	63	109	221	1:00	DL-3156	2	PAX	DL	3156	PSC	D	20:30	87%	95	82	13	109	221
DL-3635	2	PAX	DL	3635	SJC	D	19:35	88%	132	74	58	150	32N	0:45	DL-3636	2	PAX	DL	3636	DCA	D	20:20	97%	146	103	44	150	32N
DL-3157	2	PAX	DL	3157	MEM	D	19:44	84%	92	51	41	109	221	0:39	DL-3158	2	PAX	DL	3158	ALB	D	20:23	85%	93	61	32	109	221
DL-3161	2	PAX	DL	3161	MCI	D	19:45	77%	84	53	31	109	221	0:45	DL-3162	2	PAX	DL	3162	ROC	D	20:30	87%	95	65	30	109	221
DL-3637	2	PAX	DL	3637	PVD	D	19:45	88%	132	37	95	150	32N	0:51	DL-3638	2	PAX	DL	3638	PIT	D	20:36	85%	128	82	46	150	32N
DL-3513	2	PAX	DL	3513	DEN	D	19:47	77%	184	69	115	240	753	1:03	DL-3514	2	PAX	DL	3514	LAX	D	20:50	91%	218	91	127	240	753
DL-3791	2	PAX	DL	3791	SEA	D	19:52	96%	184	62	122	192	3N1	0:58	DL-3792	2	PAX	DL	3792	BWI	D	20:50	94%	180	85	95	192	3N1
DL-3311	2	PAX	DL	3311	YWG	P	19:58	100%	130	129	1	130	223	1:00	DL-3312	2	PAX	DL	3312	DSM	D	20:58	82%	106	96	10	130	223
DL-3165	2	PAX	DL	3165	BNA	D	20:00	70%	76	20	56	109	221	0:30	DL-3166	2	PAX	DL	3166	SYR	D	20:30	83%	90	59	31	109	221
DL-3167	2	PAX	DL	3167	EWR	D	20:00	78%	85	25	60	109	221	0:50	DL-3168	2	PAX	DL	3168	CLE	D	20:50	85%	92	44	48	109	221
DL-3171	2	PAX	DL	3171	MSN	D	20:00	54%	59	46	13	109	221	0:51	DL-3172	2	PAX	DL	3172	DAY	D	20:51	75%	82	52	30	109	221
DL-3169	2	PAX	DL	3169	MEM	D	20:00	76%	82	41	42	109	221	1:00	DL-3170	2	PAX	DL	3170	MDW	D	21:00	85%	92	36	57	109	221
DL-3639	2	PAX	DL	3639	PHX	D	20:00	82%	123	31	92	150	32N	1:00	DL-3640	2	PAX	DL	3640	BOI	D	21:00	98%	147	98	49	150	32N
DL-3641	2	PAX	DL	3641	LGA	D	20:21	93%	139	26	113	150	32N	0:39	DL-3642	2	PAX	DL	3642	SJC	D	21:00	83%	125	67	57	150	32N
DL-3793	2	PAX	DL	3793	ATL	D	20:30	95%	183	26	157	192	3N1	1:00	DL-3794	2	PAX	DL	3794	SLC	D	21:30	94%	181	113	68	192	3N1
DL-3313	2	PAX	DL	3313	SNA	D	20:37	88%	114	52	62	130	223	1:27	DL-3314	2	PAX	DL	3314	FSD	D	22:04	80%	104	72	32	130	223
DL-3317	2	PAX	DL	3317	IND	D	20:40	90%	117	58	59	130	223	1:26	DL-3318	2	PAX	DL	3318	DLH	D	22:06	66%	86	71	14	130	223
DL-3795	2	PAX	DL	3795	MCO	D	20:43	95%	183	62	121	192	3N1	1:12	DL-3796	2	PAX	DL	3796	SFO	D	21:55	95%	182	85	97	192	3N1
DL-3797	2	PAX	DL	3797	SLC	D	20:52	88%	170	49	121	192	3N1	1:18	DL-3798	2	PAX	DL	3798	LAX	D	22:10	91%	174	69	105	192	3N1
DL-3799	2	PAX	DL	3799	JFK	D	20:53	93%	178	29	150	192	3N1	1:22	DL-3800	2	PAX	DL	3800	SEA	D	22:15	98%	188	114	74	192	3N1
DL-3801	2	PAX	DL	3801	SEA	D	20:57	96%	185	68	116	192	3N1	1:19	DL-3802	2	PAX	DL	3802	ANC	D	22:16	91%	176	141	34	192	3N1
DL-3479	2	PAX	DL	3479	MCO	D	21:00	95%	171	57	114	180	739	1:10	DL-3480	2	PAX	DL	3480	PHX	D	22:10	92%	165	63	103	180	739
DL-3643	2	PAX	DL	3643	FAI	D	21:00	84%	126	96	30	150	32N	1:15	DL-3644	2	PAX	DL	3644	RAP	D	22:15	69%	103	78	25	150	32N
DL-3481	2	PAX	DL	3481	BDL	D	21:01	89%	160	100	59	180	739	1:15	DL-3482	2	PAX	DL	3482	LAS	D	22:16	96%	172	81	91	180	739
DL-3645	2	PAX	DL	3645	DCA	D	21:04	88%	132	48	84	150	32N	1:11	DL-3646	2	PAX	DL	3646	YWG	P	22:15	95%	143	137	6	150	32N
DL-3647	2	PAX	DL	3647	DTW	D	21:05	95%	142	36	106	150	32N	1:15	DL-3648	2	PAX	DL	3648	FAR	D	22:20	73%	109	105	4	150	32N
DL-3803	2	PAX	DL	3803	DEN	D	21:06	94%	181	38	144	192	3N1	1:19	DL-3804	2	PAX	DL	3804	SAN	D	22:25	94%	181	92	88	192	3N1
DL-3173	2	PAX	DL	3173	GRB	D	21:07	59%	64	50	14	109	221	0:53	DL-3174	2	PAX	DL	3174	ATW	D	22:00	75%	82	72	10	109	221
DL-3175	2	PAX	DL	3175	MCI	D	21:11	57%	62	30	32	109	221	0:49	DL-3176	2	PAX	DL	3176	BIS	D	22:00	71%	77	57	20	109	221
DL-3649	2	PAX	DL	3649	OMA	D	21:11	58%	86	53	34	150	32N	1:15	DL-3650	2	PAX	DL	3650	MSN	D	22:26	73%	109	96	13	150	32N
DL-3805	2	PAX	DL	3805	ANC	D	21:15	100%	192	134	58	192	3N1	1:11	DL-3806	2	PAX	DL	3806	PDX	D	22:26	90%	173	108	65	192	3N1
DL-3177	2	PAX	DL	3177	SAT	D	21:16	71%	78	24	54	109	221	0:50	DL-3178	2	PAX	DL	3178	OMA	D	22:06	73%	80	63	16	109	221
DL-3179	2	PAX	DL	3179	IAH	D	21:20	83%	90	25	65	109	221	0:50	DL-3180	2	PAX	DL	3180	STL	D	22:10	74%	80	48	32	109	221
DL-3001	2	PAX	DL	3001	STL	D	21:20	71%	78	27	51	109	221	TOW/RON	DL-3002	2	PAX	DL	3002	BNA	D	6:30	59%	64	13	51	109	221
DL-3003	2	PAX	DL	3003	BDL	D	21:24	77%	84	46	38	109	221	TOW/RON	DL-3004	2	PAX	DL	3004	MSN	D	7:05	51%	56	43	13	109	221
DL-3005	2	PAX	DL	3005	RSW	D	22:15	85%	92	-	92	109	221	TOW/RON	DL-3006	2	PAX	DL	3006	IAH	D	7:36	85%	92	28	64	109	221
DL-3181	2	PAX	DL	3181	RDU	D	20:45	96%	125	55	70	130	223	TOW/RON	DL-3182	2	PAX	DL	3182	IND	D	6:51	78%	101	45	56	130	223
DL-3183	2	PAX	DL	3183	DFW	D	20:58	83%	108	24	84	130	223	TOW/RON	DL-3184	2	PAX	DL	3184	STL	D	6:55	73%	95	36	59	130	223
DL-3185	2	PAX	DL	3185	CLT	D	21:00	79%	103	44	59	130	223	TOW/RON	DL-3186	2	PAX	DL	3186	CVG	D	7:00	86%	112	47	65	130	223
DL-3187	2	PAX	DL	3187	YYZ	P	21:00	86%	112	61	50	130	223	TOW/RON	DL-3188	2	PAX	DL	3188	EWR	D	7:00	81%	105	29	76	130	223
DL-3189	2	PAX	DL	3189	PIT	D	21:05	69%	90	47	43	130	223	TOW/RON	DL-3190	2	PAX	DL	3190	PHL	D	7:39	88%	114	45	68	130	223
DL-3191	2	PAX	DL	3191	DTW	D	23:00	93%	120	-	120	130	223	TOW/RON	DL-3192	2	PAX	DL	3192	BNA	D	7:56	63%	81	20	61	130	223
DL-3319	2	PAX	DL	3319	SAN	D	19:45	95%	183	99	85	192	321	TOW/RON	DL-3320	2	PAX	DL	3320	PDX	D	9:13	89%	171	98	72	192	321
DL-3321	2	PAX	DL	3321	SAN	D	21:25	93%	179	66	114	192	321	TOW/RON	DL-3322	2	PAX	DL	3322	SAN	D	11:25	94%	181	95	86	192	321
DL-3337	2	PAX	DL	3337	ATL	D	16:51	97%	273	106	166	281	339	TOW/RON	DL-3338	2	PAX	DL	3338	ATL	D	7:30	98%	276	53	223	281	339
DL-3339	2	PAX	DL	3339	LAX	D	17:01	98%	275	133	142	281	339	TOW/RON	DL-3340	2	PAX	DL	3340	SEA	D	8:50	98%	274	154	120	281	339
DL-3341	2	PAX	DL	3341	ATL	D	18:23	97%	273	105	168	281	339	TOW/RON	DL-3342	2	PAX	DL	3342	DTW	D	11:15	97%	274	108	166	281	339
DL-3343	2	PAX	DL	3343	ATL	D	21:17	95%	268	44	224	281	339	TOW/RON	DL-3344	2	PAX	DL	3344	OGG	D	11:15	92%	258	157	101	281	339
DL-3381	2	PAX	DL	3381	GEG	D	19:05	98%	176	165	12	180	739	TOW/RON	DL-3382	2	PAX	DL	3382	DTW	D	6:30	96%	173	29	143	180	739
DL-3383	2	PAX	DL	3383	BUF	D	19:25	96%	173	112	60	180	739	TOW/RON	DL-3384	2	PAX	DL	3384	BOS	D	6:50	97%	174	25	149	180	739
DL-3385	2	PAX	DL	3385	YVR	P	19:30	95%	171	125	45	180	739	TOW/RON	DL-3386	2	PAX	DL	3386	LAS	D	6:50	93%	167	31	136	180	739
DL-3387	2	PAX	DL	3387	BZN	D	19:45	92%	165	129	36	180	739	TOW/RON	DL-3388	2	PAX	DL	3388	DCA	D	6:55	91%	163	36	128	180	739
DL-3389	2	PAX	DL	3389	LAS	D	20:30	96%	173	54	118	180	739	TOW/RON	DL-3390	2	PAX	DL	3390	LGA	D	6:55	96%	173	33	140	180	739
DL-3391	2	PAX	DL	3391	MKE	D	21:07	66%	119	66	53	180	739	TOW/RON	DL-3392	2	PAX	DL	3392	MCI	D	6:55	67%	120	64	56	180	739
DL-3393	2	PAX	DL	3393	GEG	D	21:18	82%	147	88	59	180	739	TOW/RON	DL-3394	2	PAX	DL	3394	PHX	D	7:00	90%	162	37	124	180	739
DL-3395	2	PAX	DL	3395	LAS	D	23:24	93%	168	-	168	180	739	TOW/RON	DL-3396	2	PAX	DL	3396	BWI	D	7:30	89%	159	49	110	180	739
DL-3485	2	PAX	DL	3485	LAS	D	22:12	72%	173	59	114	240	753	TOW/RON	DL-3486	2	PAX	DL	3486	SAN	D	8:45	92%	221	81	140	240	753
DL-3515	2	PAX	DL	3515	BOS	D	21:53	95%	143	24	119	150	32N	TOW/RON	DL-3516	2	PAX	DL	3516	ORD	D	6:50	85%	127	28	99	150	32N
DL-3517	2	PAX	DL	3517	AUS	D	21:25	88%	133	44	88	150	32N	TOW/RON	DL-3518	2	PAX	DL	3518	MKE	D	7:10	63%	94	52	42	150	32N
DL-3519	2	PAX	DL	3519	ORD	D	21:25	84%	126	28	99	150	32N	TOW/RON	DL-3520	2	PAX	DL	3520	BOI	D	7:35	97%	145	86	60	150	32N
DL-3521	2	PAX	DL	3521	PHX	D	21:25	82%	123	30	93	150	32N	TOW/RON	DL-3522	2	PAX	DL	3522	ORD	D	8:11	84%	126	30	96	150	32N
DL-3523	2	PAX	DL	3523	PHL	D	21:38	77%	116	43	73	150	32N	TOW/RON	DL-3524	2	PAX	DL	3524	FCA	D	8:50	90%	135	103	32	150	32N
DL-3651	2	PAX	DL	3651	SFO	D	21:22	97%	187	44	143	192	3N1	TOW/RON	DL-3652	2	PAX	DL	3652	ATL	D	5:30	94%	181	-	181	192	3N1
DL-3653	2	PAX	DL	3653	LAX	D	21:23	96%	184	44	140	192	3N1	TOW/RON	DL-3654	2	PAX	DL	3654	ATL	D	6:30	98%	188	19	169	192	3N1
DL-3655	2	PAX	DL	3655	TPA	D	21:25	90%	173	38	135	192	3N1	TOW/RON	DL-3656	2	PAX	DL	3656	JFK	D	6:50	98%	188	27	161	192	3N1
DL-3657	2	PAX	DL	3657	PDX	D	22:06	95%	182	-	182	192	3N1	TOW/RON	DL-3658	2	PAX	DL	3658	LAX	D	6:50	87%	167	26	141	192	3N1
DL-3659	2	PAX	DL	3659	SEA	D	22:50	93%	179	-	179	192	3N1	TOW/RON	DL-3660	2	PAX	DL	3660	MCO	D	6:50	94%	180	39	141	192	3N1
DL-3661	2	PAX	DL	3661	ATL	D	22:53	94%	181	-	181	192	3N1	TOW/RON	DL-3662	2	PAX	DL	3662	SEA	D	6:50	95%	182	50	132	192	3N1
DL-3663	2	PAX	DL	3663	LAX	D	23:05	94%	181	-	181	192	3N1	TOW/RON	DL-3664	2	PAX	DL	3664	SLC	D	6:50	88%	168	45	123	192	3N1
DL-3665	2	PAX	DL	3665	SFO	D	23:49	96%	184	-	184	192	3N1	TOW/RON	DL-3666	2	PAX	DL	3666	DEN	D	6:59	95%	183	37	146	192	3N1
DL-3667	2	PAX	DL	3667	SLC	D	23:58	84%	161	-	161	192	3N1	TOW/RON	DL-3668	2	PAX	DL	3668	SFO	D	7:00	92%	176	36	140	192	3N1
DL-3955	2	PAX	DL	3955	RAP	D	19:44	78%	59	46	13	76	E7W	TOW/RON	DL-3956	2	PAX	DL	3956	GRR	D	6:55	53%	40	22	18	76	E7W
DL-3957	2	PAX	DL	3957	RST	D	19:45	73%	55	48	7	76	E7W	TOW/RON	DL-3958	2	PAX	DL	3958	MDW	D	6:55	85%	65	13	52	76	E7W
DL-3961	2	PAX	DL	3961	FAR	D	20:19	50%	38	36	2	76	E7W	TOW/RON	DL-3962	2	PAX	DL	3962	BIS	D	7:00	54%	41	21	19	76	E7W
DL-3971	2	PAX	DL	3971	GFK	D	22:50	61%	47	-	47	76	E7W	TOW/RON	DL-3972	2	PAX	DL	3972	MOT	D	6:58	57%	43	24	19	76	E7W
DL-3963	2	PAX	DL	3963	FSD	D	20:32	69%	53	26	26	76	CR9	TOW/RON	DL-3808	2	PAX	DL	3808	YYZ	P	6:50	66%	50	24	26	76	CR9
DL-3881	2	PAX	DL	3881	DSM	D	20:40	59%	45	37	8	76	CR9	TOW/RON	DL-3810	2	PAX	DL	3810	DFW	D	7:00	85%	64	10	54	76	CR9
DL-3965	2	PAX	DL	3965	DLH	D	20:40	53%	40	27	13	76	CR9	TOW/RON	DL-3812	2	PAX	DL	3812	OMA	D	7:02	52%	39	23	16	76	CR9
DL-3953	2	PAX	DL	3953	GRR	D	20:55	55%	42	-	42	76	CR9	TOW/RON	DL-3964	2	PAX	DL	3964	CHS	D	7:30	89%	67	34	34	76	CR9
DL-3807	2	PAX	DL	3807	YUL	P	21:10	91%	69	42	27	76	CR9	TOW/RON	DL-3966	2	PAX	DL	3966	FAR	D	7:50	64%	49	31	18	76	CR9
DL-3967	2	PAX	DL	3967	MOT	D	21:18	53%	40	25	15	76	CR9	TOW/RON	DL-3968	2	PAX	DL	3968	YEG	P	8:00	63%	48	41	7	76	CR9
DL-3969	2	PAX	DL	3969	MDW	D	21:20	82%	62	13	49	76	CR9	TOW/RON	DL-3974	2	PAX	DL	3974	XNA	D	8:50	74%	56	24	32	76	CR9
DL-3973	2	PAX	DL	3973	TVC	D	6:09	80%	61	47	14	76	CR9	2:41	DL-3886	2	PAX	DL	3886	LNK	D	8:50	77%	59	39	20	76	CR9
DL-3809	2	PAX	DL	3809	BJI	D	6:13	78%	60	55	5	76	CR9	2:37	DL-3960	2	PAX	DL	3960	MEM	D	8:50	89%	67	38	30	76	CR9
DL-3811	2	PAX	DL	3811	ABR	D	6:19	73%	56	53	3	76	CR9	2:31	DL-3970	2	PAX	DL	3970	MDW	D	8:50	93%	71	21	50	76	CR9
DL-3883	2	PAX	DL	3883	MBS	D	6:25	80%	61	43	18	76	CR9	2:30	DL-3978	2	PAX	DL	3978	MOT	D	8:55	71%	54	36	18	76	CR9
DL-3977	2	PAX	DL	3977	RST	D	7:15	72%	54	49	6	76	CR9	1:40	DL-3814	2	PAX	DL	3814	BDL	D	8:55	90%	69	42	27	76	CR9
DL-3813	2	PAX	DL	3813	YUL	P	7:52	96%	73	48	25	76	CR9	1:18	DL-3816	2	PAX	DL	3816	ATW	D	9:10	70%	53	45	8	76	CR9
DL-3815	2	PAX	DL	3815	IND	D	7:54	89%	67	42	26	76	CR9	1:16	DL-3818	2	PAX	DL	3818	IAH	D	9:10	92%	70	25	44	76	CR9
DL-3817	2	PAX	DL	3817	MOT	D	7:54	72%	54	43	12	76	CR9	1:16	DL-3888	2	PAX	DL	3888	INL	D	9:10	67%	51	40	11	76	CR9
DL-3819	2	PAX	DL	3819	CIU	D	7:59	75%	57	46	11	76	CR9	1:16	DL-3890	2	PAX	DL	3890	RHI	D	9:15	76%	58	48	9	76	CR9
DL-3885	2	PAX	DL	3885	LSE	D	8:02	84%	64	62	2	76	CR9	1:13	DL-3892	2	PAX	DL	3892	TUL	D	9:15	70%	53	31	22	76	CR9
DL-3821	2	PAX	DL	3821	BRD	D	8:03	72%	54	52	2	76	CR9	1:12	DL-3898	2	PAX	DL	3898	TVC	D	9:15	75%	57	43	15	76	CR9
DL-3887	2	PAX	DL	3887	MQT	D	8:04	83%	63	48	15	76	CR9	1:46	DL-3820	2	PAX	DL	3820	GRR	D	9:50	88%	67	50	17	76	CR9
DL-3987	2	PAX	DL	3987	XWA	D	8:05	67%	51	44	7	76	CR9	1:45	DL-3822	2	PAX	DL	3822	YYZ	P	9:50	89%	68	43	24	76	CR9
DL-3889	2	PAX	DL	3889	HIB	D	8:08	61%	46	37	9	76	CR9	1:42	DL-3988	2	PAX	DL	3988	DLH	D	9:50	70%	53	43	10	76	CR9
DL-3989	2	PAX	DL	3989	CHS	D	8:09	88%	67	34	33	76	CR9	1:41	DL-3990	2	PAX	DL	3990	LSE	D	9:50	49%	37	36	1	76	CR9
DL-3891	2	PAX	DL	3891	XNA	D	8:10	77%	59	33	26	76	CR9	1:45	DL-3992	2	PAX	DL	3992	ATW	D	9:55	78%	60	52	8	76	CR9
DL-3991	2	PAX	DL	3991	AZO	D	8:10	77%	58	38	20	76	CR9	1:45	DL-3994	2	PAX	DL	3994	DAY	D	9:55	76%	58	34	23	76	CR9
DL-3823	2	PAX	DL	3823	MLI	D	8:10	72%	55	38	17	76	CR9	1:49	DL-3824	2	PAX	DL	3824	GRB	D	9:59	79%	60	51	9	76	CR9
DL-3993	2	PAX	DL	3993	TUL	D	8:11	69%	52	34	18	76	CR9	1:48	DL-3996	2	PAX	DL	3996	MDW	D	9:59	94%	71	23	49	76	CR9
DL-3995	2	PAX	DL	3995	CWA	D	8:13	77%	59	52	7	76	CR9	1:47	DL-3894	2	PAX	DL	3894	SBN	D	10:00	83%	63	36	27	76	CR9
DL-3997	2	PAX	DL	3997	DLH	D	8:15	77%	59	48	10	76	CR9	1:45	DL-3998	2	PAX	DL	3998	XWA	D	10:00	51%	39	33	6	76	CR9
DL-3895	2	PAX	DL	3895	LNK	D	8:15	78%	59	43	16	76	CR9	2:00	DL-3896	2	PAX	DL	3896	LAN	D	10:15	84%	64	40	24	76	CR9
DL-3999	2	PAX	DL	3999	FWA	D	8:15	67%	51	33	18	76	CR9	2:15	DL-4000	2	PAX	DL	4000	CWA	D	10:30	73%	56	52	3	76	CR9
DL-3897	2	PAX	DL	3897	RHI	D	8:16	83%	63	54	9	76	CR9	2:59	DL-3900	2	PAX	DL	3900	BJI	D	11:15	81%	62	57	5	76	CR9
DL-3899	2	PAX	DL	3899	MOT	D	9:00	74%	56	45	11	76	CR9	2:15	DL-3826	2	PAX	DL	3826	OMA	D	11:15	76%	58	43	15	76	CR9
DL-3825	2	PAX	DL	3825	MEM	D	10:13	86%	65	41	24	76	CR9	1:02	DL-3828	2	PAX	DL	3828	SAT	D	11:15	87%	66	26	41	76	CR9
DL-3827	2	PAX	DL	3827	LAN	D	10:15	77%	59	35	24	76	CR9	1:00	DL-4002	2	PAX	DL	4002	BIS	D	11:15	73%	56	38	17	76	CR9
DL-4001	2	PAX	DL	4001	PIA	D	10:15	64%	49	36	13	76	CR9	1:05	DL-3830	2	PAX	DL	3830	YWG	P	11:20	95%	72	69	3	76	CR9
DL-3829	2	PAX	DL	3829	TYS	D	10:20	72%	54	32	22	76	CR9	1:00	DL-3832	2	PAX	DL	3832	YXE	I	11:20	90%	68	61	7	76	CR9
DL-3831	2	PAX	DL	3831	BNA	D	10:29	88%	67	34	33	76	CR9	0:56	DL-3904	2	PAX	DL	3904	ABR	D	11:25	75%	57	54	3	76	CR9
DL-3833	2	PAX	DL	3833	YYZ	P	10:32	96%	73	49	24	76	CR9	0:58	DL-3834	2	PAX	DL	3834	BIL	D	11:30	74%	56	45	11	76	CR9
DL-4015	2	PAX	DL	4015	RAP	D	10:41	89%	67	57	11	76	CR9	1:29	DL-4016	2	PAX	DL	4016	YEG	P	12:10	77%	58	50	8	76	CR9
DL-4017	2	PAX	DL	4017	CID	D	10:44	80%	61	53	7	76	CR9	2:01	DL-4018	2	PAX	DL	4018	BIS	D	12:45	77%	59	42	17	76	CR9
DL-4019	2	PAX	DL	4019	MOT	D	10:44	80%	61	48	13	76	CR9	2:01	DL-4020	2	PAX	DL	4020	DAY	D	12:45	75%	57	34	22	76	CR9
DL-3903	2	PAX	DL	3903	SBN	D	10:45	85%	65	39	26	76	CR9	2:00	DL-4022	2	PAX	DL	4022	FSD	D	12:45	83%	63	47	16	76	CR9
DL-40[illegible]	2	PAX	DL	40[illegible]	MDW	D	10:4[illegible]	87%	66	27	39	76	CR9	2:0[illegible]	DL-4028	2	PAX	DL	4028	DLH	D	12:50	73%	55	46	10	76	CR9

DL-3835	2	PAX	DL	3835	DFW	D	11:56	87%	66	26	40	76	CR9	0:58	DL-3836	2	PAX	DL	3836	ATW	D	12:54	80%	61	53	8	76	CR9
DL-3837	2	PAX	DL	3837	IND	D	12:00	96%	73	44	29	76	CR9	0:56	DL-3838	2	PAX	DL	3838	DFW	D	12:56	95%	72	27	45	76	CR9
DL-3905	2	PAX	DL	3905	INL	D	12:02	81%	62	46	16	76	CR9	1:13	DL-3912	2	PAX	DL	3912	SBN	D	13:15	84%	63	37	26	76	CR9
DL-3907	2	PAX	DL	3907	IMT	D	12:11	70%	53	40	13	76	CR9	1:19	DL-4036	2	PAX	DL	4036	XNA	D	13:30	74%	56	26	30	76	CR9
DL-4027	2	PAX	DL	4027	GFK	D	12:15	93%	71	58	12	76	CR9	1:15	DL-3914	2	PAX	DL	3914	TYS	D	13:30	71%	54	28	25	76	CR9
DL-3909	2	PAX	DL	3909	LNK	D	12:15	81%	62	45	17	76	CR9	1:18	DL-3840	2	PAX	DL	3840	DSM	D	13:33	87%	66	59	7	76	CR9
DL-3911	2	PAX	DL	3911	RHI	D	12:16	88%	67	57	9	76	CR9	1:24	DL-4038	2	PAX	DL	4038	RST	D	13:40	74%	56	49	7	76	CR9
DL-4035	2	PAX	DL	4035	MOT	D	12:34	72%	54	41	13	76	CR9	1:34	DL-3842	2	PAX	DL	3842	GRB	D	14:08	77%	59	50	9	76	CR9
DL-4037	2	PAX	DL	4037	ATW	D	12:44	76%	58	50	8	76	CR9	1:37	DL-3916	2	PAX	DL	3916	RHI	D	14:21	83%	63	54	9	76	CR9
DL-4041	2	PAX	DL	4041	RST	D	12:50	70%	53	47	6	76	CR9	1:32	DL-3918	2	PAX	DL	3918	LSE	D	14:22	79%	60	59	1	76	CR9
DL-3839	2	PAX	DL	3839	GRB	D	13:02	82%	62	54	9	76	CR9	1:23	DL-3920	2	PAX	DL	3920	BRD	D	14:25	75%	57	54	2	76	CR9
DL-3841	2	PAX	DL	3841	GRR	D	13:27	97%	74	60	14	76	CR9	1:03	DL-4042	2	PAX	DL	4042	CWA	D	14:30	51%	39	37	2	76	CR9
DL-3843	2	PAX	DL	3843	OMA	D	13:30	69%	52	37	15	76	CR9	1:00	DL-3844	2	PAX	DL	3844	BIL	D	14:30	86%	65	55	10	76	CR9
DL-3917	2	PAX	DL	3917	BJI	D	13:50	79%	60	55	5	76	CR9	1:10	DL-3846	2	PAX	DL	3846	YUL	P	15:00	94%	71	46	26	76	CR9
DL-3845	2	PAX	DL	3845	ATW	D	14:25	77%	59	52	7	76	CR9	0:40	DL-4054	2	PAX	DL	4054	ICT	D	15:05	78%	59	39	20	76	CR9
DL-3921	2	PAX	DL	3921	TVC	D	14:25	77%	58	43	16	76	CR9	0:45	DL-3924	2	PAX	DL	3924	IMT	D	15:10	70%	53	42	12	76	CR9
DL-4053	2	PAX	DL	4053	GFK	D	14:29	72%	55	39	15	76	CR9	0:41	DL-3926	2	PAX	DL	3926	MLI	D	15:10	74%	56	42	15	76	CR9
DL-3923	2	PAX	DL	3923	ABR	D	14:29	74%	56	53	3	76	CR9	0:42	DL-4058	2	PAX	DL	4058	TVC	D	15:11	54%	41	33	9	76	CR9
DL-3925	2	PAX	DL	3925	TUL	D	14:30	72%	54	36	18	76	CR9	0:45	DL-3848	2	PAX	DL	3848	HIB	D	15:15	51%	39	31	8	76	CR9
DL-4057	2	PAX	DL	4057	BIS	D	14:30	62%	47	35	12	76	CR9	0:45	DL-3928	2	PAX	DL	3928	LNK	D	15:15	81%	62	43	18	76	CR9
DL-4059	2	PAX	DL	4059	CHS	D	14:30	88%	67	34	33	76	CR9	0:59	DL-4060	2	PAX	DL	4060	GFK	D	15:29	80%	61	44	17	76	CR9
DL-4063	2	PAX	DL	4063	MDW	D	14:30	83%	63	20	42	76	CR9	1:06	DL-3850	2	PAX	DL	3850	GRB	D	15:36	79%	60	52	8	76	CR9
DL-3847	2	PAX	DL	3847	BDL	D	14:38	100%	76	54	22	76	CR9	1:00	DL-3852	2	PAX	DL	3852	ATW	D	15:38	77%	59	52	7	76	CR9
DL-3849	2	PAX	DL	3849	YYZ	P	14:45	85%	65	38	27	76	CR9	1:02	DL-3930	2	PAX	DL	3930	INL	D	15:47	70%	53	43	11	76	CR9
DL-3851	2	PAX	DL	3851	YWG	P	14:56	100%	76	76	-	76	CR9	0:53	DL-3854	2	PAX	DL	3854	DSM	D	15:49	85%	64	58	6	76	CR9
DL-3853	2	PAX	DL	3853	ATW	D	15:05	70%	53	45	8	76	CR9	0:53	DL-4064	2	PAX	DL	4064	CID	D	15:58	70%	53	46	8	76	CR9
DL-3855	2	PAX	DL	3855	YXE	I	16:35	84%	64	57	7	76	CR9	0:55	DL-3856	2	PAX	DL	3856	DSM	D	17:30	83%	63	57	6	76	CR9
DL-3857	2	PAX	DL	3857	BIL	D	16:41	88%	67	55	12	76	CR9	0:49	DL-3932	2	PAX	DL	3932	LSE	D	17:30	74%	56	55	1	76	CR9
DL-3859	2	PAX	DL	3859	DSM	D	16:43	92%	70	63	7	76	CR9	0:52	DL-4078	2	PAX	DL	4078	BIS	D	17:35	72%	54	40	15	76	CR9
DL-4077	2	PAX	DL	4077	GFK	D	16:44	81%	62	49	12	76	CR9	1:02	DL-3858	2	PAX	DL	3858	MEM	D	17:46	85%	65	39	26	76	CR9
DL-3931	2	PAX	DL	3931	LSE	D	16:49	85%	65	63	2	76	CR9	1:06	DL-4086	2	PAX	DL	4086	CHS	D	17:55	89%	67	34	34	76	CR9
DL-3933	2	PAX	DL	3933	BRD	D	16:55	82%	63	61	2	76	CR9	1:00	DL-4088	2	PAX	DL	4088	RAP	D	17:55	68%	52	39	13	76	CR9
DL-3935	2	PAX	DL	3935	SBN	D	16:58	86%	66	38	28	76	CR9	1:02	DL-3860	2	PAX	DL	3860	IND	D	18:00	81%	62	36	25	76	CR9
DL-4085	2	PAX	DL	4085	AZO	D	17:00	80%	61	39	22	76	CR9	1:00	DL-3934	2	PAX	DL	3934	GRR	D	18:00	78%	59	47	11	76	CR9
DL-4087	2	PAX	DL	4087	CWA	D	17:00	61%	46	42	5	76	CR9	1:00	DL-3862	2	PAX	DL	3862	BNA	D	18:00	92%	70	34	36	76	CR9
DL-3861	2	PAX	DL	3861	GRB	D	17:00	92%	70	60	9	76	CR9	1:00	DL-3864	2	PAX	DL	3864	YUL	P	18:00	93%	71	46	25	76	CR9
DL-3863	2	PAX	DL	3863	IAH	D	17:00	100%	76	35	41	76	CR9	1:00	DL-4090	2	PAX	DL	4090	DLH	D	18:00	66%	50	42	8	76	CR9
DL-4089	2	PAX	DL	4089	DAY	D	17:00	82%	62	40	22	76	CR9	2:30	DL-4096	2	PAX	DL	4096	SBN	D	19:30	86%	65	41	25	76	CR9
DL-4095	2	PAX	DL	4095	YEG	P	18:27	83%	63	55	8	76	CR9	1:08	DL-4098	2	PAX	DL	4098	FSD	D	19:35	95%	72	66	6	76	CR9
DL-4097	2	PAX	DL	4097	DAY	D	18:29	79%	60	38	22	76	CR9	1:06	DL-4100	2	PAX	DL	4100	ICT	D	19:35	81%	62	43	19	76	CR9
DL-4099	2	PAX	DL	4099	BIS	D	18:32	72%	55	42	13	76	CR9	1:03	DL-3938	2	PAX	DL	3938	LNK	D	19:35	87%	66	49	17	76	CR9
DL-3939	2	PAX	DL	3939	MLI	D	18:37	80%	61	43	18	76	CR9	1:03	DL-3940	2	PAX	DL	3940	XNA	D	19:40	76%	57	30	28	76	CR9
DL-3941	2	PAX	DL	3941	RHI	D	18:40	88%	67	57	10	76	CR9	1:15	DL-4102	2	PAX	DL	4102	TUL	D	19:55	74%	57	37	20	76	CR9
DL-3943	2	PAX	DL	3943	LNK	D	18:42	79%	60	42	19	76	CR9	1:18	DL-3944	2	PAX	DL	3944	MOT	D	20:00	81%	62	49	13	76	CR9
DL-4101	2	PAX	DL	4101	DLH	D	18:44	77%	58	46	13	76	CR9	1:31	DL-4106	2	PAX	DL	4106	FWA	D	20:15	72%	55	34	21	76	CR9
DL-3865	2	PAX	DL	3865	ATW	D	18:49	80%	61	52	9	76	CR9	1:34	DL-3866	2	PAX	DL	3866	TYS	D	20:23	70%	54	29	25	76	CR9
DL-3867	2	PAX	DL	3867	DSM	D	18:49	97%	74	66	7	76	CR9	1:36	DL-4108	2	PAX	DL	4108	TVC	D	20:25	81%	61	49	12	76	CR9
DL-3869	2	PAX	DL	3869	OMA	D	18:49	92%	70	53	17	76	CR9	1:37	DL-3946	2	PAX	DL	3946	LSE	D	20:26	82%	62	61	1	76	CR9
DL-4105	2	PAX	DL	4105	MDW	D	19:10	94%	71	25	47	76	CR9	1:20	DL-3948	2	PAX	DL	3948	HIB	D	20:30	53%	40	32	8	76	CR9
DL-4107	2	PAX	DL	4107	TVC	D	19:15	63%	48	36	11	76	CR9	1:15	DL-3950	2	PAX	DL	3950	MBS	D	20:30	69%	53	39	13	76	CR9
DL-4109	2	PAX	DL	4109	XNA	D	19:15	77%	59	29	30	76	CR9	1:15	DL-3952	2	PAX	DL	3952	MQT	D	20:30	81%	62	47	15	76	CR9
DL-4111	2	PAX	DL	4111	ICT	D	19:17	78%	60	37	22	76	CR9	1:14	DL-3868	2	PAX	DL	3868	IND	D	20:31	91%	69	46	23	76	CR9
DL-3871	2	PAX	DL	3871	BIL	D	19:18	90%	68	55	13	76	CR9	1:17	DL-4110	2	PAX	DL	4110	PIA	D	20:35	66%	51	36	15	76	CR9
DL-3873	2	PAX	DL	3873	SAT	D	19:23	80%	61	24	36	76	CR9	1:17	DL-3870	2	PAX	DL	3870	LAN	D	20:40	84%	64	42	22	76	CR9
DL-3945	2	PAX	DL	3945	INL	D	19:26	82%	62	45	17	76	CR9	1:19	DL-4112	2	PAX	DL	4112	XWA	D	20:45	65%	50	44	6	76	CR9
DL-3947	2	PAX	DL	3947	LAN	D	19:30	84%	64	39	25	76	CR9	1:16	DL-3872	2	PAX	DL	3872	CIU	D	20:46	72%	55	45	10	76	CR9
DL-3949	2	PAX	DL	3949	LSE	D	19:30	66%	50	48	2	76	CR9	1:30	DL-3874	2	PAX	DL	3874	MLI	D	21:00	73%	55	41	14	76	CR9
DL-3951	2	PAX	DL	3951	TYS	D	19:30	80%	61	38	23	76	CR9	2:25	DL-3876	2	PAX	DL	3876	MOT	D	21:55	70%	53	40	13	76	CR9
DL-3875	2	PAX	DL	3875	HIB	D	19:31	57%	43	33	11	76	CR9	2:24	DL-3954	2	PAX	DL	3954	RHI	D	21:55	79%	60	52	8	76	CR9
DL-4117	2	PAX	DL	4117	RIC	D	19:35	81%	62	31	31	76	CR9	2:24	DL-3878	2	PAX	DL	3878	ABR	D	21:59	75%	57	54	3	76	CR9
DL-3877	2	PAX	DL	3877	GRB	D	19:40	86%	66	56	10	76	CR9	2:20	DL-4118	2	PAX	DL	4118	RST	D	22:00	73%	55	50	6	76	CR9
DL-4119	2	PAX	DL	4119	TUL	D	19:42	69%	53	33	19	76	CR9	2:18	DL-3880	2	PAX	DL	3880	BRD	D	22:00	71%	54	52	2	76	CR9
DL-3879	2	PAX	DL	3879	DFW	D	19:46	100%	76	28	48	76	CR9	2:17	DL-3882	2	PAX	DL	3882	BJI	D	22:03	82%	62	57	5	76	CR9
DL-3959	2	PAX	DL	3959	CID	D	19:47	77%	58	50	8	76	CR9	2:23	DL-4120	2	PAX	DL	4120	YXE	I	22:10	89%	68	61	6	76	CR9
EI-1121	2	PAX	EI	1121	DUB	P	16:55	94%	174	17	156	184	32Q	1:50	EI-1122	2	PAX	EI	1122	DUB	P	18:45	95%	175	17	157	184	32Q
KL-1123	2	PAX	KL	1123	AMS	I	11:20	99%	340	238	102	344	781	3:40	KL-1124	2	PAX	KL	1124	AMS	I	15:00	100%	342	220	122	344	781
NK-1127	2	PAX	NK	1127	LAX	D	6:00	96%	143	-	143	150	319	1:00	NK-1128	2	PAX	NK	1128	ATL	D	7:00	93%	139	3	136	150	319
NK-1137	2	PAX	NK	1137	LAS	D	6:15	99%	180	0	180	182	32N	1:15	NK-1138	2	PAX	NK	1138	MYR	D	7:30	100%	181	-	181	182	32N
NK-1141	2	PAX	NK	1141	IAH	D	11:15	99%	226	16	210	228	3N1	1:00	NK-1142	2	PAX	NK	1142	DTW	D	12:15	79%	181	13	168	228	3N1
NK-1129	2	PAX	NK	1129	ATL	D	11:41	97%	146	2	143	150	319	0:49	NK-1130	2	PAX	NK	1130	DFW	D	12:30	92%	138	8	131	150	319
NK-1143	2	PAX	NK	1143	BWI	D	13:39	99%	226	0	225	228	3N1	0:51	NK-1144	2	PAX	NK	1144	DEN	D	14:30	100%	227	7	220	228	3N1
NK-1145	2	PAX	NK	1145	MCO	D	13:51	99%	226	4	222	228	3N1	1:09	NK-1146	2	PAX	NK	1146	MCO	D	15:00	100%	227	2	225	228	3N1
NK-1131	2	PAX	NK	1131	DFW	D	15:00	96%	143	0	143	150	319	2:00	NK-1132	2	PAX	NK	1132	ATL	D	17:00	93%	139	3	136	150	319
NK-1147	2	PAX	NK	1147	DTW	D	16:57	79%	180	10	170	228	3N1	0:50	NK-1148	2	PAX	NK	1148	BWI	D	17:47	100%	227	1	226	228	3N1
NK-1139	2	PAX	NK	1139	MYR	D	19:10	99%	180	4	176	182	32N	1:00	NK-1140	2	PAX	NK	1140	LAS	D	20:10	100%	181	7	174	182	32N
NK-1149	2	PAX	NK	1149	DEN	D	19:23	99%	226	5	221	228	3N1	0:50	NK-1150	2	PAX	NK	1150	IAH	D	20:13	100%	227	16	211	228	3N1
NK-1133	2	PAX	NK	1133	ATL	D	20:20	97%	146	2	143	150	319	1:15	NK-1134	2	PAX	NK	1134	DFW	D	21:35	92%	138	8	131	150	319
NK-1135	2	PAX	NK	1135	DFW	D	20:50	96%	143	0	143	150	319	1:00	NK-1136	2	PAX	NK	1136	LAX	D	21:50	96%	144	0	144	150	319
UA-1185	2	PAX	UA	1185	ORD	D	0:22	91%	150	6	144	166	7M8	4:38	UA-1186	2	PAX	UA	1186	ORD	D	5:00	91%	151	6	145	166	7M8
UA-1187	2	PAX	UA	1187	SFO	D	5:23	75%	124	10	114	166	7M8	1:02	UA-1188	2	PAX	UA	1188	SFO	D	6:25	75%	125	10	115	166	7M8
UA-1167	2	PAX	UA	1167	ORD	D	7:31	91%	118	5	113	130	223	1:04	UA-1168	2	PAX	UA	1168	ORD	D	8:35	91%	118	5	113	130	223
UA-1155	2	PAX	UA	1155	EWR	D	8:08	92%	100	2	98	109	221	0:37	UA-1156	2	PAX	UA	1156	EWR	D	8:45	88%	96	2	94	109	221
UA-1189	2	PAX	UA	1189	DEN	D	8:35	94%	156	3	153	166	7M8	0:52	UA-1190	2	PAX	UA	1190	DEN	D	9:27	92%	153	3	149	166	7M8
UA-1169	2	PAX	UA	1169	ORD	D	9:31	91%	118	5	113	130	223	0:49	UA-1170	2	PAX	UA	1170	ORD	D	10:20	91%	118	5	113	130	223
UA-1203	2	PAX	UA	1203	IAD	D	9:59	99%	75	1	74	76	E7W	1:11	UA-1204	2	PAX	UA	1204	EWR	D	11:10	88%	67	1	65	76	E7W
UA-1191	2	PAX	UA	1191	DEN	D	10:41	94%	156	3	153	166	7M8	0:44	UA-1192	2	PAX	UA	1192	DEN	D	11:25	92%	153	3	149	166	7M8
UA-1205	2	PAX	UA	1205	IAH	D	10:46	86%	65	1	64	76	E7W	1:29	UA-1206	2	PAX	UA	1206	IAD	D	12:15	100%	76	1	74	76	E7W
UA-1207	2	PAX	UA	1207	EWR	D	11:02	92%	70	1	68	76	E7W	1:08	UA-1208	2	PAX	UA	1208	EWR	D	12:10	88%	67	1	65	76	E7W
UA-1171	2	PAX	UA	1171	ORD	D	12:23	91%	118	5	113	130	223	1:00	UA-1172	2	PAX	UA	1172	ORD	D	13:23	91%	118	5	113	130	223
UA-1193	2	PAX	UA	1193	DEN	D	12:38	94%	156	3	153	166	7M8	0:37	UA-1194	2	PAX	UA	1194	DEN	D	13:15	92%	153	3	149	166	7M8
UA-1209	2	PAX	UA	1209	EWR	D	12:49	92%	70	1	68	76	E7W	1:21	UA-1210	2	PAX	UA	1210	IAH	D	14:10	93%	71	1	70	76	E7W
UA-1211	2	PAX	UA	1211	IAH	D	12:56	86%	65	1	64	76	E7W	5:03	UA-1212	2	PAX	UA	1212	IAH	D	17:59	93%	71	1	70	76	E7W
UA-1173	2	PAX	UA	1173	ORD	D	14:25	91%	118	5	113	130	223	0:52	UA-1174	2	PAX	UA	1174	ORD	D	15:17	91%	118	5	113	130	223
UA-1157	2	PAX	UA	1157	EWR	D	14:40	92%	100	2	98	109	221	0:55	UA-1158	2	PAX	UA	1158	EWR	D	15:35	88%	96	2	94	109	221
UA-1195	2	PAX	UA	1195	IAH	D	14:44	86%	143	2	141	166	7M8	1:16	UA-1196	2	PAX	UA	1196	IAH	D	16:00	93%	155	2	152	166	7M8
UA-1175	2	PAX	UA	1175	DEN	D	16:18	94%	122	2	120	130	223	0:42	UA-1176	2	PAX	UA	1176	ORD	D	17:00	91%	118	5	113	130	223
UA-1177	2	PAX	UA	1177	ORD	D	16:18	91%	118	5	113	130	223	0:46	UA-1178	2	PAX	UA	1178	DEN	D	17:04	92%	120	3	117	130	223
UA-1159	2	PAX	UA	1159	SFO	D	16:45	75%	81	6	75	109	221	1:15	UA-1160	2	PAX	UA	1160	SFO	D	18:00	75%	82	6	75	109	221
UA-1213	2	PAX	UA	1213	IAH	D	17:06	86%	65	1	64	76	E7W	1:19	UA-1214	2	PAX	UA	1214	ORD	D	18:25	91%	69	3	66	76	E7W
UA-1179	2	PAX	UA	1179	EWR	D	17:44	92%	119	2	117	130	223	1:01	UA-1180	2	PAX	UA	1180	EWR	D	18:45	88%	114	2	112	130	223
UA-1181	2	PAX	UA	1181	DEN	D	18:40	94%	122	2	120	130	223	0:50	UA-1182	2	PAX	UA	1182	DEN	D	19:30	92%	120	3	117	130	223
UA-1183	2	PAX	UA	1183	ORD	D	18:40	91%	179	8	172	198	7M1	1:30	UA-1184	2	PAX	UA	1184	ORD	D	20:10	91%	180	8	173	198	7M1
UA-1161	2	PAX	UA	1161	EWR	D	18:56	92%	100	2	98	109	221	1:14	UA-1162	2	PAX	UA	1162	EWR	D	20:10	88%	96	2	94	109	221
AA-1015	2	PAX	AA	1015	MIA	D	23:25	90%	98	1	97	109	221	TOW/RON	AA-1016	3	PAX	AA	1016	MIA	D	6:03	90%	98	1	97	109	221
AA-1017	2	PAX	AA	1017	DCA	D	23:44	87%	95	1	94	109	221	TOW/RON	AA-1018	3	PAX	AA	1018	DCA	D	6:59	86%	94	1	92	109	221
AA-1031	2	PAX	AA	1031	PHL	D	20:00	79%	127	2	125	160	73H	TOW/RON	AA-1032	3	PAX	AA	1032	CLT	D	5:01	84%	134	1	133	160	73H
AA-1033	2	PAX	AA	1033	PHX	D	20:00	88%	140	3	138	160	73H	TOW/RON	AA-1034	3	PAX	AA	1034	DFW	D	6:00	96%	153	2	151	160	73H
AA-1035	2	PAX	AA	1035	DFW	D	20:59	97%	155	3	153	160	73H	TOW/RON	AA-1036	3	PAX	AA	1036	ORD	D	6:00	86%	137	6	131	160	73H
AA-1037	2	PAX	AA	1037	ORD	D	22:08	91%	145	6	139	160	73H	TOW/RON	AA-1038	3	PAX	AA	1038	PHL	D	6:09	80%	128	2	126	160	73H
AA-1039	2	PAX	AA	1039	CLT	D	22:12	87%	140	1	139	160	73H	TOW/RON	AA-1040	3	PAX	AA	1040	CLT	D	6:26	84%	134	1	133	160	73H
AA-1041	2	PAX	AA	1041	PHL	D	22:27	79%	127	2	125	160	73H	TOW/RON	AA-1042	3	PAX	AA	1042	PHX	D	7:30	88%	141	4	137	160	73H
AA-1043	2	PAX	AA	1043	PHX	D	23:54	88%	140	3	138	160	73H	TOW/RON	AA-1044	3	PAX	AA	1044	DFW	D	8:33	96%	153	2	151	160	73H
AA-1045	2	PAX	AA	1045	CLT	D	23:56	87%	140	1	139	160	73H	TOW/RON	AA-1046	3	PAX	AA	1046	PHL	D	8:50	80%	128	2	126	160	73H
AA-1077	2	PAX	AA	1077	DFW	D	22:54	97%	167	3	164	172	7M8	TOW/RON	AA-1078	3	PAX	AA	1078	DFW	D	6:44	96%	164	2	162	172	7M8
AA-1081	2	PAX	AA	1081	LGA	D	22:14	73%	55	1	54	76	E75	TOW/RON	AA-1082	3	PAX	AA	1082	LGA	D	7:07	73%	56	1	55	76	E75
AC-1095	2	PAX	AC	1095	YYZ	P	20:34	92%	70	7	63	76	E75	TOW/RON	AC-1096	3	PAX	AC	1096	YYZ	P	6:30	93%	71	7	64	76	E75
AS-1111	2	PAX	AS	1111	SEA	D	23:02	90%	161	2	159	178	7M9	TOW/RON	AS-1112	3	PAX	AS	1112	SEA	D	6:49	88%	157	2	156	178	7M9
NK-1125	2	PAX	NK	1125	LAX	D	23:59	96%	143	-	143	150	319	TOW/RON	NK-1126	3	PAX	NK	1126	LAX	D	6:32	96%	144	0	144	150	319
UA-1151	2	PAX	UA	1151	IAD	D	19:45	99%	108	1	106	109	221	TOW/RON	UA-1152	3	PAX	UA	1152	IAH	D	8:00	93%	101	1	100	109	221
UA-1153	2	PAX	UA	1153	IAH	D	22:46	86%	94	1	92	109	221	TOW/RON	UA-1154	3	PAX	UA	1154	IAD	D	8:16	100%	108	2	106	109	221
UA-1163	2	PAX	UA	1163	ORD	D	22:48	91%	118	5	113	130	223	TOW/RON	UA-1164	3	PAX	UA	1164	DEN	D	6:00	92%	120	3	117	130	223
UA-1165	2	PAX	UA	1165	DEN	D	23:18	94%	122	2	120	130	223	TOW/RON	UA-1166	3	PAX	UA	1166	ORD	D	6:35	91%	118	5	113	130	223
UA-1197	2	PAX	UA	1197	ORD	D	19:32	91%	69	3	66	76	E7W	TOW/RON	UA-1198	3	PAX	UA	1198	EWR	D	6:00	88%	67	1	65	76	E7W
UA-1199	2	PAX	UA	1199	ORD	D	21:18	91%	69	3	66	76	E7W	TOW/RON	UA-1200	3	PAX	UA	1200	ORD	D	7:30	91%	69	3	66	76	E7W
UA-1201	2	PAX	UA	1201	EWR	D	23:14	92%	70	1	68	76	E7W	TOW/RON	UA-1202	3	PAX	UA	1202	IAH	D	11:15	93%	71	1	70	76	E7W
AA-1015	1	PAX	AA	1015	MIA	D	23:25	90%	98	1	97	109	221	TOW/RON	AA-1016	2	PAX	AA	1016	MIA	D	6:03	90%	98	1	97	109	221
AA-1017	1	PAX	AA	1017	DCA	D	23:44	87%	95	1	94	109	221	TOW/RON	AA-1018	2	PAX	AA	1018	DCA	D	6:59	86%	94	1	92	109	221
AA-1031	1	PAX	AA	1031	PHL	D	20:00	79%	127	2	125	160	73H	TOW/RON	AA-1032	2	PAX	AA	1032	CLT	D	5:01	84%	134	1	133	160	73H
AA-1033	1	PAX	AA	1033	PHX	D	20:00	88%	140	3	138	160	73H	TOW/RON	AA-1034	2	PAX	AA	1034	DFW	D	6:00	96%	153	2	151	160	73H
AA-1035	1	PAX	AA	1035	DFW	D	20:59	97%	155	3	153	160	73H	TOW/RON	AA-1036	2	PAX	AA	1036	ORD	D	6:00	86%	137	6	131	160	73H
AA-1037	1	PAX	AA	1037	ORD	D	22:08	91%	145	6	139	160	73H	TOW/RON	AA-1038	2	PAX	AA	1038	PHL	D	6:09	80%	128	2	126	160	73H
AA-1039	1	PAX	AA	1039	CLT	D	22:12	87%	140	1	139	160	73H	TOW/RON	AA-1040	2	PAX	AA	1040	CLT	D	6:26	84%	134	1	133	160	73H
AA-1041	1	PAX	AA	1041	PHL	D	22:27	79%	127	2	125	160	73H	TOW/RON	AA-1042	2	PAX	AA	1042	PHX	D	7:30	88%	141	4	137	160	73H
AA-1043	1	PAX	AA	1043	PHX	D	23:54	88%	140	3	138	160	73H	TOW/RON	AA-1044	2	PAX	AA	1044	DFW	D	8:33	96%	153	2	151	160	73H
AA-1045	1	PAX	AA	1045	CLT	D	23:56	87%	140	1	139	160	73H	TOW/RON	AA-1046	2	PAX	AA	1046	PHL	D	8:50	80%	128	2	126	160	73H
AA-1077	1	PAX	AA	1077	DFW	D	22:54	97%	167	3	164	172	7M8	TOW/RON	AA-1078	2	PAX	AA	1078	DFW	D	6:44	96%	164	2	162	172	7M8
AA-1081	1	PAX	AA	1081	LGA	D	22:14	73%	55	1	54	76	E75	TOW/RON	AA-1082	2	PAX	AA	1082	LGA	D	7:07	73%	56	1	55	76	E75
AC-1095	1	PAX	AC	1095	YYZ	P	20:34	92%	70	7	63	76	E75	TOW/RON	AC-1096	2	PAX	AC	1096	YYZ	P	6:30	93%	71	7	64	76	E75
AS-1111	1	PAX	AS	1111	SEA	D	23:02	90%	161	2	159	178	7M9	TOW/RON	AS-1112	2	PAX	AS	1112	SEA	D	6:49	88%	157	2	156	178	7M9
NK-1125	1	PAX	NK	1125	LAX	D	23:59	96%	143	-	143	150	319	TOW/RON	NK-1126	2	PAX	NK	1126	LAX	D	6:32	96%	144	0	144	150	319
UA-1151	1	PAX	UA	1151	IAD	D	19:45	99%	108	1	106	109	221	TOW/RON	UA-1152	2	PAX	UA	1152	IAH	D	8:00	93%	101	1	100	109	221
UA-1153	1	PAX	UA	1153	IAH	D	22:46	86%	94	1	92	109	221	TOW/RON	UA-1154	2	PAX	UA	1154	IAD	D	8:16	100%	108	2	106	109	221
UA-1163	1	PAX	UA	1163	ORD	D	22:48	91%	118	5	113	130	223	TOW/RON	UA-1164	2	PAX	UA	1164	DEN	D	6:00	92%	120	3	117	130	223
UA-1165	1	PAX	UA	1165	DEN	D	23:18	94%	122	2	120	130	223	TOW/RON	UA-1166	2	PAX	UA	1166	ORD	D	6:35	91%	118	5	113	130	223
UA-1197	1	PAX	UA	1197	ORD	D	19:32	91%	69	3	66	76	E7W	TOW/RON	UA-1198	2	PAX	UA	1198	EWR	D	6:00	88%	67	1	65	76	E7W
UA-1199	1	PAX	UA	1199	ORD	D	21:18	91%	69	3	66	76	E7W	TOW/RON	UA-1200	2	PAX	UA	1200	ORD	D	7:30	91%	69	3	66	76	E7W
UA-1201	1	PAX	UA	1201	EWR	D	23:14	92%	70	1	68	76	E7W	TOW/RON	UA-1202	2	PAX	UA	1202	IAH	D	11:15	93%	71	1	70	76	E7W
B6-2003	2	PAX	B6	2003	BOS	D	8:11	89%	134	1	133	150	320	1:26	B6-2004	2	PAX	B6	2004	BOS	D	9:37	91%	137	1	137	150	320
B6-2005	2	PAX	B6	2005	BOS	D	16:29	89%	134	1	133	150	320	0:41	B6-2006	2	PAX	B6	2006	BOS	D	17:10	91%	137	1	137	150	320
B6-2007	2	PAX	B6	2007	BOS	D	18:41	89%	134	1	133	150	320	0:34	B6-2008	2	PAX	B6	2008	BOS	D	19:15	91%	137	1	137	150	320
DE-2009	2	PAX	DE	2009	FRA	I	18:25	99%	288	1	287	291	788	2:05	DE-2010	2	PAX	DE	2010	FRA	I	20:30	100%	290	28	262	291	788
F9-2011	2	PAX	F9	2011	TTN	D	7:53	98%	225	3	222	230	321	0:50	F9-2012	2	PAX	F9	2012	DEN	D	8:43	88%	203	1	202	230	321
F9-2013	2	PAX	F9	2013	DEN	D	9:12	85%	196	1	195	230	321	0:40	F9-2014	2	PAX	F9	2014	CLE	D	9:52	99%	229	-	229	230	321
F9-2015	2	PAX	F9	2015	AUS	D	10:11	99%	227	2	225	230	321	0:50	F9-2016	2	PAX	F9	2016	AUS	D	11:01	100%	229	0	229	230	321
F9-2021	2	PAX	F9	2021	MCO	D	11:54	91%	164	-	164	180	32N	1:51	F9-2022	2	PAX	F9	2022	DEN	D	13:45	88%	159	1	158	180	32N
F9-2023	2	PAX	F9	2023	DEN	D	13:00	85%	153	1	153	180	32N	1:30	F9-2024	2	PAX	F9	2024	MCO	D	14:30	92%	165	-	165	180	32N
F9-2017	2	PAX	F9	2017	COS	D	15:23	99%	228	-	228	230	321	0:50	F9-2018	2	PAX	F9	2018	COS	D	16:13	100%	229	-	229	230	321
F9-2025	2	PAX	F9	2025	DEN	D	17:59	85%	153	1	153	180	32N	0:51	F9-2026	2	PAX	F9	2026	TTN	D	18:50	90%	162	-	162	180	32N
F9-2027	2	PAX	F9	2027	MCO	D	18:54	91%	164	-	164	180	32N	0:59	F9-2028	2	PAX	F9	2028	DEN	D	19:53	88%	159	1	158	180	32N
FI-2029	2	PAX	FI	2029	KEF	I	18:05	82%	181	1	180	220	7M9	1:15	FI-2030	2	PAX	FI	2030	KEF	I	19:20	83%	182	1	181	220	7M9
SY-2113	2	PAX	SY	2113	SFO	D	0:03	87%	162	-	162	186	738	6:57	SY-2114	2	PAX	SY	2114	EWR	D	7:00	92%	171	56	115	186	738
SY-2115	2	PAX	SY	2115	PHX	D	4:30	89%	165	37	129	186	738	2:35	SY-2116	2	PAX	SY	2116	BNA	D	7:05	88%	163	28	135	186	738
SY-2117	2	PAX	SY	2117	PDX	D	5:00	89%	165	53	112	186	738	2:05	SY-2118	2	PAX	SY	2118	ORD	D	7:05	88%	164	39	125	186	738
SY-2119	2	PAX	SY	2119	ANC	D	5:04	91%	170	56	114	186	738	2:06	SY-2120	2	PAX	SY	2120	DCA	D	7:10	92%	171	55	116	186	738
SY-2121	2	PAX	SY	2121	SEA	D	5:06	92%	172	82	90	186	738	2:19	SY-2122	2	PAX	SY	2122	PHL	D	7:25	91%	169	11	157	186	738
SY-2123	2	PAX	SY	2123	LAX	D	5:10	90%	168	43	124	186	738	2:20	SY-2124	2	PAX	SY	2124	DEN	D	7:30	92%	172	13	158	186	738
SY-2125	2	PAX	SY	2125	SAN	D	5:15	92%	171	49	122	186	738	2:50	SY-2126	2	PAX	SY	2126	LAS	D	8:05	91%	170	23	147	186	738
SY-2127	2	PAX	SY	2127	DCA	D	7:15	92%	172	56	116	186	738	1:15	SY-2128	2	PAX	SY	2128	BNA	D	8:30	88%	163	28	135	186	738
SY-2129	2	PAX	SY	2129	ORD	D	7:15	90%	168	42	126	186	738	1:15	SY-2130	2	PAX	SY	2130	LAX	D	8:30	92%	172	23	149	186	738
SY-2131	2	PAX	SY	2131	PHL	D	7:15	91%	169	53	116	186	738	1:15	SY-2132	2	PAX	SY	2132	PHX	D	8:30	89%	166	18	147	186	738
SY-2133	2	PAX	SY	2133	BOS	D	7:45	90%	167	59	109	186	738	0:45	SY-2134	2	PAX	SY	2134	SAN	D	8:30	92%	172	17	155	186	738
SY-2135	2	PAX	SY	2135	ATL	D	7:55	91%	170	24	146	186	738	0:55	SY-2136	2	PAX	SY	2136	AUS	D	8:50	92%	172	14	157	186	738
SY-2137	2	PAX	SY	2137	MCO	D	8:00	90%	167	31	137	186	738	0:50	SY-2138	2	PAX	SY	2138	SAT	D	8:50	91%	169	14	155	186	738
SY-2139	2	PAX	SY	2139	RSW	D	8:00	90%	168	29	139	186	738	1:15	SY-2140	2	PAX	SY	2140	PDX	D	9:15	91%	168	55	114	186	738
SY-2141	2	PAX	SY	2141	DEN	D	9:50	90%	167	24	143	186	738	3:40	SY-2142	2	PAX	SY	2142	BOS	D	13:30	90%	167	58	109	186	738
SY-2143	2	PAX	SY	2143	LAS	D	12:00	91%	170	65	104	186	738	1:30	SY-2144	2	PAX	SY	2144	MCO	D	13:30	89%	166	20	146	186	738
SY-2145	2	PAX	SY	2145	SAT	D	12:05	90%	168	20	147	186	738	1:25	SY-2146	2	PAX	SY	2146	PHL	D	13:30	91%	169	73	96	186	738
SY-2147	2	PAX	SY	2147	DEN	D	12:20	90%	167	24	143	186	738	1:10	SY-2148	2	PAX	SY	2148	RSW	D	13:30	90%	168	20	148	186	738
SY-2149	2	PAX	SY	2149	PHX	D	12:30	89%	165	37	129	186	738	1:05	SY-2150	2	PAX	SY	2150	ATL	D	13:35	90%	167	21	146	186	738
SY-2151	2	PAX	SY	2151	LAX	D	12:50	90%	168	43	124	186	738	[illegible]	SY-2152	2	PAX	SY	2152	DCA	D	13:35	92%	171	55	116	186	738

SY-2153	2	PAX	SY	2153	PDX	D	12:35	89%	165	53	112	186	738	1:10	SY-2154	2	PAX	SY	2154	BNA	D	13:45	88%	163	28	135	186	738
SY-2155	2	PAX	SY	2155	SFO	D	12:35	93%	174	82	92	186	738	2:20	SY-2156	2	PAX	SY	2156	ORD	D	14:55	88%	164	39	125	186	738
SY-2157	2	PAX	SY	2157	AUS	D	12:39	91%	170	20	150	186	738	2:21	SY-2158	2	PAX	SY	2158	SEA	D	15:00	92%	171	85	86	186	738
SY-2159	2	PAX	SY	2159	BOS	D	13:45	90%	167	59	109	186	738	1:25	SY-2160	2	PAX	SY	2160	SAN	D	15:10	92%	172	42	129	186	738
SY-2161	2	PAX	SY	2161	PHL	D	13:55	91%	169	53	116	186	738	1:20	SY-2162	2	PAX	SY	2162	SAT	D	15:15	91%	169	14	155	186	738
SY-2163	2	PAX	SY	2163	DCA	D	14:00	92%	172	56	116	186	738	1:15	SY-2164	2	PAX	SY	2164	SFO	D	15:15	93%	174	85	89	186	738
SY-2165	2	PAX	SY	2165	EWR	D	14:00	96%	178	112	66	186	738	1:20	SY-2166	2	PAX	SY	2166	AUS	D	15:20	92%	172	14	157	186	738
SY-2167	2	PAX	SY	2167	SEA	D	14:00	92%	172	82	90	186	738	1:25	SY-2168	2	PAX	SY	2168	LAX	D	15:25	92%	172	57	115	186	738
SY-2169	2	PAX	SY	2169	RSW	D	14:03	90%	168	29	139	186	738	1:27	SY-2170	2	PAX	SY	2170	BOS	D	15:30	90%	167	58	109	186	738
SY-2171	2	PAX	SY	2171	BNA	D	14:10	89%	166	31	135	186	738	1:20	SY-2172	2	PAX	SY	2172	EWR	D	15:30	92%	171	56	115	186	738
SY-2173	2	PAX	SY	2173	MCO	D	14:10	90%	167	31	137	186	738	1:20	SY-2174	2	PAX	SY	2174	LAS	D	15:30	91%	170	57	113	186	738
SY-2175	2	PAX	SY	2175	SFO	D	14:30	93%	174	82	92	186	738	2:00	SY-2176	2	PAX	SY	2176	ANC	D	16:30	92%	171	56	115	186	738
SY-2177	2	PAX	SY	2177	LAS	D	15:25	91%	170	65	104	186	738	2:00	SY-2178	2	PAX	SY	2178	PDX	D	17:25	91%	168	55	114	186	738
SY-2179	2	PAX	SY	2179	ORD	D	16:00	90%	168	42	126	186	738	3:00	SY-2180	2	PAX	SY	2180	ATL	D	19:00	90%	167	21	146	186	738
SY-2181	2	PAX	SY	2181	ATL	D	16:25	91%	170	24	146	186	738	2:35	SY-2182	2	PAX	SY	2182	PHL	D	19:00	91%	169	73	96	186	738
SY-2183	2	PAX	SY	2183	BNA	D	16:30	89%	166	31	135	186	738	2:30	SY-2184	2	PAX	SY	2184	RSW	D	19:00	90%	168	20	148	186	738
SY-2185	2	PAX	SY	2185	SAN	D	16:45	92%	171	49	122	186	738	2:20	SY-2186	2	PAX	SY	2186	DCA	D	19:05	92%	171	55	116	186	738
SY-2187	2	PAX	SY	2187	SAT	D	18:00	90%	168	20	147	186	738	1:15	SY-2188	2	PAX	SY	2188	MCO	D	19:15	89%	166	20	146	186	738
SY-2189	2	PAX	SY	2189	PDX	D	18:05	89%	165	53	112	186	738	1:10	SY-2190	2	PAX	SY	2190	ORD	D	19:15	88%	164	39	125	186	738
SY-2191	2	PAX	SY	2191	LAX	D	18:15	90%	168	43	124	186	738	2:20	SY-2192	2	PAX	SY	2192	LAS	D	20:35	91%	170	57	113	186	738
SY-2193	2	PAX	SY	2193	AUS	D	18:30	91%	170	20	150	186	738	2:05	SY-2194	2	PAX	SY	2194	PHX	D	20:35	89%	166	46	120	186	738
SY-2195	2	PAX	SY	2195	PHX	D	18:30	89%	165	37	129	186	738	2:15	SY-2196	2	PAX	SY	2196	SAN	D	20:45	92%	172	42	129	186	738
SY-2197	2	PAX	SY	2197	BNA	D	18:50	89%	166	31	135	186	738	2:00	SY-2198	2	PAX	SY	2198	LAX	D	20:50	92%	172	57	115	186	738
SY-2199	2	PAX	SY	2199	ORD	D	18:55	90%	168	42	126	186	738	2:00	SY-2200	2	PAX	SY	2200	SFO	D	20:55	93%	174	85	89	186	738
SY-2201	2	PAX	SY	2201	DCA	D	19:45	92%	172	56	116	186	738	1:15	SY-2202	2	PAX	SY	2202	DEN	D	21:00	92%	172	40	132	186	738
SY-2203	2	PAX	SY	2203	ATL	D	19:50	91%	170	24	146	186	738	1:15	SY-2204	2	PAX	SY	2204	SEA	D	21:05	92%	171	85	86	186	738
SY-2205	2	PAX	SY	2205	PHL	D	20:00	91%	169	53	116	186	738	1:10	SY-2206	2	PAX	SY	2206	PDX	D	21:10	91%	168	55	114	186	738
SY-2207	2	PAX	SY	2207	BOS	D	20:05	90%	167	59	109	186	738	1:40	SY-2208	2	PAX	SY	2208	AUS	D	21:45	92%	172	14	157	186	738
SY-2209	2	PAX	SY	2209	MCO	D	21:00	88%	163	-	163	186	738	1:00	SY-2210	2	PAX	SY	2210	PHX	D	22:00	89%	166	46	120	186	738
SY-2211	2	PAX	SY	2211	RSW	D	21:15	88%	164	-	164	186	738	0:45	SY-2212	2	PAX	SY	2212	SAT	D	22:00	91%	169	14	155	186	738
WN-2407	2	PAX	WN	2407	PHX	D	1:15	99%	141	2	140	143	73W	4:25	WN-2408	2	PAX	WN	2408	PHX	D	5:40	95%	136	3	134	143	73W
WN-2431	2	PAX	WN	2431	DEN	D	1:20	99%	173	3	170	175	7M8	6:10	WN-2432	2	PAX	WN	2432	DAL	D	7:30	96%	168	4	164	175	7M8
WN-2433	2	PAX	WN	2433	MDW	D	8:10	75%	132	2	130	175	7M8	0:45	WN-2434	2	PAX	WN	2434	DEN	D	8:55	97%	169	2	167	175	7M8
WN-2435	2	PAX	WN	2435	DEN	D	9:00	99%	173	3	170	175	7M8	0:45	WN-2436	2	PAX	WN	2436	MCI	D	9:45	95%	166	8	158	175	7M8
WN-2437	2	PAX	WN	2437	DAL	D	9:15	95%	167	3	164	175	7M8	0:45	WN-2438	2	PAX	WN	2438	DEN	D	10:00	97%	169	2	167	175	7M8
WN-2439	2	PAX	WN	2439	BNA	D	9:45	70%	122	1	122	175	7M8	0:45	WN-2440	2	PAX	WN	2440	DAL	D	10:30	96%	168	4	164	175	7M8
WN-2409	2	PAX	WN	2409	BWI	D	9:50	93%	133	1	132	143	73W	0:55	WN-2410	2	PAX	WN	2410	BWI	D	10:45	94%	134	1	133	143	73W
WN-2441	2	PAX	WN	2441	ATL	D	10:20	95%	166	1	165	175	7M8	0:45	WN-2442	2	PAX	WN	2442	MDW	D	11:05	75%	132	2	130	175	7M8
WN-2443	2	PAX	WN	2443	MDW	D	10:25	75%	132	2	130	175	7M8	0:45	WN-2444	2	PAX	WN	2444	DEN	D	11:10	97%	169	2	167	175	7M8
WN-2445	2	PAX	WN	2445	MCI	D	10:50	99%	173	6	168	175	7M8	0:45	WN-2446	2	PAX	WN	2446	STL	D	11:35	81%	141	4	137	175	7M8
WN-2411	2	PAX	WN	2411	STL	D	12:10	82%	117	2	115	143	73W	0:40	WN-2412	2	PAX	WN	2412	BNA	D	12:50	70%	101	1	100	143	73W
WN-2413	2	PAX	WN	2413	MDW	D	12:35	75%	107	2	106	143	73W	0:45	WN-2414	2	PAX	WN	2414	MDW	D	13:20	75%	108	1	106	143	73W
WN-2447	2	PAX	WN	2447	DEN	D	13:55	99%	173	3	170	175	7M8	0:45	WN-2448	2	PAX	WN	2448	DEN	D	14:40	97%	169	2	167	175	7M8
WN-2415	2	PAX	WN	2415	PHX	D	14:40	99%	141	2	140	143	73W	0:45	WN-2416	2	PAX	WN	2416	MDW	D	15:25	75%	108	1	106	143	73W
WN-2449	2	PAX	WN	2449	MDW	D	14:50	75%	132	2	130	175	7M8	0:45	WN-2450	2	PAX	WN	2450	ATL	D	15:35	96%	167	1	166	175	7M8
WN-2451	2	PAX	WN	2451	MDW	D	15:55	75%	132	2	130	175	7M8	1:05	WN-2452	2	PAX	WN	2452	MDW	D	17:00	75%	132	2	130	175	7M8
WN-2417	2	PAX	WN	2417	BNA	D	16:10	70%	100	1	99	143	73W	0:45	WN-2418	2	PAX	WN	2418	PHX	D	16:55	95%	136	3	134	143	73W
WN-2419	2	PAX	WN	2419	ATL	D	16:40	95%	136	1	135	143	73W	0:45	WN-2420	2	PAX	WN	2420	MCI	D	17:25	95%	136	7	129	143	73W
WN-2453	2	PAX	WN	2453	BWI	D	17:00	93%	163	2	161	175	7M8	0:45	WN-2454	2	PAX	WN	2454	BWI	D	17:45	94%	164	2	163	175	7M8
WN-2421	2	PAX	WN	2421	MDW	D	17:15	75%	107	2	106	143	73W	0:45	WN-2422	2	PAX	WN	2422	ATL	D	18:00	96%	137	1	136	143	73W
WN-2455	2	PAX	WN	2455	STL	D	17:35	82%	143	3	140	175	7M8	0:30	WN-2456	2	PAX	WN	2456	BNA	D	18:05	70%	123	1	122	175	7M8
WN-2457	2	PAX	WN	2457	DEN	D	18:30	99%	173	3	170	175	7M8	0:45	WN-2458	2	PAX	WN	2458	STL	D	19:15	81%	141	4	137	175	7M8
WN-2459	2	PAX	WN	2459	DAL	D	18:50	95%	167	3	164	175	7M8	0:45	WN-2460	2	PAX	WN	2460	MDW	D	19:35	75%	132	2	130	175	7M8
WN-2461	2	PAX	WN	2461	MDW	D	19:35	75%	132	2	130	175	7M8	0:45	WN-2462	2	PAX	WN	2462	DEN	D	20:20	97%	169	2	167	175	7M8
WN-2463	2	PAX	WN	2463	DEN	D	20:35	99%	173	3	170	175	7M8	0:45	WN-2464	2	PAX	WN	2464	MDW	D	21:20	75%	132	2	130	175	7M8
WN-2465	2	PAX	WN	2465	MDW	D	21:00	75%	132	2	130	175	7M8	0:45	WN-2466	2	PAX	WN	2466	PHX	D	21:45	95%	167	3	163	175	7M8
WN-2423	2	PAX	WN	2423	BWI	D	21:20	93%	133	1	132	143	73W	0:40	WN-2424	2	PAX	WN	2424	MDW	D	22:00	75%	108	1	106	143	73W
B6-2001	2	PAX	B6	2001	BOS	D	23:12	89%	134	1	133	150	320	TOW/RON	B6-2002	3	PAX	B6	2002	BOS	D	5:45	91%	137	1	137	150	320
F9-2019	2	PAX	F9	2019	CLE	D	21:30	91%	163	0	163	180	32N	TOW/RON	F9-2020	3	PAX	F9	2020	MCO	D	8:00	92%	165	-	165	180	32N
SY-2101	2	PAX	SY	2101	SEA	D	22:51	85%	159	-	159	186	738	TOW/RON	SY-2102	3	PAX	SY	2102	SFO	D	6:00	93%	174	-	174	186	738
SY-2103	2	PAX	SY	2103	EWR	D	23:00	87%	162	-	162	186	738	TOW/RON	SY-2104	3	PAX	SY	2104	SEA	D	6:10	92%	171	-	171	186	738
SY-2105	2	PAX	SY	2105	LAS	D	23:00	86%	159	-	159	186	738	TOW/RON	SY-2106	3	PAX	SY	2106	RSW	D	6:25	90%	168	20	148	186	738
SY-2107	2	PAX	SY	2107	SAT	D	23:10	89%	165	-	165	186	738	TOW/RON	SY-2108	3	PAX	SY	2108	MCO	D	6:40	89%	166	20	146	186	738
SY-2109	2	PAX	SY	2109	AUS	D	23:11	90%	168	-	168	186	738	TOW/RON	SY-2110	3	PAX	SY	2110	BOS	D	6:50	90%	167	58	109	186	738
SY-2111	2	PAX	SY	2111	SAN	D	23:30	89%	165	-	165	186	738	TOW/RON	SY-2112	3	PAX	SY	2112	ATL	D	7:00	90%	167	21	146	186	738
WN-2401	2	PAX	WN	2401	ATL	D	21:40	95%	136	1	135	143	73W	TOW/RON	WN-2402	3	PAX	WN	2402	BWI	D	6:45	94%	134	1	133	143	73W
WN-2403	2	PAX	WN	2403	STL	D	21:50	82%	117	2	115	143	73W	TOW/RON	WN-2404	3	PAX	WN	2404	STL	D	6:10	81%	116	4	112	143	73W
WN-2405	2	PAX	WN	2405	MCI	D	22:00	99%	142	5	137	143	73W	TOW/RON	WN-2406	3	PAX	WN	2406	ATL	D	6:30	96%	137	1	136	143	73W
WN-2425	2	PAX	WN	2425	DEN	D	22:45	99%	173	3	170	175	7M8	TOW/RON	WN-2426	3	PAX	WN	2426	MDW	D	5:30	75%	132	2	130	175	7M8
WN-2427	2	PAX	WN	2427	PHX	D	23:30	99%	173	2	171	175	7M8	TOW/RON	WN-2428	3	PAX	WN	2428	DEN	D	5:55	97%	169	2	167	175	7M8
WN-2429	2	PAX	WN	2429	MDW	D	23:50	75%	132	2	130	175	7M8	TOW/RON	WN-2430	3	PAX	WN	2430	MDW	D	7:00	75%	132	2	130	175	7M8
B6-2001	1	PAX	B6	2001	BOS	D	23:12	89%	134	1	133	150	320	TOW/RON	B6-2002	2	PAX	B6	2002	BOS	D	5:45	91%	137	1	137	150	320
F9-2019	1	PAX	F9	2019	CLE	D	21:30	91%	163	0	163	180	32N	TOW/RON	F9-2020	2	PAX	F9	2020	MCO	D	8:00	92%	165	-	165	180	32N
SY-2101	1	PAX	SY	2101	SEA	D	22:51	85%	159	-	159	186	738	TOW/RON	SY-2102	2	PAX	SY	2102	SFO	D	6:00	93%	174	-	174	186	738
SY-2103	1	PAX	SY	2103	EWR	D	23:00	87%	162	-	162	186	738	TOW/RON	SY-2104	2	PAX	SY	2104	SEA	D	6:10	92%	171	-	171	186	738
SY-2105	1	PAX	SY	2105	LAS	D	23:00	86%	159	-	159	186	738	TOW/RON	SY-2106	2	PAX	SY	2106	RSW	D	6:25	90%	168	20	148	186	738
SY-2107	1	PAX	SY	2107	SAT	D	23:10	89%	165	-	165	186	738	TOW/RON	SY-2108	2	PAX	SY	2108	MCO	D	6:40	89%	166	20	146	186	738
SY-2109	1	PAX	SY	2109	AUS	D	23:11	90%	168	-	168	186	738	TOW/RON	SY-2110	2	PAX	SY	2110	BOS	D	6:50	90%	167	58	109	186	738
SY-2111	1	PAX	SY	2111	SAN	D	23:30	89%	165	-	165	186	738	TOW/RON	SY-2112	2	PAX	SY	2112	ATL	D	7:00	90%	167	21	146	186	738
WN-2401	1	PAX	WN	2401	ATL	D	21:40	95%	136	1	135	143	73W	TOW/RON	WN-2402	2	PAX	WN	2402	BWI	D	6:45	94%	134	1	133	143	73W
WN-2403	1	PAX	WN	2403	STL	D	21:50	82%	117	2	115	143	73W	TOW/RON	WN-2404	2	PAX	WN	2404	STL	D	6:10	81%	116	4	112	143	73W
WN-2405	1	PAX	WN	2405	MCI	D	22:00	99%	142	5	137	143	73W	TOW/RON	WN-2406	2	PAX	WN	2406	ATL	D	6:30	96%	137	1	136	143	73W
WN-2425	1	PAX	WN	2425	DEN	D	22:45	99%	173	3	170	175	7M8	TOW/RON	WN-2426	2	PAX	WN	2426	MDW	D	5:30	75%	132	2	130	175	7M8
WN-2427	1	PAX	WN	2427	PHX	D	23:30	99%	173	2	171	175	7M8	TOW/RON	WN-2428	2	PAX	WN	2428	DEN	D	5:55	97%	169	2	167	175	7M8
WN-2429	1	PAX	WN	2429	MDW	D	23:50	75%	132	2	130	175	7M8	TOW/RON	WN-2430	2	PAX	WN	2430	MDW	D	7:00	75%	132	2	130	175	7M8
										39,876	62,063														40,259	61,614		

	2	CHT	SCX	9901	CID		1:06	88%	148	-	148	168	738	0:59								2:06						
	2	CHT	SCX	9903	BIF		3:04	88%	148	-	148	168	738	0:59								4:04						
	2	CHT	SCX	9905	BTR		3:25	88%	148	-	148	168	738	1:00								4:25						
	2	CHT	SCX	9907	BIF		4:50	88%	148	-	148	168	738	0:59								5:50						
	2	CHT	SCX	9909	EAU		12:15	88%	148	-	148	168	738	1:48		2	CHT	SCX	9910	POB		14:04	89%	149	-	149	168	738
	Prior Day						0:00							6:45		2	CHT	SKW		MKE		6:45						CRJ7
	Prior Day						0:00							16:46		2	CHT	SKW		OKC		16:46						E75L
	2	CHT	SKW		MKE		20:21						CRJ9	3:38		Next Day						23:59						
	2	CHT	RPA		STL		17:27						E75L	6:32		Next Day						23:59						
	2	CHT	RPA		CVG		21:22						E170	2:37		Next Day						23:59						
	Prior Day						0:00							7:58		2	CHT	DAL		DTW		7:58						MD90
	Prior Day						0:00							19:23		2	CHT	UAL		CHS		19:23						A319

	Prior Day						0:00							9:30		2	AT	DKT		TVF		9:30						SW4
	2	AT	DKT		TVF		16:00						SW4	7:58		Next Day						23:59						
	Prior Day						0:00							9:16		2	AT	DOW		PSF		9:16						C56X
	2	AT	DOW		PSF		17:57						C56X	6:01		Next Day						23:59						
	Prior Day						0:00							12:52		2	AT	DOW		ATW		12:52						CL30
	2	AT	EDG		YYZ		8:15						G280	15:44		Next Day						23:59						
	2	AT	EDG		SNA		21:17						GLF4	2:41		Next Day						23:59						
	Prior Day						0:00							12:19		2	AT	EDG		GYY		12:19						GLF4
	2	AT	EJA		BJC		11:46						C56X	1:00		2	AT	EJA		AXN		12:46						C56X
	2	AT	EJA		PHL		11:57						C56X	12:01		Next Day						23:59						
	2	AT	EJA		APA		16:56						C56X	7:02		Next Day						23:59						
	Prior Day						0:00							12:40		2	AT	EJA		MKE		12:40						C68A
	2	AT	EJA		GPZ		17:45						C68A	2:07		2	AT	EJA		STL		19:52						C68A
	Prior Day						0:00							8:55		2	AT	EJA		BZN		8:55						CL35
	2	AT	EJA		LAS		14:24						C750	9:34		Next Day						23:59						
	Prior Day						0:00							7:01		2	AT	EJA		SDF		7:01						E55P
	Prior Day						0:00							10:35		2	AT	EJA		IMT		10:35						E55P
	2	AT	EJA		TEB		9:55						GLEX	1:00		2	AT	EJA		SFO		10:55						GLEX
	Prior Day						0:00							0:19		2	AT	EJM		YNG		0:19						CL30
	2	AT	EJM		DPA		12:12						C680	11:46		Next Day						23:59						
	2	AT	EJM		OAK		23:55						CL30	0:03		Next Day						23:59						
	2	AT	ERY		CAK		15:22						H25B	0:32		2	AT	ERY		MKE		15:55						H25B
	Prior Day						0:00							14:22		2	AT	FLC		MWM		14:22						CL60
	2	AT	GAJ		PWK		17:05						B350	1:00		2	AT	GAJ		PWK		18:05						B350
	2	AT	GDG		JWN		16:36						LJ55	7:22		Next Day						23:59						
	2	AT	GJS		MTJ		19:07						CRJ7	4:51		Next Day						23:59						
	2	AT	JAS		MDW		9:14						CL60	7:54		2	AT	JAS		MMU		17:08						CL60
	2	AT	LXJ		YWG		11:49						CL30	2:05		2	AT	LXJ		SBM		13:54						CL30
	2	AT	LXJ		PTK		13:07						CL30	10:51		Next Day						23:59						
	Prior Day						0:00							12:05		2	AT	LXJ		SUS		12:05						E545
	2	AT	LXJ		DSM		11:29						GLF4	8:06		2	AT	LXJ		YUL		19:35						GLF4
	Prior Day						0:00							15:08		2	AT	PWA		COS		15:08						C56X
	Prior Day						0:00							15:01		2	AT	SIS		SBA		15:01						CL30
	Prior Day						0:00							9:29		2	AT	TFF		TQPF		9:29						HA4T
	2	AT	XOJ		RST		17:12						C750	6:46		Next Day						23:59						
	2	AT	XOJ		APA		12:20						CL30	1:00		2	AT	XOJ		SSI		13:20						CL30

	Prior Day						0:00							6:54		2	CGO	BMJ		GPZ		6:54						BE65
	Prior Day						0:00							7:02		2	CGO	BMJ		RPD		7:02						BE65
	Prior Day						0:00							7:02		2	CGO	BMJ		MML		7:02						BE99
	Prior Day						0:00							7:03		2	CGO	BMJ		MOX		7:03						BE80
	Prior Day						0:00							7:05		2	CGO	BMJ		RHI		7:05						BE99
	Prior Day						0:00							7:08		2	CGO	BMJ		BJI		7:08						BE99
	Prior Day						0:00							7:10		2	CGO	BMJ		BDE		7:10						BE80
	Prior Day						0:00							7:13		2	CGO	BMJ		EVM		7:13						BE99
	Prior Day						0:00							7:14		2	CGO	BMJ		FFM		7:14						BE99
	Prior Day						0:00							7:15		2	CGO	BMJ		HIB		7:15						BE99
	Prior Day						0:00							7:19		2	CGO	BMJ		DTL		7:19						BE65
	Prior Day						0:00							7:20		2	CGO	BMJ		AXN		7:20						BE65
	Prior Day						0:00							7:22		2	CGO	BMJ		ADC		7:22						BE80
	Prior Day						0:00							7:32		2	CGO	BMJ		BRD		7:32						BE65
	2	CGO	BMJ		MOX		9:10						BE80	14:48		Next Day						23:59						
	2	CGO	BMJ		ADC		9:59						BE80	13:59		Next Day						23:59						
	2	CGO	BMJ		BJI		19:34						BE99	4:24		Next Day						23:59						
	2	CGO	BMJ		MML		19:48						BE99	4:10		Next Day						23:59						
	2	CGO	BMJ		RHI		19:55						BE99	4:04		Next Day						23:59						
	2	CGO	BMJ		FFM		20:04						BE80	3:54		Next Day						23:59						
	2	CGO	BMJ		BDE		20:05						BE80	3:54		Next Day						23:59						
	2	CGO	BMJ		AXN		20:12						BE65	3:46		Next Day						23:59						
	2	CGO	BMJ		HIB		20:20						BE99	3:39		Next Day						23:59						
	2	CGO	BMJ		RPD		20:20						BE65	3:38		Next Day						23:59						
	2	CGO	BMJ		GPZ		20:23						BE99	3:35		Next Day						23:59						
	2	CGO	BMJ		TVF		20:29						BE99	3:29		Next Day						23:59						
	2	CGO	BMJ		BRD		20:32						BE65	3:26		Next Day						23:59						
	2	CGO	BMJ		BRD		20:40						BE65	3:18		Next Day						23:59						
	Prior Day						0:00							6:54		2	CGO	BMJ		LSE		6:54						SW4
	Prior Day						0:00							7:18		2	CGO	BMJ		GPZ		7:18						SW4
	2	CGO	BMJ		TVF		19:52						SW4	4:06		Next Day						23:59						
	2	CGO	BMJ		DLH		19:59						SW4	3:59		Next Day						23:59						
	2	CGO	BMJ		LSE		20:01						SW4	3:57		Next Day						23:59						
	2	CGO	CKS		DTW		8:06						B763	13:27		2	CGO	CKS		DTW		21:33						B763
	2	CGO	FDX		IND		4:33						B752	16:56		2	CGO	FDX		IND		21:29						B752
	2	CGO	FDX		EWR		4:50						B752	16:50		2	CGO	FDX		EWR		21:40						B752
	2	CGO	FDX		IND		5:23						B763	2:10		2	CGO	FDX		MEM		7:33						B763
	2	CGO	FDX		AFW		5:36						B763	3:02		2	CGO	FDX		MEM		8:38						B763
	2	CGO	FDX		OAK		5:55						B763	14:35		2	CGO	FDX		OAK		20:30						B763
	2	CGO	FDX		MEM		17:35						B763	4:15		2	CGO	FDX		IND		21:51						B763
	2	CGO	FDX		MEM		18:28						B763	3:38		2	CGO	FDX		AFW		22:06						B763
	2	CGO	FDX		MEM		[illegible]						B77F	[illegible]		2	CGO	FDX		MEM		21:46						[illegible]

2	CGO	FDX	MEM	5:19	MD11	2:17	2	CGO	FDX	MEM	7:36	MD11
2	CGO	GTI	ANC	6:30	B748	5:45	2	CGO	GTI	ANC	12:15	B748
2	CGO	GTI	BWI	3:30	B763	2:16	2	CGO	GTI	CVG	5:47	B763
Prior Day				0:00		7:01	2	CGO	MTN	DLH	7:01	AT43
2	CGO	MTN	DLH	8:48	AT43	1:02	2	CGO	MTN	DLH	9:50	AT43
2	CGO	MTN	DLH	20:26	AT43	3:32	Next Day				23:59	
2	CGO	PAC	EDDP	12:03	B748	11:55	Next Day				23:59	
2	CGO	TSU	MEM	3:56	CRJ2	0:39	2	CGO	TSU	TVF	4:35	CRJ2
2	CGO	UPS	SDF	16:43	B748	5:03	2	CGO	UPS	SDF	21:47	B748
Prior Day				0:00		6:27	2	CGO	UPS	YWG	6:27	B752
2	CGO	UPS	SDF	3:17	B752	3:17	2	CGO	UPS	MEM	6:35	B752
2	CGO	UPS	PHL	4:36	B752	15:56	2	CGO	UPS	PIA	20:33	B752
2	CGO	UPS	RFD	4:03	B763	17:50	2	CGO	UPS	RFD	21:54	B763
2	CGO	UPS	ONT	6:10	B763	14:45	2	CGO	UPS	ONT	20:55	B763
2	CGO	UPS	SDF	17:39	B763	3:55	2	CGO	UPS	PHL	21:35	B763
2	CGO	UPS	SDF	20:14	B763	3:44	Next Day				23:59	
2	CGO	UPS	SDF	5:10	MD11	2:09	2	CGO	UPS	SDF	7:20	MD11
Prior Day				0:00		7:24	2	GA	N13	MKC	7:24	C680
Prior Day				0:00		6:53	2	GA	N48	CMA	6:53	C750
Prior Day				0:00		15:27	2	GA	N45	CRQ	15:27	GLF4
Prior Day				0:00		6:41	2	GA	N25	ICT	6:41	GLF5
Prior Day				0:00		17:10	2	GA	N60	MDW	17:10	GLF5
2	GA	N65	RRT	6:59	B190	0:29	2	GA	N65	RRT	7:28	B190
2	GA	N57	MBS	7:14	F2TH	2:18	2	GA	N57	MBS	9:32	F2TH
2	GA	N47	UNK	7:30	PC12	0:58	2	GA	N47	UNK	8:29	PC12
2	GA	N40	BED	8:15	FA50	1:00	2	GA	N40	DVT	9:15	FA50
2	GA	N78	MSN	8:17	LJ40	6:09	2	GA	N78	MSN	14:26	LJ40
2	GA	N42	BJC	9:19	F2TH	9:53	2	GA	N42	TEB	19:12	F2TH
2	GA	N80	PNE	9:25	CL60	7:53	2	GA	N80	BZN	17:18	CL60
2	GA	N40	MSN	9:30	BE55	13:20	2	GA	N40	MSN	22:50	BE55
2	GA	N84	FCM	9:32	BE20	0:25	2	GA	N84	BCK	9:58	BE20
2	GA	N83	MVY	9:49	C56X	7:44	2	GA	N83	MVY	17:34	C56X
2	GA	N45	RKD	9:50	CL35	3:16	2	GA	N45	SFO	13:06	CL35
2	GA	N95	UNK	10:24	C208	0:50	2	GA	N95	UNK	11:14	C208
2	GA	N47	UNK	11:11	PC12	12:47	Next Day				23:59	
2	GA	N51	STE	12:25	F2TH	2:43	2	GA	N51	STE	15:08	F2TH
2	GA	N91	ACY	12:43	LJ60	4:44	2	GA	N91	FTY	17:28	LJ60
2	GA	N19	UNK	12:55	C208	2:05	2	GA	N19	UNK	15:00	C208
2	GA	N65	RRT	12:57	B190	0:34	2	GA	N65	RRT	13:31	B190
2	GA	NXX	UNK	13:07	C560	1:58	2	GA	NXX	UNK	15:05	C560
2	GA	N85	VNY	13:12	GLEX	5:51	2	GA	N85	VNY	19:04	GLEX
2	GA	N16	UNK	13:30	B190	2:17	2	GA	N16	UNK	15:47	B190
2	GA	N66	FAR	13:35	C56X	0:41	2	GA	N66	MKE	14:16	C56X
2	GA	NXY	UNK	13:51	C560	1:54	2	GA	NXY	UNK	15:46	C560
2	GA	N46	YIP	13:58	H25B	0:43	2	GA	N46	LAS	14:42	H25B
2	GA	N40	FFC	14:40	C25B	1:00	2	GA	N40	FFC	15:40	C25B
2	GA	N57	MBS	14:43	F2TH	0:23	2	GA	N57	MBS	15:07	F2TH
2	GA	N40	DLH	15:35	SF50	1:00	2	GA	N40	TYS	16:35	SF50
2	GA	N7R	OLV	15:37	B350	8:21	Next Day				23:59	
2	GA	N85	SUS	16:30	FA50	0:22	2	GA	N85	SUS	16:52	FA50
2	GA	N68	RRT	16:41	B190	0:42	2	GA	N68	RRT	17:24	B190
2	GA	N11	MKE	17:15	H25B	6:43	Next Day				23:59	
2	GA	N53	DSM	17:18	C25B	4:37	2	GA	N53	DSM	21:56	C25B
2	GA	N40	COE	17:24	C680	0:27	2	GA	N40	APA	17:51	C680
2	GA	N25	ICT	17:46	GLF5	6:12	Next Day				23:59	
2	GA	N65	RRT	17:51	B190	6:07	Next Day				23:59	
2	GA	N40	SAN	18:20	GLF4	1:00	2	GA	N40	HEF	19:20	GLF4
2	GA	N71	ABR	20:30	C56X	3:28	Next Day				23:59	
2	GA	N84	TVF	20:41	BE20	0:31	2	GA	N84	FCM	21:12	BE20
2	GA	N43	BDH	23:22	M20P	0:36	Next Day				23:59	
Prior Day				0:00		9:45	2	MIL	MIL	UNK	9:45	C130
2	MIL	MIL	UNK	11:27	C130	0:46	2	MIL	MIL	UNK	12:13	C130
2	MIL	MIL	UNK	12:24	K35R	1:28	2	MIL	MIL	UNK	13:53	K35R
2	MIL	MIL	UNK	14:36	C130	3:12	2	MIL	MIL	UNK	17:48	C130
Prior Day				0:00		18:44	2	MIL	MIL	UNK	18:44	C130
Prior Day				0:00		18:59	2	MIL	MIL	UNK	18:59	C130
2	MIL	MIL	UNK	19:04	C130	4:54	Next Day				23:59	
2	MIL	MIL	UNK	20:17	C130	3:42	Next Day				23:59	
2	MIL	MIL	UNK	21:22	C130	2:36	Next Day				23:59	

PAL 3 Alternate 3.1A Spring

A_CODE	A_MAI	A_ORG	A_D/I	A_FLT#	A_TIME	A_EQP	A_STS	A_LF	A_PAX	A_O&D	A_CX	A_GATE	CONCOURSE	G_TIME	D_CODE	D_MAI	D_DST	D_D/I	D_FLT#	D_TIME	D_EQP	D_STS	D_LF	D_PAX	D_O&D	D_CX	D_GATE	CONCOURSE
Arr-3E-3029	3E	MCW	D	3029	10:25	CNC	8	54.2%	4	4	0	B15b	B	0:45	Dep-3E-3030	3E	MCW	D	3030	11:10	CNC	8	48.4%	4	4	0	B15b	B
Arr-3E-3031	3E	IWD	D	3031	13:05	CNC	8	83.5%	7	7	0	B15b	B	1:40	Dep-3E-3032	3E	IWD	D	3032	14:45	CNC	8	69.7%	6	6	0	B15b	B
Arr-3E-3033	3E	FOD	D	3033	14:05	CNC	8	61.9%	5	5	0	B15a	B	1:25	Dep-3E-3034	3E	FOD	D	3034	15:30	CNC	8	60.8%	5	5	0	B15a	B
Arr-3E-3035	3E	MCW	D	3035	15:15	CNC	8	54.2%	4	4	0	B15b	B	0:45	Dep-3E-3036	3E	MCW	D	3036	16:00	PL2	8	48.4%	4	4	0	B15b	B
Arr-4B-3037	4B	TVF	D	3037	7:45	PL2	8	56.4%	5	4	0	B15c	B	0:40	Dep-4B-3038	4B	TVF	D	3038	8:25	PL2	8	59.7%	5	5	0	B15c	B
Arr-4B-3039	4B	TVF	D	3039	11:25	PL2	8	56.4%	5	4	0	B15c	B	3:05	Dep-4B-3040	4B	TVF	D	3040	14:30	PL2	8	59.7%	5	5	0	B15c	B
Arr-4B-3041	4B	TVF	D	3041	17:30	PL2	8	56.4%	5	4	0	B15c	B	0:40	Dep-4B-3042	4B	TVF	D	3042	18:10	PL2	8	59.7%	5	5	0	B15c	B
Arr-AA-2015	AA	PHL	D	2015	22:51	221	109	76.0%	83	80	2	H40	H	TOW/RON	Dep-AA-2018	AA	PHL	D	2018	11:30	221	109	82.3%	90	88	2	H37	H
Arr-AA-2017	AA	PHL	D	2017	10:37	221	109	76.0%	83	80	2	H39	H	1:30	Dep-AA-2020	AA	ORD	D	2020	12:07	221	109	98.7%	108	104	3	H39	H
Arr-AA-2019	AA	MIA	D	2019	11:35	221	109	90.5%	99	97	2	H42	H	0:39	Dep-AA-2022	AA	MIA	D	2022	12:14	221	109	95.0%	104	102	1	H42	H
Arr-AA-2021	AA	ORD	D	2021	11:36	221	109	94.4%	103	99	4	H40	H	0:48	Dep-AA-2024	AA	DCA	D	2024	12:24	221	109	77.9%	85	83	1	H40	H
Arr-AA-2023	AA	DCA	D	2023	11:51	221	109	70.5%	77	75	2	H36	H	4:09	Dep-AA-2026	AA	ORD	D	2026	16:00	221	109	98.7%	108	104	3	H36	H
Arr-AA-2025	AA	ORD	D	2025	15:30	221	109	94.4%	103	99	4	H42	H	2:10	Dep-AA-2028	AA	MIA	D	2028	17:40	221	109	85.6%	93	93	1	H42	H
Arr-AA-2027	AA	MIA	D	2027	17:00	221	109	86.3%	94	92	2	H36	H	TOW/RON	Dep-AA-2016	AA	PHL	D	2016	6:07	221	109	82.3%	90	88	2	H39	H
Arr-AA-2031	AA	DFW	D	2031	21:01	73H	160	88.1%	141	137	4	H38	H	TOW/RON	Dep-AA-2032	AA	CLT	D	2032	5:01	73H	160	82.0%	131	131	1	H34	H
Arr-AA-2033	AA	CLT	D	2033	22:12	73H	160	86.6%	138	137	2	H37	H	TOW/RON	Dep-AA-2034	AA	DFW	D	2034	5:07	73H	160	89.1%	142	140	2	H37	H
Arr-AA-2035	AA	DFW	D	2035	23:16	73H	160	88.1%	141	137	4	H42	H	TOW/RON	Dep-AA-2036	AA	DFW	D	2036	6:51	73H	160	89.1%	142	140	2	H34	H
Arr-AA-2037	AA	ORD	D	2037	8:36	73H	160	76.3%	122	117	5	H42	H	0:46	Dep-AA-2038	AA	ORD	D	2038	9:22	73H	160	95.7%	153	149	5	H42	H
Arr-AA-2039	AA	CLT	D	2039	9:27	73H	160	74.2%	119	116	3	H36	H	0:45	Dep-AA-2040	AA	CLT	D	2040	10:12	73H	160	92.1%	147	146	2	H36	H
Arr-AA-2041	AA	DFW	D	2041	9:43	73H	160	88.1%	141	137	4	H40	H	1:24	Dep-AA-2042	AA	DFW	D	2042	11:07	73H	160	89.1%	142	140	2	H40	H
Arr-AA-2043	AA	DFW	D	2043	12:38	73H	160	97.8%	157	152	5	H41	H	0:41	Dep-AA-2044	AA	DFW	D	2044	13:19	73H	160	96.5%	154	152	2	H41	H
Arr-AA-2045	AA	DFW	D	2045	14:36	73H	160	88.1%	141	137	4	H40	H	0:46	Dep-AA-2046	AA	DFW	D	2046	15:22	73H	160	89.1%	142	140	2	H40	H
Arr-AA-2047	AA	CLT	D	2047	15:03	73H	160	74.2%	119	116	3	H39	H	0:45	Dep-AA-2048	AA	CLT	D	2048	15:48	73H	160	92.1%	147	146	2	H39	H
Arr-AA-2049	AA	DFW	D	2049	15:30	73H	160	97.1%	155	151	4	H37	H	1:20	Dep-AA-2050	AA	DFW	D	2050	16:50	73H	160	95.5%	153	151	2	H37	H
Arr-AA-2051	AA	CLT	D	2051	16:32	73H	160	87.8%	140	138	2	H39	H	0:58	Dep-AA-2052	AA	CLT	D	2052	17:30	73H	160	85.3%	136	135	1	H39	H
Arr-AA-2059	AA	ORD	D	2059	21:56	7M8	172	89.0%	153	147	6	H36	H	TOW/RON	Dep-AA-2060	AA	PHX	D	2060	5:05	7M8	172	94.0%	162	159	3	H36	H
Arr-AA-2061	AA	MIA	D	2061	23:24	7M8	172	94.2%	162	159	3	H43	H	TOW/RON	Dep-AA-2062	AA	MIA	D	2062	5:07	7M8	172	96.6%	166	164	2	H43	H
Arr-AA-2063	AA	ORD	D	2063	23:42	7M8	172	89.0%	153	147	6	H38	H	TOW/RON	Dep-AA-2064	AA	ORD	D	2064	5:50	7M8	172	76.5%	132	128	4	H38	H
Arr-AA-2065	AA	PHX	D	2065	0:03	7M8	172	93.5%	161	157	4	H40	H	5:57	Dep-AA-2066	AA	PHX	D	2066	6:00	7M8	172	94.0%	162	159	3	H40	H
Arr-AA-2067	AA	CLT	D	2067	0:33	7M8	172	87.5%	150	147	3	H41	H	5:46	Dep-AA-2068	AA	CLT	D	2068	6:19	7M8	172	93.2%	160	158	2	H41	H
Arr-AA-2069	AA	PHX	D	2069	5:12	7M8	172	93.5%	161	157	4	H42	H	2:00	Dep-AA-2070	AA	PHX	D	2070	7:12	7M8	172	86.4%	149	144	4	H42	H
Arr-AA-2071	AA	PHX	D	2071	11:00	7M8	172	86.6%	149	145	4	H38	H	1:10	Dep-AA-2072	AA	CLT	D	2072	12:10	7M8	172	88.6%	152	151	2	H38	H
Arr-AA-2073	AA	CLT	D	2073	13:23	7M8	172	80.1%	138	135	3	H42	H	1:22	Dep-AA-2074	AA	PHX	D	2074	14:45	7M8	172	94.0%	162	159	3	H42	H
Arr-AA-2075	AA	PHX	D	2075	13:50	7M8	172	93.5%	161	157	4	H41	H	2:05	Dep-AA-2076	AA	ORD	D	2076	15:55	7M8	172	76.5%	132	128	4	H41	H
Arr-AA-2077	AA	DFW	D	2077	17:05	7M8	172	88.1%	152	148	4	H40	H	0:55	Dep-AA-2078	AA	PHX	D	2078	18:00	7M8	172	94.0%	162	159	3	H40	H
Arr-AA-2079	AA	ORD	D	2079	17:05	7M8	172	89.0%	153	147	6	H43	H	1:23	Dep-AA-2080	AA	DFW	D	2080	18:28	7M8	172	89.1%	153	151	3	H43	H
Arr-AA-2081	AA	PHX	D	2081	17:30	7M8	172	93.5%	161	157	4	H37	H	2:17	Dep-AA-2082	AA	ORD	D	2082	19:47	7M8	172	76.5%	132	128	4	H37	H
Arr-AA-2083	AA	PHX	D	2083	20:01	7M8	172	93.5%	161	157	4	H39	H	0:59	Dep-AA-2084	AA	PHX	D	2084	21:00	7M8	172	87.9%	151	147	4	H39	H
Arr-AA-2091	AA	LGA	D	2091	22:32	E75	76	69.6%	53	51	2	H41	H	TOW/RON	Dep-AA-2092	AA	DCA	D	2092	7:06	E75	76	77.9%	59	58	1	H36	H
Arr-AA-2093	AA	DCA	D	2093	23:50	E75	76	70.5%	54	52	1	H39	H	TOW/RON	Dep-AA-2094	AA	LGA	D	2094	7:06	E75	76	72.0%	55	53	1	H37	H
Arr-AA-2095	AA	LGA	D	2095	8:34	E75	76	76.8%	58	57	2	H41	H	2:26	Dep-AA-2096	AA	LGA	D	2096	11:00	E75	76	76.9%	58	57	1	H41	H
Arr-AA-2097	AA	PHL	D	2097	15:22	E75	76	82.2%	62	61	2	H38	H	0:43	Dep-AA-2098	AA	PHL	D	2098	16:05	E75	76	82.6%	63	62	1	H38	H
Arr-AA-2099	AA	DCA	D	2099	16:56	E75	76	70.5%	54	52	1	H38	H	0:40	Dep-AA-2100	AA	LGA	D	2100	17:36	E75	76	72.0%	55	53	1	H38	H
Arr-AA-2101	AA	LGA	D	2101	17:01	E75	76	69.6%	53	51	2	H41	H	0:48	Dep-AA-2102	AA	DCA	D	2102	17:49	E75	76	77.9%	59	58	1	H41	H
Arr-AC-2109	AC	YYZ	P	2109	10:11	E75	76	72.0%	55	54	1	H24	H	0:39	Dep-AC-2110	AC	YYZ	P	2110	10:50	E75	76	79.7%	61	60	1	H24	H
Arr-AC-2111	AC	YYZ	P	2111	15:56	E75	76	72.0%	55	54	1	H24	H	0:39	Dep-AC-2112	AC	YYZ	P	2112	16:35	E75	76	79.7%	61	60	1	H24	H
Arr-AC-2107	AC	YYZ	P	2107	21:26	E75	76	72.0%	55	54	1	H24	H	TOW/RON	Dep-AC-2108	AC	YYZ	P	2108	6:30	E75	76	79.7%	61	60	1	H24	H
Arr-AS-2117	AS	SEA	D	2117	11:51	7M8	159	94.4%	150	146	4	H34	H	0:59	Dep-AS-2118	AS	SEA	D	2118	12:50	7M8	159	88.3%	140	139	1	H34	H
Arr-AS-2119	AS	SEA	D	2119	15:10	7M8	159	88.5%	141	137	4	H34	H	1:00	Dep-AS-2120	AS	SEA	D	2120	16:10	7M8	159	92.9%	148	145	3	H34	H
Arr-AS-2121	AS	SAN	D	2121	16:45	7M8	159	94.1%	150	146	4	H34	H	0:50	Dep-AS-2122	AS	SAN	D	2122	17:35	7M8	159	90.8%	144	142	2	H34	H
Arr-AS-2115	AS	SEA	D	2115	23:05	7M8	159	94.3%	150	145	5	H35	H	TOW/RON	Dep-AS-2116	AS	SEA	D	2116	7:00	7M8	159	89.1%	142	139	3	H35	H
Arr-AS-2125	AS	SAN	D	2125	11:45	E75	76	84.2%	64	64	0	H35	H	0:45	Dep-AS-2126	AS	SAN	D	2126	12:30	E75	76	83.1%	63	63	0	H35	H
Arr-AS-2127	AS	PDX	D	2127	13:20	E75	76	93.4%	71	69	2	H35	H	0:45	Dep-AS-2128	AS	PDX	D	2128	14:05	E75	76	93.9%	71	70	2	H35	H
Arr-AS-2129	AS	PDX	D	2129	16:00	E75	76	86.7%	66	63	2	H35	H	1:00	Dep-AS-2130	AS	PDX	D	2130	17:00	E75	76	86.8%	66	64	2	H35	H
Arr-B6-2133	B6	BOS	D	2133	9:43	320	150	76.8%	115	106	10	H34	H	0:40	Dep-B6-2134	B6	BOS	D	2134	10:23	320	150	82.1%	123	114	9	H34	H
Arr-B6-2135	B6	BOS	D	2135	17:01	320	150	76.8%	115	106	10	H33	H	0:45	Dep-B6-2136	B6	BOS	D	2136	17:46	320	150	82.1%	123	114	9	H33	H
Arr-B6-2137	B6	BOS	D	2137	18:41	320	150	89.0%	134	132	2	H33	H	0:34	Dep-B6-2138	B6	BOS	D	2138	19:15	320	150	91.5%	137	137	1	H33	H
Arr-B6-2139	B6	BOS	D	2139	23:28	320	150	76.8%	115	106	10	H44	H	TOW/RON	Dep-B6-2140	B6	BOS	D	2140	5:40	320	150	82.1%	123	114	9	H44	H
Arr-DL-2019	DL	GFK	D	2019	6:20	221	109	80.5%	88	8	80	F02	F	2:25	Dep-DL-2018	DL	CLE	D	2018	8:45	221	109	86.8%	95	51	44	F02	F
Arr-DL-2021	DL	ROC	D	2021	7:34	221	109	62.0%	68	20	48	C18	C	1:11	Dep-DL-2020	DL	MEM	D	2020	8:45	221	109	81.9%	89	40	50	C18	C
Arr-DL-2023	DL	SDF	D	2023	7:51	221	109	81.3%	89	41	47	F15A	F	0:59	Dep-DL-2022	DL	BIL	D	2022	8:50	221	109	78.6%	86	16	70	F15A	F
Arr-DL-2025	DL	DLH	D	2025	7:52	221	109	87.7%	96	2	94	F15	F	0:58	Dep-DL-2026	DL	CMH	D	2026	8:50	221	109	94.6%	103	52	52	F15	F
Arr-DL-2027	DL	PHL	D	2027	7:59	221	109	94.1%	103	39	64	E11	E	0:51	Dep-DL-2028	DL	STL	D	2028	8:50	221	109	82.7%	90	50	40	E11	E
Arr-DL-2029	DL	PIT	D	2029	7:59	221	109	79.7%	87	41	45	F07	F	0:51	Dep-DL-2030	DL	TUL	D	2030	8:50	221	109	71.9%	78	41	37	F07	F
Arr-DL-2031	DL	YYZ	P	2031	7:59	221	109	78.6%	86	41	45	F05	F	0:56	Dep-DL-2032	DL	BNA	D	2032	8:55	221	109	96.1%	105	63	42	F05	F
Arr-DL-2033	DL	CID	D	2033	8:06	221	109	75.2%	82	20	62	G10	G	0:54	Dep-DL-2034	DL	YYC	P	2034	9:00	221	109	92.7%	101	20	81	G10	G
Arr-DL-2035	DL	DAY	D	2035	8:07	221	109	70.7%	77	36	41	G11	G	0:54	Dep-DL-2036	DL	IAD	D	2036	9:01	221	109	77.9%	85	40	44	G11	G
Arr-DL-2037	DL	DSM	D	2037	8:15	221	109	73.6%	80	11	69	G13	G	0:55	Dep-DL-2038	DL	IAH	D	2038	9:10	221	109	89.0%	97	58	39	G13	G
Arr-DL-2039	DL	IND	D	2039	8:15	221	109	87.7%	96	48	48	F04	F	1:43	Dep-DL-2040	DL	SDF	D	2040	9:58	221	109	81.9%	89	42	47	F04	F
Arr-DL-2051	DL	IAD	D	2051	9:05	221	109	75.0%	82	39	43	C01	C	0:55	Dep-DL-2042	DL	GRB	D	2042	10:00	221	109	88.7%	97	14	83	C01	C
Arr-DL-2041	DL	SAT	D	2041	9:12	221	109	86.2%	94	58	36	D05	D	0:48	Dep-DL-2044	DL	JAX	D	2044	10:00	221	109	95.9%	105	83	22	D05	D
Arr-DL-2043	DL	ORD	D	2043	9:18	221	109	88.1%	96	65	31	C15	C	0:47	Dep-DL-2046	DL	CVG	D	2046	10:05	221	109	83.0%	90	40	51	C15	C
Arr-DL-2045	DL	HLN	D	2045	9:19	221	109	82.2%	90	14	75	F05	F	0:46	Dep-DL-2048	DL	GRR	D	2048	10:05	221	109	85.6%	93	25	68	F05	F
Arr-DL-2047	DL	OKC	D	2047	9:21	221	109	75.7%	83	32	51	C19	C	0:44	Dep-DL-2050	DL	MSN	D	2050	10:05	221	109	86.3%	94	14	80	C19	C
Arr-DL-2049	DL	DSM	D	2049	9:25	221	109	73.6%	80	11	69	C12	C	0:45	Dep-DL-2052	DL	PHL	D	2052	10:10	221	109	90.8%	99	54	45	C12	C
Arr-DL-2053	DL	MOT	D	2053	10:14	221	109	81.8%	89	9	81	C08	C	1:01	Dep-DL-2054	DL	SJC	D	2054	11:15	221	109	91.2%	99	46	53	C08	C
Arr-DL-2055	DL	BHM	D	2055	10:20	221	109	85.3%	93	61	32	C01	C	1:00	Dep-DL-2056	DL	MOT	D	2056	11:20	221	109	86.1%	94	9	85	C01	C
Arr-DL-2057	DL	MEM	D	2057	10:24	221	109	77.9%	85	37	47	D06	D	0:56	Dep-DL-2058	DL	SMF	D	2058	11:20	221	109	93.8%	102	41	61	D06	D
Arr-DL-2059	DL	IAH	D	2059	10:29	221	109	84.6%	92	55	38	C15	C	1:06	Dep-DL-2060	DL	YYC	P	2060	11:35	221	109	93.1%	101	20	81	C15	C
Arr-DL-2061	DL	CLE	D	2061	10:40	221	109	95.0%	104	55	49	G22	G	1:05	Dep-DL-2062	DL	FCA	D	2062	11:45	221	109	88.1%	96	27	69	G22	G
Arr-DL-2063	DL	CVG	D	2063	10:42	221	109	75.9%	83	36	47	E08	E	1:03	Dep-DL-2064	DL	IAH	D	2064	11:45	221	109	84.3%	92	55	37	E08	E
Arr-DL-2065	DL	ORF	D	2065	10:43	221	109	69.6%	76	35	40	E09	E	1:43	Dep-DL-2066	DL	RIC	D	2066	12:26	221	109	79.7%	87	41	46	E09	E
Arr-DL-2067	DL	GRR	D	2067	10:45	221	109	89.4%	97	26	71	F10	F	1:56	Dep-DL-2162	DL	YYZ	P	2162	12:41	221	109	90.6%	99	47	51	F10	F
Arr-DL-2069	DL	PIT	D	2069	10:45	221	109	79.7%	87	41	45	F09	F	2:00	Dep-DL-2068	DL	IND	D	2068	12:45	221	109	82.4%	90	45	44	F09	F
Arr-DL-2071	DL	IND	D	2071	11:17	221	109	87.7%	96	48	48	F03	F	1:28	Dep-DL-2070	DL	PIT	D	2070	12:45	221	109	88.7%	97	46	50	F03	F
Arr-DL-2161	DL	YYZ	P	2161	11:30	221	109	78.6%	86	41	45	C06	C	1:20	Dep-DL-2072	DL	GFK	D	2072	12:50	221	109	89.6%	98	9	89	C06	C
Arr-DL-2147	DL	IAH	D	2147	11:34	221	109	84.2%	92	54	37	F11	F	1:22	Dep-DL-2074	DL	STL	D	2074	12:56	221	109	89.5%	98	54	44	F11	F
Arr-DL-2073	DL	PSC	D	2073	12:03	221	109	96.0%	105	13	92	C08	C	0:54	Dep-DL-2076	DL	IAD	D	2076	12:57	221	109	77.9%	85	40	44	C08	C
Arr-DL-2075	DL	BNA	D	2075	12:15	221	109	87.2%	95	55	40	C02	C	1:04	Dep-DL-2078	DL	GRR	D	2078	13:19	221	109	85.6%	93	25	68	C02	C
Arr-DL-2077	DL	JFK	D	2077	12:20	221	109	94.7%	103	67	36	D06	D	1:05	Dep-DL-2148	DL	ROC	D	2148	13:25	221	109	77.4%	84	25	60	D06	D
Arr-DL-2079	DL	STL	D	2079	12:38	221	109	85.7%	93	51	42	C12	C	0:53	Dep-DL-2080	DL	MCI	D	2080	13:31	221	109	91.2%	99	45	55	C12	C
Arr-DL-2081	DL	BIL	D	2081	12:45	221	109	75.4%	82	17	65	G18	G	0:55	Dep-DL-2082	DL	OMA	D	2082	13:40	221	109	85.2%	93	25	68	G18	G
Arr-DL-2083	DL	GRB	D	2083	12:49	221	109	87.5%	95	14	82	C03	C	0:56	Dep-DL-2084	DL	CLE	D	2084	13:45	221	109	86.8%	95	51	44	C03	C
Arr-DL-2085	DL	MSN	D	2085	12:59	221	109	82.2%	90	13	76	F02	F	0:53	Dep-DL-2086	DL	MKE	D	2086	13:52	221	109	91.3%	100	39	61	F02	F
Arr-DL-2087	DL	TUS	D	2087	13:00	221	109	88.4%	96	48	48	G21	G	0:55	Dep-DL-2088	DL	FAR	D	2088	13:55	221	109	87.6%	96	5	90	G21	G
Arr-DL-2089	DL	IND	D	2089	13:12	221	109	87.7%	96	48	48	C22	C	1:00	Dep-DL-2090	DL	CMH	D	2090	14:12	221	109	94.6%	103	52	52	C22	C
Arr-DL-2091	DL	DFW	D	2091	13:15	221	109	94.5%	103	68	35	C09	C	1:05	Dep-DL-2092	DL	JFK	D	2092	14:20	221	109	86.1%	94	61	33	C09	C
Arr-DL-2093	DL	SJC	D	2093	13:27	221	109	90.2%	98	38	60	C19	C	1:02	Dep-DL-2094	DL	DFW	D	2094	14:29	221	109	92.0%	100	67	34	C19	C
Arr-DL-2095	DL	IAH	D	2095	13:30	221	109	85.8%	93	55	38	C15	C	1:00	Dep-DL-2096	DL	OKC	D	2096	14:30	221	109	86.7%	94	37	58	C15	C
Arr-DL-2097	DL	CMH	D	2097	13:32	221	109	81.2%	88	44	45	F11	F	1:04	Dep-DL-2098	DL	MEM	D	2098	14:36	221	109	81.9%	89	40	50	F11	F
Arr-DL-2099	DL	GRR	D	2099	13:42	221	109	95.2%	104	28	76	C17	C	1:03	Dep-DL-2100	DL	CLT	D	2100	14:45	221	109	93.6%	102	47	55	C17	C
Arr-DL-2101	DL	TUL	D	2101	13:46	221	109	77.1%	84	44	40	E11	E	1:24	Dep-DL-2102	DL	EWR	D	2102	15:10	221	109	83.0%	90	56	34	E11	E
Arr-DL-2103	DL	MCI	D	2103	13:49	221	109	63.9%	70	31	39	E13	E	1:21	Dep-DL-2104	DL	PIT	D	2104	15:10	221	109	83.9%	91	44	47	E13	E
Arr-DL-2105	DL	MEM	D	2105	13:50	221	109	77.9%	85	37	47	C14	C	1:20	Dep-DL-2106	DL	STL	D	2106	15:10	221	109	93.3%	102	56	45	C14	C
Arr-DL-2107	DL	PHL	D	2107	13:50	221	109	82.9%	90	49	42	F07	F	1:30	Dep-DL-2108	DL	BDL	D	2108	15:20	221	109	86.9%	95	36	59	F07	F
Arr-DL-2109	DL	BNA	D	2109	14:21	221	109	91.9%	100	60	40	C16	C	1:23	Dep-DL-2110	DL	BNA	D	2110	15:44	221	109	96.1%	105	63	42	C16	C
Arr-DL-2111	DL	SDF	D	2111	14:40	221	109	88.9%	97	45	52	G19	G	2:20	Dep-DL-2112	DL	PHL	D	2112	17:00	221	109	89.9%	98	48	50	G19	G
Arr-DL-2113	DL	BHM	D	2113	15:05	221	109	83.3%	91	64	27	C17	C	2:25	Dep-DL-2154	DL	PSC	D	2154	17:30	221	109	87.0%	95	13	82	C17	C
Arr-DL-2115	DL	YYC	P	2115	15:20	221	109	95.3%	104	29	75	F10	F	2:10	Dep-DL-2114	DL	JFK	D	2114	17:30	221	109	98.6%	108	76	32	F10	F
Arr-DL-2153	DL	PIT	D	2153	16:00	221	109	87.6%	95	46	50	C02	C	1:37	Dep-DL-2116	DL	STL	D	2116	17:37	221	109	93.3%	102	56	45	C02	C
Arr-DL-2117	DL	CLE	D	2117	16:33	221	109	95.0%	104	55	49	E07	E	1:07	Dep-DL-2118	DL	SAT	D	2118	17:40	221	109	89.2%	97	61	37	E07	E
Arr-DL-2119	DL	IAH	D	2119	16:33	221	109	84.6%	92	55	38	F05	F	1:11	Dep-DL-2120	DL	CLT	D	2120	17:44	221	109	84.7%	92	51	41	F05	F
Arr-DL-2121	DL	PHL	D	2121	16:42	221	109	85.1%	93	50	43	E11	E	1:03	Dep-DL-2122	DL	AUS	D	2122	17:45	221	109	93.9%	102	73	29	E11	E
Arr-DL-2123	DL	GRR	D	2123	16:52	221	109	89.3%	97	26	71	F03	F	0:53	Dep-DL-2124	DL	OKC	D	2124	17:45	221	109	80.2%	87	34	53	F03	F
Arr-DL-2125	DL	HDN	D	2125	16:52	221	109	85.4%	93	29	64	F04	F	0:58	Dep-DL-2126	DL	DSM	D	2126	17:50	221	109	77.9%	85	12	73	F04	F
Arr-DL-2127	DL	IND	D	2127	16:57	221	109	87.7%	96	48	48	C12	C	0:55	Dep-DL-2128	DL	MEM	D	2128	17:52	221	109	81.9%	89	40	50	C12	C
Arr-DL-2129	DL	JAX	D	2129	16:57	221	109	93.7%	102	80	22	E06	E	1:03	Dep-DL-2130	DL	RDU	D	2130	18:00	221	109	90.9%	99	55	44	E06	E
Arr-DL-2131	DL	MKE	D	2131	17:00	221	109	94.5%	103	40	63	C05	C	1:30	Dep-DL-2132	DL	BHM	D	2132	18:30	221	109	84.5%	92	60	32	C05	C
Arr-DL-2133	DL	OMA	D	2133	17:00	221	109	85.1%	93	24	68	C11	C	1:30	Dep-DL-2134	DL	BZN	D	2134	18:30	221	109	97.2%	106	19	87	C11	C

Arr-DL-2135	DL	STL	D	2135	17:01	221	109	94.3%	103	56	46	C06	C	1:29	Dep-DL-2136	DL	SBN	D	2136	18:30	221	109	89.8%	98	40	58	C06	C
Arr-DL-2137	DL	MCI	D	2137	17:05	221	109	92.5%	101	45	56	C08	C	1:25	Dep-DL-2138	DL	TUS	D	2138	18:30	221	109	88.9%	97	31	66	C08	C
Arr-DL-2139	DL	MSN	D	2139	18:15	221	109	82.2%	90	13	76	C02	C	1:31	Dep-DL-2140	DL	HLN	D	2140	19:46	221	109	72.7%	79	13	66	C02	C
Arr-DL-2141	DL	CLT	D	2141	18:23	221	109	71.2%	78	43	35	C01	C	1:32	Dep-DL-2142	DL	ORF	D	2142	19:55	221	109	78.2%	85	44	41	C01	C
Arr-DL-2143	DL	CMH	D	2143	18:24	221	109	89.4%	97	37	60	G18	G	1:47	Dep-DL-2144	DL	ORD	D	2144	20:11	221	109	86.8%	95	65	30	G18	G
Arr-DL-2145	DL	RIC	D	2145	18:33	221	109	74.4%	81	38	43	E12	E	1:42	Dep-DL-2998	DL	BDL	D	2998	20:15	221	109	68.9%	75	28	47	E12	E
Arr-DL-2149	DL	IAD	D	2149	18:54	221	109	75.0%	82	39	43	C06	C	1:31	Dep-DL-2146	DL	IAD	D	2146	20:25	221	109	77.9%	85	40	44	C06	C
Arr-DL-2151	DL	STL	D	2151	18:54	221	109	85.8%	94	51	42	F04	F	1:33	Dep-DL-2150	DL	SDF	D	2150	20:27	221	109	84.1%	92	43	49	F04	F
Arr-DL-2157	DL	YYC	P	2157	19:15	221	109	98.8%	108	28	80	E07	E	1:15	Dep-DL-2152	DL	BUF	D	2152	20:30	221	109	71.0%	77	33	44	E07	E
Arr-DL-2159	DL	SMF	D	2159	19:28	221	109	97.6%	106	40	66	C04	C	1:07	Dep-DL-2158	DL	CID	D	2158	20:35	221	109	75.4%	82	20	62	C04	C
Arr-DL-2165	DL	MEM	D	2165	19:41	221	109	77.9%	85	37	47	C08	C	0:55	Dep-DL-2160	DL	PIT	D	2160	20:36	221	109	88.2%	96	35	61	C08	C
Arr-DL-2167	DL	RDU	D	2167	20:45	221	109	96.0%	105	58	47	C07	C	1:40	Dep-DL-2164	DL	DSM	D	2164	22:25	221	109	77.9%	85	12	73	C07	C
Arr-DL-2001	DL	BNA	D	2001	20:54	221	109	91.9%	100	60	40	C16	C	1:31	Dep-DL-2166	DL	MOT	D	2166	22:25	221	109	72.5%	79	8	71	C16	C
Arr-DL-2003	DL	CLT	D	2003	21:00	221	109	79.3%	86	49	37	E12	E	1:31	Dep-DL-2156	DL	IND	D	2156	22:31	221	109	92.5%	101	31	70	E12	E
Arr-DL-2155	DL	SDF	D	2155	21:15	221	109	81.3%	89	41	47	E08	E	1:25	Dep-DL-2168	DL	GFK	D	2168	22:40	221	109	83.2%	91	8	83	E08	E
Arr-DL-2163	DL	OKC	D	2163	21:25	221	109	81.8%	89	34	55	G21	G	TOW/RON	Dep-DL-2002	DL	ORD	D	2002	5:30	221	109	86.1%	94	94	0	G21	G
Arr-DL-2005	DL	JFK	D	2005	21:27	221	109	81.6%	89	57	32	F06	F	TOW/RON	Dep-DL-2004	DL	IAH	D	2004	6:50	221	109	87.7%	96	57	38	F06	F
Arr-DL-2007	DL	STL	D	2007	21:37	221	109	85.8%	94	51	42	F05	F	TOW/RON	Dep-DL-2006	DL	IND	D	2006	6:55	221	109	82.4%	90	45	44	F05	F
Arr-DL-2009	DL	IAH	D	2009	21:39	221	109	84.6%	92	55	38	E14	E	TOW/RON	Dep-DL-2008	DL	GRR	D	2008	7:00	221	109	65.1%	71	19	52	E14	E
Arr-DL-2011	DL	DFW	D	2011	21:42	221	109	94.8%	103	68	35	E06	E	TOW/RON	Dep-DL-2010	DL	PHL	D	2010	7:21	221	109	79.2%	86	47	39	E06	E
Arr-DL-2013	DL	BDL	D	2013	21:50	221	109	70.4%	77	29	48	C20	C	TOW/RON	Dep-DL-2012	DL	DFW	D	2012	7:22	221	109	96.1%	105	70	35	C20	C
Arr-DL-2015	DL	EWR	D	2015	21:51	221	109	82.3%	90	90	0	C21	C	TOW/RON	Dep-DL-2014	DL	BNA	D	2014	7:25	221	109	83.6%	91	56	35	C21	C
Arr-DL-2017	DL	SAT	D	2017	21:54	221	109	83.7%	91	91	0	C01	C	TOW/RON	Dep-DL-2016	DL	BHM	D	2016	8:45	221	109	84.7%	92	64	29	C01	C
Arr-DL-2177	DL	FAR	D	2177	6:14	223	130	86.3%	112	6	106	E12	E	2:36	Dep-DL-2178	DL	DTW	D	2178	8:50	223	130	88.9%	116	69	46	E12	E
Arr-DL-2179	DL	ORD	D	2179	7:49	223	130	86.1%	112	63	49	D05	D	1:01	Dep-DL-2180	DL	MDW	D	2180	8:50	223	130	75.6%	98	72	26	D05	D
Arr-DL-2181	DL	STL	D	2181	7:54	223	130	59.6%	77	42	35	E13	E	1:01	Dep-DL-2182	DL	SAT	D	2182	8:55	223	130	91.3%	119	74	45	E13	E
Arr-DL-2183	DL	FAR	D	2183	7:59	223	130	86.3%	112	6	106	G14	G	1:01	Dep-DL-2184	DL	MKE	D	2184	9:00	223	130	83.3%	108	42	66	G14	G
Arr-DL-2185	DL	GRB	D	2185	7:59	223	130	95.2%	124	18	106	F12A	F	1:06	Dep-DL-2186	DL	FAR	D	2186	9:05	223	130	76.7%	100	6	94	F12A	F
Arr-DL-2187	DL	LEX	D	2187	7:59	223	130	72.0%	94	31	63	F12	F	1:06	Dep-DL-2188	DL	ORD	D	2188	9:05	223	130	87.2%	113	78	35	F12	F
Arr-DL-2189	DL	YWG	P	2189	8:00	223	130	82.2%	107	8	99	F08	F	1:10	Dep-DL-2190	DL	AUS	D	2190	9:10	223	130	93.9%	122	88	35	F08	F
Arr-DL-2191	DL	BNA	D	2191	8:04	223	130	91.6%	119	71	48	F10	F	1:06	Dep-DL-2192	DL	DFW	D	2192	9:10	223	130	94.1%	122	81	41	F10	F
Arr-DL-2193	DL	CLT	D	2193	8:04	223	130	71.2%	93	51	41	F09	F	1:06	Dep-DL-2194	DL	INL	D	2194	9:10	223	130	37.0%	48	4	44	F09	F
Arr-DL-2195	DL	EWR	D	2195	8:10	223	130	63.6%	83	51	32	E06	E	1:05	Dep-DL-2196	DL	YVR	P	2196	9:15	223	130	82.1%	107	28	79	E06	E
Arr-DL-2197	DL	CVG	D	2197	8:15	223	130	77.5%	101	44	57	F03	F	1:45	Dep-DL-2198	DL	ORD	D	2198	10:00	223	130	87.2%	113	78	35	F03	F
Arr-DL-2199	DL	BIL	D	2199	9:05	223	130	85.2%	111	17	94	C18	C	2:10	Dep-DL-2200	DL	DFW	D	2200	11:15	223	130	96.1%	125	83	42	C18	C
Arr-DL-2201	DL	MSO	D	2201	9:09	223	130	78.8%	102	17	85	F02	F	2:06	Dep-DL-2202	DL	EWR	D	2202	11:15	223	130	84.5%	110	59	51	F02	F
Arr-DL-2203	DL	SYR	D	2203	9:10	223	130	60.1%	78	21	57	C03	C	2:05	Dep-DL-2204	DL	YVR	P	2204	11:15	223	130	91.4%	119	30	89	C03	C
Arr-DL-2205	DL	JFK	D	2205	9:23	223	130	81.6%	106	68	38	C16	C	1:57	Dep-DL-2206	DL	FAR	D	2206	11:20	223	130	87.6%	114	6	108	C16	C
Arr-DL-2207	DL	DTW	D	2207	9:25	223	130	90.5%	118	70	48	C20	C	1:58	Dep-DL-2208	DL	SNA	D	2208	11:23	223	130	94.3%	123	70	52	C20	C
Arr-DL-2209	DL	CLT	D	2209	9:44	223	130	71.2%	93	51	41	C22	C	1:43	Dep-DL-2210	DL	HRL	D	2210	11:27	223	130	88.5%	115	54	61	C22	C
Arr-DL-2211	DL	YWG	P	2211	10:20	223	130	87.6%	114	20	94	C07	C	1:08	Dep-DL-2212	DL	PSP	D	2212	11:28	223	130	96.3%	125	72	53	C07	C
Arr-DL-2213	DL	DFW	D	2213	10:28	223	130	88.1%	115	75	39	C19	C	1:02	Dep-DL-2214	DL	BIL	D	2214	11:30	223	130	87.2%	113	18	96	C19	C
Arr-DL-2215	DL	EWR	D	2215	10:41	223	130	63.6%	83	51	32	E07	E	0:49	Dep-DL-2216	DL	TUS	D	2216	11:30	223	130	92.5%	120	68	53	E07	E
Arr-DL-2217	DL	RDU	D	2217	10:45	223	130	84.0%	109	59	50	G20	G	0:50	Dep-DL-2218	DL	MSO	D	2218	11:35	223	130	79.8%	104	21	83	G20	G
Arr-DL-2219	DL	STL	D	2219	10:54	223	130	59.6%	77	42	35	E12	E	0:47	Dep-DL-2220	DL	HDN	D	2220	11:41	223	130	71.7%	93	29	64	E12	E
Arr-DL-2221	DL	LAS	D	2221	11:00	223	130	90.6%	118	75	43	E14	E	1:00	Dep-DL-2222	DL	AUS	D	2222	12:00	223	130	94.7%	123	76	47	E14	E
Arr-DL-2223	DL	DEN	D	2223	11:50	223	130	92.2%	120	73	47	C22	C	0:55	Dep-DL-2224	DL	YXE	I	2224	12:45	223	130	79.3%	103	10	93	C22	C
Arr-DL-2225	DL	YVR	P	2225	11:56	223	130	94.1%	122	31	91	C09	C	0:54	Dep-DL-2226	DL	RDU	D	2226	12:50	223	130	78.1%	101	56	46	C09	C
Arr-DL-2227	DL	FAR	D	2227	12:05	223	130	94.0%	122	7	115	C10	C	0:55	Dep-DL-2228	DL	DFW	D	2228	13:00	223	130	96.1%	125	83	42	C10	C
Arr-DL-2229	DL	MKE	D	2229	12:05	223	130	88.1%	115	44	70	C17	C	1:16	Dep-DL-2230	DL	CLT	D	2230	13:21	223	130	84.7%	110	61	49	C17	C
Arr-DL-2231	DL	CVG	D	2231	12:15	223	130	77.5%	101	44	57	G20	G	1:20	Dep-DL-2232	DL	BNA	D	2232	13:35	223	130	95.3%	124	74	49	G20	G
Arr-DL-2233	DL	SNA	D	2233	12:34	223	130	89.7%	117	66	50	C13	C	1:46	Dep-DL-2234	DL	AUS	D	2234	14:20	223	130	93.9%	122	88	35	C13	C
Arr-DL-2235	DL	ORD	D	2235	12:50	223	130	87.4%	114	77	36	G22	G	1:30	Dep-DL-2236	DL	CWA	D	2236	14:20	223	130	82.4%	107	8	99	G22	G
Arr-DL-2237	DL	DTW	D	2237	13:06	223	130	90.5%	118	70	48	G19	G	1:14	Dep-DL-2238	DL	YYZ	P	2238	14:20	223	130	90.6%	118	56	61	G19	G
Arr-DL-2239	DL	JFK	D	2239	13:34	223	130	81.6%	106	68	38	E12	E	1:01	Dep-DL-2240	DL	DSM	D	2240	14:35	223	130	77.9%	101	14	87	E12	E
Arr-DL-2241	DL	RDU	D	2241	13:44	223	130	84.0%	109	59	50	C02	C	1:26	Dep-DL-2242	DL	YWG	P	2242	15:10	223	130	90.1%	117	9	108	C02	C
Arr-DL-2243	DL	FAR	D	2243	14:04	223	130	77.9%	101	6	96	D05	D	1:11	Dep-DL-2244	DL	GRR	D	2244	15:15	223	130	88.0%	114	31	83	D05	D
Arr-DL-2249	DL	CLT	D	2249	14:10	223	130	71.2%	93	51	41	F04	F	0:50	Dep-DL-2250	DL	FAR	D	2250	15:00	223	130	91.4%	119	7	112	F04	F
Arr-DL-2245	DL	SNA	D	2245	14:17	223	130	89.7%	117	66	50	C04	C	1:09	Dep-DL-2246	DL	MCI	D	2246	15:26	223	130	88.5%	115	52	63	C04	C
Arr-DL-2247	DL	AUS	D	2247	14:27	223	130	90.1%	117	83	34	C08	C	1:33	Dep-DL-2248	DL	FAR	D	2248	16:00	223	130	91.4%	119	7	112	C08	C
Arr-DL-2251	DL	DFW	D	2251	14:39	223	130	94.8%	123	81	42	C06	C	1:21	Dep-DL-2252	DL	YWG	P	2252	16:00	223	130	90.1%	117	9	108	C06	C
Arr-DL-2253	DL	ORD	D	2253	15:17	223	130	87.4%	114	77	36	C09	C	1:43	Dep-DL-2254	DL	GRB	D	2254	17:00	223	130	82.7%	108	16	92	C09	C
Arr-DL-2255	DL	SNA	D	2255	16:00	223	130	87.1%	113	59	55	G18	G	1:30	Dep-DL-2256	DL	DLH	D	2256	17:30	223	130	86.9%	113	2	111	G18	G
Arr-DL-2257	DL	RDU	D	2257	16:30	223	130	92.0%	120	66	54	C18	C	1:05	Dep-DL-2258	DL	EWR	D	2258	17:35	223	130	70.9%	92	58	35	C18	C
Arr-DL-2259	DL	BIL	D	2259	16:40	223	130	85.2%	111	17	94	E10	E	1:00	Dep-DL-2260	DL	LEX	D	2260	17:40	223	130	77.1%	100	41	59	E10	E
Arr-DL-2261	DL	YVR	P	2261	16:51	223	130	97.3%	127	32	95	F02	F	0:53	Dep-DL-2262	DL	SNA	D	2262	17:44	223	130	94.3%	123	70	52	F02	F
Arr-DL-2263	DL	DFW	D	2263	17:05	223	130	94.5%	123	81	42	C13	C	1:25	Dep-DL-2264	DL	YWG	P	2264	18:30	223	130	86.5%	112	13	100	C13	C
Arr-DL-2265	DL	AUS	D	2265	18:15	223	130	82.9%	108	78	29	C12	C	1:20	Dep-DL-2266	DL	BIL	D	2266	19:35	223	130	87.2%	113	18	96	C12	C
Arr-DL-2287	DL	SAT	D	2287	18:30	223	130	86.2%	112	69	43	D06	D	1:15	Dep-DL-2288	DL	STL	D	2288	19:45	223	130	78.8%	102	42	61	D06	D
Arr-DL-2267	DL	JFK	D	2267	18:31	223	130	81.6%	106	68	38	C10	C	1:04	Dep-DL-2268	DL	SNA	D	2268	19:35	223	130	94.8%	123	59	64	C10	C
Arr-DL-2269	DL	MSO	D	2269	18:35	223	130	88.0%	114	22	93	F03	F	1:21	Dep-DL-2270	DL	YVR	P	2270	19:56	223	130	91.6%	119	29	90	F03	F
Arr-DL-2271	DL	BNA	D	2271	18:39	223	130	90.7%	118	60	57	F12	F	1:21	Dep-DL-2272	DL	MSO	D	2272	20:00	223	130	77.4%	101	17	84	F12	F
Arr-DL-2273	DL	HRL	D	2273	18:44	223	130	92.6%	120	56	65	E15A	E	1:31	Dep-DL-2274	DL	BNA	D	2274	20:15	223	130	93.0%	121	61	60	E15A	E
Arr-DL-2275	DL	FAR	D	2275	18:46	223	130	85.4%	111	4	107	F05	F	1:29	Dep-DL-2276	DL	JFK	D	2276	20:15	223	130	86.1%	112	73	39	F05	F
Arr-DL-2277	DL	DFW	D	2277	18:49	223	130	94.5%	123	81	42	F11	F	1:31	Dep-DL-2278	DL	CLT	D	2278	20:20	223	130	84.7%	110	61	49	F11	F
Arr-DL-2279	DL	GRR	D	2279	18:54	223	130	90.9%	118	32	86	F07	F	1:26	Dep-DL-2280	DL	RDU	D	2280	20:20	223	130	78.1%	101	56	46	F07	F
Arr-DL-2281	DL	TUS	D	2281	19:20	223	130	91.9%	119	67	53	C16	C	1:08	Dep-DL-2282	DL	FAR	D	2282	20:28	223	130	91.4%	119	7	112	C16	C
Arr-DL-2283	DL	YVR	P	2283	19:30	223	130	93.9%	122	36	86	F10	F	1:00	Dep-DL-2284	DL	SYR	D	2284	20:30	223	130	64.9%	84	23	61	F10	F
Arr-DL-2285	DL	YWG	P	2285	19:30	223	130	95.5%	124	8	116	C05	C	1:29	Dep-DL-2286	DL	DTW	D	2286	20:59	223	130	76.2%	99	59	40	C05	C
Arr-DL-2169	DL	PSP	D	2169	19:39	223	130	98.6%	128	73	55	C18	C	TOW/RON	Dep-DL-2170	DL	JFK	D	2170	6:50	223	130	86.1%	112	73	39	C18	C
Arr-DL-2171	DL	SNA	D	2171	19:39	223	130	89.7%	117	66	50	C15	C	TOW/RON	Dep-DL-2172	DL	STL	D	2172	6:50	223	130	62.7%	81	45	36	C15	C
Arr-DL-2173	DL	CVG	D	2173	19:45	223	130	77.5%	101	44	57	C11	C	TOW/RON	Dep-DL-2174	DL	RDU	D	2174	7:03	223	130	78.1%	101	56	46	C11	C
Arr-DL-2175	DL	MCI	D	2175	19:45	223	130	77.4%	101	37	64	C13	C	TOW/RON	Dep-DL-2176	DL	SNA	D	2176	8:00	223	130	94.6%	123	62	61	C13	C
Arr-DL-2315	DL	PHX	D	2315	5:29	321	192	89.6%	172	119	53	C12	C	1:46	Dep-DL-2316	DL	RSW	D	2316	7:15	321	192	94.6%	182	141	41	C12	C
Arr-DL-2373	DL	PHX	D	2373	10:35	321	192	88.8%	170	77	94	G18	G	1:08	Dep-DL-2374	DL	ATL	D	2374	11:43	321	192	92.0%	177	126	51	G18	G
Arr-DL-2415	DL	PHX	D	2415	15:30	321	192	84.7%	163	98	64	C14	C	1:07	Dep-DL-2416	DL	ATL	D	2416	16:37	321	192	88.7%	170	121	49	C14	C
Arr-DL-2421	DL	DEN	D	2421	16:49	321	192	92.2%	177	108	69	E08	E	0:57	Dep-DL-2422	DL	MCI	D	2422	17:46	321	192	78.7%	151	68	83	E08	E
Arr-DL-2425	DL	MCO	D	2425	16:58	321	192	91.9%	177	121	55	C10	C	1:06	Dep-DL-2426	DL	PHX	D	2426	18:04	321	192	94.1%	181	127	54	C10	C
Arr-DL-2345	DL	PDX	D	2345	18:00	321	192	97.4%	187	67	120	C16	C	1:00	Dep-DL-2346	DL	LAX	D	2346	19:00	321	192	89.4%	172	116	56	C16	C
Arr-DL-2343	DL	PHX	D	2343	19:09	321	192	87.3%	168	91	77	F08	F	1:11	Dep-DL-2344	DL	SLC	D	2344	20:20	321	192	91.7%	176	83	93	F08	F
Arr-DL-2333	DL	PHX	D	2333	20:00	321	192	81.9%	157	117	40	C14	C	TOW/RON	Dep-DL-2334	DL	ANC	D	2334	9:00	321	192	92.1%	177	39	137	C14	C
Arr-DL-2455	DL	OGG	D	2455	6:15	339	281	91.5%	257	76	181	F13	F	6:09	Dep-DL-2456	DL	HND	I	2456	12:24	339	281	88.8%	250	56	193	F13	F
Arr-DL-2457	DL	SEA	D	2457	11:43	339	281	94.2%	265	123	141	F14	F	3:37	Dep-DL-2458	DL	MCO	D	2458	15:20	339	281	92.6%	260	180	80	F14	F
Arr-DL-2459	DL	LAX	D	2459	11:51	339	281	87.8%	247	156	91	F12	F	4:34	Dep-DL-2460	DL	CDG	I	2460	16:25	339	281	96.5%	271	82	189	G04B	G
Arr-DL-2461	DL	CDG	I	2461	12:13	339	281	97.9%	275	81	194	G04B	G	5:17	Dep-DL-2462	DL	CDG	I	2462	17:30	339	281	100.0%	281	85	196	G13B	G
Arr-DL-2463	DL	CDG	I	2463	13:50	339	281	99.1%	278	82	196	G04B	G	4:05	Dep-DL-2464	DL	LAX	D	2464	17:55	339	281	92.2%	259	165	94	F12	F
Arr-DL-2465	DL	AMS	I	2465	14:40	339	281	91.3%	256	116	140	G13B	G	3:20	Dep-DL-2466	DL	SEA	D	2466	18:00	339	281	93.9%	264	124	140	F15	F
Arr-DL-2467	DL	LHR	I	2467	16:14	339	281	77.1%	217	130	87	G06A	G	1:50	Dep-DL-2468	DL	LHR	I	2468	18:04	339	281	81.1%	228	138	90	G06A	G
Arr-DL-2469	DL	ATL	D	2469	16:50	339	281	90.8%	255	180	75	F13	F	2:42	Dep-DL-2470	DL	AMS	I	2470	19:32	339	281	100.0%	281	117	164	G03A	G
Arr-DL-2471	DL	SEA	D	2471	17:05	339	281	94.2%	265	123	141	F14	F	2:54	Dep-DL-2472	DL	SEA	D	2472	19:59	339	281	93.9%	264	124	140	F14	F
Arr-DL-2473	DL	AMS	I	2473	17:07	339	281	97.6%	274	109	166	G04B	G	3:53	Dep-DL-2474	DL	PDX	D	2474	21:00	339	281	93.6%	263	68	195	F13	F
Arr-DL-2475	DL	ATL	D	2475	18:28	339	281	91.9%	258	182	76	F13	F	3:39	Dep-DL-2476	DL	AMS	I	2476	22:07	339	281	93.8%	264	120	143	F14	F
Arr-DL-2477	DL	ASIA	I	2477	17:15	350	306	96.6%	296	80	215	G08	G	TOW/RON	Dep-DL-2478	DL	HNL	D	2478	11:15	350	306	93.4%	286	175	111	F12	F
Arr-DL-2489	DL	SLC	D	2489	20:00	739	180	91.4%	165	83	82	C10	C	TOW/RON	Dep-DL-2490	DL	DTW	D	2490	6:15	739	180	88.3%	159	159	0	C10	C
Arr-DL-2481	DL	HNL	D	2481	5:48	350	306	92.1%	282	171	111	F12	F	7:02	Dep-DL-2482	DL	ICN	I	2482	12:50	350	306	97.0%	297	81	215	G03A	G
Arr-DL-2483	DL	AMS	I	2483	12:27	350	306	96.2%	294	131	164	G09B	G	3:09	Dep-DL-2484	DL	ATL	D	2484	15:36	350	306	84.6%	259	184	74	F15	F
Arr-DL-2485	DL	EUR1	I	2485	12:27	350	306	96.6%	295	117	179	G08	G	4:23	Dep-DL-2486	DL	AMS	I	2486	16:50	350	306	98.2%	301	143	158	G08	G
Arr-DL-2487	DL	HND	I	2487	13:32	350	306	87.7%	268	60	209	G06A	G	3:18	Dep-DL-2488	DL	EUR1	I	2488	16:50	350	306	97.0%	297	119	178	G09B	G
Arr-DL-2479	DL	ICN	I	2479	17:15	350	306	96.6%	296	80	215	G09B	G	TOW/RON	Dep-DL-2480	DL	ASIA	I	2480	12:50	350	306	97.0%	297	81	215	G06A	G
Arr-DL-2505	DL	FSD	D	2505	6:01	739	180	59.4%	107	6	100	E08	E	2:50	Dep-DL-2506	DL	LGA	D	2506	8:51	739	180	85.4%	154	101	53	E08	E
Arr-DL-2507	DL	GRR	D	2507	7:39	739	180	76.4%	137	37	100	C15	C	1:16	Dep-DL-2508	DL	BZN	D	2508	8:55	739	180	84.0%	151	38	113	C15	C
Arr-DL-2509	DL	MKE	D	2509	7:39	739	180	69.4%	125	48	77	C12	C	1:21	Dep-DL-2510	DL	CZM	I	2510	9:00	739	180	89.2%	161	74	86	C12	C
Arr-DL-2511	DL	FSD	D	2511	7:40	739	180	84.3%	152	9	142	C11	C	1:20	Dep-DL-2512	DL	PVR	I	2512	9:00	739	180	89.2%	161	74	86	C11	C
Arr-DL-2513	DL	OMA	D	2513	7:46	739	180	70.6%	127	33	94	C10	C	1:19	Dep-DL-2514	DL	PHX	D	2514	9:05	739	180	94.1%	169	119	51	C10	C
Arr-DL-2515	DL	BWI	D	2515	7:47	739	180	60.3%	109	66	43	D06	D	1:28	Dep-DL-2516	DL	LAS	D	2516	9:15	739	180	91.7%	165	106	59	D06	D
Arr-DL-2517	DL	DCA	D	2517	7:59	739	180	63.7%	115	63	52	E14	E	1:56	Dep-DL-2518	DL	LGA	D	2518	9:55	739	180	85.2%	153	101	53	E14	E
Arr-DL-2519	DL	LGA	D	2519	8:15	739	180	75.0%	135	88	47	F01	F	1:50	Dep-DL-2520	DL	CZM	I	2520	10:05	739	180	84.1%	151	110	41	F01	F
Arr-DL-2521	DL	LGA	D	2521	9:00	739	180	87.5%	157	104	53	G21	G	1:05	Dep-DL-2522	DL	MZT	I	2522	10:05	739	180	80.0%	144	92	52	G21	G
Arr-DL-2523	DL	AUS	D	2523	9:04	739	180	90.1%	162	115	47	G22	G	1:16	Dep-DL-2524	DL	DCA	D	2524	10:20	739	180	91.4%	165	91	74	G22	G
Arr-DL-2525	DL	BZN	D	2525	9:24	739	180	81.3%	146	36	110	C17	C	0:59	Dep-DL-2526	DL	PVR	I	2526	10:23	739	180	96.4%	174	122	52	C17	C
Arr-DL-2527	DL	BOI	D	2527	9:25	739	180	90.3%	163	39	123	C14	C	0:59	Dep-DL-2528	DL	MBJ	I	2528	10:24	739	180	87.1%	157	101	56	C14	C
Arr-DL-2529	DL	DCA	D	2529	10:17	739	180	86.1%	155	85	70	C09	C	1:13	Dep-DL-2530	DL	SEA	D	2530	11:30	739	180	97.2%	175	82	93	C09	C
Arr-DL-2531	DL	BOI	D	2531	10:30	739	180	[illegible]	139	52	87	C05	C	1:20	Dep-DL-2532	DL	GEG	D	2532	11:50	739	180	90.6%	163	26	137	C05	C

Arr-DL-2533	DL	DTW	D	2533	10:53	739	180	92.9%	167	99	68	F07	F	1:52	Dep-DL-2534	DL	LGA	D	2534	12:45	739	180	85.4%	154	101	53	F07	F
Arr-DL-2535	DL	MCI	D	2535	10:59	739	180	67.1%	121	54	67	E13	E	1:51	Dep-DL-2536	DL	BWI	D	2536	12:50	739	180	92.0%	166	101	65	E13	E
Arr-DL-2537	DL	GEG	D	2537	11:55	739	180	94.6%	170	27	144	C16	C	0:55	Dep-DL-2538	DL	MIA	D	2538	12:50	739	180	96.4%	174	128	46	C16	C
Arr-DL-2539	DL	SLC	D	2539	12:14	739	180	93.2%	168	89	79	C05	C	0:46	Dep-DL-2540	DL	SJD	I	2540	13:00	739	180	90.0%	162	89	73	C05	C
Arr-DL-2541	DL	BOS	D	2541	12:15	739	180	96.5%	174	117	57	C01	C	1:00	Dep-DL-2542	DL	SLC	D	2542	13:15	739	180	91.7%	165	78	87	C01	C
Arr-DL-2543	DL	BWI	D	2543	13:47	739	180	82.7%	149	90	59	E10	E	1:23	Dep-DL-2544	DL	PHL	D	2544	15:10	739	180	83.8%	151	82	69	E10	E
Arr-DL-2545	DL	BOS	D	2545	13:50	739	180	89.0%	160	92	69	F01	F	1:15	Dep-DL-2546	DL	GEG	D	2546	15:05	739	180	92.4%	166	27	139	F01	F
Arr-DL-2547	DL	LGA	D	2547	14:06	739	180	83.1%	150	97	52	F06	F	1:04	Dep-DL-2548	DL	BOS	D	2548	15:10	739	180	91.1%	164	95	69	F06	F
Arr-DL-2549	DL	PDX	D	2549	14:17	739	180	98.9%	178	66	112	G21	G	0:53	Dep-DL-2550	DL	LGA	D	2550	15:10	739	180	79.3%	143	94	49	G21	G
Arr-DL-2551	DL	BZN	D	2551	14:30	739	180	90.9%	164	41	123	F05	F	0:55	Dep-DL-2552	DL	MKE	D	2552	15:25	739	180	91.5%	165	64	101	F05	F
Arr-DL-2553	DL	MIA	D	2553	15:58	739	180	96.4%	174	126	47	C21	C	0:57	Dep-DL-2554	DL	RST	D	2554	16:55	739	180	84.7%	152	7	146	C21	C
Arr-DL-2555	DL	LGA	D	2555	16:22	739	180	83.1%	150	97	52	C22	C	1:28	Dep-DL-2556	DL	DCA	D	2556	17:50	739	180	91.4%	165	91	74	C22	C
Arr-DL-2557	DL	DCA	D	2557	16:30	739	180	86.1%	155	85	70	G21	G	1:20	Dep-DL-2558	DL	MKE	D	2558	17:50	739	180	80.5%	145	57	88	G21	G
Arr-DL-2559	DL	SJD	I	2559	16:40	739	180	98.6%	177	133	45	G11	G	1:15	Dep-DL-2560	DL	BOS	D	2560	17:55	739	180	91.1%	164	95	69	G11	G
Arr-DL-2561	DL	CVG	D	2561	16:55	739	180	92.7%	167	73	94	D05	D	1:05	Dep-DL-2562	DL	PDX	D	2562	18:00	739	180	93.8%	169	43	126	D05	D
Arr-DL-2563	DL	BOS	D	2563	17:02	739	180	89.0%	160	92	69	C03	C	1:28	Dep-DL-2564	DL	SLC	D	2564	18:30	739	180	93.3%	168	70	98	C03	C
Arr-DL-2565	DL	LGA	D	2565	18:00	739	180	100.0%	180	120	60	C18	C	1:00	Dep-DL-2566	DL	LGA	D	2566	19:00	739	180	91.9%	165	102	64	C18	C
Arr-DL-2567	DL	CZM	I	2567	18:25	739	180	86.6%	156	69	87	G06B	G	1:15	Dep-DL-2568	DL	BOI	D	2568	19:40	739	180	100.0%	180	19	161	G06B	G
Arr-DL-2569	DL	PHL	D	2569	18:38	739	180	80.2%	144	78	67	C14	C	1:02	Dep-DL-2570	DL	FSD	D	2570	19:40	739	180	93.0%	167	10	157	C14	C
Arr-DL-2571	DL	GEG	D	2571	18:39	739	180	94.6%	170	27	144	F06	F	1:06	Dep-DL-2572	DL	GEG	D	2572	19:45	739	180	100.0%	180	6	174	F06	F
Arr-DL-2573	DL	PVR	I	2573	18:40	739	180	89.4%	161	59	102	G04A	G	1:50	Dep-DL-2574	DL	OMA	D	2574	20:30	739	180	68.5%	123	33	91	G04A	G
Arr-DL-2577	DL	MZT	I	2577	18:59	739	180	97.1%	175	110	65	G10	G	1:21	Dep-DL-2578	DL	CVG	D	2578	20:20	739	180	79.6%	143	63	80	G10	G
Arr-DL-2579	DL	BWI	D	2579	19:17	739	180	77.3%	139	72	67	C03	C	1:29	Dep-DL-2580	DL	BWI	D	2580	20:46	739	180	68.2%	123	75	48	C03	C
Arr-DL-2581	DL	CZM	I	2581	19:25	739	180	88.4%	159	115	44	G09	G	3:00	Dep-DL-2582	DL	MKE	D	2582	22:25	739	180	80.5%	145	57	88	G09	G
Arr-DL-2583	DL	PVR	I	2583	19:58	739	180	97.3%	175	122	53	G13	G	2:28	Dep-DL-2584	DL	PDX	D	2584	22:26	739	180	92.7%	167	60	107	G13	G
Arr-DL-2575	DL	MKE	D	2575	20:45	739	180	92.3%	166	64	102	G20	G	0:57	Dep-DL-2576	DL	FSD	D	2576	21:42	739	180	71.2%	128	8	120	G20	G
Arr-DL-2491	DL	MBJ	I	2491	21:02	739	180	86.3%	155	99	56	G06B	G	TOW/RON	Dep-DL-2492	DL	BOS	D	2492	6:50	739	180	91.1%	164	95	69	G06B	G
Arr-DL-2493	DL	MKE	D	2493	21:08	739	180	69.4%	125	48	77	G19	G	TOW/RON	Dep-DL-2494	DL	LGA	D	2494	6:50	739	180	85.4%	154	101	53	G19	G
Arr-DL-2495	DL	GEG	D	2495	21:18	739	180	77.6%	140	58	82	G14	G	TOW/RON	Dep-DL-2496	DL	ORD	D	2496	6:50	739	180	86.1%	155	107	49	G14	G
Arr-DL-2497	DL	LGA	D	2497	21:34	739	180	75.0%	135	88	47	F07	F	TOW/RON	Dep-DL-2498	DL	MCI	D	2498	6:55	739	180	54.8%	99	44	54	F07	F
Arr-DL-2499	DL	SEA	D	2499	21:52	739	180	92.2%	166	166	0	E13	E	TOW/RON	Dep-DL-2500	DL	SJD	I	2500	7:05	739	180	86.6%	156	118	38	E13	E
Arr-DL-2501	DL	PDX	D	2501	22:06	739	180	94.6%	170	170	0	G20	G	TOW/RON	Dep-DL-2502	DL	CVG	D	2502	8:14	739	180	83.0%	149	66	84	G20	G
Arr-DL-2503	DL	SJD	I	2503	22:20	739	180	91.9%	165	165	0	G03	G	TOW/RON	Dep-DL-2504	DL	ATL	D	2504	8:50	739	180	92.3%	166	118	48	G03	G
Arr-DL-2585	DL	LAX	D	2585	21:27	753	240	90.2%	216	137	80	G15	G	TOW/RON	Dep-DL-2586	DL	LAX	D	2586	6:50	753	240	92.2%	221	141	80	G15	G
Arr-DL-2627	DL	SNA	D	2627	21:00	32N	150	87.1%	131	68	63	C04	C	TOW/RON	Dep-DL-2628	DL	ATL	D	2628	6:20	32N	150	92.3%	138	138	0	C04	C
Arr-DL-2591	DL	DTW	D	2591	8:13	753	240	75.7%	182	108	74	E15	E	1:49	Dep-DL-2592	DL	ATL	D	2592	10:02	753	240	92.3%	221	158	64	E15	E
Arr-DL-2593	DL	MCO	D	2593	8:50	753	240	85.1%	204	140	64	F13	F	1:20	Dep-DL-2594	DL	CUN	I	2594	10:10	753	240	96.3%	231	149	83	F13	F
Arr-DL-2595	DL	ATL	D	2595	9:04	753	240	90.2%	216	153	64	G08	G	2:11	Dep-DL-2596	DL	SLC	D	2596	11:15	753	240	86.8%	208	111	97	G08	G
Arr-DL-2597	DL	SLC	D	2597	9:14	753	240	78.7%	189	100	89	G17	G	2:20	Dep-DL-2598	DL	LAX	D	2598	11:34	753	240	96.0%	230	147	84	G17	G
Arr-DL-2599	DL	RSW	D	2599	9:53	753	240	91.9%	221	170	51	G15	G	1:42	Dep-DL-2600	DL	LAS	D	2600	11:35	753	240	91.7%	220	142	79	G15	G
Arr-DL-2601	DL	ATL	D	2601	10:36	753	240	90.2%	216	153	64	E15	E	2:19	Dep-DL-2602	DL	RSW	D	2602	12:55	753	240	88.9%	213	166	48	E15	E
Arr-DL-2603	DL	SAN	D	2603	12:06	753	240	95.2%	228	119	109	G15	G	2:19	Dep-DL-2604	DL	DEN	D	2604	14:25	753	240	92.1%	221	136	85	G15	G
Arr-DL-2623	DL	LAS	D	2623	13:05	753	240	90.6%	217	139	79	F13	F	2:31	Dep-DL-2624	DL	SFO	D	2624	15:36	753	240	91.5%	220	146	74	F13	F
Arr-DL-2605	DL	SEA	D	2605	13:17	753	240	88.8%	213	99	114	E15	E	1:38	Dep-DL-2606	DL	SEA	D	2606	14:55	753	240	97.2%	233	110	124	E15	E
Arr-DL-2607	DL	ATL	D	2607	13:50	753	240	90.2%	216	153	64	F12	F	1:35	Dep-DL-2608	DL	LAS	D	2608	15:25	753	240	91.7%	220	142	79	F12	F
Arr-DL-2625	DL	LAS	D	2625	15:50	753	240	90.6%	217	139	79	G17	G	1:46	Dep-DL-2626	DL	SLC	D	2626	17:36	753	240	86.8%	208	111	97	G17	G
Arr-DL-2609	DL	CUN	I	2609	16:00	753	240	91.9%	221	141	80	G03A	G	1:40	Dep-DL-2610	DL	DTW	D	2610	17:40	753	240	91.7%	220	132	89	G03A	G
Arr-DL-2611	DL	LAX	D	2611	16:43	753	240	96.6%	232	146	85	E15	E	1:33	Dep-DL-2612	DL	TPA	D	2612	18:16	753	240	80.8%	194	136	57	E15	E
Arr-DL-2613	DL	TPA	D	2613	16:54	753	240	90.7%	218	152	66	G20	G	1:21	Dep-DL-2614	DL	MCO	D	2614	18:15	753	240	87.8%	211	146	65	G20	G
Arr-DL-2615	DL	CUN	I	2615	18:39	753	240	97.8%	235	150	85	G05	G	1:41	Dep-DL-2616	DL	BOS	D	2616	20:20	753	240	90.8%	218	156	62	G05	G
Arr-DL-2621	DL	ATL	D	2621	19:40	753	240	90.3%	217	153	64	G17	G	1:35	Dep-DL-2622	DL	DEN	D	2622	21:15	753	240	93.1%	223	137	86	G17	G
Arr-DL-2617	DL	RSW	D	2617	20:56	753	240	96.6%	232	178	53	F12	F	1:35	Dep-DL-2618	DL	LAS	D	2618	22:31	753	240	98.1%	235	151	84	F12	F
Arr-DL-2619	DL	SLC	D	2619	21:26	753	240	94.3%	226	120	106	E15	E	TOW/RON	Dep-DL-2620	DL	ATL	D	2620	7:25	753	240	92.3%	221	158	64	E15	E
Arr-DL-2587	DL	LAS	D	2587	22:58	753	240	90.6%	217	217	0	G05	G	TOW/RON	Dep-DL-2588	DL	DCA	D	2588	7:00	753	240	91.4%	219	121	98	G05	G
Arr-DL-2589	DL	ATL	D	2589	23:59	753	240	90.8%	218	218	0	G09B	G	TOW/RON	Dep-DL-2590	DL	CUN	I	2590	9:00	753	240	96.3%	231	149	83	G09B	G
Arr-DL-2749	DL	MDW	D	2749	21:32	CR9	76	79.2%	60	44	16	A06	A	TOW/RON	Dep-DL-2750	DL	MDW	D	2750	6:55	CR9	76	75.6%	57	42	15	A06	A
Arr-DL-2643	DL	PSP	D	2643	5:22	32N	150	89.6%	134	93	41	C16	C	3:38	Dep-DL-2644	DL	MZT	I	2644	9:00	32N	150	89.2%	134	62	72	C16	C
Arr-DL-2645	DL	SEA	D	2645	5:43	32N	150	88.8%	133	62	71	C09	C	3:27	Dep-DL-2646	DL	MEX	I	2646	9:10	32N	150	88.3%	132	99	33	C09	C
Arr-DL-2647	DL	LAS	D	2647	5:45	32N	150	90.6%	136	87	49	C07	C	4:15	Dep-DL-2648	DL	MIA	D	2648	10:00	32N	150	90.6%	136	82	54	C07	C
Arr-DL-2649	DL	LAX	D	2649	6:08	32N	150	90.7%	136	86	50	E09	E	4:02	Dep-DL-2650	DL	TPA	D	2650	10:10	32N	150	92.6%	139	103	35	E09	E
Arr-DL-2651	DL	MSN	D	2651	7:44	32N	150	79.9%	120	18	102	C04	C	2:31	Dep-DL-2652	DL	MSY	D	2652	10:15	32N	150	90.5%	136	89	47	C04	C
Arr-DL-2653	DL	MCI	D	2653	7:51	32N	150	57.6%	86	38	48	G19	G	2:38	Dep-DL-2654	DL	DTW	D	2654	10:29	32N	150	91.9%	138	82	55	G19	G
Arr-DL-2655	DL	CMH	D	2655	7:57	32N	150	63.2%	95	47	48	E10	E	2:48	Dep-DL-2656	DL	MCO	D	2656	10:45	32N	150	94.6%	142	97	45	E10	E
Arr-DL-2657	DL	BIS	D	2657	8:15	32N	150	71.7%	108	13	95	F11	F	2:45	Dep-DL-2658	DL	SFO	D	2658	11:00	32N	150	92.2%	138	85	54	F11	F
Arr-DL-2659	DL	DFW	D	2659	8:51	32N	150	74.8%	112	74	38	F06	F	2:24	Dep-DL-2660	DL	JAC	D	2660	11:15	32N	150	84.9%	127	41	86	F06	F
Arr-DL-2661	DL	BOS	D	2661	9:30	32N	150	96.4%	145	99	45	C21	C	1:50	Dep-DL-2662	DL	SAN	D	2662	11:20	32N	150	96.6%	145	76	68	C21	C
Arr-DL-2663	DL	LGA	D	2663	10:02	32N	150	71.1%	107	69	37	C11	C	1:38	Dep-DL-2664	DL	DTW	D	2664	11:40	32N	150	91.9%	138	82	55	C11	C
Arr-DL-2665	DL	PHL	D	2665	10:10	32N	150	80.2%	120	65	56	C10	C	1:35	Dep-DL-2666	DL	BOI	D	2666	11:45	32N	150	97.2%	146	36	110	C10	C
Arr-DL-2667	DL	BOS	D	2667	10:15	32N	150	69.5%	104	60	45	C13	C	1:46	Dep-DL-2668	DL	SFO	D	2668	12:01	32N	150	91.5%	137	91	46	C13	C
Arr-DL-2669	DL	MKE	D	2669	10:30	32N	150	80.7%	121	47	74	F08	F	1:45	Dep-DL-2670	DL	SEA	D	2670	12:15	32N	150	96.2%	144	85	59	F08	F
Arr-DL-2671	DL	MIA	D	2671	10:37	32N	150	96.5%	145	86	59	G21	G	2:03	Dep-DL-2672	DL	BZN	D	2672	12:40	32N	150	91.5%	137	29	108	G21	G
Arr-DL-2673	DL	ORD	D	2673	10:38	32N	150	92.5%	139	94	44	E06	E	2:02	Dep-DL-2674	DL	SNA	D	2674	12:40	32N	150	94.6%	142	72	70	E06	E
Arr-DL-2675	DL	MEX	I	2675	11:15	32N	150	87.8%	132	98	34	G13	G	1:30	Dep-DL-2676	DL	LAX	D	2676	12:45	32N	150	86.2%	129	82	47	G13	G
Arr-DL-2677	DL	BWI	D	2677	11:17	32N	150	91.1%	137	72	65	F04	F	1:33	Dep-DL-2678	DL	PVD	D	2678	12:50	32N	150	88.5%	133	96	37	F04	F
Arr-DL-2679	DL	JAC	D	2679	11:32	32N	150	81.8%	123	38	84	F01	F	1:23	Dep-DL-2680	DL	ORD	D	2680	12:55	32N	150	86.1%	129	89	40	F01	F
Arr-DL-2681	DL	MSY	D	2681	11:45	32N	150	80.2%	120	59	61	C18	C	1:15	Dep-DL-2682	DL	MEX	I	2682	13:00	32N	150	88.3%	132	99	33	C18	C
Arr-DL-2683	DL	SMF	D	2683	11:54	32N	150	94.9%	142	57	85	C19	C	1:11	Dep-DL-2684	DL	MCO	D	2684	13:05	32N	150	90.8%	136	95	42	C19	C
Arr-DL-2685	DL	LAX	D	2685	13:01	32N	150	90.2%	135	85	50	C04	C	0:44	Dep-DL-2686	DL	MSN	D	2686	13:45	32N	150	86.7%	130	20	110	C04	C
Arr-DL-2687	DL	OAK	D	2687	13:20	32N	150	86.9%	130	52	79	C18	C	1:02	Dep-DL-2688	DL	BZN	D	2688	14:22	32N	150	84.0%	126	32	94	C18	C
Arr-DL-2689	DL	SFO	D	2689	13:38	32N	150	86.8%	130	86	45	F08	F	1:32	Dep-DL-2690	DL	ORD	D	2690	15:10	32N	150	86.1%	129	89	40	F08	F
Arr-DL-2691	DL	SEA	D	2691	14:30	32N	150	98.3%	147	56	91	F03	F	0:45	Dep-DL-2692	DL	IND	D	2692	15:15	32N	150	88.0%	132	67	65	F03	F
Arr-DL-2693	DL	DTW	D	2693	14:51	32N	150	91.2%	137	81	56	C19	C	1:39	Dep-DL-2694	DL	BOS	D	2694	16:30	32N	150	97.3%	146	108	38	C19	C
Arr-DL-2695	DL	TPA	D	2695	14:55	32N	150	90.7%	136	101	35	C15	C	2:40	Dep-DL-2696	DL	BIS	D	2696	17:35	32N	150	69.6%	104	12	92	C15	C
Arr-DL-2697	DL	MSY	D	2697	15:19	32N	150	89.9%	135	88	47	F11	F	2:16	Dep-DL-2698	DL	DFW	D	2698	17:35	32N	150	94.1%	141	94	47	F11	F
Arr-DL-2699	DL	BOS	D	2699	15:45	32N	150	96.2%	144	102	43	C20	C	1:50	Dep-DL-2700	DL	ORD	D	2700	17:35	32N	150	86.1%	129	89	40	C20	C
Arr-DL-2701	DL	SEA	D	2701	16:00	32N	150	97.3%	146	73	73	C07	C	1:40	Dep-DL-2702	DL	JAC	D	2702	17:40	32N	150	84.0%	126	37	89	C07	C
Arr-DL-2703	DL	FLL	D	2703	16:06	32N	150	96.2%	144	106	39	F08	F	1:34	Dep-DL-2704	DL	RSW	D	2704	17:40	32N	150	88.9%	133	104	30	F08	F
Arr-DL-2705	DL	MSN	D	2705	16:37	32N	150	95.3%	143	22	121	E09	E	1:06	Dep-DL-2706	DL	LGA	D	2706	17:43	32N	150	85.2%	128	84	44	E09	E
Arr-DL-2707	DL	JAC	D	2707	16:45	32N	150	81.1%	122	40	82	E13	E	1:00	Dep-DL-2708	DL	MIA	D	2708	17:45	32N	150	90.6%	136	82	54	E13	E
Arr-DL-2709	DL	DTW	D	2709	16:50	32N	150	93.2%	140	83	57	C19	C	1:00	Dep-DL-2710	DL	LAS	D	2710	17:50	32N	150	91.7%	138	88	49	C19	C
Arr-DL-2711	DL	LAS	D	2711	16:51	32N	150	90.6%	136	87	49	F01	F	1:08	Dep-DL-2712	DL	SAN	D	2712	17:59	32N	150	96.6%	145	76	68	F01	F
Arr-DL-2713	DL	ORD	D	2713	16:54	32N	150	92.5%	139	94	44	G22	G	1:05	Dep-DL-2714	DL	SMF	D	2714	17:59	32N	150	92.0%	138	56	82	G22	G
Arr-DL-2715	DL	BZN	D	2715	16:59	32N	150	100.0%	150	30	120	D06	D	1:01	Dep-DL-2716	DL	FLL	D	2716	18:00	32N	150	88.2%	132	96	37	D06	D
Arr-DL-2717	DL	MBJ	I	2717	17:30	32N	150	92.7%	139	34	105	G15	G	0:59	Dep-DL-2718	DL	BWI	D	2718	18:29	32N	150	89.5%	134	80	54	G15	G
Arr-DL-2719	DL	MZT	I	2719	18:00	32N	150	97.0%	146	90	56	G13	G	1:15	Dep-DL-2720	DL	CMH	D	2720	19:15	32N	150	81.8%	123	44	78	G13	G
Arr-DL-2721	DL	TPA	D	2721	18:26	32N	150	90.7%	136	101	35	G22	G	1:04	Dep-DL-2722	DL	MSY	D	2722	19:30	32N	150	77.7%	117	65	52	G22	G
Arr-DL-2723	DL	MCO	D	2723	18:30	32N	150	95.0%	142	96	47	E13	E	1:20	Dep-DL-2724	DL	OAK	D	2724	19:50	32N	150	87.3%	131	58	73	E13	E
Arr-DL-2725	DL	MIA	D	2725	18:45	32N	150	96.5%	145	86	59	F12A	F	1:09	Dep-DL-2726	DL	PSP	D	2726	19:54	32N	150	86.3%	130	49	81	F12A	F
Arr-DL-2727	DL	SJC	D	2727	18:54	32N	150	91.8%	138	56	82	C17	C	1:11	Dep-DL-2728	DL	LAX	D	2728	20:05	32N	150	91.6%	137	75	62	C17	C
Arr-DL-2729	DL	ORD	D	2729	18:59	32N	150	92.5%	139	94	44	F02	F	1:21	Dep-DL-2730	DL	DCA	D	2730	20:20	32N	150	78.4%	118	65	53	F02	F
Arr-DL-2731	DL	BOI	D	2731	19:00	32N	150	95.9%	144	27	117	G20	G	1:20	Dep-DL-2732	DL	PHL	D	2732	20:20	32N	150	100.0%	150	54	96	G20	G
Arr-DL-2733	DL	MSY	D	2733	19:00	32N	150	89.9%	135	88	47	G21	G	1:30	Dep-DL-2734	DL	SJC	D	2734	20:30	32N	150	85.6%	128	61	67	G21	G
Arr-DL-2735	DL	SFO	D	2735	19:15	32N	150	98.3%	148	82	66	G19	G	1:16	Dep-DL-2736	DL	SFO	D	2736	20:31	32N	150	94.7%	142	74	68	G19	G
Arr-DL-2737	DL	MEX	I	2737	19:20	32N	150	87.8%	132	98	34	G12	G	1:20	Dep-DL-2738	DL	MCI	D	2738	20:40	32N	150	83.7%	126	38	88	G12	G
Arr-DL-2739	DL	IND	D	2739	19:27	32N	150	81.1%	122	61	61	D05	D	1:16	Dep-DL-2740	DL	LAS	D	2740	20:43	32N	150	91.7%	138	88	49	D05	D
Arr-DL-2743	DL	PVD	D	2743	19:45	32N	150	88.0%	132	94	38	E10	E	2:40	Dep-DL-2744	DL	LAX	D	2744	22:25	32N	150	86.2%	129	82	47	E10	E
Arr-DL-2745	DL	SEA	D	2745	20:00	32N	150	96.8%	145	72	73	C12	C	2:25	Dep-DL-2746	DL	SAN	D	2746	22:25	32N	150	92.7%	139	74	65	C12	C
Arr-DL-2747	DL	BOS	D	2747	20:46	32N	150	89.0%	134	76	57	G18	G	1:59	Dep-DL-2748	DL	MSN	D	2748	22:45	32N	150	67.1%	101	15	85	G18	G
Arr-DL-2741	DL	BZN	D	2741	21:00	32N	150	90.9%	136	34	103	G22	G	1:15	Dep-DL-2742	DL	SEA	D	2742	22:15	32N	150	94.8%	142	63	79	G22	G
Arr-DL-2629	DL	MCO	D	2629	21:03	32N	150	85.1%	128	88	40	D05	D	TOW/RON	Dep-DL-2630	DL	BOS	D	2630	6:50	32N	150	91.1%	137	79	58	D05	D
Arr-DL-2631	DL	FLL	D	2631	21:16	32N	150	93.5%	140	89	51	F03	F	TOW/RON	Dep-DL-2632	DL	FLL	D	2632	7:00	32N	150	90.9%	136	101	36	F03	F
Arr-DL-2633	DL	MIA	D	2633	21:19	32N	150	93.0%	140	102	38	F01	F	TOW/RON	Dep-DL-2634	DL	MBJ	I	2634	7:00	32N	150	86.6%	130	81	49	F01	F
Arr-DL-2635	DL	ORD	D	2635	21:21	32N	150	92.5%	139	94	44	E07	E	TOW/RON	Dep-DL-2636	DL	TPA	D	2636	7:15	32N	150	92.6%	139	103	35	E07	E
Arr-DL-2637	DL	SAN	D	2637	21:25	32N	150	92.8%	139	82	57	C22	C	TOW/RON	Dep-DL-2638	DL	SEA	D	2638	7:45	32N	150	94.1%	141	116	26	C22	C
Arr-DL-2639	DL	MCI	D	2639	21:28	32N	150	48.5%	73	32	40	C03	C	TOW/RON	Dep-DL-2640	DL	MSY	D	2640	8:50	32N	150	90.5%	136	89	47	C03	C
Arr-DL-2641	DL	SFO	D	2641	21:35	32N	150	86.8%	130	86	45	C05	C	TOW/RON	Dep-DL-2642	DL	MIA	D	2642	8:55	32N	150	96.4%	145	106	38	C05	C
Arr-DL-2313	DL	RSW	D	2313	0:32	3N1	192	89.4%	172	172	0	E10	E	6:36	Dep-DL-2314	DL	MCO	D	2314	7:08	3N1	192	92.6%	178	123	54	E10	E
Arr-DL-2331	DL	SAN	D	2331	5:45	3N1	192	95.2%	183	95	87	C02	C	3:10	Dep-DL-2332	DL	SFO	D	2332	8:55	3N1	192	91.5%	176	117	59	C02	C
Arr-DL-2317	DL	PDX	D	2317	5:46	3N1	192	90.6%	174	62	112	G18	G	2:14	Dep-DL-2318	DL	ATL	D	2318	8:00	3N1	192	97.3%	187	125	62	G18	G
Arr-DL-2319	DL	ANC	D	2319	5:53	3N1	192	95.1%	183	25	157	G21	G	2:07	Dep-DL-2320	DL	LAS	D	2320	8:00	3N1	192	90.5%	174	95	79	G21	G
Arr-DL-2321	DL	SFO	D	2321	5:57	3N1	192	86.8%	167	110	57	G22	G	2:03	Dep-DL-2322	DL	MCO	D	2322	8:00	3N1	192	94.6%	182	124	58	G22	G
Arr-DL-2323	DL	BOS	D	2323	7:53	3N1	192	69.5%	133	76	57	G08	G	0:43	Dep-DL-2324	DL	SLC	D	2324	8:36	3N1	192	93.8%	180	96	84	G08	G
Arr-DL-2325	DL	ATL	D	2325	8:15	3N1	192	[illegible]	188	88	100	E07	E	1:05	Dep-DL-2326	DL	RSW	D	2326	9:20	3N1	192	83.2%	160	124	36	[illegible]	E

Arr-DL-2349	DL	RSW	D	2349	8:30	3N1	192	96.4%	185	142	43	C13	C	1:25	Dep-DL-2350	DL	BOS	D	2350	9:55	3N1	192	91.1%	175	101	74	C13	C
Arr-DL-2329	DL	FLL	D	2329	8:45	3N1	192	93.5%	180	114	65	G18	G	1:00	Dep-DL-2330	DL	SEA	D	2330	9:45	3N1	192	94.7%	182	86	96	G18	G
Arr-DL-2327	DL	DEN	D	2327	9:00	3N1	192	93.4%	179	109	70	G20	G	1:25	Dep-DL-2328	DL	LAX	D	2328	10:25	3N1	192	92.9%	178	114	65	G20	G
Arr-DL-2367	DL	TPA	D	2367	10:19	3N1	192	91.2%	175	122	53	C06	C	0:41	Dep-DL-2368	DL	PUJ	I	2368	11:00	3N1	192	92.2%	177	108	69	C06	C
Arr-DL-2369	DL	SLC	D	2369	10:20	3N1	192	92.8%	178	80	98	C02	C	1:00	Dep-DL-2370	DL	PHX	D	2370	11:20	3N1	192	96.5%	185	130	55	C02	C
Arr-DL-2371	DL	DEN	D	2371	10:30	3N1	192	96.8%	186	97	89	D05	D	0:55	Dep-DL-2372	DL	PDX	D	2372	11:25	3N1	192	96.8%	186	67	119	D05	D
Arr-DL-2375	DL	MCO	D	2375	10:43	3N1	192	91.9%	177	121	55	C17	C	1:02	Dep-DL-2376	DL	DEN	D	2376	11:45	3N1	192	93.1%	179	110	69	C17	C
Arr-DL-2353	DL	SLC	D	2353	11:15	3N1	192	92.9%	178	80	98	E11	E	1:30	Dep-DL-2354	DL	ATL	D	2354	12:45	3N1	192	88.7%	170	121	49	E11	E
Arr-DL-2377	DL	ATL	D	2377	11:15	3N1	192	97.0%	186	113	73	E10	E	1:45	Dep-DL-2378	DL	DEN	D	2378	13:00	3N1	192	96.4%	185	124	61	E10	E
Arr-DL-2351	DL	RSW	D	2351	11:30	3N1	192	96.4%	185	142	43	F05	F	1:15	Dep-DL-2352	DL	LAS	D	2352	12:45	3N1	192	90.5%	174	95	79	F05	F
Arr-DL-2379	DL	SFO	D	2379	11:41	3N1	192	86.8%	167	110	57	C21	C	1:19	Dep-DL-2380	DL	FLL	D	2380	13:00	3N1	192	88.2%	169	123	47	C21	C
Arr-DL-2381	DL	PHX	D	2381	11:44	3N1	192	93.0%	178	124	55	C20	C	1:21	Dep-DL-2382	DL	SAN	D	2382	13:05	3N1	192	95.0%	182	79	103	C20	C
Arr-DL-2383	DL	PDX	D	2383	11:56	3N1	192	90.6%	174	62	112	C15	C	1:14	Dep-DL-2384	DL	DTW	D	2384	13:10	3N1	192	88.3%	170	101	68	C15	C
Arr-DL-2385	DL	MCO	D	2385	12:00	3N1	192	95.0%	182	122	60	C11	C	1:10	Dep-DL-2386	DL	TPA	D	2386	13:10	3N1	192	96.5%	185	131	55	C11	C
Arr-DL-2387	DL	ATL	D	2387	12:12	3N1	192	91.9%	176	124	52	C07	C	1:18	Dep-DL-2388	DL	PHX	D	2388	13:30	3N1	192	92.7%	178	101	77	C07	C
Arr-DL-2355	DL	SFO	D	2355	12:40	3N1	192	86.8%	167	110	57	D05	D	1:00	Dep-DL-2356	DL	PUJ	I	2356	13:40	3N1	192	92.7%	178	128	50	D05	D
Arr-DL-2389	DL	SAN	D	2389	12:50	3N1	192	94.2%	181	101	80	E07	E	0:55	Dep-DL-2390	DL	ATL	D	2390	13:45	3N1	192	97.3%	187	125	62	E07	E
Arr-DL-2391	DL	DCA	D	2391	12:55	3N1	192	86.1%	165	91	75	E08	E	0:50	Dep-DL-2392	DL	LAX	D	2392	13:45	3N1	192	89.9%	173	104	68	E08	E
Arr-DL-2393	DL	LGA	D	2393	13:12	3N1	192	71.1%	137	89	48	C16	C	0:48	Dep-DL-2394	DL	MCO	D	2394	14:00	3N1	192	94.6%	182	124	58	C16	C
Arr-DL-2395	DL	SAN	D	2395	13:27	3N1	192	94.7%	182	95	87	C05	C	0:55	Dep-DL-2396	DL	PHX	D	2396	14:22	3N1	192	91.9%	177	124	53	C05	C
Arr-DL-2397	DL	SLC	D	2397	13:32	3N1	192	92.8%	178	94	84	E06	E	0:58	Dep-DL-2398	DL	PDX	D	2398	14:30	3N1	192	93.0%	179	60	119	E06	E
Arr-DL-2399	DL	LAX	D	2399	13:45	3N1	192	97.3%	187	107	80	C01	C	0:45	Dep-DL-2400	DL	SLC	D	2400	14:30	3N1	192	86.8%	167	89	78	C01	C
Arr-DL-2401	DL	MCO	D	2401	13:49	3N1	192	91.9%	177	121	55	E14	E	0:51	Dep-DL-2402	DL	LAX	D	2402	14:40	3N1	192	92.9%	178	114	65	E14	E
Arr-DL-2403	DL	DEN	D	2403	13:58	3N1	192	92.2%	177	108	69	C12	C	0:47	Dep-DL-2404	DL	ATL	D	2404	14:45	3N1	192	97.3%	187	125	62	C12	C
Arr-DL-2405	DL	LAX	D	2405	14:23	3N1	192	93.8%	180	114	66	E07	E	0:52	Dep-DL-2406	DL	DCA	D	2406	15:15	3N1	192	91.4%	176	97	78	E07	E
Arr-DL-2407	DL	PHX	D	2407	14:24	3N1	192	93.0%	178	124	55	E08	E	0:51	Dep-DL-2408	DL	MSN	D	2408	15:15	3N1	192	86.3%	166	25	141	E08	E
Arr-DL-2409	DL	LAS	D	2409	14:38	3N1	192	90.6%	174	111	63	C22	C	1:11	Dep-DL-2410	DL	DTW	D	2410	15:49	3N1	192	88.3%	170	101	68	C22	C
Arr-DL-2411	DL	ATL	D	2411	14:45	3N1	192	95.3%	183	130	53	C18	C	1:15	Dep-DL-2412	DL	LAX	D	2412	16:00	3N1	192	91.0%	175	101	73	C18	C
Arr-DL-2413	DL	CUN	I	2413	15:00	3N1	192	82.1%	158	51	107	G12	G	1:30	Dep-DL-2414	DL	DTW	D	2414	16:30	3N1	192	97.4%	187	116	71	G12	G
Arr-DL-2347	DL	DEN	D	2347	15:30	3N1	192	76.7%	147	91	56	C10	C	1:00	Dep-DL-2348	DL	RSW	D	2348	16:30	3N1	192	94.6%	182	141	41	C10	C
Arr-DL-2361	DL	MCO	D	2361	15:30	3N1	192	94.8%	182	125	56	C12	C	1:00	Dep-DL-2362	DL	DCA	D	2362	16:30	3N1	192	90.5%	174	96	78	C12	C
Arr-DL-2363	DL	SFO	D	2363	15:32	3N1	192	98.2%	189	108	80	E06	E	1:03	Dep-DL-2364	DL	FLL	D	2364	16:35	3N1	192	90.9%	175	129	46	E06	E
Arr-DL-2365	DL	ATL	D	2365	15:37	3N1	192	91.9%	176	124	52	F09	F	1:03	Dep-DL-2366	DL	PHX	D	2366	16:40	3N1	192	92.0%	177	104	72	F09	F
Arr-DL-2419	DL	PHX	D	2419	16:42	3N1	192	89.6%	172	119	53	E12	E	1:03	Dep-DL-2418	DL	ATL	D	2418	17:45	3N1	192	92.0%	177	126	51	E12	E
Arr-DL-2423	DL	PDX	D	2423	16:55	3N1	192	97.4%	187	67	120	F07	F	0:53	Dep-DL-2424	DL	ANC	D	2424	17:48	3N1	192	89.9%	173	24	149	F07	F
Arr-DL-2427	DL	SAN	D	2427	16:59	3N1	192	95.2%	183	95	87	C14	C	1:06	Dep-DL-2428	DL	SFO	D	2428	18:05	3N1	192	91.5%	176	117	59	C14	C
Arr-DL-2429	DL	LAX	D	2429	17:01	3N1	192	96.6%	185	106	79	C04	C	1:29	Dep-DL-2430	DL	ATL	D	2430	18:30	3N1	192	99.0%	190	120	70	C04	C
Arr-DL-2359	DL	CUN	I	2359	17:30	3N1	192	96.6%	185	118	67	G12	G	1:30	Dep-DL-2360	DL	BOS	D	2360	19:00	3N1	192	87.7%	168	97	71	G12	G
Arr-DL-2357	DL	PUJ	I	2357	18:00	3N1	192	92.7%	178	127	51	G14	G	1:30	Dep-DL-2358	DL	PDX	D	2358	19:30	3N1	192	96.8%	186	67	119	G14	G
Arr-DL-2431	DL	DEN	D	2431	18:00	3N1	192	95.5%	183	122	61	C15	C	1:00	Dep-DL-2432	DL	DEN	D	2432	19:00	3N1	192	94.1%	181	112	68	C15	C
Arr-DL-2433	DL	LAS	D	2433	18:00	3N1	192	92.1%	177	102	75	C09	C	1:26	Dep-DL-2434	DL	ATL	D	2434	19:26	3N1	192	88.7%	170	121	49	C09	C
Arr-DL-2435	DL	LAX	D	2435	18:00	3N1	192	98.1%	188	89	99	C07	C	1:30	Dep-DL-2436	DL	PHX	D	2436	19:30	3N1	192	92.0%	177	104	72	C07	C
Arr-DL-2437	DL	DCA	D	2437	18:15	3N1	192	91.5%	176	77	99	C19	C	1:43	Dep-DL-2438	DL	GRR	D	2438	19:58	3N1	192	82.5%	158	34	124	C19	C
Arr-DL-2439	DL	SEA	D	2439	18:30	3N1	192	98.6%	189	65	124	E09	E	1:28	Dep-DL-2440	DL	SAN	D	2440	19:58	3N1	192	91.9%	176	93	83	E09	E
Arr-DL-2441	DL	SLC	D	2441	18:30	3N1	192	91.4%	176	88	87	E08	E	1:33	Dep-DL-2442	DL	LGA	D	2442	20:03	3N1	192	79.3%	152	100	52	E08	E
Arr-DL-2443	DL	RSW	D	2443	18:38	3N1	192	96.4%	185	142	43	E14	E	1:26	Dep-DL-2444	DL	DEN	D	2444	20:04	3N1	192	92.1%	177	108	68	E14	E
Arr-DL-2445	DL	FLL	D	2445	18:45	3N1	192	96.2%	185	135	49	F01	F	1:30	Dep-DL-2446	DL	RSW	D	2446	20:15	3N1	192	83.2%	160	124	36	F01	F
Arr-DL-2447	DL	DTW	D	2447	19:00	3N1	192	91.2%	175	104	71	E11	E	1:32	Dep-DL-2448	DL	PHX	D	2448	20:32	3N1	192	91.9%	177	124	53	E11	E
Arr-DL-2449	DL	LAX	D	2449	19:00	3N1	192	98.7%	189	89	101	E06	E	1:30	Dep-DL-2450	DL	SLC	D	2450	20:30	3N1	192	94.1%	181	68	113	E06	E
Arr-DL-2335	DL	DTW	D	2335	20:30	3N1	192	95.2%	183	106	77	C19	C	TOW/RON	Dep-DL-2336	DL	DEN	D	2336	9:00	3N1	192	93.1%	179	110	69	C19	C
Arr-DL-2337	DL	LAS	D	2337	20:30	3N1	192	95.9%	184	125	59	C17	C	TOW/RON	Dep-DL-2338	DL	MCO	D	2338	9:00	3N1	192	92.6%	178	123	54	C17	C
Arr-DL-2339	DL	ATL	D	2339	20:45	3N1	192	95.3%	183	130	53	C06	C	TOW/RON	Dep-DL-2340	DL	SAN	D	2340	9:00	3N1	192	96.6%	186	98	88	C06	C
Arr-DL-2341	DL	TPA	D	2341	20:57	3N1	192	91.9%	177	123	53	C08	C	TOW/RON	Dep-DL-2342	DL	TPA	D	2342	9:00	3N1	192	94.9%	182	128	54	C08	C
Arr-DL-2309	DL	DCA	D	2309	21:01	3N1	192	86.1%	165	91	75	D06	D	TOW/RON	Dep-DL-2310	DL	SFO	D	2310	7:00	3N1	192	87.4%	168	139	29	D06	D
Arr-DL-2311	DL	ANC	D	2311	21:15	3N1	192	97.9%	188	70	118	E11	E	TOW/RON	Dep-DL-2312	DL	PUJ	I	2312	7:05	3N1	192	96.1%	185	133	51	E11	E
Arr-DL-2451	DL	MCO	D	2451	21:30	3N1	192	95.0%	182	122	60	F02	F	1:15	Dep-DL-2452	DL	PHX	D	2452	22:45	3N1	192	91.9%	177	124	53	F02	F
Arr-DL-2303	DL	PUJ	I	2303	21:31	3N1	192	89.1%	171	122	49	G12	G	TOW/RON	Dep-DL-2304	DL	PHX	D	2304	6:55	3N1	192	91.9%	177	124	53	G12	G
Arr-DL-2305	DL	DTW	D	2305	21:41	3N1	192	91.2%	175	104	71	F10	F	TOW/RON	Dep-DL-2306	DL	SLC	D	2306	6:55	3N1	192	86.8%	167	89	78	F10	F
Arr-DL-2307	DL	PHX	D	2307	21:47	3N1	192	93.0%	178	124	55	F04	F	TOW/RON	Dep-DL-2308	DL	DEN	D	2308	7:00	3N1	192	92.1%	177	108	68	F04	F
Arr-DL-2289	DL	AUS	D	2289	21:53	3N1	192	90.1%	173	173	0	C09	C	TOW/RON	Dep-DL-2290	DL	ATL	D	2290	5:20	3N1	192	88.7%	170	170	0	C09	C
Arr-DL-2291	DL	DEN	D	2291	21:55	3N1	192	93.4%	179	179	0	G17	G	TOW/RON	Dep-DL-2292	DL	CUN	I	2292	6:00	3N1	192	92.6%	178	178	0	G17	G
Arr-DL-2293	DL	ATL	D	2293	23:00	3N1	192	91.9%	176	176	0	G13	G	TOW/RON	Dep-DL-2294	DL	MCO	D	2294	6:00	3N1	192	92.6%	178	178	0	G13	G
Arr-DL-2295	DL	PUJ	I	2295	23:00	3N1	192	91.9%	176	176	0	G04A	G	TOW/RON	Dep-DL-2296	DL	LAS	D	2296	6:50	3N1	192	91.4%	175	113	63	G04A	G
Arr-DL-2297	DL	LAX	D	2297	23:16	3N1	192	93.8%	180	180	0	F11	F	TOW/RON	Dep-DL-2298	DL	SEA	D	2298	6:50	3N1	192	84.2%	162	76	86	F11	F
Arr-DL-2299	DL	PHX	D	2299	23:51	3N1	192	93.0%	178	178	0	F09	F	TOW/RON	Dep-DL-2300	DL	CUN	I	2300	6:55	3N1	192	96.3%	185	119	66	F09	F
Arr-DL-2301	DL	SLC	D	2301	23:59	3N1	192	92.8%	178	178	0	F08	F	TOW/RON	Dep-DL-2302	DL	MKE	D	2302	6:55	3N1	192	56.9%	109	43	67	F08	F
Arr-DL-2453	DL	ATL	D	2453	21:35	339	281	91.2%	256	181	75	F13	F	TOW/RON	Dep-DL-2454	DL	OGG	D	2454	11:15	339	281	91.9%	258	101	157	F15	F
Arr-DL-2751	DL	DLH	D	2751	6:10	CR9	76	87.7%	67	1	66	A02	A	1:02	Dep-DL-2752	DL	EWR	D	2752	7:12	CR9	76	73.7%	56	35	21	A02	A
Arr-DL-2753	DL	RST	D	2753	6:15	CR9	76	87.4%	66	3	64	A08	A	1:05	Dep-DL-2754	DL	MSN	D	2754	7:20	CR9	76	60.5%	46	7	39	A08	A
Arr-DL-2953	DL	BJI	D	2953	6:19	CR9	76	77.3%	59	4	55	A09	A	1:11	Dep-DL-2758	DL	CHS	D	2758	7:30	CR9	76	88.7%	67	34	34	A09	A
Arr-DL-2755	DL	ABR	D	2755	6:20	CR9	76	75.5%	57	3	54	A03	A	1:10	Dep-DL-2756	DL	FAR	D	2756	7:30	CR9	76	87.6%	67	4	63	A03	A
Arr-DL-2757	DL	BIS	D	2757	6:39	CR9	76	49.4%	38	4	33	A07	A	0:56	Dep-DL-2760	DL	BOI	D	2760	7:35	CR9	76	97.0%	74	30	43	A07	A
Arr-DL-2759	DL	MOT	D	2759	6:39	CR9	76	80.0%	61	6	55	A04	A	2:06	Dep-DL-2762	DL	YEG	P	2762	8:45	CR9	76	63.1%	48	7	41	A04	A
Arr-DL-2761	DL	MDW	D	2761	7:49	CR9	76	79.2%	60	44	16	A06	A	0:56	Dep-DL-2954	DL	ALB	D	2954	8:45	CR9	76	82.6%	63	24	39	A06	A
Arr-DL-2955	DL	LNK	D	2955	7:53	CR9	76	85.8%	65	17	49	A03	A	0:52	Dep-DL-2956	DL	LNK	D	2956	8:45	CR9	76	84.1%	64	16	48	A03	A
Arr-DL-2763	DL	CLE	D	2763	7:54	CR9	76	81.2%	62	33	29	A09	A	0:51	Dep-DL-2958	DL	XNA	D	2958	8:45	CR9	76	63.2%	48	21	27	A09	A
Arr-DL-2765	DL	BUF	D	2765	7:58	CR9	76	60.6%	46	20	26	A07	A	0:47	Dep-DL-2764	DL	CLT	D	2764	8:45	CR9	76	84.7%	64	36	28	A07	A
Arr-DL-2767	DL	CIU	D	2767	7:59	CR9	76	75.5%	57	9	49	A08	A	0:46	Dep-DL-2766	DL	DLH	D	2766	8:45	CR9	76	89.1%	68	1	67	A08	A
Arr-DL-2957	DL	MBS	D	2957	8:00	CR9	76	72.6%	55	14	41	G17	G	0:50	Dep-DL-2768	DL	PIT	D	2768	8:50	CR9	76	83.9%	64	31	33	G17	G
Arr-DL-2769	DL	AZO	D	2769	8:00	CR9	76	78.6%	60	18	42	A02	A	0:55	Dep-DL-2960	DL	MOT	D	2960	8:55	CR9	76	86.1%	65	6	59	A02	A
Arr-DL-2959	DL	LSE	D	2959	8:01	CR9	76	86.9%	66	1	65	B04	B	0:54	Dep-DL-2770	DL	BDL	D	2770	8:55	CR9	76	86.9%	66	25	41	B04	B
Arr-DL-2771	DL	BRD	D	2771	8:02	CR9	76	60.5%	46	2	44	G15	G	0:53	Dep-DL-2772	DL	OMA	D	2772	8:55	CR9	76	84.4%	64	17	47	G15	G
Arr-DL-2773	DL	XNA	D	2773	8:02	CR9	76	67.9%	52	23	29	G12	G	0:58	Dep-DL-2774	DL	BWI	D	2774	9:00	CR9	76	81.0%	62	38	24	G12	G
Arr-DL-2961	DL	SBN	D	2961	8:07	CR9	76	84.2%	64	23	41	C20	C	0:53	Dep-DL-2780	DL	MLI	D	2780	9:00	CR9	76	74.0%	56	15	42	C20	C
Arr-DL-2775	DL	RDU	D	2775	8:07	CR9	76	59.6%	45	25	21	C22	C	0:58	Dep-DL-2962	DL	FSD	D	2962	9:05	CR9	76	95.9%	73	4	68	C22	C
Arr-DL-2779	DL	CHS	D	2779	8:09	CR9	76	88.2%	67	33	34	C21	C	0:56	Dep-DL-2776	DL	YWG	P	2776	9:05	CR9	76	79.7%	61	5	56	C21	C
Arr-DL-2777	DL	YUL	P	2777	8:09	CR9	76	70.0%	53	16	37	C20A	C	1:01	Dep-DL-2782	DL	RAP	D	2782	9:10	CR9	76	92.3%	70	19	51	C20A	C
Arr-DL-2781	DL	ATW	D	2781	8:12	CR9	76	89.7%	68	15	53	C21A	C	1:03	Dep-DL-2784	DL	YXE	I	2784	9:15	CR9	76	55.4%	42	5	37	C21A	C
Arr-DL-2963	DL	FWA	D	2963	8:13	CR9	76	81.4%	62	23	39	B08	B	1:17	Dep-DL-2778	DL	RST	D	2778	9:30	CR9	76	77.1%	59	3	56	B08	B
Arr-DL-2965	DL	HIB	D	2965	8:13	CR9	76	54.4%	41	3	39	B14	B	1:42	Dep-DL-2786	DL	ATW	D	2786	9:55	CR9	76	86.3%	66	14	51	B14	B
Arr-DL-2967	DL	LAN	D	2967	8:13	CR9	76	81.9%	62	26	37	B12	B	1:42	Dep-DL-2788	DL	DSM	D	2788	9:55	CR9	76	72.8%	55	8	48	B12	B
Arr-DL-2969	DL	MQT	D	2969	8:13	CR9	76	88.0%	67	9	58	F14A	F	1:42	Dep-DL-2790	DL	IND	D	2790	9:55	CR9	76	82.4%	63	32	31	F14A	F
Arr-DL-2783	DL	CWA	D	2783	8:13	CR9	76	82.7%	63	4	58	B16	B	1:42	Dep-DL-2792	DL	MDW	D	2792	9:55	CR9	76	75.6%	57	42	15	B16	B
Arr-DL-2971	DL	RHI	D	2971	8:15	CR9	76	67.5%	51	3	48	F14	F	1:40	Dep-DL-2794	DL	YYZ	P	2794	9:55	CR9	76	87.9%	67	32	35	F14	F
Arr-DL-2785	DL	BDL	D	2785	8:15	CR9	76	97.8%	74	20	54	G05	G	1:45	Dep-DL-2796	DL	CID	D	2796	10:00	CR9	76	82.1%	62	15	47	G05	G
Arr-DL-2787	DL	ICT	D	2787	8:15	CR9	76	84.6%	64	24	40	G06B	G	1:50	Dep-DL-2972	DL	MCI	D	2972	10:05	CR9	76	90.0%	68	31	38	G06B	G
Arr-DL-2789	DL	MLI	D	2789	8:15	CR9	76	74.5%	57	15	42	B06	B	1:56	Dep-DL-2798	DL	EWR	D	2798	10:11	CR9	76	83.0%	63	39	24	B06	B
Arr-DL-2791	DL	RIC	D	2791	8:15	CR9	76	74.4%	57	26	30	B02	B	2:00	Dep-DL-2800	DL	JFK	D	2800	10:15	CR9	76	86.1%	65	43	23	B02	B
Arr-DL-2793	DL	XWA	D	2793	8:15	CR9	76	60.5%	46	9	37	B10	B	3:00	Dep-DL-2974	DL	HIB	D	2974	11:15	CR9	76	56.4%	43	3	40	B10	B
Arr-DL-2795	DL	YXE	I	2795	8:54	CR9	76	76.9%	58	6	53	G04A	G	2:21	Dep-DL-2806	DL	BIS	D	2806	11:15	CR9	76	83.1%	63	8	56	G04A	G
Arr-DL-2797	DL	RAP	D	2797	9:10	CR9	76	85.1%	65	18	47	A09	A	2:05	Dep-DL-2802	DL	BJI	D	2802	11:15	CR9	76	78.0%	59	4	55	A09	A
Arr-DL-2799	DL	GFK	D	2799	9:13	CR9	76	83.6%	64	6	58	A08	A	2:02	Dep-DL-2804	DL	FSD	D	2804	11:15	CR9	76	95.9%	73	4	68	A08	A
Arr-DL-2801	DL	IAH	D	2801	9:18	CR9	76	78.5%	60	35	24	A07	A	2:02	Dep-DL-2808	DL	GFK	D	2808	11:20	CR9	76	89.6%	68	6	62	A07	A
Arr-DL-2803	DL	GTF	D	2803	9:22	CR9	76	85.0%	65	11	54	A06	A	1:58	Dep-DL-2810	DL	YWG	P	2810	11:20	CR9	76	86.3%	66	5	61	A06	A
Arr-DL-2805	DL	TYS	D	2805	9:25	CR9	76	69.1%	52	18	34	A04	A	1:58	Dep-DL-2812	DL	OMA	D	2812	11:23	CR9	76	84.4%	64	17	47	A04	A
Arr-DL-2807	DL	MSN	D	2807	10:26	CR9	76	94.1%	71	11	61	A03	A	1:04	Dep-DL-2814	DL	RST	D	2814	11:30	CR9	76	84.7%	64	3	62	A03	A
Arr-DL-2809	DL	FAR	D	2809	10:32	CR9	76	77.9%	59	3	56	A02	A	1:18	Dep-DL-2816	DL	YEG	P	2816	11:50	CR9	76	92.5%	70	9	62	A02	A
Arr-DL-2811	DL	CMH	D	2811	10:37	CR9	76	86.8%	66	33	33	B02	B	1:38	Dep-DL-2818	DL	GTF	D	2818	12:15	CR9	76	66.0%	50	9	41	B02	B
Arr-DL-2813	DL	MDW	D	2813	10:50	CR9	76	79.2%	60	44	16	B04	B	1:55	Dep-DL-2820	DL	GRB	D	2820	12:45	CR9	76	88.7%	67	10	58	B04	B
Arr-DL-2815	DL	DLH	D	2815	11:05	CR9	76	87.7%	67	1	66	B06	B	1:45	Dep-DL-2822	DL	BDL	D	2822	12:50	CR9	76	86.9%	66	25	41	B06	B
Arr-DL-2817	DL	HDN	D	2817	11:27	CR9	76	86.7%	66	17	49	B08	B	1:23	Dep-DL-2824	DL	DLH	D	2824	12:50	CR9	76	89.1%	68	1	67	B08	B
Arr-DL-2819	DL	YYC	P	2819	11:36	CR9	76	90.7%	69	14	55	A09	A	1:14	Dep-DL-2826	DL	MDW	D	2826	12:50	CR9	76	75.6%	57	42	15	A09	A
Arr-DL-2821	DL	JAX	D	2821	11:45	CR9	76	89.5%	68	35	33	A08	A	1:10	Dep-DL-2976	DL	SBN	D	2976	12:55	CR9	76	83.1%	63	23	40	A08	A
Arr-DL-2823	DL	YEG	P	2823	11:58	CR9	76	93.5%	71	9	62	A07	A	0:57	Dep-DL-2828	DL	CVG	D	2828	12:55	CR9	76	83.0%	63	28	35	A07	A
Arr-DL-2975	DL	INL	D	2975	12:00	CR9	76	38.6%	29	2	27	A06	A	1:00	Dep-DL-2830	DL	BIS	D	2830	13:00	CR9	76	83.1%	63	8	56	A06	A
Arr-DL-2825	DL	FSD	D	2825	12:04	CR9	76	94.2%	72	4	67	A04	A	1:16	Dep-DL-2832	DL	ATW	D	2832	13:20	CR9	76	86.3%	66	14	51	A04	A
Arr-DL-2827	DL	IMT	D	2827	12:12	CR9	76	75.6%	57	8	49	A03	A	1:13	Dep-DL-2978	DL	AZO	D	2978	13:25	CR9	76	68.9%	52	16	36	A03	A
Arr-DL-2829	DL	OMA	D	2829	12:15	CR9	76	85.8%	65	17	48	A02	A	1:15	Dep-DL-2834	DL	FSD	D	2834	13:30	CR9	76	95.9%	73	4	68	A02	A
Arr-DL-2831	DL	MDW	D	2831	12:35	CR9	76	79.2%	60	44	16	B02	B	0:55	Dep-DL-2838	DL	TYS	D	2838	13:30	CR9	76	70.7%	54	25	28	B02	B
Arr-DL-2981	DL	MOT	D	2981	12:41	CR9	76	80.0%	61	6	55	B10	B	0:49	Dep-DL-2836	DL	XNA	D	2836	13:30	CR9	76	73.8%	56	30	26	B10	B
Arr-DL-2833	DL	XNA	D	2833	12:45	CR9	76	75.0%	57	29	28	B12	B	1:13	Dep-DL-2980	DL	BUF	D	2980	13:58	CR9	76	90.3%	69	27	42	B12	B
Arr-DL-2835	DL	YWG	P	2835	12:49	CR9	76	87.1%	66	5	61	B14	B	1:10	Dep-DL-2840	DL	SAT	D	2840	13:59	CR9	76	91.3%	69	43	26	B14	B
Arr-DL-2837	DL	ATW	D	2837	12:50	CR9	76	89.7%	68	15	53	B16	B	1:30	Dep-DL-2982	DL	ICT	D	2982	14:20	CR9	76	84.8%	64	24	40	B16	B

Arr-DL-2839	DL	DSM	D	2839	12:59	CR9	76	79.9%	61	8	52	E09	E	1:23	Dep-DL-2984	DL	IAH	D	2984	14:22	CR9	76	87.7%	67	40	27	E09	E
Arr-DL-2841	DL	CID	D	2841	13:08	CR9	76	83.3%	63	16	48	B04	B	1:17	Dep-DL-2842	DL	RHI	D	2842	14:25	CR9	76	64.4%	49	3	46	B04	B
Arr-DL-2843	DL	RAP	D	2843	13:13	CR9	76	88.1%	67	18	49	A09	A	1:13	Dep-DL-2844	DL	SDF	D	2844	14:26	CR9	76	84.1%	64	30	34	A09	A
Arr-DL-2983	DL	CWA	D	2983	13:31	CR9	76	82.7%	63	4	58	A08	A	0:59	Dep-DL-2986	DL	LSE	D	2986	14:30	CR9	76	83.0%	63	1	62	A08	A
Arr-DL-2845	DL	RST	D	2845	13:37	CR9	76	87.4%	66	3	64	A07	A	0:58	Dep-DL-2988	DL	BRD	D	2988	14:35	CR9	76	63.9%	49	2	46	A07	A
Arr-DL-2985	DL	HIB	D	2985	13:45	CR9	76	54.4%	41	3	39	A06	A	1:00	Dep-DL-3016	DL	ABR	D	3016	14:45	CR9	76	80.6%	61	3	58	A06	A
Arr-DL-2847	DL	BJI	D	2847	13:50	CR9	76	77.3%	59	4	55	B06	B	1:02	Dep-DL-2846	DL	MOT	D	2846	14:52	CR9	76	86.1%	65	6	59	B06	B
Arr-DL-2849	DL	EWR	D	2849	13:50	CR9	76	81.5%	62	38	24	A04	A	1:02	Dep-DL-2848	DL	RST	D	2848	14:52	CR9	76	84.7%	64	3	62	A04	A
Arr-DL-2851	DL	MDW	D	2851	13:50	CR9	76	79.2%	60	44	16	A03	A	1:20	Dep-DL-2850	DL	MDW	D	2850	15:10	CR9	76	75.6%	57	42	15	A03	A
Arr-DL-2853	DL	PIT	D	2853	13:50	CR9	76	79.6%	60	29	32	A02	A	1:25	Dep-DL-3010	DL	XWA	D	3010	15:15	CR9	76	51.2%	39	6	33	A02	A
Arr-DL-2855	DL	FSD	D	2855	13:55	CR9	76	94.2%	72	4	67	B02	B	1:20	Dep-DL-2854	DL	BIS	D	2854	15:15	CR9	76	83.1%	63	8	56	B02	B
Arr-DL-3015	DL	ALB	D	3015	14:00	CR9	76	84.9%	65	22	42	B08	B	1:15	Dep-DL-2852	DL	DAY	D	2852	15:15	CR9	76	82.0%	62	29	33	B08	B
Arr-DL-2857	DL	BOI	D	2857	14:10	CR9	76	89.7%	68	17	51	B10	B	1:06	Dep-DL-2856	DL	RDU	D	2856	15:16	CR9	76	92.5%	70	40	30	B10	B
Arr-DL-2859	DL	IAD	D	2859	14:20	CR9	76	75.0%	57	27	30	B12	B	0:59	Dep-DL-2858	DL	CLE	D	2858	15:19	CR9	76	89.2%	68	36	32	B12	B
Arr-DL-2989	DL	XWA	D	2989	14:25	CR9	76	60.5%	46	9	37	B14	B	0:55	Dep-DL-2860	DL	CMH	D	2860	15:20	CR9	76	93.5%	71	36	36	B14	B
Arr-DL-2863	DL	CHS	D	2863	14:30	CR9	76	88.2%	67	33	34	C20A	C	0:51	Dep-DL-2862	DL	IMT	D	2862	15:21	CR9	76	67.4%	51	7	44	C20A	C
Arr-DL-2861	DL	GFK	D	2861	14:30	CR9	76	83.6%	64	6	58	C20	C	0:55	Dep-DL-3012	DL	CWA	D	3012	15:25	CR9	76	82.4%	63	5	58	C20	C
Arr-DL-2865	DL	OMA	D	2865	14:32	CR9	76	85.8%	65	17	48	C21	C	0:58	Dep-DL-2864	DL	GFK	D	2864	15:30	CR9	76	89.6%	68	6	62	C21	C
Arr-DL-2991	DL	ABR	D	2991	14:40	CR9	76	75.5%	57	3	54	B16	B	0:50	Dep-DL-2866	DL	OMA	D	2866	15:30	CR9	76	86.1%	65	17	48	B16	B
Arr-DL-2867	DL	BIS	D	2867	14:45	CR9	76	83.0%	63	7	56	B04	B	0:51	Dep-DL-2868	DL	GRB	D	2868	15:36	CR9	76	88.7%	67	10	58	B04	B
Arr-DL-2869	DL	YWG	P	2869	14:58	CR9	76	80.5%	61	5	57	A08	A	0:47	Dep-DL-2870	DL	JAX	D	2870	15:45	CR9	76	81.2%	62	39	23	A08	A
Arr-DL-2871	DL	YEG	P	2871	15:00	CR9	76	90.1%	68	10	59	A09	A	0:48	Dep-DL-2872	DL	ATW	D	2872	15:48	CR9	76	86.3%	66	14	51	A09	A
Arr-DL-2873	DL	YXE	I	2873	15:00	CR9	76	80.1%	61	6	55	G11	G	0:55	Dep-DL-2992	DL	CID	D	2992	15:55	CR9	76	82.1%	62	15	47	G11	G
Arr-DL-2875	DL	MOT	D	2875	15:01	CR9	76	80.0%	61	6	55	A07	A	1:03	Dep-DL-2874	DL	INL	D	2874	16:04	CR9	76	37.0%	28	2	26	A07	A
Arr-DL-2877	DL	YYZ	P	2877	15:09	CR9	76	81.5%	62	29	33	A06	A	1:01	Dep-DL-2994	DL	CVG	D	2994	16:10	CR9	76	83.0%	63	28	35	A06	A
Arr-DL-2879	DL	DLH	D	2879	15:13	CR9	76	87.7%	67	1	66	A04	A	1:02	Dep-DL-2876	DL	FSD	D	2876	16:15	CR9	76	95.9%	73	4	68	A04	A
Arr-DL-2883	DL	GRB	D	2883	15:37	CR9	76	87.5%	66	10	57	A03	A	0:53	Dep-DL-2878	DL	DLH	D	2878	16:30	CR9	76	89.1%	68	1	67	A03	A
Arr-DL-2885	DL	GFK	D	2885	15:54	CR9	76	83.6%	64	6	58	A02	A	0:42	Dep-DL-2880	DL	RAP	D	2880	16:36	CR9	76	92.3%	70	19	51	A02	A
Arr-DL-2887	DL	FSD	D	2887	16:01	CR9	76	94.2%	72	4	67	B02	B	0:39	Dep-DL-2884	DL	HDN	D	2884	16:40	CR9	76	86.0%	65	31	34	B02	B
Arr-DL-2889	DL	ATW	D	2889	16:20	CR9	76	89.7%	68	15	53	A09	A	1:10	Dep-DL-2882	DL	FSD	D	2882	17:30	CR9	76	82.4%	63	14	49	A09	A
Arr-DL-2881	DL	BDL	D	2881	16:30	CR9	76	70.4%	54	20	33	A08	A	1:10	Dep-DL-2886	DL	OMA	D	2886	17:40	CR9	76	86.1%	65	17	48	A08	A
Arr-DL-3017	DL	SBN	D	3017	16:42	CR9	76	84.2%	64	23	41	A07	A	1:03	Dep-DL-2888	DL	GFK	D	2888	17:45	CR9	76	89.6%	68	6	62	A07	A
Arr-DL-2891	DL	BIS	D	2891	16:46	CR9	76	83.0%	63	7	56	A06	A	0:59	Dep-DL-2890	DL	MDW	D	2890	17:45	CR9	76	75.6%	57	42	15	A06	A
Arr-DL-2893	DL	MDW	D	2893	16:47	CR9	76	79.2%	60	44	16	A04	A	0:59	Dep-DL-2892	DL	FAR	D	2892	17:46	CR9	76	87.6%	67	4	63	A04	A
Arr-DL-2895	DL	EWR	D	2895	16:50	CR9	76	82.3%	63	39	24	A03	A	1:00	Dep-DL-2894	DL	IAH	D	2894	17:50	CR9	76	89.0%	68	41	27	A03	A
Arr-DL-2897	DL	FAR	D	2897	16:59	CR9	76	77.9%	59	3	56	A02	A	0:56	Dep-DL-2898	DL	CHS	D	2898	17:55	CR9	76	88.7%	67	34	34	A02	A
Arr-DL-2899	DL	CWA	D	2899	17:03	CR9	76	82.7%	63	4	58	B02	B	0:52	Dep-DL-2896	DL	RIC	D	2896	17:55	CR9	76	79.7%	61	28	32	B02	B
Arr-DL-3025	DL	AZO	D	3025	17:05	CR9	76	78.6%	60	18	42	B04	B	0:55	Dep-DL-2900	DL	BDL	D	2900	18:00	CR9	76	88.6%	67	22	46	B04	B
Arr-DL-2901	DL	RST	D	2901	17:12	CR9	76	87.4%	66	3	64	B06	B	0:48	Dep-DL-2902	DL	PIT	D	2902	18:00	CR9	76	78.5%	60	24	36	B06	B
Arr-DL-2903	DL	GTF	D	2903	18:15	CR9	76	76.7%	58	10	49	A09	A	1:00	Dep-DL-2904	DL	TOW	TOW	2904	19:15								
Arr-DL-2905	DL	YXE	I	2905	18:15	CR9	76	76.9%	58	6	53	G11	G	1:00	Dep-DL-3028	DL	ABR	D	3028	19:15	CR9	76	80.6%	61	3	58	G11	G
Arr-DL-2907	DL	MOT	D	2907	18:18	CR9	76	78.7%	60	13	47	A08	A	1:12	Dep-DL-2904	DL	DFW	D	2904	19:30	CR9	76	94.0%	71	39	32	A08	A
Arr-DL-2909	DL	FCA	D	2909	18:23	CR9	76	92.1%	70	20	50	A07	A	1:07	Dep-DL-2906	DL	YYC	P	2906	19:30	CR9	76	89.5%	68	14	54	A07	A
Arr-DL-2911	DL	YEG	P	2911	18:27	CR9	76	93.5%	71	9	62	A06	A	1:08	Dep-DL-2908	DL	ICT	D	2908	19:35	CR9	76	84.8%	64	24	40	A06	A
Arr-DL-3027	DL	DAY	D	3027	18:29	CR9	76	84.8%	64	23	42	A03	A	1:06	Dep-DL-2910	DL	LNK	D	2910	19:35	CR9	76	84.1%	64	16	48	A03	A
Arr-DL-2913	DL	CLE	D	2913	18:29	CR9	76	81.2%	62	33	29	A04	A	1:06	Dep-DL-2912	DL	YEG	P	2912	19:35	CR9	76	92.5%	70	9	62	A04	A
Arr-DL-2915	DL	BIS	D	2915	18:32	CR9	76	79.7%	61	13	48	A02	A	1:05	Dep-DL-2914	DL	GTF	D	2914	19:37	CR9	76	71.4%	54	9	46	A02	A
Arr-DL-2917	DL	DSM	D	2917	18:39	CR9	76	73.6%	56	8	48	B02	B	1:01	Dep-DL-2916	DL	DLH	D	2916	19:40	CR9	76	89.1%	68	1	67	B02	B
Arr-DL-2919	DL	GFK	D	2919	18:39	CR9	76	83.6%	64	6	58	B04	B	1:01	Dep-DL-2918	DL	XNA	D	2918	19:40	CR9	76	75.7%	58	28	30	B04	B
Arr-DL-2921	DL	DLH	D	2921	18:44	CR9	76	81.7%	62	10	52	B06	B	1:01	Dep-DL-2996	DL	IAH	D	2996	19:45	CR9	76	91.1%	69	35	34	B06	B
Arr-DL-2995	DL	ICT	D	2995	18:45	CR9	76	84.6%	64	24	40	B08	B	1:08	Dep-DL-2920	DL	YXE	I	2920	19:53	CR9	76	79.3%	60	6	54	B08	B
Arr-DL-2997	DL	ATW	D	2997	18:49	CR9	76	89.7%	68	15	53	B12	B	1:11	Dep-DL-2922	DL	MOT	D	2922	20:00	CR9	76	81.5%	62	13	49	B12	B
Arr-DL-2923	DL	OMA	D	2923	18:49	CR9	76	92.2%	70	16	54	B10	B	1:26	Dep-DL-3002	DL	FWA	D	3002	20:15	CR9	76	73.7%	56	22	34	B10	B
Arr-DL-2999	DL	INL	D	2999	18:54	CR9	76	38.6%	29	2	27	B14	B	1:21	Dep-DL-2924	DL	CWA	D	2924	20:15	CR9	76	82.0%	62	3	59	B14	B
Arr-DL-2925	DL	RST	D	2925	19:08	CR9	76	87.4%	66	3	64	B16	B	1:07	Dep-DL-2926	DL	TYS	D	2926	20:15	CR9	76	70.9%	54	19	35	B16	B
Arr-DL-2927	DL	MDW	D	2927	19:10	CR9	76	93.7%	71	46	25	C22	C	1:05	Dep-DL-2928	DL	YUL	P	2928	20:15	CR9	76	86.7%	66	20	46	C22	C
Arr-DL-2929	DL	XNA	D	2929	19:15	CR9	76	77.3%	59	30	29	C21A	C	1:08	Dep-DL-2930	DL	ALB	D	2930	20:23	CR9	76	72.5%	55	20	35	C21A	C
Arr-DL-3001	DL	BUF	D	3001	19:25	CR9	76	96.0%	73	25	48	F15	F	1:01	Dep-DL-3004	DL	LSE	D	3004	20:26	CR9	76	88.8%	67	2	66	F15	F
Arr-DL-2931	DL	FSD	D	2931	19:25	CR9	76	88.7%	67	10	57	C20	C	1:05	Dep-DL-3006	DL	HIB	D	3006	20:30	CR9	76	56.4%	43	3	40	C20	C
Arr-DL-2933	DL	TYS	D	2933	19:30	CR9	76	79.7%	61	23	38	F15A	F	1:00	Dep-DL-3020	DL	MBS	D	3020	20:30	CR9	76	70.5%	54	15	38	F15A	F
Arr-DL-3007	DL	LNK	D	3007	19:42	CR9	76	85.8%	65	17	49	A09	A	0:48	Dep-DL-3022	DL	MQT	D	3022	20:30	CR9	76	72.0%	55	7	48	A09	A
Arr-DL-2937	DL	RAP	D	2937	19:44	CR9	76	88.1%	67	18	49	G15	G	0:51	Dep-DL-2932	DL	ATW	D	2932	20:35	CR9	76	86.3%	66	14	51	G15	G
Arr-DL-3019	DL	BRD	D	3019	19:45	CR9	76	60.5%	46	2	44	F09	F	0:50	Dep-DL-2934	DL	PIA	D	2934	20:35	CR9	76	86.9%	66	22	45	F09	F
Arr-DL-3021	DL	RHI	D	3021	19:45	CR9	76	67.5%	51	3	48	C20A	C	0:55	Dep-DL-3024	DL	LAN	D	3024	20:40	CR9	76	76.3%	58	24	34	C20A	C
Arr-DL-3005	DL	CID	D	3005	19:47	CR9	76	76.8%	58	8	50	C09	C	0:58	Dep-DL-3008	DL	XWA	D	3008	20:45	CR9	76	65.4%	50	6	44	C09	C
Arr-DL-3023	DL	LSE	D	3023	19:55	CR9	76	86.9%	66	1	65	A07	A	0:50	Dep-DL-2938	DL	CIU	D	2938	20:45	CR9	76	67.4%	51	8	43	A07	A
Arr-DL-2939	DL	ALB	D	2939	20:08	CR9	76	64.3%	49	18	31	A06	A	0:42	Dep-DL-2940	DL	CLE	D	2940	20:50	CR9	76	84.8%	64	34	31	A06	A
Arr-DL-2941	DL	PIA	D	2941	20:09	CR9	76	83.5%	63	20	43	A08	A	0:42	Dep-DL-2942	DL	DAY	D	2942	20:51	CR9	76	79.9%	61	22	39	A08	A
Arr-DL-2943	DL	FSD	D	2943	20:32	CR9	76	62.1%	47	19	28	A04	A	0:43	Dep-DL-2944	DL	MDW	D	2944	21:15	CR9	76	84.8%	64	40	25	A04	A
Arr-DL-2945	DL	FAR	D	2945	20:48	CR9	76	77.9%	59	3	56	A02	A	0:43	Dep-DL-2946	DL	BIS	D	2946	21:31	CR9	76	82.8%	63	7	55	A02	A
Arr-DL-2947	DL	BDL	D	2947	21:00	CR9	76	88.8%	67	25	43	A03	A	1:25	Dep-DL-2948	DL	BJI	D	2948	22:25	CR9	76	78.0%	59	4	55	A03	A
Arr-DL-2949	DL	PIT	D	2949	21:05	CR9	76	69.1%	52	25	28	B02	B	1:20	Dep-DL-2950	DL	BRD	D	2950	22:25	CR9	76	63.9%	49	2	46	B02	B
Arr-DL-2951	DL	OMA	D	2951	21:10	CR9	76	67.5%	51	13	38	B04	B	1:20	Dep-DL-2952	DL	RAP	D	2952	22:30	CR9	76	81.5%	62	17	45	B04	B
Arr-DL-3025	DL	TOW	TOW	3025	17:05	CR9					0			1:00	Dep-DL-3026	DL	RHI	D	3026	18:05	CR9	76	64.4%	49	3	46	B08	B
Arr-DL-2935	DL	GRB	D	2935	19:40	E7W	76	86.4%	66	10	56	C21	C	1:00	Dep-DL-2936	DL	AZO	D	2936	20:40	E7W	76	68.9%	52	16	36	C21	C
Arr-F9-3335	F9	DEN	D	3335	23:42	32B	230	95.1%	219	216	2	H45	H	TOW/RON	Dep-F9-3336	F9	DEN	D	3336	5:45	32B	230	95.4%	219	219	0	H45	H
Arr-F9-3337	F9	TPA	D	3337	9:30	32N	180	97.3%	175	173	2	H45	H	1:00	Dep-F9-3338	F9	TPA	D	3338	10:30	32N	180	98.7%	178	177	0	H45	H
Arr-F9-3339	F9	MCO	D	3339	9:36	32N	180	97.3%	175	173	2	H44	H	1:00	Dep-F9-3340	F9	MCO	D	3340	10:36	32N	180	98.7%	178	177	0	H44	H
Arr-F9-3341	F9	DEN	D	3341	10:51	32N	180	95.2%	171	170	2	H43	H	0:45	Dep-F9-3342	F9	DEN	D	3342	11:36	32N	180	98.5%	177	177	0	H43	H
Arr-F9-3343	F9	TPA	D	3343	13:33	32N	180	91.3%	164	163	2	H44	H	1:00	Dep-F9-3344	F9	TPA	D	3344	14:33	32N	180	99.6%	179	179	0	H44	H
Arr-F9-3345	F9	MCO	D	3345	14:00	32N	180	91.3%	164	164	0	H45	H	1:00	Dep-F9-3346	F9	MCO	D	3346	15:00	32N	180	91.9%	165	165	0	H45	H
Arr-F9-3347	F9	DEN	D	3347	18:00	32N	180	87.5%	157	155	2	H44	H	1:53	Dep-F9-3348	F9	DEN	D	3348	19:53	32N	180	90.9%	164	163	1	H44	H
Arr-FI-3349	FI	KEF	I	3349	18:05	7M9	160	65.3%	104	101	3	H07	H	1:25	Dep-FI-3350	FI	KEF	I	3350	19:30	7M9	160	83.8%	134	131	3	H07	H
Arr-KL-3043	KL	AMS	I	3043	19:40	781	344	86.7%	298	158	141	G08	G	2:35	Dep-KL-3044	KL	AMS	I	3044	22:15	781	344	81.9%	282	150	131	G08	G
Arr-NK-3355	NK	FLL	D	3355	0:52	319	150	98.7%	148	146	2	H25	H	6:08	Dep-NK-3356	NK	MCO	D	3356	7:00	319	150	100.0%	150	147	3	H25	H
Arr-NK-3357	NK	FLL	D	3357	10:30	319	150	96.6%	145	141	4	H27	H	1:00	Dep-NK-3358	NK	FLL	D	3358	11:30	319	150	97.2%	146	143	3	H27	H
Arr-NK-3359	NK	RSW	D	3359	11:00	319	150	96.6%	145	141	4	H25	H	1:00	Dep-NK-3360	NK	RSW	D	3360	12:00	319	150	97.2%	146	143	3	H25	H
Arr-NK-3361	NK	LAS	D	3361	12:00	319	150	97.2%	146	144	2	H23	H	1:00	Dep-NK-3362	NK	LAS	D	3362	13:00	319	150	97.5%	146	140	6	H23	H
Arr-NK-3363	NK	MCO	D	3363	12:00	319	150	98.0%	147	143	4	H27	H	1:00	Dep-NK-3364	NK	MCO	D	3364	13:00	319	150	97.0%	146	144	1	H27	H
Arr-NK-3365	NK	PHX	D	3365	12:00	319	150	97.7%	147	143	3	H26	H	1:00	Dep-NK-3366	NK	PHX	D	3366	13:00	319	150	97.2%	146	143	3	H26	H
Arr-NK-3367	NK	MCO	D	3367	14:52	319	150	98.4%	148	143	4	H27	H	1:03	Dep-NK-3368	NK	TPA	D	3368	15:55	319	150	99.8%	150	149	0	H27	H
Arr-NK-3369	NK	RSW	D	3369	16:02	319	150	95.0%	143	140	3	H26	H	0:53	Dep-NK-3370	NK	LAS	D	3370	16:55	319	150	99.3%	149	147	2	H26	H
Arr-NK-3371	NK	ATL	D	3371	16:17	319	150	94.6%	142	138	4	H25	H	0:55	Dep-NK-3372	NK	BWI	D	3372	17:12	319	150	98.2%	147	147	0	H25	H
Arr-NK-3373	NK	PHX	D	3373	17:15	319	150	100.0%	150	148	2	H27	H	0:50	Dep-NK-3374	NK	DTW	D	3374	18:05	319	150	83.5%	125	120	5	H27	H
Arr-NK-3353	NK	ATL	D	3353	21:20	319	150	96.7%	145	142	3	H26	H	TOW/RON	Dep-NK-3354	NK	ATL	D	3354	7:00	319	150	92.8%	139	136	3	H26	H
Arr-NK-3377	NK	LAS	D	3377	6:38	32N	182	90.2%	164	161	4	H27	H	1:22	Dep-NK-3378	NK	RSW	D	3378	8:00	32N	182	98.9%	180	178	2	H27	H
Arr-NK-3379	NK	LAX	D	3379	18:21	32N	182	98.0%	178	171	7	H26	H	0:46	Dep-NK-3380	NK	LAX	D	3380	19:07	32N	182	98.4%	179	173	6	H26	H
Arr-NK-3381	NK	LAS	D	3381	23:33	3N1	228	90.2%	206	201	4	H24	H	TOW/RON	Dep-NK-3382	NK	FLL	D	3382	0:30	3N1	228	98.4%	224	224	1	H24	H
Arr-NK-3385	NK	DTW	D	3385	8:53	3N1	228	77.6%	177	168	9	H26	H	0:50	Dep-NK-3386	NK	PHX	D	3386	9:43	3N1	228	99.2%	226	226	1	H26	H
Arr-NK-3387	NK	BWI	D	3387	10:28	3N1	228	68.7%	157	155	2	H26	H	0:50	Dep-NK-3388	NK	ATL	D	3388	11:18	3N1	228	96.0%	219	215	4	H26	H
Arr-NK-3389	NK	MSY	D	3389	12:59	3N1	228	91.0%	208	205	3	H25	H	0:46	Dep-NK-3390	NK	MSY	D	3390	13:45	3N1	228	97.3%	222	221	1	H25	H
Arr-NK-3391	NK	TPA	D	3391	18:02	3N1	228	95.0%	217	214	3	H25	H	0:45	Dep-NK-3392	NK	TPA	D	3392	18:47	3N1	228	98.7%	225	224	1	H25	H
Arr-NK-3383	NK	TPA	D	3383	23:40	3N1	228	91.5%	209	206	3	H27	H	TOW/RON	Dep-NK-3384	NK	LAS	D	3384	6:00	3N1	228	99.3%	226	224	3	H27	H
Arr-SY-3425	SY	SFO	D	3425	0:03	738	186	87.2%	162	162	0	H21	H	7:27	Dep-SY-3426	SY	MYR	D	3426	7:30	738	186	90.9%	169	167	2	H16	H
Arr-SY-3427	SY	PVR	I	3427	0:25	738	186	82.5%	153	153	0	H04	H	7:10	Dep-SY-3428	SY	RSW	D	3428	7:35	738	186	89.8%	167	149	18	H04	H
Arr-SY-3429	SY	SJD	I	3429	1:05	738	186	90.8%	169	169	0	H03	H	7:00	Dep-SY-3430	SY	MCO	D	3430	8:05	738	186	97.3%	181	178	3	H03	H
Arr-SY-3431	SY	LAS	D	3431	5:00	738	186	92.7%	172	166	6	H12	H	3:20	Dep-SY-3432	SY	LAS	D	3432	8:20	738	186	91.5%	170	133	37	H12	H
Arr-SY-3433	SY	PHX	D	3433	5:04	738	186	90.6%	168	165	3	H21	H	3:21	Dep-SY-3434	SY	MIA	D	3434	8:25	738	186	96.1%	179	177	2	H21	H
Arr-SY-3435	SY	LAX	D	3435	5:25	738	186	93.0%	173	162	11	H10	H	3:15	Dep-SY-3436	SY	MBJ	I	3436	8:40	738	186	80.4%	149	149	1	H10	H
Arr-SY-3437	SY	DCA	D	3437	7:15	738	186	92.3%	172	115	57	H06	H	1:35	Dep-SY-3438	SY	SAT	D	3438	8:50	738	186	90.6%	169	155	14	H06	H
Arr-SY-3439	SY	PHL	D	3439	7:15	738	186	91.0%	169	115	54	H05	H	2:00	Dep-SY-3440	SY	PDX	D	3440	9:15	738	186	90.5%	168	114	55	H05	H
Arr-SY-3441	SY	BOS	D	3441	7:45	738	186	90.0%	167	108	60	H02	H	1:40	Dep-SY-3442	SY	MZT	I	3442	9:25	738	186	78.7%	146	146	0	H02	H
Arr-SY-3443	SY	RSW	D	3443	8:37	738	186	90.2%	168	148	20	H01	H	2:03	Dep-SY-3444	SY	LIR	I	3444	10:40	738	186	81.0%	151	150	0	H01	H
Arr-SY-3445	SY	MCO	D	3445	10:55	738	186	92.9%	173	169	4	H02	H	1:00	Dep-SY-3446	SY	PVR	I	3446	11:55	738	186	88.1%	164	163	0	H02	H
Arr-SY-3447	SY	DEN	D	3447	11:20	738	186	90.0%	167	145	22	H03	H	1:00	Dep-SY-3448	SY	SJD	I	3448	12:20	738	186	90.8%	169	169	0	H03	H
Arr-SY-3449	SY	PDX	D	3449	12:35	738	186	89.0%	165	111	54	H02	H	1:00	Dep-SY-3450	SY	ATL	D	3450	13:35	738	186	89.8%	167	146	21	H02	H
Arr-SY-3451	SY	AUS	D	3451	12:39	738	186	91.4%	170	149	21	H01	H	1:06	Dep-SY-3452	SY	BNA	D	3452	13:45	738	186	87.6%	163	135	28	H01	H
Arr-SY-3453	SY	BOS	D	3453	13:45	738	186	90.0%	167	108	60	H12	H	1:05	Dep-SY-3454	SY	MCO	D	3454	14:50	738	186	97.3%	181	178	3	H12	H
Arr-SY-3455	SY	DCA	D	3455	14:00	738	186	92.3%	172	115	57	H10	H	0:55	Dep-SY-3456	SY	ORD	D	3456	14:55	738	186	87.9%	164	125	39	H10	H
Arr-SY-3457	SY	EWR	D	3457	14:00	738	186	95.6%	178	66	112	H09	H	1:00	Dep-SY-3458	SY	SEA	D	3458	15:00	738	186	92.0%	171	86	85	H09	H
Arr-SY-3459	SY	MYR	D	3459	14:00	738	186	93.8%	175	97	78	H08	H	1:10	Dep-SY-3460	SY	PVR	I	3460	15:10	738	186	91.9%	171	141	30	H08	H
Arr-SY-3461	SY	SEA	D	3461	14:00	738	186	93.6%	174	109	65	H06	H	1:10	Dep-SY-3462	SY	SAN	D	3462	15:10	738	186	91.8%	171	164	7	H06	H
Arr-SY-3463	SY	BNA	D	3463	14:10	738	186	89.3%	166	134	32	H13	H	1:05	Dep-SY-3464	SY	SAT	D	3464	15:15	738	186	90.6%	169	155	14	H13	H

Arr-SY-3465	SY	RSW	D	3465	14:12	738	186	94.4%	176	173	3	H05	H	1:03	Dep-SY-3466	SY	SFO	D	3466	15:15	738	186	93.4%	174	89	85	H05	H
Arr-SY-3467	SY	PHX	D	3467	14:19	738	186	90.6%	168	165	3	H11	H	1:01	Dep-SY-3468	SY	AUS	D	3468	15:20	738	186	92.2%	172	157	14	H11	H
Arr-SY-3469	SY	SRQ	D	3469	14:25	738	186	90.3%	168	138	30	H03	H	1:05	Dep-SY-3470	SY	EWR	D	3470	15:30	738	186	91.9%	171	115	56	H03	H
Arr-SY-3471	SY	SFO	D	3471	14:30	738	186	93.4%	174	91	82	H04	H	1:25	Dep-SY-3472	SY	RSW	D	3472	15:55	738	186	97.6%	182	180	1	H04	H
Arr-SY-3473	SY	CZM	I	3473	14:50	738	186	79.2%	147	147	0	H07	H	1:10	Dep-SY-3474	SY	BOS	D	3474	16:00	738	186	90.0%	167	119	48	H07	H
Arr-SY-3475	SY	MIA	D	3475	15:20	738	186	93.6%	174	171	3	H12	H	0:40	Dep-SY-3476	SY	SJD	I	3476	16:00	738	186	90.0%	167	119	48	H12	H
Arr-SY-3477	SY	NAS	I	3477	15:20	738	186	90.3%	168	138	30	H02	H	0:50	Dep-SY-3478	SY	PHX	D	3478	16:10	738	186	95.8%	178	177	2	H02	H
Arr-SY-3479	SY	LAS	D	3479	15:21	738	186	92.7%	172	166	6	H01	H	1:14	Dep-SY-3480	SY	LAS	D	3480	16:35	738	186	95.8%	178	174	4	H01	H
Arr-SY-3481	SY	MCO	D	3481	15:40	738	186	92.9%	173	169	4	H10	H	1:45	Dep-SY-3482	SY	MCO	D	3482	17:25	738	186	97.3%	181	178	3	H10	H
Arr-SY-3483	SY	CUN	I	3483	16:20	738	186	91.7%	171	169	2	H06	H	1:25	Dep-SY-3484	SY	RSW	D	3484	17:45	738	186	97.6%	182	180	1	H06	H
Arr-SY-3485	SY	MIA	D	3485	16:45	738	186	93.6%	174	171	3	H03	H	2:15	Dep-SY-3486	SY	PHL	D	3486	19:00	738	186	90.7%	169	96	73	H03	H
Arr-SY-3487	SY	SAT	D	3487	18:00	738	186	90.1%	168	146	21	H08	H	1:05	Dep-SY-3488	SY	DCA	D	3488	19:05	738	186	92.1%	171	116	55	H08	H
Arr-SY-3489	SY	PDX	D	3489	18:05	738	186	89.0%	165	111	54	H04	H	2:10	Dep-SY-3490	SY	PHX	D	3490	20:15	738	186	96.7%	180	178	2	H04	H
Arr-SY-3491	SY	MZT	I	3491	18:15	738	186	91.4%	170	168	2	H06	H	2:40	Dep-SY-3492	SY	LAX	D	3492	20:55	738	186	97.2%	181	171	10	H06	H
Arr-SY-3493	SY	BNA	D	3493	18:50	738	186	89.3%	166	134	32	H02	H	2:20	Dep-SY-3494	SY	PDX	D	3494	21:10	738	186	90.5%	168	114	55	H02	H
Arr-SY-3495	SY	MBJ	I	3495	18:55	738	186	81.6%	152	150	2	H05	H	2:35	Dep-SY-3496	SY	LAS	D	3496	21:30	738	186	95.8%	178	174	4	H05	H
Arr-SY-3497	SY	ORD	D	3497	18:55	738	186	90.3%	168	125	43	H01	H	2:50	Dep-SY-3498	SY	AUS	D	3498	21:45	738	186	92.2%	172	157	14	H01	H
Arr-SY-3397	SY	ATL	D	3397	19:50	738	186	91.3%	170	170	0	H16	H	TOW/RON	Dep-SY-3398	SY	CZM	I	3398	6:00	738	186	87.2%	162	162	0	H16	H
Arr-SY-3399	SY	PVR	I	3399	21:10	738	186	85.2%	159	159	0	H07	H	TOW/RON	Dep-SY-3400	SY	SFO	D	3400	6:00	738	186	93.4%	174	174	0	H07	H
Arr-SY-3401	SY	SJD	I	3401	21:30	738	186	90.8%	169	169	0	H06	H	TOW/RON	Dep-SY-3402	SY	SEA	D	3402	6:10	738	186	92.1%	171	171	0	H06	H
Arr-SY-3403	SY	MCO	D	3403	22:25	738	186	92.9%	173	173	0	H15	H	TOW/RON	Dep-SY-3404	SY	RSW	D	3404	6:20	738	186	97.6%	182	182	0	H15	H
Arr-SY-3405	SY	LIR	I	3405	22:26	738	186	87.5%	163	163	0	H05	H	TOW/RON	Dep-SY-3406	SY	DEN	D	3406	6:30	738	186	92.0%	171	149	22	H05	H
Arr-SY-3407	SY	RSW	D	3407	22:32	738	186	94.4%	176	176	0	H14	H	TOW/RON	Dep-SY-3408	SY	NAS	I	3408	6:30	738	186	90.9%	169	167	2	H14	H
Arr-SY-3409	SY	SEA	D	3409	22:51	738	186	87.6%	163	163	0	H13	H	TOW/RON	Dep-SY-3410	SY	BOS	D	3410	6:50	738	186	89.8%	167	109	58	H13	H
Arr-SY-3411	SY	EWR	D	3411	23:00	738	186	87.1%	162	162	0	H11	H	TOW/RON	Dep-SY-3412	SY	SRQ	D	3412	6:50	738	186	90.9%	169	167	2	H11	H
Arr-SY-3413	SY	SAT	D	3413	23:10	738	186	88.7%	165	165	0	H22	H	TOW/RON	Dep-SY-3414	SY	EWR	D	3414	7:00	738	186	91.9%	171	115	56	H22	H
Arr-SY-3415	SY	AUS	D	3415	23:11	738	186	90.2%	168	168	0	H23	H	TOW/RON	Dep-SY-3416	SY	MIA	D	3416	7:00	738	186	96.1%	179	177	2	H23	H
Arr-SY-3417	SY	PHX	D	3417	23:19	738	186	90.6%	168	168	0	H09	H	TOW/RON	Dep-SY-3418	SY	BNA	D	3418	7:05	738	186	87.6%	163	135	28	H09	H
Arr-SY-3419	SY	SAN	D	3419	23:30	738	186	88.8%	165	165	0	H08	H	TOW/RON	Dep-SY-3420	SY	PHX	D	3420	7:05	738	186	95.8%	178	177	2	H08	H
Arr-SY-3421	SY	RSW	D	3421	23:44	738	186	94.4%	176	176	0	H02	H	TOW/RON	Dep-SY-3422	SY	DCA	D	3422	7:10	738	186	92.1%	171	116	55	H02	H
Arr-SY-3423	SY	LAS	D	3423	23:56	738	186	92.7%	172	172	0	H01	H	TOW/RON	Dep-SY-3424	SY	CUN	I	3424	7:25	738	186	92.9%	173	172	0	H01	H
Arr-UA-3531	UA	SFO	D	3531	0:15	221	109	93.2%	102	97	4	E04	E	7:55	Dep-UA-3532	UA	IAH	D	3532	8:10	221	109	94.8%	103	102	2	E02	E
Arr-UA-3533	UA	ORD	D	3533	7:31	221	109	86.1%	94	89	5	E01	E	1:14	Dep-UA-3534	UA	ORD	D	3534	8:45	221	109	91.4%	100	96	4	E01	E
Arr-UA-3535	UA	IAD	D	3535	10:14	221	109	78.9%	86	83	3	E01	E	2:06	Dep-UA-3536	UA	IAD	D	3536	12:20	221	109	92.1%	100	97	3	E01	E
Arr-UA-3537	UA	IAH	D	3537	12:27	221	109	88.0%	96	93	2	E04	E	0:46	Dep-UA-3538	UA	ORD	D	3538	13:13	221	109	92.1%	100	98	3	E04	E
Arr-UA-3539	UA	EWR	D	3539	12:59	221	109	85.9%	94	90	4	E01	E	0:36	Dep-UA-3540	UA	EWR	D	3540	13:35	221	109	93.9%	102	99	3	E01	E
Arr-UA-3541	UA	ORD	D	3541	14:31	221	109	95.6%	104	101	4	E03	E	0:44	Dep-UA-3542	UA	EWR	D	3542	15:15	221	109	93.9%	102	99	3	E03	E
Arr-UA-3543	UA	SFO	D	3543	16:47	221	109	93.2%	102	97	4	E02	E	0:38	Dep-UA-3544	UA	SFO	D	3544	17:25	221	109	94.2%	103	99	3	E02	E
Arr-UA-3545	UA	EWR	D	3545	17:01	221	109	85.9%	94	90	4	E05	E	0:39	Dep-UA-3546	UA	IAH	D	3546	17:40	221	109	91.9%	100	99	2	E05	E
Arr-UA-3547	UA	IAH	D	3547	17:13	221	109	98.0%	107	104	3	E04	E	0:37	Dep-UA-3548	UA	IAD	D	3548	17:50	221	109	88.0%	96	93	3	E04	E
Arr-UA-3549	UA	IAD	D	3549	19:43	221	109	92.4%	101	97	4	E05	E	0:47	Dep-UA-3550	UA	IAH	D	3550	20:30	221	109	93.0%	101	100	2	E05	E
Arr-UA-3529	UA	EWR	D	3529	23:50	221	109	85.9%	94	90	4	E05	E	TOW/RON	Dep-UA-3530	UA	SFO	D	3530	7:15	221	109	94.2%	103	99	3	E05	E
Arr-UA-3555	UA	IAH	D	3555	21:33	223	130	95.6%	124	121	3	E03	E	TOW/RON	Dep-UA-3556	UA	IAH	D	3556	5:40	223	130	93.7%	122	120	2	E03	E
Arr-UA-3557	UA	IAH	D	3557	14:50	223	130	95.6%	124	121	3	E04	E	0:45	Dep-UA-3558	UA	IAH	D	3558	15:35	223	130	93.7%	122	120	2	E04	E
Arr-UA-3559	UA	ORD	D	3559	16:14	223	130	96.2%	125	121	4	E01	E	0:42	Dep-UA-3560	UA	ORD	D	3560	16:56	223	130	92.7%	121	117	3	E01	E
Arr-UA-3563	UA	DEN	D	3563	23:24	7M1	198	88.3%	175	167	8	E01	E	TOW/RON	Dep-UA-3564	UA	DEN	D	3564	6:14	7M1	198	80.5%	159	153	6	E01	E
Arr-UA-3527	UA	IAH	D	3527	19:45	738	109	87.9%	96	94	2	E02	E	TOW/RON	Dep-UA-3528	UA	EWR	D	3528	6:00	738	109	73.8%	80	78	2	E04	E
Arr-UA-3569	UA	ORD	D	3569	21:18	7M8	166	90.5%	150	145	5	E02	E	TOW/RON	Dep-UA-3570	UA	ORD	D	3570	5:30	7M8	166	89.0%	148	144	4	E02	E
Arr-UA-3565	UA	ORD	D	3565	19:32	7M1	198	93.0%	184	175	9	E04	E	0:50	Dep-UA-3566	UA	DEN	D	3566	20:22	7M1	198	80.5%	159	153	6	E04	E
Arr-UA-3573	UA	ORD	D	3573	9:23	7M8	166	93.3%	155	149	5	E04	E	0:52	Dep-UA-3574	UA	ORD	D	3574	10:15	7M8	166	89.0%	148	144	4	E04	E
Arr-UA-3575	UA	DEN	D	3575	10:43	7M8	166	91.9%	153	146	7	E04	E	0:54	Dep-UA-3576	UA	DEN	D	3576	11:37	7M8	166	89.1%	148	142	5	E04	E
Arr-UA-3577	UA	DEN	D	3577	14:09	7M8	166	91.9%	153	146	7	E02	E	1:11	Dep-UA-3578	UA	ORD	D	3578	15:20	7M8	166	90.9%	151	147	4	E02	E
Arr-UA-3579	UA	DEN	D	3579	16:18	7M8	166	92.0%	153	146	7	E03	E	0:42	Dep-UA-3580	UA	DEN	D	3580	17:00	7M8	166	92.1%	153	147	6	E03	E
Arr-UA-3581	UA	DEN	D	3581	18:40	7M8	166	93.9%	156	152	4	E01	E	0:50	Dep-UA-3582	UA	DEN	D	3582	19:30	7M8	166	92.1%	153	149	3	E01	E
Arr-UA-3571	UA	ORD	D	3571	22:58	7M8	166	93.3%	155	149	5	E04	E	TOW/RON	Dep-UA-3572	UA	ORD	D	3572	7:30	7M8	166	90.9%	151	147	4	E03	E
Arr-UA-3587	UA	IAH	D	3587	9:00	E7W	76	87.9%	67	65	2	E03	E	1:30	Dep-UA-3588	UA	IAH	D	3588	10:30	E7W	76	91.9%	70	69	1	E03	E
Arr-UA-3589	UA	EWR	D	3589	9:46	E7W	76	85.9%	65	63	2	E02	E	1:41	Dep-UA-3590	UA	ORD	D	3590	11:27	E7W	76	92.1%	70	68	2	E02	E
Arr-UA-3591	UA	IAH	D	3591	10:27	E7W	76	81.6%	62	60	2	E05	E	1:58	Dep-UA-3592	UA	EWR	D	3592	12:25	E7W	76	93.9%	71	69	2	E05	E
Arr-UA-3593	UA	ORD	D	3593	11:49	E7W	76	95.6%	73	70	3	E03	E	1:11	Dep-UA-3594	UA	IAH	D	3594	13:00	E7W	76	93.0%	71	70	1	E03	E
Arr-UA-3595	UA	ORD	D	3595	17:36	E7W	76	93.2%	71	68	2	E03	E	0:54	Dep-UA-3596	UA	ORD	D	3596	18:30	E7W	76	92.1%	70	68	2	E03	E
Arr-UA-3597	UA	EWR	D	3597	19:31	E7W	76	85.9%	65	63	2	E03	E	0:39	Dep-UA-3598	UA	EWR	D	3598	20:10	E7W	76	73.8%	56	54	2	E03	E
Arr-WN-3605	WN	DAL	D	3605	9:15	73W	143	95.4%	136	133	4	H29	H	0:45	Dep-WN-3606	WN	DAL	D	3606	10:00	73W	143	96.0%	137	134	3	H29	H
Arr-WN-3607	WN	MDW	D	3607	10:00	73W	143	76.4%	109	107	3	H32	H	0:45	Dep-WN-3608	WN	OAK	D	3608	10:45	73W	143	88.8%	127	127	0	H32	H
Arr-WN-3609	WN	MCI	D	3609	11:45	73W	143	59.0%	84	81	4	H32	H	0:45	Dep-WN-3610	WN	PHX	D	3610	12:30	73W	143	98.5%	141	140	1	H32	H
Arr-WN-3611	WN	MDW	D	3611	12:15	73W	143	78.2%	112	108	3	H31	H	0:40	Dep-WN-3612	WN	BNA	D	3612	12:55	73W	143	83.8%	120	119	1	H31	H
Arr-WN-3613	WN	LAS	D	3613	14:15	73W	143	90.3%	129	127	2	H31	H	0:45	Dep-WN-3614	WN	LAS	D	3614	15:00	73W	143	90.9%	130	129	1	H31	H
Arr-WN-3615	WN	DEN	D	3615	17:00	73W	143	97.2%	139	135	4	H32	H	0:45	Dep-WN-3616	WN	MCI	D	3616	17:45	73W	143	63.2%	90	87	3	H32	H
Arr-WN-3617	WN	MDW	D	3617	17:00	73W	143	78.2%	112	108	3	H31	H	0:45	Dep-WN-3618	WN	MDW	D	3618	17:45	73W	143	75.7%	108	106	2	H31	H
Arr-WN-3619	WN	ATL	D	3619	17:15	73W	143	86.3%	123	122	2	H30	H	0:45	Dep-WN-3620	WN	ATL	D	3620	18:00	73W	143	95.6%	137	136	1	H30	H
Arr-WN-3621	WN	DAL	D	3621	18:50	73W	143	81.2%	116	114	2	H29	H	0:40	Dep-WN-3622	WN	DEN	D	3622	19:30	73W	143	89.6%	128	125	3	H29	H
Arr-WN-3623	WN	LAS	D	3623	21:30	73W	143	90.2%	129	126	3	H28	H	0:45	Dep-WN-3624	WN	DEN	D	3624	22:15	73W	143	95.8%	137	135	2	H28	H
Arr-WN-3601	WN	ATL	D	3601	21:40	73W	143	95.0%	136	134	2	H32	H	TOW/RON	Dep-WN-3602	WN	PHX	D	3602	5:35	73W	143	98.5%	141	140	1	H32	H
Arr-WN-3603	WN	MDW	D	3603	22:30	73W	143	78.2%	112	108	3	H29	H	TOW/RON	Dep-WN-3604	WN	MDW	D	3604	5:40	73W	143	75.7%	108	106	2	H29	H
Arr-WN-3631	WN	PHX	D	3631	21:40	7M8	175	96.0%	168	165	3	H31	H	TOW/RON	Dep-WN-3632	WN	DEN	D	3632	5:30	7M8	175	84.5%	148	144	3	H31	H
Arr-WN-3637	WN	OAK	D	3637	0:05	7M8	175	85.4%	149	149	0	H33	H	6:55	Dep-WN-3638	WN	DAL	D	3638	7:00	7M8	175	88.9%	156	154	1	H33	H
Arr-WN-3639	WN	PHX	D	3639	0:10	7M8	175	96.2%	168	165	3	H34	H	6:55	Dep-WN-3640	WN	STL	D	3640	7:05	7M8	175	72.1%	126	124	2	H32	H
Arr-WN-3641	WN	MDW	D	3641	8:05	7M8	175	78.2%	137	133	4	H28	H	0:35	Dep-WN-3642	WN	MDW	D	3642	8:40	7M8	175	75.7%	132	129	3	H28	H
Arr-WN-3643	WN	DEN	D	3643	10:20	7M8	175	74.8%	131	127	4	H31	H	0:50	Dep-WN-3644	WN	DEN	D	3644	11:10	7M8	175	84.5%	148	144	3	H31	H
Arr-WN-3645	WN	ATL	D	3645	10:30	7M8	175	85.0%	149	147	2	H28	H	0:50	Dep-WN-3646	WN	LAS	D	3646	11:20	7M8	175	99.8%	175	172	3	H28	H
Arr-WN-3647	WN	BWI	D	3647	10:35	7M8	175	77.8%	136	133	3	H30	H	0:40	Dep-WN-3648	WN	MDW	D	3648	11:15	7M8	175	75.7%	132	129	3	H30	H
Arr-WN-3649	WN	STL	D	3649	13:20	7M8	175	71.8%	126	123	3	H30	H	0:45	Dep-WN-3650	WN	MDW	D	3650	14:05	7M8	175	75.7%	132	129	3	H30	H
Arr-WN-3651	WN	PHX	D	3651	13:25	7M8	175	96.0%	168	165	3	H28	H	0:50	Dep-WN-3652	WN	DEN	D	3652	14:15	7M8	175	85.4%	149	146	3	H28	H
Arr-WN-3653	WN	DEN	D	3653	13:35	7M8	175	90.5%	158	153	5	H29	H	0:40	Dep-WN-3654	WN	OAK	D	3654	14:15	7M8	175	85.8%	150	147	3	H29	H
Arr-WN-3655	WN	MDW	D	3655	14:50	7M8	175	78.2%	137	133	4	H29	H	0:35	Dep-WN-3656	WN	MDW	D	3656	15:25	7M8	175	75.7%	132	129	3	H29	H
Arr-WN-3657	WN	BNA	D	3657	14:55	7M8	175	82.8%	145	142	3	H30	H	0:35	Dep-WN-3658	WN	ATL	D	3658	15:30	7M8	175	92.3%	161	161	1	H30	H
Arr-WN-3659	WN	STL	D	3659	17:30	7M8	175	71.8%	126	123	3	H29	H	0:45	Dep-WN-3660	WN	BWI	D	3660	18:15	7M8	175	79.7%	139	137	2	H29	H
Arr-WN-3661	WN	OAK	D	3661	17:40	7M8	175	85.4%	149	149	0	H28	H	0:45	Dep-WN-3662	WN	STL	D	3662	18:25	7M8	175	76.0%	133	126	7	H28	H
Arr-WN-3663	WN	MDW	D	3663	18:50	7M8	175	83.8%	147	142	5	H30	H	0:45	Dep-WN-3664	WN	PHX	D	3664	19:35	7M8	175	98.5%	172	171	2	H30	H
Arr-WN-3665	WN	DEN	D	3665	19:45	7M8	175	90.5%	158	153	5	H28	H	0:50	Dep-WN-3666	WN	MDW	D	3666	20:35	7M8	175	75.7%	132	129	3	H28	H
Arr-WN-3633	WN	BWI	D	3633	22:00	7M8	175	65.8%	115	112	3	H30	H	TOW/RON	Dep-WN-3634	WN	ATL	D	3634	6:05	7M8	175	92.3%	161	161	1	H30	H
Arr-WN-3635	WN	DEN	D	3635	23:35	7M8	175	90.5%	158	153	5	H28	H	TOW/RON	Dep-WN-3636	WN	BWI	D	3636	6:40	7M8	175	84.5%	148	146	2	H28	H
Arr-WN-3599	WN	MCI	D	3599	20:25	73W	143	59.0%	84	81	4	H33	H	TOW/RON	Dep-WN-3600	WN	MCI	D	3600	5:05	73W	143	63.2%	90	87	3	H33	H

PAL 3 Alternate 3.1A Summer

ARRIVALS																	7:34	DEPARTURES																
A_CODE	A_DAY	A_TYPE	A_MAIR	A_ORG	A_D/I	A_FLT#	A_TIME	A_EQP	A_STS	A_LF	A_PAX	A_O&D	A_CX	A_TERM	A_GATE	Concourse	G_TIME	D_CODE	D_DAY	D_TYPE	D_MAIR	D_DST	D_D/I	D_FLT#	D_TIME	D_EQP	D_STS	D_LF	D_PAX	D_O&D	D_CX	D_TERM	D_GATE	
Arr-3E-1001	2	PAX	3E	MCW	D	1001	10:25	CNC	8	58%	5	5	0	1	B15a	B	0:45	Dep-3E-1002	2	PAX	3E	MCW	D	1002	11:10	CNC	8	54%	4	4	0	1	B15a	B
Arr-3E-1003	2	PAX	3E	IWD	D	1003	13:05	CNC	8	99%	8	8	0	1	B15b	B	1:40	Dep-3E-1004	2	PAX	3E	IWD	D	1004	14:45	CNC	8	100%	8	8	0	1	B15b	B
Arr-3E-1005	2	PAX	3E	FOD	D	1005	14:05	CNC	8	54%	4	4	0	1	B15a	B	1:25	Dep-3E-1006	2	PAX	3E	FOD	D	1006	15:30	CNC	8	80%	6	6	0	1	B15a	B
Arr-3E-1007	2	PAX	3E	MCW	D	1007	15:15	CNC	8	58%	5	5	0	1	B15b	B	0:45	Dep-3E-1008	2	PAX	3E	MCW	D	1008	16:00	CNC	8	54%	4	4	0	1	B15b	B
Arr-4B-1009	2	PAX	4B	TVF	D	1009	7:45	PL2	8	75%	6	6	0	1	B15c	B	0:40	Dep-4B-1010	2	PAX	4B	TVF	D	1010	8:25	PL2	8	78%	6	6	0	1	B15c	B
Arr-4B-1011	2	PAX	4B	TVF	D	1011	11:25	PL2	8	75%	6	6	0	1	B15c	B	3:05	Dep-4B-1012	2	PAX	4B	TVF	D	1012	14:30	PL2	8	78%	6	6	0	1	B15c	B
Arr-4B-1013	2	PAX	4B	TVF	D	1013	17:30	PL2	8	75%	6	6	0	1	B15c	B	0:40	Dep-4B-1014	2	PAX	4B	TVF	D	1014	18:10	PL2	8	78%	6	6	0	1	B15c	B
Arr-AA-1047	2	PAX	AA	ORD	D	1047	8:29	73H	160	91%	145	139	6	2	H15	H	0:48	Dep-AA-1048	2	PAX	AA	ORD	D	1048	9:17	73H	160	86%	137	131	6	2	H15	H
Arr-AA-1083	2	PAX	AA	LGA	D	1083	8:34	E75	76	73%	55	54	1	2	H16	H	0:33	Dep-AA-1084	2	PAX	AA	LGA	D	1084	9:07	E75	76	73%	56	55	1	2	H16	H
Arr-AA-1049	2	PAX	AA	CLT	D	1049	9:00	73H	160	87%	140	139	1	2	H13	H	1:00	Dep-AA-1050	2	PAX	AA	CLT	D	1050	10:00	73H	160	84%	134	133	1	2	H13	H
Arr-AA-1051	2	PAX	AA	DFW	D	1051	9:46	73H	160	97%	155	153	3	2	H18	H	1:04	Dep-AA-1052	2	PAX	AA	DFW	D	1052	10:50	73H	160	96%	153	151	2	2	H18	H
Arr-AA-1019	2	PAX	AA	PHL	D	1019	10:13	221	109	79%	86	85	1	2	H15	H	0:41	Dep-AA-1020	2	PAX	AA	PHL	D	1020	10:54	221	109	80%	87	85	1	2	H15	H
Arr-AA-1053	2	PAX	AA	CLT	D	1053	11:07	73H	160	87%	140	139	1	2	H16	H	0:47	Dep-AA-1054	2	PAX	AA	CLT	D	1054	11:54	73H	160	84%	134	133	1	2	H16	H
Arr-AA-1021	2	PAX	AA	PHL	D	1021	11:13	221	109	79%	86	85	1	2	H14	H	0:40	Dep-AA-1022	2	PAX	AA	PHL	D	1022	11:53	221	109	80%	87	85	1	2	H14	H
Arr-AA-1023	2	PAX	AA	MIA	D	1023	11:28	221	109	90%	98	97	1	2	H17	H	0:32	Dep-AA-1024	2	PAX	AA	MIA	D	1024	12:00	221	109	90%	98	97	1	2	H17	H
Arr-AA-1025	2	PAX	AA	ORD	D	1025	11:47	221	109	91%	99	95	4	2	H13	H	0:32	Dep-AA-1026	2	PAX	AA	ORD	D	1026	12:19	221	109	86%	93	89	4	2	H13	H
Arr-AA-1085	2	PAX	AA	DCA	D	1085	11:55	E75	76	87%	66	65	1	2	H18	H	0:35	Dep-AA-1086	2	PAX	AA	DCA	D	1086	12:30	E75	76	86%	65	64	1	2	H18	H
Arr-AA-1055	2	PAX	AA	DFW	D	1055	12:38	73H	160	97%	155	153	3	2	H14	H	0:41	Dep-AA-1056	2	PAX	AA	DFW	D	1056	13:19	73H	160	96%	153	151	2	2	H14	H
Arr-AA-1057	2	PAX	AA	ORD	D	1057	13:37	73H	160	91%	145	139	6	2	H13	H	0:46	Dep-AA-1058	2	PAX	AA	ORD	D	1058	14:23	73H	160	86%	137	131	6	2	H13	H
Arr-AA-1059	2	PAX	AA	PHX	D	1059	13:46	73H	160	88%	140	138	3	2	H15	H	1:02	Dep-AA-1060	2	PAX	AA	PHX	D	1060	14:48	73H	160	88%	141	137	4	2	H15	H
Arr-AA-1087	2	PAX	AA	LGA	D	1087	14:10	E75	76	73%	55	54	1	2	H18	H	1:10	Dep-AA-1088	2	PAX	AA	LGA	D	1088	15:20	E75	76	73%	56	55	1	2	H18	H
Arr-AA-1061	2	PAX	AA	CLT	D	1061	14:25	73H	160	87%	140	139	1	2	H17	H	0:50	Dep-AA-1062	2	PAX	AA	CLT	D	1062	15:15	73H	160	84%	134	133	1	2	H17	H
Arr-AA-1079	2	PAX	AA	DFW	D	1079	14:39	7M8	172	97%	167	164	3	2	H16	H	0:45	Dep-AA-1080	2	PAX	AA	DFW	D	1080	15:24	7M8	172	96%	164	162	2	2	H16	H
Arr-AA-1063	2	PAX	AA	ORD	D	1063	15:04	73H	160	91%	145	139	6	2	H13	H	0:45	Dep-AA-1064	2	PAX	AA	ORD	D	1064	15:49	73H	160	86%	137	131	6	2	H13	H
Arr-AA-1027	2	PAX	AA	PHL	D	1027	15:22	221	109	79%	86	85	1	2	H15	H	0:43	Dep-AA-1028	2	PAX	AA	PHL	D	1028	16:05	221	109	80%	87	85	1	2	H15	H
Arr-AA-1065	2	PAX	AA	DFW	D	1065	15:30	73H	160	97%	155	153	3	2	H14	H	1:20	Dep-AA-1066	2	PAX	AA	DFW	D	1066	16:50	73H	160	96%	153	151	2	2	H14	H
Arr-AA-1067	2	PAX	AA	CLT	D	1067	16:32	73H	160	87%	140	139	1	2	H13	H	0:58	Dep-AA-1068	2	PAX	AA	CLT	D	1068	17:30	73H	160	84%	134	133	1	2	H13	H
Arr-AA-1029	2	PAX	AA	ORD	D	1029	16:45	221	109	91%	99	95	4	2	H17	H	0:45	Dep-AA-1030	2	PAX	AA	ORD	D	1030	17:30	221	109	86%	93	89	4	2	H17	H
Arr-AA-1089	2	PAX	AA	LGA	D	1089	16:49	E75	76	73%	55	54	1	2	H18	H	0:31	Dep-AA-1090	2	PAX	AA	LGA	D	1090	17:20	E75	76	73%	56	55	1	2	H18	H
Arr-AA-1069	2	PAX	AA	DFW	D	1069	17:07	73H	160	97%	155	153	3	2	H19	H	0:58	Dep-AA-1070	2	PAX	AA	PHX	D	1070	18:05	73H	160	88%	141	137	4	2	H19	H
Arr-AA-1091	2	PAX	AA	DCA	D	1091	17:22	E75	76	87%	66	65	1	2	H15	H	0:30	Dep-AA-1092	2	PAX	AA	DCA	D	1092	17:52	E75	76	86%	65	64	1	2	H15	H
Arr-AA-1071	2	PAX	AA	PHX	D	1071	17:35	73H	160	88%	140	138	3	2	H16	H	0:46	Dep-AA-1072	2	PAX	AA	DFW	D	1072	18:21	73H	160	96%	153	151	2	2	H16	H
Arr-AA-1093	2	PAX	AA	LGA	D	1093	18:10	E75	76	73%	55	54	1	2	H17	H	1:10	Dep-AA-1094	2	PAX	AA	LGA	D	1094	19:20	E75	76	73%	56	55	1	2	H17	H
Arr-AA-1073	2	PAX	AA	ORD	D	1073	18:31	73H	160	91%	145	139	6	2	H18	H	0:54	Dep-AA-1074	2	PAX	AA	ORD	D	1074	19:25	73H	160	86%	137	131	6	2	H18	H
Arr-AA-1075	2	PAX	AA	DFW	D	1075	19:00	73H	160	97%	155	153	3	2	H16	H	2:00	Dep-AA-1076	2	PAX	AA	PHX	D	1076	21:00	73H	160	88%	141	137	4	2	H16	H
Arr-AA-1015	2	PAX	AA	MIA	D	1015	23:25	221	109	90%	98	97	1	2	H13	H	TOW/RON	Dep-AA-1016	2	PAX	AA	MIA	D	1016	6:03	221	109	90%	98	97	1	2	H19	H
Arr-AA-1017	2	PAX	AA	DCA	D	1017	23:44	221	109	87%	95	94	1	2	H19	H	TOW/RON	Dep-AA-1018	2	PAX	AA	DCA	D	1018	6:59	221	109	86%	94	92	1	2	H13	H
Arr-AA-1031	2	PAX	AA	PHL	D	1031	20:00	73H	160	79%	127	125	2	2	H17	H	TOW/RON	Dep-AA-1032	2	PAX	AA	CLT	D	1032	5:01	73H	160	84%	134	133	1	2	H17	H
Arr-AA-1033	2	PAX	AA	PHX	D	1033	20:00	73H	160	88%	140	138	3	2	H18	H	TOW/RON	Dep-AA-1034	2	PAX	AA	DFW	D	1034	6:00	73H	160	96%	153	151	2	2	H20	H
Arr-AA-1035	2	PAX	AA	DFW	D	1035	20:59	73H	160	97%	155	153	3	2	H14	H	TOW/RON	Dep-AA-1036	2	PAX	AA	ORD	D	1036	6:00	73H	160	86%	137	131	6	2	H14	H
Arr-AA-1037	2	PAX	AA	ORD	D	1037	22:08	73H	160	91%	145	139	6	2	H16	H	TOW/RON	Dep-AA-1038	2	PAX	AA	PHL	D	1038	6:09	73H	160	80%	128	126	2	2	H16	H
Arr-AA-1039	2	PAX	AA	CLT	D	1039	22:12	73H	160	87%	140	139	1	2	H15	H	TOW/RON	Dep-AA-1040	2	PAX	AA	CLT	D	1040	6:26	73H	160	84%	134	133	1	2	H15	H
Arr-AA-1041	2	PAX	AA	PHL	D	1041	22:27	73H	160	79%	127	125	2	2	H20	H	TOW/RON	Dep-AA-1042	2	PAX	AA	PHX	D	1042	7:30	73H	160	88%	141	137	4	2	H14	H
Arr-AA-1043	2	PAX	AA	PHX	D	1043	23:54	73H	160	88%	140	138	3	2	H14	H	TOW/RON	Dep-AA-1044	2	PAX	AA	DFW	D	1044	8:33	73H	160	96%	153	151	2	2	H17	H
Arr-AA-1045	2	PAX	AA	CLT	D	1045	23:56	73H	160	87%	140	139	1	2	H17	H	TOW/RON	Dep-AA-1046	2	PAX	AA	PHL	D	1046	8:50	73H	160	80%	128	126	2	2	H18	H
Arr-AA-1077	2	PAX	AA	DFW	D	1077	22:54	7M8	172	97%	167	164	3	2	H11	H	TOW/RON	Dep-AA-1078	2	PAX	AA	DFW	D	1078	6:44	7M8	172	96%	164	162	2	2	H17	H
Arr-AA-1081	2	PAX	AA	LGA	D	1081	22:14	E75	76	73%	55	54	1	2	H18	H	TOW/RON	Dep-AA-1082	2	PAX	AA	LGA	D	1082	7:07	E75	76	73%	56	55	1	2	H18	H
Arr-AC-1097	1	PAX	AC	YYZ	D	1097	10:04	E75	76	92%	70	63	7	1	E07	E	0:41	Dep-AC-1098	1	PAX	AC	YYZ	D	1098	10:45	E75	76	93%	71	64	7	1	E07	E
Arr-AC-1099	1	PAX	AC	YYZ	D	1099	15:54	E75	76	92%	70	63	7	1	E07	E	0:41	Dep-AC-1100	1	PAX	AC	YYZ	D	1100	16:35	E75	76	93%	71	64	7	1	E07	E
Arr-AC-1101	1	PAX	AC	YYZ	D	1101	17:10	E75	76	92%	70	63	7	1	E07	E	1:50	Dep-AC-1102	1	PAX	AC	YYZ	D	1102	19:00	E75	76	93%	71	64	7	1	E07	E
Arr-AC-1095	1	PAX	AC	YYZ	D	1095	20:34	E75	76	92%	70	63	7	1	E07	E	TOW/RON	Dep-AC-1096	1	PAX	AC	YYZ	D	1096	6:30	E75	76	93%	71	64	7	1	E07	E
Arr-AF-1103	2	PAX	AF	CDG	I	1103	15:45	359	324	96%	310	142	168	1	G04B	G	4:00	Dep-AF-1104	2	PAX	AF	CDG	I	1104	19:45	359	324	94%	304	139	165	1	G06A	G
Arr-AF-1105	2	PAX	AF	CDG	I	1105	17:00	359	324	96%	310	142	168	1	G15	G	4:00	Dep-AF-1106	2	PAX	AF	CDG	I	1106	21:00	359	324	94%	304	139	165	1	G04B	G
Arr-AS-1115	1	PAX	AS	SAN	D	1115	11:45	E75	76	84%	64	64	0	1	E08	E	0:52	Dep-AS-1116	1	PAX	AS	SAN	D	1116	12:37	E75	76	85%	64	64	0	1	E08	E
Arr-AS-1107	1	PAX	AS	SEA	D	1107	11:51	7M8	159	90%	143	142	1	1	E08	E	0:59	Dep-AS-1108	1	PAX	AS	SEA	D	1108	12:50	7M8	159	88%	140	139	1	1	E08	E
Arr-AS-1113	1	PAX	AS	SEA	D	1113	13:43	7M9	178	90%	161	159	2	1	E08	E	1:06	Dep-AS-1114	1	PAX	AS	SEA	D	1114	14:49	7M9	178	88%	157	156	2	1	E08	E
Arr-AS-1117	1	PAX	AS	PDX	D	1117	15:18	E75	76	84%	64	62	2	1	E08	E	0:45	Dep-AS-1118	1	PAX	AS	PDX	D	1118	16:03	E75	76	85%	64	63	2	1	E08	E
Arr-AS-1109	1	PAX	AS	SEA	D	1109	17:45	7M8	159	90%	143	142	1	1	E08	E	0:57	Dep-AS-1110	1	PAX	AS	SEA	D	1110	18:42	7M8	159	88%	140	139	1	1	E08	E
Arr-AS-1119	1	PAX	AS	SAN	D	1119	19:56	E75	76	84%	64	64	0	1	E08	E	0:34	Dep-AS-1120	1	PAX	AS	SAN	D	1120	20:30	E75	76	85%	64	64	0	1	E08	E
Arr-AS-1111	1	PAX	AS	SEA	D	1111	23:02	7M9	178	90%	161	159	2	1	E08	E	TOW/RON	Dep-AS-1112	1	PAX	AS	SEA	D	1112	6:49	7M9	178	88%	157	156	2	1	E08	E
Arr-B6-2003	2	PAX	B6	BOS	D	2003	8:11	320	150	89%	134	133	1	2	H23	H	1:26	Dep-B6-2004	2	PAX	B6	BOS	D	2004	9:37	320	150	91%	137	137	1	2	H23	H
Arr-B6-2005	2	PAX	B6	BOS	D	2005	16:29	320	150	89%	134	133	1	2	H24	H	0:41	Dep-B6-2006	2	PAX	B6	BOS	D	2006	17:10	320	150	91%	137	137	1	2	H24	H
Arr-B6-2007	2	PAX	B6	BOS	D	2007	18:41	320	150	89%	134	133	1	2	H22	H	0:34	Dep-B6-2008	2	PAX	B6	BOS	D	2008	19:15	320	150	91%	137	137	1	2	H22	H
Arr-B6-2001	2	PAX	B6	BOS	D	2001	23:12	320	150	89%	134	133	1	2	H23	H	TOW/RON	Dep-B6-2002	2	PAX	B6	BOS	D	2002	5:45	320	150	91%	137	137	1	2	H23	H
Arr-DE-2009	2	PAX	DE	FRA	I	2009	18:25	788	291	99%	288	287	1	2	H05	H	2:05	Dep-DE-2010	2	PAX	DE	FRA	I	2010	20:30	788	291	100%	290	262	28	2	H05	H
Arr-DL-3669	2	PAX	DL	ATL	D	3669	0:11	3N1	192	94%	181	181	0	1	C02	C	7:34	Dep-DL-3670	2	PAX	DL	SEA	D	3670	7:45	3N1	192	94%	181	148	33	1	C02	C
Arr-DL-3671	2	PAX	DL	LAX	D	3671	5:15	3N1	192	97%	186	116	70	1	C16	C	2:45	Dep-DL-3672	2	PAX	DL	SFO	D	3672	8:00	3N1	192	92%	177	135	42	1	C16	C
Arr-DL-3397	2	PAX	DL	LAS	D	3397	5:18	739	180	97%	174	97	77	1	C13	C	2:57	Dep-DL-3398	2	PAX	DL	GEG	D	3398	8:15	739	180	81%	146	55	91	1	C13	C
Arr-DL-3357	2	PAX	DL	HNL	D	3357	5:32	350	306	97%	298	85	213	1	F12	F	5:48	Dep-DL-3358	2	PAX	DL	HNL	D	3358	11:20	350	306	95%	290	114	176	1	F12	F
Arr-DL-3673	2	PAX	DL	SFO	D	3673	5:40	3N1	192	98%	188	123	65	1	C10	C	3:05	Dep-DL-3674	2	PAX	DL	DTW	D	3674	8:45	3N1	192	97%	187	119	68	1	C10	C
Arr-DL-3675	2	PAX	DL	SMF	D	3675	5:43	3N1	192	79%	152	64	88	1	C07	C	3:02	Dep-DL-3676	2	PAX	DL	LAX	D	3676	8:45	3N1	192	90%	172	113	59	1	C07	C
Arr-DL-3399	2	PAX	DL	PHX	D	3399	5:47	739	180	84%	152	97	55	1	C04	C	2:58	Dep-DL-3400	2	PAX	DL	GEG	D	3400	8:45	739	180	86%	154	43	111	1	C04	C
Arr-DL-3525	2	PAX	DL	SJC	D	3525	5:52	32N	150	80%	120	49	71	1	C01	C	2:58	Dep-DL-3526	2	PAX	DL	PIT	D	3526	8:50	32N	150	84%	125	55	70	1	C01	C
Arr-DL-3345	2	PAX	DL	SEA	D	3345	5:53	339	281	98%	275	116	160	1	F14	F	6:56	Dep-DL-3346	2	PAX	DL	LAX	D	3346	12:49	339	281	91%	256	149	106	1	F13	F
Arr-DL-3193	2	PAX	DL	FSD	D	3193	6:00	223	130	81%	105	29	77	1	E07	E	2:00	Dep-DL-3194	2	PAX	DL	SLC	D	3194	8:00	223	130	86%	112	90	22	1	E07	E
Arr-DL-3677	2	PAX	DL	PDX	D	3677	6:00	3N1	192	99%	190	63	128	1	G26	G	2:45	Dep-DL-3678	2	PAX	DL	SLC	D	3678	8:45	3N1	192	91%	175	91	85	1	G26	G
Arr-DL-3527	2	PAX	DL	FAI	D	3527	6:00	32N	150	91%	137	28	109	1	G24	G	2:55	Dep-DL-3528	2	PAX	DL	LGA	D	3528	8:55	32N	150	100%	150	109	41	1	G24	G
Arr-DL-3195	2	PAX	DL	FAR	D	3195	6:08	223	130	73%	95	3	92	1	E13	E	2:37	Dep-DL-3196	2	PAX	DL	BIS	D	3196	8:45	223	130	71%	93	31	62	1	E13	E
Arr-DL-3679	2	PAX	DL	ANC	D	3679	6:09	3N1	192	100%	192	42	150	1	F01	F	1:46	Dep-DL-3680	2	PAX	DL	ATL	D	3680	7:55	3N1	192	99%	190	119	71	1	F01	F
Arr-DL-3681	2	PAX	DL	LAX	D	3681	6:12	3N1	192	99%	190	70	120	1	F04	F	2:48	Dep-DL-3682	2	PAX	DL	ANC	D	3682	9:00	3N1	192	93%	179	41	137	1	F04	F
Arr-DL-3975	2	PAX	DL	GFK	D	3975	6:15	E7W	76	94%	72	14	57	1	F07	F	2:40	Dep-DL-3976	2	PAX	DL	CID	D	3976	8:55	E7W	76	68%	51	8	43	1	F07	F
Arr-DL-3347	2	PAX	DL	OGG	D	3347	6:15	339	281	92%	257	77	180	1	F13	F	6:55	Dep-DL-3348	2	PAX	DL	ATL	D	3348	13:10	339	281	99%	279	162	117	1	F12	F
Arr-DL-3197	2	PAX	DL	DLH	D	3197	6:20	223	130	68%	89	19	70	1	C19	C	2:10	Dep-DL-3198	2	PAX	DL	DFW	D	3198	8:30	223	130	93%	121	84	38	1	C19	C
Arr-DL-3007	2	PAX	DL	BIS	D	3007	6:20	221	109	66%	72	15	57	1	F11	F	2:25	Dep-DL-3008	2	PAX	DL	ALB	D	3008	8:45	221	109	83%	90	34	56	1	F11	F
Arr-DL-3683	2	PAX	DL	DTW	D	3683	6:20	3N1	192	96%	184	111	73	1	F10	F	2:50	Dep-DL-3684	2	PAX	DL	LAS	D	3684	9:10	3N1	192	95%	182	111	71	1	F10	F
Arr-DL-3199	2	PAX	DL	GRB	D	3199	6:56	223	130	73%	94	15	80	1	C18	C	1:54	Dep-DL-3200	2	PAX	DL	BIL	D	3200	8:50	223	130	74%	96	19	77	1	C18	C
Arr-DL-3009	2	PAX	DL	ATW	D	3009	6:57	221	109	63%	69	12	57	1	F08	F	1:48	Dep-DL-3010	2	PAX	DL	BHM	D	3010	8:45	221	109	85%	92	64	29	1	F08	F
Arr-DL-3011	2	PAX	DL	OMA	D	3011	7:14	221	109	78%	85	19	66	1	C15	C	1:31	Dep-DL-3012	2	PAX	DL	IAD	D	3012	8:45	221	109	82%	89	44	45	1	C15	C
Arr-DL-3201	2	PAX	DL	YYZ	D	3201	7:43	223	130	81%	106	44	62	1	C22	C	1:12	Dep-DL-3202	2	PAX	DL	MIA	D	3202	8:55	223	130	89%	116	72	44	1	C22	C
Arr-DL-3529	2	PAX	DL	FAR	D	3529	7:44	32N	150	70%	105	4	102	1	C17	C	1:16	Dep-DL-3530	2	PAX	DL	RAP	D	3530	9:00	32N	150	71%	106	30	76	1	C17	C
Arr-DL-3401	2	PAX	DL	GRR	D	3401	7:45	739	180	79%	143	33	110	1	C12	C	1:00	Dep-DL-3402	2	PAX	DL	PHX	D	3402	8:45	739	180	91%	165	108	57	1	C12	C
Arr-DL-3203	2	PAX	DL	CID	D	3203	7:46	223	130	65%	84	13	71	1	C09	C	1:14	Dep-DL-3204	2	PAX	DL	MKE	D	3204	9:00	223	130	82%	107	36	71	1	C09	C
Arr-DL-3403	2	PAX	DL	MKE	D	3403	7:48	739	180	83%	150	42	108	1	C03	C	1:07	Dep-DL-3404	2	PAX	DL	DEN	D	3404	8:55	739	180	97%	174	111	63	1	C03	C
Arr-DL-3531	2	PAX	DL	MSN	D	3531	7:48	32N	150	75%	113	15	98	1	C06	C	1:15	Dep-DL-3532	2	PAX	DL	BZN	D	3532	9:03	32N	150	88%	132	31	101	1	C06	C
Arr-DL-3205	2	PAX	DL	ORD	D	3205	7:49	223	130	83%	107	62	45	1	G25	G	1:16	Dep-DL-3206	2	PAX	DL	AUS	D	3206	9:05	223	130	97%	126	79	46	1	G25	G
Arr-DL-3533	2	PAX	DL	YWG	D	3533	7:50	32N	150	100%	149	4	146	1	E12	E	1:23	Dep-DL-3534	2	PAX	DL	FLL	D	3534	9:13	32N	150	89%	133	97	35	1	E12	E
Arr-DL-3535	2	PAX	DL	DCA	D	3535	7:51	32N	150	93%	140	50	90	1	E14	E	1:24	Dep-DL-3536	2	PAX	DL	FAI	D	3536	9:15	32N	150	87%	131	31	100	1	E14	E
Arr-DL-3013	2	PAX	DL	IAD	D	3013	7:52	221	109	90%	98	43	55	1	F03	F	0:53	Dep-DL-3014	2	PAX	DL	RDU	D	3014	8:45	221	109	97%	106	66	40	1	F03	F
Arr-DL-3015	2	PAX	DL	STL	D	3015	7:54	221	109	81%	88	36	52	1	F05	F	0:51	Dep-DL-3016	2	PAX	DL	SYR	D	3016	8:45	221	109	80%	87	34	54	1	F05	F
Arr-DL-3979	2	PAX	DL	BIS	D	3979	7:54	E7W	76	67%	51	10	41	1	C21	C	1:06	Dep-DL-3980	2	PAX	DL	ICT	D	3980	9:00	E7W	76	73%	56	22	34	1	C21	C
Arr-DL-3981	2	PAX	DL	ICT	D	3981	7:56	E7W	76	75%	57	19	38	1	C14	C	1:14	Dep-DL-3982	2	PAX	DL	GFK	D	3982	9:10	E7W	76	72%	55	19	36	1	C14	C
Arr-DL-3017	2	PAX	DL	ALB	D	3017	7:59	221	109	86%	94	31	63	1	D06	D	0:46	Dep-DL-3018	2	PAX	DL	YWG	D	3018	8:45	221	109	75%	81	18	63	1	D06	D
Arr-DL-3207	2	PAX	DL	CLT	D	3207	7:59	223	130	83%	108	51	57	1	E11	E	1:06	Dep-DL-3208	2	PAX	DL	CMH	D	3208	9:05	223	130	78%	102	44	58	1	E11	E
Arr-DL-3209	2	PAX	DL	PHL	D	3209	7:59	223	130	93%	120	49	71	1	D05	D	1:11	Dep-DL-3210	2	PAX	DL	MEX	I	3210	9:10	223	130	88%	115	86	29	1	D05	D
Arr-DL-3685	2	PAX	DL	RDU	D	3685	7:59	3N1	192	84%	162	91	71	1	F09	F	1:11	Dep-DL-3686	2	PAX	DL	SFO	D	3686	9:10	3N1	192	94%	180	111	69	1	F09	F
Arr-DL-3537	2	PAX	DL	PIT	D	3537	7:59	32N	150	79%	119	41	77	1	G05	G	1:16	Dep-DL-3538	2	PAX	DL	SMF	D	3538	9:15	32N	150	90%	135	59	76	1	G05	G
Arr-DL-3983	2	PAX	DL	LEX	D	3983	7:59	E7W	76	72%	55	18	37	1	F06	F	1:16	Dep-DL-3984	2	PAX	DL	RST	D	3984	9:15	E7W	76	68%	52	7	45	1	F06	F
Arr-DL-3405	2	PAX	DL	LGA	D	3405	8:00	739	180	89%	160	102	58	1	G12	G	1:00	Dep-DL-3406	2	PAX	DL	BWI	D	3406	9:00	739	180	96%	173	107	66	1	G12	G
Arr-DL-3407	2	PAX	DL	MCI	D	3407	8:00	739	180	68%	123	42	80	1	G22	G	1:00	Dep-DL-3408	2	PAX	DL	MCO	D	3408	9:00	739	180	94%	170	123	46	1	G22	G
Arr-DL-3211	2	PAX	DL	BIL	D	3211	8:00	223	130	75%	98	19	79	1	G03	G	1:10	Dep-DL-3212	2	PAX	DL	MSN	D	3212	9:10	223	130	71%	92	14	78	1	G03	G
Arr-DL-3213	2	PAX	DL	EWR	D	3213	8:00	223	130	79%	103	57	46	1	F15A	F	1:15	Dep-DL-3214	2	PAX	DL	SNA	D	3214	9:15	223	130	94%	122	69	53	1	F15A	F
Arr-DL-3687	2	PAX	DL	DTW	D	3687	8:03	3N1	192	97%	186	90	97	1	F15	F	1:07	Dep-DL-3688	2	PAX	DL	TPA	D	3688	9:10	3N1	192	92%	177	135	43	1	F15	F
Arr-DL-3019	2	PAX	DL	BNA	D	3019	8:04	221	109	88%	95	52	44	1	G14	G	0:42	Dep-DL-3020	2	PAX	DL	CLE	D	3020	8:46	221	109	87%	95	57	38	1	G14	G
Arr-DL-3021	2	PAX	DL	CLE	D	3021	8:04	221	109	83%	90	53	37	1	G18	G	0:46	Dep-DL-3022	2	PAX	DL	TVC	D	3022	8:50	221	109	74%	81	21	60	1	G18	G
Arr-DL-3023	2	PAX	DL	CVG	D	3023	8:04	221	109	89%	97	46	52	1	G15	G	0:51	Dep-DL-3024	2	PAX	DL	CLT	D	3024	8:55	221	109	90%	98	52	46	1	G15	G
Arr-DL-3025	2	PAX	DL	ROC	D	3025	8:04	221	109	84%	91	28	63	1	G21	G	0:51	Dep-DL-3026	2	PAX	DL	RSW	D	3026	8:55	221	109	84%	91	72	19	1	G21	G
Arr-DL-3985	2	PAX	DL	SBN	D	3985	8:04	E7W	76	76%	58	26	32	1	G04A	G	1:11	Dep-DL-3986	2	PAX	DL	YXE	I	3986	9:15	E7W	76	55%	42	5	37	1	G04A	G
Arr-DL-3027	2	PAX	DL	DAY	D	3027	8:06	221	109	71%	78	29	48	1	C02	C	0:59	Dep-DL-3028	2	PAX	DL	FAR	D	3028	9:05	221	109	69%	75	3	72	1	C02	C
Arr-DL-3029	2	PAX	DL	MDW	D	3029	8:07	221	109	79%	86	56	30	1	G10	G	0:58	Dep-DL-3030	2	PAX	DL	ORD	D	3030	9:05	221	109	93%	101	70	31	1	G10	G
Arr-DL-3689	2	PAX	DL	BWI	D	3689	8:09	3N1	192	93%	178	102	76	1	G09	G	1:16	Dep-DL-3690	2	PAX	DL	LAX	D	3690	9:25	3N1	192	89%	172	116	56	1	G09	G
Arr-DL-3031	2	PAX	DL	RIC	D	3031	8:10	221	109	73%	80	41	39	1	G17	G	0:55	Dep-DL-3032	2	PAX	DL	SAT	D	3032	9:05	221	109	88%	95	59	36	1	G17	G
Arr-DL-3033	2	PAX	DL	SYR	D	3033	8:13	221	109	87%	94	31	63	1	G11	G	0:57	Dep-DL-3034	2	PAX	DL	FSD	D	3034	9:10	221	109	70%	76	38	38	1	G11	G
Arr-DL-3035	2	PAX	DL	BDL	D	3035	8:15	221	109	98%	107	29	77	1	G13	G	1:00	Dep-DL-3036	2	PAX	DL	RIC	D	3036	9:15	221	109	77%	84	49	35	1	G13	G
Arr-DL-3037	2	PAX	DL	DSM	D	3037	8:15	221	109	89%	97	9	88	1	G20	G	1:15	Dep-DL-3038	2	PAX	DL	DSM	D	3038	9:30	221	109	78%	85	10	74	1	G20	G
Arr-DL-3691	2	PAX	DL	ATL	D	3691	8:15	3N1	192	98%	188	89	100	1	F14	F	1:15	Dep-DL-3692	2	PAX	DL	ATL	D	3692	9:30	3N1	192	99%	190	119	71	1	F14	F
Arr-DL-3039	2	PAX	DL	SDF	D	3039	8:15	221	109	82%	89	42	47	1	F14A	F	1:35	Dep-DL-3040	2	PAX	DL	IND	D	3040	9:50	221	109	91%	99	45	54	1	F14A	F
Arr-DL-3539	2	PAX	DL	MCO	D	3539	8:26	32N	150	95%	143	89	54	1	C16	C	0:49	Dep-DL-3540	2	PAX	DL	YVR	D	3540	9:15	32N	150	82%	123	32	91	1	C16	C
Arr-DL-3131	2	PAX	DL	RSW	D	3131	8:48	221	109	90%	98	69	29	1	C13	C	1:11	Dep-DL-3132	2	PAX	DL	BDL	D	3132	9:59	221	109	89%	97	31	65	1	C13	C
Arr-DL-3541	2	PAX	DL	MKE	D	3541	8:55	32N	150	82%	123	34	89	1	C05	C	1:04	Dep-DL-3542	2	PAX	DL	LGA	D	3542	9:59	32N	150	100%	150	104	46	1	C05	C
Arr-DL-3041	2	PAX	DL	SAT	D	3041	8:57	221	109	71%	77	48	30	1	G19	G	0:53	Dep-DL-3042	2	PAX	DL	SDF	D	3042	9:50	221	109	82%	89	43	46	1	G19	G
Arr-DL-3693	2	PAX	DL	DEN	D	3693	8:57	3N1	192	96%	184	114	70	1	G23	G	0:53	Dep-DL-3694	2	PAX	DL	BOS	D	3694	9:50	3N1	192	97%	187	139	48	1	G23	G
Arr-DL-3695	2	PAX	DL	BIL	D	3695	8:58	3N1	192	68%	130	30	100	1	C11	C	0:57	Dep-DL-3696	2	PAX	DL	ATL	D	3696	9:55	3N1	192	99%	191	107	84	1	C11	C
Arr-DL-3409	2	PAX	DL	AUS	D	3409	8:59	739	180	80%	145	97	48	1	F01	F	1:11	Dep-DL-3410	2	PAX	DL	DTW	D	3410	10:10	739	180	98%	176	98	78	1	F01	F
Arr-DL-3043	2	PAX	DL	IAH	D	3043	9:00	221	109	82%	90	53	37	1	E01	E	1:00	Dep-DL-3044	2	PAX	DL	CVG	D	3044	10:00	221	109	98%	107	52	55	1	E01	E
Arr-DL-3411	2	PAX	DL	DTW	D	3411	9:00	739	180	97%	174	90	84	1	G06A	G	1:10	Dep-DL-3412	2	PAX	DL	MCO	D	3412	10:10	739	180	95%	170	117	53	1	G06A	G
Arr-DL-3697	2	PAX	DL	ATL	D	3697	9:04	3N1	192	97%	187	110	76	1	C19	C	0:57	Dep-DL-3698	2	PAX	DL	JFK	D	3698	10:01	3N1	192	99%	189	137	53	1	C19	C
Arr-DL-3215	2	PAX	DL	DFW	D	3215	9:05	223	130	80%	104	68	36	1	C12	C	0:45	Dep-DL-3216	2	PAX	DL	YYC	D	3216	9:50	223	130	90%	117	23	94	1	C12	C
Arr-DL-3413	2	PAX	DL	LGA	D	3413	9:05	739	180	87%	157	105	52	1	C15	C	1:25	Dep-DL-3414	2	PAX	DL	DCA	D	3414	10:30	739	180	96%	173	68	105	1	C15	C
Arr-DL-3045	2	PAX	DL	GTF	D	3045	9:09	221	109	74%	80	13	67	1	C10	C	0:51	Dep-DL-3046	2	PAX	DL	STL	D	3046	10:00	221	109	90%	99	47	51	1	C10	C
Arr-DL-3415	2	PAX	DL	BUF	D	3415	9:10	739	180	94%	168	57	112	1	C08	C	1:30	Dep-DL-3416	2	PAX	DL	PDX	D	3416	10:40	739	180	90%	162	63	99	1	C08	C
Arr-DL-3417	2	PAX	DL	CMH	D	3417	9:10	739	180	79%	142	57	85	1	C18	C	2:07	Dep-DL-3418	2	PAX	DL	YVR	D	3418	11:17	739	180	85%	153	38	116	1	C18	C
Arr-DL-3047	2	PAX	DL	HLN	D	3047	9:14	221	109	83%	90	21	69	1	C07	C	0:52	Dep-DL-3048	2	PAX	DL	EWR	D	3048	10:06	221	109	91%	99	61	38	1	C07	C
Arr-DL-3219	2	PAX	DL	OKC	D	3219	9:15	223	130	67%	87	28	59	1	C22	C	0:45	Dep-DL-3220	2	PAX	DL	MCI	D	3220	10:00	223	130	83%	108	39	69	1	C22	C
Arr-DL-3323	2	PAX	DL	BOS	D	3323	9:15	321	192	97%	186	121	65	1	C04	C	1:15	Dep-DL-3324	2	PAX	DL	PDX	D	3324	10:30	321	192	90%	174	63	110	1	C04	C
Arr-DL-3543	2	PAX	DL	RAP	D	3543	9:25	32N	150	64%	96	23	73	1	C17	C	1:00	Dep-DL-3544	2	PAX	DL	MSY	D	3544	10:25	32N	150	77%	116	70	46	1	C17	C
Arr-DL-3699	2	PAX	DL	BOS	D	3699	9:30	3N1	192	96%	185	128	57	1	C21	C	1:45	Dep-DL-3700	2	PAX	DL	LAX	D	3700	11:15	3N1	192	90%	174	106	68	1	C21	C
Arr-DL-3217	2	PAX	DL	DSM	D	3217	9:36	223	130	76%	99	11	87	1	C16	C	1:00	Dep-DL-3218	2	PAX	DL	JAX	D	3218	10:36	223	130	83%	108	69	39	1	C16	C
Arr-DL-3221	2	PAX	DL	EWR	D	3221	9:46	223	130	81%	106	59	47	1	C14	C	0:45	Dep-DL-3222	2	PAX	DL	ORD	D	3222	10:31	223	130	97%	126	80	46	1	C14	C
Arr-DL-3359	2	PAX	DL	KEF	I	3359	9:58	350	306	97%	296	119	177	1	G03A	G	1:28	Dep-DL-3360	2	PAX	DL	HND	I	3360	11:26	350	306	100%	306	66	240	1	G03A	G
Arr-DL-3701	2	PAX	DL	JFK	D	3701	10:00	3N1	192	94%	181	126	56	1	C06	C	1:00	Dep-DL-3702	2	PAX	DL	SEA	D	3702	11:00	3N1	192	98%	188	78	110	1	C06	C
Arr-DL-3223	2	PAX	DL	DFW	D	3223	10:02	223	130	85%	111	70	41	1	C02	C	0:45	Dep-DL-3224	2	PAX	DL	PHL	D	3224	10:47	223	130	100%	130	60	70	1	C02	C
Arr-DL-3159	2	PAX	DL	CLE	D	3159	10:15	221	109	88%	96	61	35	1	D05	D	1:00	Dep-DL-3160	2	PAX	DL	IAD	D	3160	11:15	221	109	84%	91	39	52	1	D05	D
Arr-DL-3299	2	PAX	DL	MCI	D	3299	10:15	223	130	79%	102	36	66	1	G18	G	1:00	Dep-DL-3300	2	PAX	DL	EWR	D	3300	11:15	223	130	84%	110	59	51	1	G18	G
Arr-DL-4003	2	PAX	DL	FSD	D	4003	10:15	E7W	76	84%	64	15	49	1	G23	G	1:00	Dep-DL-4004	2	PAX	DL	RST	D	4004	11:15	E7W	76	72%	55	7	48	1	G23	G
Arr-DL-3703	2	PAX	DL	BZN	D	3703	10:15	3N1	192	95%	182	36	146	1	C01	C	1:05	Dep-DL-3704	2	PAX	DL	SLC	D	3704	11:20	3N1	192	93%	178	81	97	1	C01	C
Arr-DL-4005	2	PAX	DL	YXE	I	4005	10:15	E7W	76	83%	63	6	57	1	G04A	G	1:05	Dep-DL-4006	2	PAX	DL	MOT	D	4006	11:20	E7W	76	73%	55	17	38	1	G04A	G
Arr-DL-3705	2	PAX	DL	BOS	D	3705	[illegible]	3N1	192	[illegible]	185	123	63	1	G24	G	[illegible]	Dep-DL-3706	2	PAX	DL	DEN	D	3706	11:25	3N1	192	97%	186	114	72	1	[illegible]	G

Arr-DL-3049	2	PAX	DL	BHM	D	3049	10:20	221	109	85%	93	61	32	1	C13	C	0:55	Dep-DL-3050	2	PAX	DL	JAC	D	3050	11:15	221	109	85%	92	30	63	1	C13	C
Arr-DL-3545	2	PAX	DL	BOI	D	3545	10:20	32N	150	95%	143	30	113	1	C22	C	0:55	Dep-DL-3546	2	PAX	DL	SJC	D	3546	11:15	32N	150	84%	126	66	60	1	C22	C
Arr-DL-4007	2	PAX	DL	GFK	D	4007	10:20	E7W	76	79%	60	13	47	1	G25	G	1:00	Dep-DL-4008	2	PAX	DL	RAP	D	4008	11:20	E7W	76	72%	54	15	39	1	G25	G
Arr-DL-3051	2	PAX	DL	YWG	D	3051	10:20	221	109	88%	95	17	79	1	C05	C	1:02	Dep-DL-3052	2	PAX	DL	FAR	D	3052	11:22	221	109	75%	82	3	78	1	C05	C
Arr-DL-3707	2	PAX	DL	SLC	D	3707	10:20	3N1	192	93%	178	81	97	1	C10	C	1:05	Dep-DL-3708	2	PAX	DL	SFO	D	3708	11:25	3N1	192	94%	181	106	75	1	C10	C
Arr-DL-3053	2	PAX	DL	OMA	D	3053	10:24	221	109	81%	88	20	68	1	G26	G	1:07	Dep-DL-3054	2	PAX	DL	IAH	D	3054	11:31	221	109	92%	100	60	41	1	G26	G
Arr-DL-3055	2	PAX	DL	CLT	D	3055	10:25	221	109	88%	96	40	55	1	C03	C	1:45	Dep-DL-3056	2	PAX	DL	GTF	D	3056	12:10	221	109	66%	72	14	58	1	C03	C
Arr-DL-3709	2	PAX	DL	MCO	D	3709	10:26	3N1	192	95%	183	115	68	1	C07	C	1:04	Dep-DL-3710	2	PAX	DL	BOS	D	3710	11:30	3N1	192	97%	187	138	49	1	C07	C
Arr-DL-4009	2	PAX	DL	BIS	D	4009	10:29	E7W	76	72%	55	11	44	1	E11	E	0:52	Dep-DL-4010	2	PAX	DL	ICT	D	4010	11:21	E7W	76	74%	56	21	35	1	E11	E
Arr-DL-3487	2	PAX	DL	ATL	D	3487	10:29	753	240	97%	233	137	96	1	E15	E	0:59	Dep-DL-3488	2	PAX	DL	ATL	D	3488	11:28	753	240	99%	237	157	80	1	E15	E
Arr-DL-3225	2	PAX	DL	STL	D	3225	10:30	223	130	88%	115	48	66	1	F05	F	0:45	Dep-DL-3226	2	PAX	DL	DFW	D	3226	11:15	223	130	92%	120	80	40	1	F05	F
Arr-DL-3057	2	PAX	DL	CVG	D	3057	10:30	221	109	95%	104	48	56	1	E13	E	1:40	Dep-DL-3058	2	PAX	DL	PSC	D	3058	12:10	221	109	83%	91	14	77	1	E13	E
Arr-DL-3419	2	PAX	DL	DEN	D	3419	10:30	739	180	97%	174	92	83	1	E12	E	1:40	Dep-DL-3420	2	PAX	DL	BOI	D	3420	12:10	739	180	99%	179	41	138	1	E12	E
Arr-DL-3547	2	PAX	DL	FCA	D	3547	10:35	32N	150	90%	136	32	104	1	F08	F	0:45	Dep-DL-3548	2	PAX	DL	SMF	D	3548	11:20	32N	150	93%	140	58	82	1	F08	F
Arr-DL-3549	2	PAX	DL	MSO	D	3549	10:35	32N	150	84%	126	23	102	1	F07	F	1:00	Dep-DL-3550	2	PAX	DL	FCA	D	3550	11:35	32N	150	90%	135	31	104	1	F07	F
Arr-DL-3551	2	PAX	DL	PHX	D	3551	10:35	32N	150	89%	133	60	73	1	F03	F	1:00	Dep-DL-3552	2	PAX	DL	MSO	D	3552	11:35	32N	150	80%	120	24	96	1	F03	F
Arr-DL-3711	2	PAX	DL	BDL	D	3711	10:35	3N1	192	90%	173	58	115	1	F02	F	1:05	Dep-DL-3712	2	PAX	DL	LAS	D	3712	11:40	3N1	192	95%	183	103	80	1	F02	F
Arr-DL-3059	2	PAX	DL	MSN	D	3059	10:36	221	109	92%	100	11	90	1	E14	E	2:09	Dep-DL-3060	2	PAX	DL	CLE	D	3060	12:45	221	109	87%	94	54	40	1	E14	E
Arr-DL-3553	2	PAX	DL	MKE	D	3553	10:37	32N	150	96%	145	36	109	1	C09	C	1:33	Dep-DL-3554	2	PAX	DL	ABQ	D	3554	12:10	32N	150	78%	117	66	50	1	C09	C
Arr-DL-3227	2	PAX	DL	FLL	D	3227	10:39	223	130	93%	121	75	45	1	F10	F	0:45	Dep-DL-3228	2	PAX	DL	MIA	D	3228	11:24	223	130	89%	116	70	46	1	F10	F
Arr-DL-4011	2	PAX	DL	GRR	D	4011	10:39	E7W	76	100%	76	11	65	1	F09	F	0:46	Dep-DL-4012	2	PAX	DL	GFK	D	4012	11:25	E7W	76	76%	58	18	40	1	F09	F
Arr-DL-3421	2	PAX	DL	LGA	D	3421	10:39	739	180	96%	173	108	65	1	F04	F	1:31	Dep-DL-3422	2	PAX	DL	GEG	D	3422	12:10	739	180	98%	176	11	165	1	F04	F
Arr-DL-3229	2	PAX	DL	IND	D	3229	10:40	223	130	90%	117	52	65	1	F15	F	0:45	Dep-DL-3230	2	PAX	DL	BNA	D	3230	11:25	223	130	84%	109	61	48	1	F15	F
Arr-DL-4013	2	PAX	DL	FAR	D	4013	10:40	E7W	76	100%	76	2	74	1	F11	F	0:50	Dep-DL-4014	2	PAX	DL	FSD	D	4014	11:30	E7W	76	80%	61	18	43	1	F11	F
Arr-DL-3231	2	PAX	DL	MIA	D	3231	10:45	223	130	97%	126	71	54	1	F15A	F	0:45	Dep-DL-3232	2	PAX	DL	SNA	D	3232	11:30	223	130	95%	124	67	57	1	F15A	F
Arr-DL-3423	2	PAX	DL	DTW	D	3423	10:45	739	180	98%	176	71	105	1	C12	C	1:00	Dep-DL-3424	2	PAX	DL	BDL	D	3424	11:45	739	180	95%	170	58	113	1	C12	C
Arr-DL-3233	2	PAX	DL	RDU	D	3233	10:45	223	130	93%	121	61	60	1	F06	F	1:15	Dep-DL-3234	2	PAX	DL	AUS	D	3234	12:00	223	130	95%	123	76	47	1	F06	F
Arr-DL-3555	2	PAX	DL	ORD	D	3555	10:45	32N	150	91%	136	79	57	1	D06	D	1:25	Dep-DL-3556	2	PAX	DL	PHX	D	3556	12:10	32N	150	92%	138	85	53	1	D06	D
Arr-DL-3557	2	PAX	DL	PHL	D	3557	10:45	32N	150	90%	136	61	75	1	F01	F	2:00	Dep-DL-3558	2	PAX	DL	MKE	D	3558	12:45	32N	150	87%	131	37	94	1	F01	F
Arr-DL-3559	2	PAX	DL	TPA	D	3559	10:45	32N	150	89%	134	94	40	1	C17	C	2:05	Dep-DL-3560	2	PAX	DL	PVD	D	3560	12:50	32N	150	89%	133	96	37	1	C17	C
Arr-DL-3235	2	PAX	DL	MEX	I	3235	11:15	223	130	88%	114	86	29	1	G11	G	0:55	Dep-DL-3236	2	PAX	DL	YYC	D	3236	12:10	223	130	89%	115	23	92	1	G11	G
Arr-DL-3713	2	PAX	DL	ATL	D	3713	11:15	3N1	192	97%	186	114	72	1	C20	C	0:55	Dep-DL-3714	2	PAX	DL	ANC	D	3714	12:10	3N1	192	94%	181	40	141	1	C20	C
Arr-DL-3325	2	PAX	DL	DCA	D	3325	11:20	321	192	91%	175	82	92	1	C16	C	1:30	Dep-DL-3326	2	PAX	DL	DCA	D	3326	12:50	321	192	96%	184	72	112	1	C16	C
Arr-DL-3715	2	PAX	DL	SEA	D	3715	11:30	3N1	192	99%	190	58	132	1	C08	C	0:45	Dep-DL-3716	2	PAX	DL	SEA	D	3716	12:15	3N1	192	96%	185	109	76	1	C08	C
Arr-DL-3061	2	PAX	DL	IAH	D	3061	11:32	221	109	90%	98	55	43	1	C14	C	1:13	Dep-DL-3062	2	PAX	DL	ROC	D	3062	12:45	221	109	86%	94	32	62	1	C14	C
Arr-DL-3063	2	PAX	DL	JAC	D	3063	11:32	221	109	82%	89	28	61	1	C15	C	1:18	Dep-DL-3064	2	PAX	DL	EWR	D	3064	12:50	221	109	88%	96	57	39	1	C15	C
Arr-DL-3717	2	PAX	DL	BOS	D	3717	11:40	3N1	192	96%	185	129	56	1	C21	C	0:50	Dep-DL-3718	2	PAX	DL	ATL	D	3718	12:30	3N1	192	99%	190	119	71	1	C21	C
Arr-DL-3065	2	PAX	DL	CMH	D	3065	11:40	221	109	91%	99	34	65	1	C22	C	1:10	Dep-DL-3066	2	PAX	DL	FAR	D	3066	12:50	221	109	82%	90	3	87	1	C22	C
Arr-DL-3067	2	PAX	DL	ORF	D	3067	11:42	221	109	79%	86	41	45	1	C18	C	1:10	Dep-DL-3068	2	PAX	DL	IAD	D	3068	12:52	221	109	84%	92	43	49	1	C18	C
Arr-DL-3327	2	PAX	DL	PDX	D	3327	11:43	321	192	99%	190	68	122	1	C13	C	1:22	Dep-DL-3328	2	PAX	DL	SAN	D	3328	13:05	321	192	95%	182	79	103	1	C13	C
Arr-DL-3163	2	PAX	DL	SDF	D	3163	11:45	221	109	83%	91	47	44	1	C04	C	0:50	Dep-DL-3164	2	PAX	DL	SDF	D	3164	12:35	221	109	81%	89	39	50	1	C04	C
Arr-DL-3719	2	PAX	DL	LAX	D	3719	11:45	3N1	192	98%	189	81	108	1	C05	C	0:55	Dep-DL-3720	2	PAX	DL	BZN	D	3720	12:40	3N1	192	92%	176	38	138	1	C05	C
Arr-DL-4023	2	PAX	DL	RST	D	4023	11:45	E7W	76	70%	53	6	48	1	C06	C	1:00	Dep-DL-4024	2	PAX	DL	RIC	D	4024	12:45	E7W	76	78%	59	33	27	1	C06	C
Arr-DL-3069	2	PAX	DL	JAX	D	3069	11:45	221	109	90%	98	51	47	1	C10	C	1:09	Dep-DL-3070	2	PAX	DL	ORD	D	3070	12:54	221	109	94%	102	62	39	1	C10	C
Arr-DL-3425	2	PAX	DL	BWI	D	3425	11:45	739	180	91%	164	87	77	1	C11	C	1:10	Dep-DL-3426	2	PAX	DL	LGA	D	3426	12:55	739	180	100%	180	121	59	1	C11	C
Arr-DL-3071	2	PAX	DL	MSY	D	3071	11:45	221	109	80%	87	43	44	1	C19	C	1:15	Dep-DL-3072	2	PAX	DL	RAP	D	3072	13:00	221	109	75%	82	21	61	1	C19	C
Arr-DL-3133	2	PAX	DL	CVG	D	3133	11:50	221	109	97%	105	53	53	1	C02	C	0:50	Dep-DL-3134	2	PAX	DL	GRB	D	3134	12:40	221	109	75%	82	12	70	1	C02	C
Arr-DL-3073	2	PAX	DL	PIT	D	3073	11:50	221	109	92%	100	30	70	1	C07	C	1:25	Dep-DL-3074	2	PAX	DL	CVG	D	3074	13:15	221	109	98%	107	50	58	1	C07	C
Arr-DL-3721	2	PAX	DL	DEN	D	3721	11:55	3N1	192	96%	185	108	77	1	C01	C	1:00	Dep-DL-3722	2	PAX	DL	MCO	D	3722	12:55	3N1	192	95%	183	114	69	1	C01	C
Arr-DL-3427	2	PAX	DL	LAS	D	3427	12:00	739	180	99%	178	60	117	1	G24	G	1:00	Dep-DL-3428	2	PAX	DL	DEN	D	3428	13:00	739	180	96%	174	117	57	1	G24	G
Arr-DL-3429	2	PAX	DL	MCI	D	3429	12:00	739	180	74%	134	44	89	1	G25	G	1:00	Dep-DL-3430	2	PAX	DL	DTW	D	3430	13:00	739	180	97%	174	120	54	1	G25	G
Arr-DL-3431	2	PAX	DL	PHX	D	3431	12:00	739	180	87%	157	82	74	1	D05	D	1:00	Dep-DL-3432	2	PAX	DL	LAS	D	3432	13:00	739	180	95%	172	95	77	1	D05	D
Arr-DL-3561	2	PAX	DL	BOI	D	3561	12:00	32N	150	93%	139	42	97	1	G26	G	1:00	Dep-DL-3562	2	PAX	DL	JFK	D	3562	13:00	32N	150	99%	148	101	47	1	G26	G
Arr-DL-3723	2	PAX	DL	GEG	D	3723	12:00	3N1	192	98%	189	10	179	1	G23	G	1:06	Dep-DL-3724	2	PAX	DL	TPA	D	3724	13:06	3N1	192	92%	177	130	47	1	G23	G
Arr-DL-3075	2	PAX	DL	FAR	D	3075	12:00	221	109	83%	90	3	87	1	G22	G	1:19	Dep-DL-3076	2	PAX	DL	SAT	D	3076	13:19	221	109	89%	96	57	40	1	G22	G
Arr-DL-3433	2	PAX	DL	DCA	D	3433	12:02	739	180	90%	162	83	80	1	F07	F	1:06	Dep-DL-3434	2	PAX	DL	GRR	D	3434	13:08	739	180	88%	159	36	122	1	F07	F
Arr-DL-3077	2	PAX	DL	FSD	D	3077	12:02	221	109	79%	86	27	59	1	E11	E	1:30	Dep-DL-3078	2	PAX	DL	MCI	D	3078	13:32	221	109	82%	90	30	60	1	E11	E
Arr-DL-3725	2	PAX	DL	SLC	D	3725	12:05	3N1	192	95%	183	60	123	1	F05	F	1:25	Dep-DL-3726	2	PAX	DL	LAX	D	3726	13:30	3N1	192	92%	176	95	81	1	F05	F
Arr-DL-3237	2	PAX	DL	MSN	D	3237	12:06	223	130	84%	110	13	96	1	F08	F	0:46	Dep-DL-3238	2	PAX	DL	RDU	D	3238	12:52	223	130	99%	129	72	57	1	F08	F
Arr-DL-3489	2	PAX	DL	SFO	D	3489	12:06	753	240	98%	236	127	109	1	E15	E	1:00	Dep-DL-3490	2	PAX	DL	BWI	D	3490	13:06	753	240	77%	184	108	77	1	E15	E
Arr-DL-3239	2	PAX	DL	BIS	D	3239	12:10	223	130	64%	83	20	63	1	F09	F	0:45	Dep-DL-3240	2	PAX	DL	CLT	D	3240	12:55	223	130	92%	120	58	61	1	F09	F
Arr-DL-3241	2	PAX	DL	SNA	D	3241	12:10	223	130	88%	114	57	57	1	F10	F	0:45	Dep-DL-3242	2	PAX	DL	IND	D	3242	12:55	223	130	91%	118	51	67	1	F10	F
Arr-DL-3727	2	PAX	DL	SAN	D	3727	12:10	3N1	192	97%	186	67	119	1	C12	C	1:50	Dep-DL-3728	2	PAX	DL	ATL	D	3728	14:00	3N1	192	99%	190	114	77	1	C12	C
Arr-DL-3563	2	PAX	DL	ORD	D	3563	12:12	32N	150	92%	138	82	56	1	F11	F	0:48	Dep-DL-3564	2	PAX	DL	PHL	D	3564	13:00	32N	150	100%	150	68	82	1	F11	F
Arr-DL-3361	2	PAX	DL	CDG	I	3361	12:13	350	306	100%	306	91	215	1	G06A	G	2:25	Dep-DL-3362	2	PAX	DL	ASIA	I	3362	14:38	350	306	97%	297	81	215	1	G06A	G
Arr-DL-4025	2	PAX	DL	DLH	D	4025	12:15	E7W	76	82%	62	11	51	1	G17	G	0:32	Dep-DL-4026	2	PAX	DL	CID	D	4026	12:47	E7W	76	73%	56	8	48	1	G17	G
Arr-DL-3243	2	PAX	DL	BNA	D	3243	12:15	223	130	87%	113	67	47	1	F14A	F	0:40	Dep-DL-3244	2	PAX	DL	STL	D	3244	12:55	223	130	89%	115	52	63	1	F14A	F
Arr-DL-3245	2	PAX	DL	DTW	D	3245	12:15	223	130	97%	127	56	71	1	F14	F	0:45	Dep-DL-3246	2	PAX	DL	CMH	D	3246	13:00	223	130	82%	106	41	65	1	F14	F
Arr-DL-3247	2	PAX	DL	MKE	D	3247	12:15	223	130	100%	130	30	100	1	G19	G	0:45	Dep-DL-3248	2	PAX	DL	MEX	I	3248	13:00	223	130	88%	115	86	29	1	G19	G
Arr-DL-4029	2	PAX	DL	LSE	D	4029	12:15	E7W	76	60%	46	1	45	1	G18	G	0:48	Dep-DL-4030	2	PAX	DL	MDW	D	4030	13:03	E7W	76	91%	69	45	24	1	G18	G
Arr-DL-3079	2	PAX	DL	RSW	D	3079	12:15	221	109	88%	96	65	31	1	F03	F	1:30	Dep-DL-3080	2	PAX	DL	BNA	D	3080	13:45	221	109	73%	80	51	28	1	F03	F
Arr-DL-3081	2	PAX	DL	TVC	D	3081	12:15	221	109	82%	89	23	66	1	F02	F	2:15	Dep-DL-3082	2	PAX	DL	RSW	D	3082	14:30	221	109	82%	90	69	21	1	F02	F
Arr-DL-3565	2	PAX	DL	JFK	D	3565	12:20	32N	150	95%	142	93	49	1	F06	F	1:00	Dep-DL-3566	2	PAX	DL	BOS	D	3566	13:20	32N	150	98%	146	102	45	1	F06	F
Arr-DL-3363	2	PAX	DL	AMS	I	3363	12:27	350	306	100%	306	139	167	1	G04B	G	2:11	Dep-DL-3364	2	PAX	DL	ICN	I	3364	14:38	350	306	97%	297	81	215	1	F12	F
Arr-DL-3365	2	PAX	DL	EUR1	I	3365	12:27	350	306	97%	295	118	178	1	G08	G	3:58	Dep-DL-3366	2	PAX	DL	CDG	I	3366	16:25	350	306	100%	306	93	213	1	F12	F
Arr-DL-4031	2	PAX	DL	ICT	D	4031	12:30	E7W	76	76%	58	21	37	1	C09	C	0:55	Dep-DL-4032	2	PAX	DL	AZO	D	4032	13:25	E7W	76	76%	58	22	36	1	C09	C
Arr-DL-3567	2	PAX	DL	MCO	D	3567	12:30	32N	150	95%	143	89	54	1	E12	E	1:00	Dep-DL-3568	2	PAX	DL	PHX	D	3568	13:30	32N	150	93%	139	79	60	1	E12	E
Arr-DL-3569	2	PAX	DL	MSO	D	3569	12:30	32N	150	87%	130	24	106	1	C20	C	1:00	Dep-DL-3570	2	PAX	DL	SLC	D	3570	13:30	32N	150	95%	142	50	92	1	C20	C
Arr-DL-3571	2	PAX	DL	YVR	D	3571	12:30	32N	150	97%	146	35	111	1	G12	G	1:05	Dep-DL-3572	2	PAX	DL	OMA	D	3572	13:35	32N	150	79%	118	28	91	1	G12	G
Arr-DL-3083	2	PAX	DL	CLE	D	3083	12:30	221	109	82%	90	52	38	1	E13	E	2:21	Dep-DL-3084	2	PAX	DL	IAH	D	3084	14:51	221	109	95%	103	56	47	1	E13	E
Arr-DL-3729	2	PAX	DL	ATL	D	3729	12:31	3N1	192	97%	187	103	84	1	F04	F	1:49	Dep-DL-3730	2	PAX	DL	SEA	D	3730	14:20	3N1	192	99%	190	60	129	1	F04	F
Arr-DL-4033	2	PAX	DL	MDW	D	4033	12:33	E7W	76	84%	64	41	23	1	G20	G	0:57	Dep-DL-4034	2	PAX	DL	TVC	D	4034	13:30	E7W	76	78%	59	14	45	1	G20	G
Arr-DL-3573	2	PAX	DL	YYC	D	3573	12:35	32N	150	94%	141	37	104	1	C03	C	1:34	Dep-DL-3574	2	PAX	DL	AUS	D	3574	14:09	32N	150	95%	143	85	57	1	C03	C
Arr-DL-3085	2	PAX	DL	ABQ	D	3085	12:35	221	109	87%	95	53	42	1	C08	C	2:16	Dep-DL-3086	2	PAX	DL	MEM	D	3086	14:51	221	109	92%	100	39	61	1	C08	C
Arr-DL-3483	2	PAX	DL	BOS	D	3483	12:40	739	180	96%	174	118	56	1	G21	G	1:05	Dep-DL-3484	2	PAX	DL	MKE	D	3484	13:45	739	180	82%	148	39	109	1	G21	G
Arr-DL-3249	2	PAX	DL	BIL	D	3249	12:45	223	130	75%	98	21	77	1	G11	G	0:45	Dep-DL-3250	2	PAX	DL	YYZ	D	3250	13:30	223	130	89%	116	39	77	1	G11	G
Arr-DL-4039	2	PAX	DL	XNA	D	4039	12:46	E7W	76	75%	57	29	28	1	D06	D	1:00	Dep-DL-4040	2	PAX	DL	GFK	D	4040	13:46	E7W	76	69%	53	17	35	1	D06	D
Arr-DL-3491	2	PAX	DL	LAX	D	3491	12:48	753	240	97%	234	132	102	1	F15	F	1:00	Dep-DL-3492	2	PAX	DL	JFK	D	3492	13:48	753	240	79%	189	132	57	1	F15	F
Arr-DL-3493	2	PAX	DL	SAN	D	3493	12:50	753	240	94%	226	128	98	1	G15	G	0:58	Dep-DL-3494	2	PAX	DL	PIT	D	3494	13:48	753	240	53%	128	52	76	1	G15	G
Arr-DL-3435	2	PAX	DL	LGA	D	3435	12:58	739	180	94%	170	116	54	1	C21	C	1:00	Dep-DL-3436	2	PAX	DL	BUF	D	3436	13:58	739	180	91%	163	63	100	1	C21	C
Arr-DL-3437	2	PAX	DL	BWI	D	3437	13:00	739	180	100%	180	102	78	1	C05	C	1:00	Dep-DL-3438	2	PAX	DL	SFO	D	3438	14:00	739	180	93%	168	108	60	1	C05	C
Arr-DL-3087	2	PAX	DL	YEG	D	3087	13:00	221	109	97%	106	15	90	1	C04	C	2:04	Dep-DL-3088	2	PAX	DL	STL	D	3088	15:04	221	109	93%	102	41	61	1	C04	C
Arr-DL-3575	2	PAX	DL	SMF	D	3575	13:09	32N	150	96%	144	52	92	1	C14	C	1:11	Dep-DL-3576	2	PAX	DL	MCO	D	3576	14:20	32N	150	95%	143	87	56	1	C14	C
Arr-DL-3731	2	PAX	DL	PDX	D	3731	13:17	3N1	192	99%	190	71	119	1	C22	C	1:13	Dep-DL-3732	2	PAX	DL	PDX	D	3732	14:30	3N1	192	93%	179	48	132	1	C22	C
Arr-DL-3349	2	PAX	DL	CDG	I	3349	13:18	339	281	100%	281	85	196	1	G13B	G	2:17	Dep-DL-3350	2	PAX	DL	ATL	D	3350	15:35	339	281	99%	279	165	114	1	F13	F
Arr-DL-3577	2	PAX	DL	OAK	D	3577	13:20	32N	150	87%	130	52	78	1	C19	C	1:07	Dep-DL-3578	2	PAX	DL	OKC	D	3578	14:27	32N	150	90%	136	42	93	1	C19	C
Arr-DL-3251	2	PAX	DL	EWR	D	3251	13:22	223	130	83%	108	63	45	1	C18	C	0:45	Dep-DL-3252	2	PAX	DL	MSN	D	3252	14:07	223	130	77%	100	13	87	1	C18	C
Arr-DL-3733	2	PAX	DL	JFK	D	3733	13:24	3N1	192	94%	181	129	52	1	C17	C	1:06	Dep-DL-3734	2	PAX	DL	SLC	D	3734	14:30	3N1	192	95%	182	62	120	1	C17	C
Arr-DL-3351	2	PAX	DL	SEA	D	3351	13:26	339	281	98%	277	103	173	1	F14	F	4:04	Dep-DL-3352	2	PAX	DL	CDG	I	3352	17:30	339	281	100%	281	85	196	1	F13	F
Arr-DL-3579	2	PAX	DL	SJC	D	3579	13:27	32N	150	90%	135	53	82	1	C16	C	1:03	Dep-DL-3580	2	PAX	DL	PHX	D	3580	14:30	32N	150	93%	140	75	65	1	C16	C
Arr-DL-3439	2	PAX	DL	DEN	D	3439	13:30	739	180	96%	173	102	71	1	C13	C	0:57	Dep-DL-3440	2	PAX	DL	BZN	D	3440	14:27	739	180	97%	175	34	140	1	C13	C
Arr-DL-3089	2	PAX	DL	ORD	D	3089	13:30	221	109	91%	99	59	40	1	C15	C	1:35	Dep-DL-3090	2	PAX	DL	CLE	D	3090	15:05	221	109	88%	96	52	44	1	C15	C
Arr-DL-4043	2	PAX	DL	XWA	D	4043	13:31	E7W	76	54%	41	11	31	1	C11	C	0:59	Dep-DL-4044	2	PAX	DL	FSD	D	4044	14:30	E7W	76	87%	66	12	54	1	C11	C
Arr-DL-4045	2	PAX	DL	DAY	D	4045	13:35	E7W	76	70%	54	21	32	1	C07	C	0:56	Dep-DL-4046	2	PAX	DL	MOT	D	4046	14:31	E7W	76	80%	61	16	45	1	C07	C
Arr-DL-3735	2	PAX	DL	SFO	D	3735	13:35	3N1	192	99%	189	97	92	1	C10	C	1:00	Dep-DL-3736	2	PAX	DL	LAX	D	3736	14:35	3N1	192	92%	178	88	89	1	C10	C
Arr-DL-3495	2	PAX	DL	SAN	D	3495	13:35	753	240	94%	226	125	102	1	E15	E	1:03	Dep-DL-3496	2	PAX	DL	DEN	D	3496	14:38	753	240	78%	187	101	87	1	E15	E
Arr-DL-3367	2	PAX	DL	HND	I	3367	13:36	350	306	100%	306	87	219	1	G03A	G	3:14	Dep-DL-3368	2	PAX	DL	AMS	I	3368	16:50	350	306	100%	306	160	146	1	G03A	G
Arr-DL-3253	2	PAX	DL	MCI	D	3253	13:39	223	130	72%	93	33	60	1	C06	C	0:45	Dep-DL-3254	2	PAX	DL	DFW	D	3254	14:24	223	130	94%	122	75	47	1	C06	C
Arr-DL-3255	2	PAX	DL	PHL	D	3255	13:39	223	130	94%	122	55	67	1	C02	C	0:45	Dep-DL-3256	2	PAX	DL	DTW	D	3256	14:24	223	130	99%	128	60	68	1	C02	C
Arr-DL-3581	2	PAX	DL	RAP	D	3581	13:40	32N	150	66%	99	24	75	1	C01	C	1:20	Dep-DL-3582	2	PAX	DL	ORD	D	3582	15:00	32N	150	92%	138	82	56	1	C01	C
Arr-DL-3257	2	PAX	DL	CMH	D	3257	13:44	223	130	82%	107	43	65	1	D05	D	0:45	Dep-DL-3258	2	PAX	DL	YYZ	D	3258	14:29	223	130	91%	118	38	80	1	D05	D
Arr-DL-3259	2	PAX	DL	AUS	D	3259	13:45	223	130	85%	111	72	39	1	G24	G	0:45	Dep-DL-3260	2	PAX	DL	MIA	D	3260	14:30	223	130	90%	117	68	49	1	G24	G
Arr-DL-3315	2	PAX	DL	MIA	D	3315	13:45	223	130	97%	127	77	49	1	C09	C	1:00	Dep-DL-3316	2	PAX	DL	CID	D	3316	14:45	223	130	74%	96	13	83	1	C09	C
Arr-DL-3497	2	PAX	DL	LAX	D	3497	13:45	753	240	97%	234	135	99	1	G22	G	1:00	Dep-DL-3498	2	PAX	DL	LAS	D	3498	14:45	753	240	73%	174	77	97	1	G22	G
Arr-DL-3441	2	PAX	DL	BWI	D	3441	13:45	739	180	94%	168	95	73	1	G23	G	1:06	Dep-DL-3442	2	PAX	DL	GEG	D	3442	14:51	739	180	90%	161	33	128	1	G23	G
Arr-DL-3091	2	PAX	DL	YWG	D	3091	13:45	221	109	88%	96	16	79	1	G17	G	1:20	Dep-DL-3092	2	PAX	DL	CMH	D	3092	15:05	221	109	85%	93	34	59	1	G17	G
Arr-DL-3737	2	PAX	DL	BOS	D	3737	13:46	3N1	192	96%	184	137	47	1	G25	G	1:14	Dep-DL-3738	2	PAX	DL	BOS	D	3738	15:00	3N1	192	97%	187	131	56	1	G25	G
Arr-DL-4047	2	PAX	DL	MEM	D	4047	13:47	E7W	76	87%	66	26	40	1	G26	G	0:48	Dep-DL-4048	2	PAX	DL	BIS	D	4048	14:35	E7W	76	83%	63	16	47	1	G26	G
Arr-DL-3739	2	PAX	DL	ATL	D	3739	13:49	3N1	192	97%	187	107	80	1	F06	F	1:26	Dep-DL-3740	2	PAX	DL	SFO	D	3740	15:15	3N1	192	95%	183	89	95	1	F06	F
Arr-DL-3261	2	PAX	DL	CVG	D	3261	13:50	223	130	90%	117	61	57	1	E12	E	0:55	Dep-DL-3262	2	PAX	DL	CLT	D	3262	14:45	223	130	94%	122	57	65	1	E12	E
Arr-DL-3583	2	PAX	DL	PIT	D	3583	13:50	32N	150	80%	120	45	75	1	C20	C	1:15	Dep-DL-3584	2	PAX	DL	PHL	D	3584	15:05	32N	150	100%	150	64	86	1	C20	C
Arr-DL-3443	2	PAX	DL	LAS	D	3443	13:51	739	180	97%	175	86	90	1	F01	F	1:19	Dep-DL-3444	2	PAX	DL	GRR	D	3444	15:10	739	180	90%	162	35	127	1	F01	F
Arr-DL-4049	2	PAX	DL	CWA	D	4049	13:55	E7W	76	75%	57	7	50	1	E11	E	1:05	Dep-DL-4050	2	PAX	DL	DAY	D	4050	15:00	E7W	76	77%	59	22	37	1	E11	E
Arr-DL-3093	2	PAX	DL	DSM	D	3093	14:00	221	109	83%	90	10	80	1	F05	F	1:05	Dep-DL-3094	2	PAX	DL	SDF	D	3094	15:05	221	109	83%	91	41	50	1	F05	F
Arr-DL-3585	2	PAX	DL	LGA	D	3585	14:00	32N	150	100%	149	91	59	1	F08	F	1:10	Dep-DL-3586	2	PAX	DL	LGA	D	3586	15:10	32N	150	100%	150	95	55	1	F08	F
Arr-DL-3741	2	PAX	DL	LAX	D	3741	14:00	3N1	192	97%	187	107	79	1	E14	E	2:00	Dep-DL-3742	2	PAX	DL	LAX	D	3742	16:00	3N1	192	91%	175	101	73	1	E14	E
Arr-DL-3095	2	PAX	DL	PSC	D	3095	14:02	221	109	94%	103	14	89	1	F07	F	1:13	Dep-DL-3096	2	PAX	DL	BDL	D	3096	15:15	221	109	98%	107	33	74	1	F07	F
Arr-DL-3587	2	PAX	DL	BOI	D	3587	14:10	32N	150	94%	141	37	104	1	F11	F	1:01	Dep-DL-3588	2	PAX	DL	DCA	D	3588	15:11	32N	150	97%	145	49	96	1	F11	F
Arr-DL-3445	2	PAX	DL	PHX	D	3445	14:10	739	180	84%	152	97	55	1	F09	F	1:15	Dep-DL-3446	2	PAX	DL	DTW	D	3446	15:25	739	180	98%	176	94	83	1	F09	F
Arr-DL-3589	2	PAX	DL	SLC	D	3589	14:10	32N	150	95%	142	50	92	1	F10	F	1:15	Dep-DL-3590	2	PAX	DL	MSN	D	3590	15:25	32N	150	81%	122	15	107	1	F10	F
Arr-DL-3263	2	PAX	DL	RDU	D	3263	14:14	223	130	85%	110	65	46	1	G21	G	0:46	Dep-DL-3264	2	PAX	DL	EWR	D	3264	15:00	223	130	89%	115	66	49	1	G21	G
Arr-DL-3097	2	PAX	DL	STL	D	3097	14:15	221	109	84%	91	43	49	1	G18	G	1:01	Dep-DL-3098	2	PAX	DL	CVG	D	3098	15:16	221	109	97%	105	48	58	1	G18	G
Arr-DL-3743	2	PAX	DL	ANC	D	3743	14:15	3N1	192	100%	192	50	142	1	F03	F	1:45	Dep-DL-3744	2	PAX	DL	SEA	D	3744	16:00	3N1	192	98%	189	70	119	1	F03	F
Arr-DL-3265	2	PAX	DL	SNA	D	3265	14:16	223	130	81%	106	58	48	1	G12	G	0:44	Dep-DL-3266	2	PAX	DL	PIT	D	3266	15:00	223	130	88%	114	44	71	1	G12	G
Arr-DL-4051	2	PAX	DL	FSD	D	4051	14:18	E7W	76	79%	60	19	41	1	G11	G	0:42	Dep-DL-4052	2	PAX	DL	TUL	D	4052	15:00	E7W	76	75%	57	20	36	1	G11	G
Arr-DL-3267	2	PAX	DL	DFW	D	3267	14:18	223	130	82%	106	75	31	1	C21	C	0:45	Dep-DL-3268	2	PAX	DL	YWG	D	3268	15:03	223	130	100%	130	0	130	1	C21	C
Arr-DL-3591	2	PAX	DL	BZN	D	3591	14:21	32N	150	100%	150	31	119	1	C05	C	1:24	Dep-DL-3592	2	PAX	DL	TPA	D	3592	15:45	32N	150	89%	134	98	36	1	C05	C
Arr-DL-3269	2	PAX	DL	ORD	D	3269	14:22	223	130	86%	112	74	39	1	G19	G	0:45	Dep-DL-3270	2	PAX	DL	MCI	D	3270	15:07	223	130	87%	113	35	79	1	G19	G
Arr-DL-3099	2	PAX	DL	IAH	D	3099	14:25	221	109	88%	96	58	38	1	G20	G	1:00	Dep-DL-3100	2	PAX	DL	BNA	D	3100	15:25	221	109	87%	95	51	44	1	G20	G
Arr-DL-3447	2	PAX	DL	GEG	D	3447	14:25	739	180	88%	158	41	118	1	C12	C	1:10	Dep-DL-3448	2	PAX	DL	MKE	D	3448	15:35	739	180	86%	155	42	113	1	C12	C
Arr-DL-4055	2	PAX	DL	RAP	D	4055	14:29	E7W	76	65%	49	12	37	1	C18	C	0:41	Dep-DL-4056	2	PAX	DL	MDW	D	4056	15:10	E7W	76	90%	68	43	26	1	C18	C
Arr-DL-3271	2	PAX	DL	BNA	D	3271	14:30	223	130	87%	113	67	46	1	E01	E	0:46	Dep-DL-3272	2	PAX	DL	RDU	D	3272	15:16	223	130	97%	127	69	57	1	E01	E
Arr-DL-3273	2	PAX	DL	YYC	D	3273	14:30	223	130	92%	119	33	86	1	G15	G	0:50	Dep-DL-3274	2	PAX	DL	IND	D	3274	15:20	223	130	90%	117	49	68	1	G15	G
Arr-DL-3101	2	PAX	DL	IND	D	3101	14:30	221	109	88%	96	45	50	1	F15	F	1:00	Dep-DL-3102	2	PAX	DL	OMA	D	3102	15:30	221	109	81%	88	19	69	1	F15	F
Arr-DL-4061	2	PAX	DL	CID	D	4061	14:30	E7W	76	69%	52	8	44	1	F15A	F	1:00	Dep-DL-4062	2	PAX	DL	RAP	D	4062	15:30	E7W	76	76%	58	13	44	1	F15A	F
Arr-DL-3747	2	PAX	DL	SEA	D	3747	14:30	3N1	192	98%	189	73	116	1	D06	D	2:15	Dep-DL-3748	2	PAX	DL	ATL	D	3748	16:45	3N1	192	99%	190	116	74	1	D06	D
Arr-DL-3449	2	PAX	DL	DTW	D	3449	14:35	739	180	96%	174	98	76	1	C03	C	1:55	Dep-DL-3450	2	PAX	DL	LGA	D	3450	16:30	739	180	92%	166	110	57	1	C03	C
Arr-DL-3369	2	PAX	DL	AMS	I	3369	14:41	350	306	100%	306	148	158	1	G09B	G	2:09	Dep-DL-3370	2	PAX	DL	EUR1	I	3370	16:50	350	306	97%	297	119	178	1	G09B	G
Arr-DL-3371	2	PAX	DL	EUR2	I	3371	14:41	350	306	97%	295	118	178	1	G08	G	4:51	Dep-DL-3372	2	PAX	DL	AMS	I	3372	19:32	350	306	100%	306	141	165	1	G03A	G
Arr-DL-3329	2	PAX	DL	PDX	D	3329	14:43	321	192	99%	190	71	119	1	C14	C	1:17	Dep-DL-3330	2	PAX	DL	BOS	D	3330	16:00	321	192	97%	187	136	51	1	C14	C
Arr-DL-3103	2	PAX	DL	SAT	D	3103	14:45	221	109	72%	79	50	28	1	C02	C	1:00	Dep-DL-3104	2	PAX	DL	JAX	D	3104	15:45	221	109	81%	89	55	33	1	C02	C
Arr-DL-3105	2	PAX	DL	SYR	D	3105	14:45	221	109	86%	94	32	62	1	C06	C	1:03	Dep-DL-3106	2	PAX	DL	FAR	D	3106	15:48	221	109	80%	87	3	84	1	C06	C
Arr-DL-3473	2	PAX	DL	GRR	D	3473	14:50	739	180	83%	149	37	111	1	C22	C	1:00	Dep-DL-3474	2	PAX	DL	BUF	D	3474	15:50	739	180	93%	168	60	107	1	C22	C
Arr-DL-3499	2	PAX	DL	ATL	D	3499	14:50	753	240	96%	231	164	67	1	F14	F	1:40	Dep-DL-3500	2	PAX	DL	ATL	D	3500	16:30	753	240	99%	237	155	83	1	F14	F
Arr-DL-4065	2	PAX	DL	YEG	D	4065	14:58	E7W	76	83%	63	8	55	1	C19	C	1:07	Dep-DL-4066	2	PAX	DL	FSD	D	4066	16:05	E7W	76	83%	63	16	47	1	C19	C
Arr-DL-3107	2	PAX	DL	CLT	D	3107	15:00	221	109	97%	105	49	57	1	C13	C	1:00	Dep-DL-3108	2	PAX	DL	MCI	D	3108	16:00	221	109	78%	85	28	57	1	C13	C
Arr-DL-3109	2	PAX	DL	FAR	D	3109	15:00	221	109	62%	68	3	65	1	C11	C	1:00	Dep-DL-3110	2	PAX	DL	MEM	D	3110	16:00	221	109	88%	96	39	57	1	C11	C
Arr-DL-3593	2	PAX	DL	FCA	D	3593	15:00	32N	150	94%	141	33	107	1	C16	C	1:00	Dep-DL-3594	2	PAX	DL	MCO	D	3594	16:00	32N	150	95%	143	91	52	1	C16	C
Arr-DL-3111	2	PAX	DL	BHM	D	3111	15:05	221	109	83%	91	64	26	1	C10	C	0:55	Dep-DL-3112	2	PAX	DL	RSW	D	3112	16:00	221	109	80%	87	68	20	1	C10	C
Arr-DL-4067	2	PAX	DL	MOT	D	4067	15:08	E7W	76	72%	55	14	41	1	C09	C	1:03	Dep-DL-4068	2	PAX	DL	DLH	D	4068	16:11	E7W	76	70%	53	9	44	1	C09	C
Arr-DL-4069	2	PAX	DL	DLH	D	4069	15:12	E7W	76	72%	55	12	43	1	C08	C	1:29	Dep-DL-4070	2	PAX	DL	RST	D	4070	16:41	E7W	76	71%	54	6	47	1	C08	C
Arr-DL-4071	2	PAX	DL	FSD	D	4071	15:13	E7W	76	[illegible]	64	14	50	1	C21	C	2:07	Dep-DL-4072	2	PAX	DL	FAR	D	4072	17:30	E7W	76	79%	60	2	58	1	C21	C

Arr-DL-3745	2	PAX	DL	MCO	D	3745	15:30	3N1	192	95%	182	127	55	1	C20	C	1:00	Dep-DL-3746	2	PAX	DL	DTW	D	3746	16:30	3N1	192	97%	187	116	71	1	C20	C
Arr-DL-3501	2	PAX	DL	ATL	D	3501	15:30	753	240	97%	232	154	78	1	E15	E	1:30	Dep-DL-3502	2	PAX	DL	SAN	D	3502	17:00	753	240	93%	223	127	96	1	E15	E
Arr-DL-3749	2	PAX	DL	SLC	D	3749	15:30	3N1	192	92%	177	87	90	1	C18	C	1:30	Dep-DL-3750	2	PAX	DL	BOS	D	3750	17:00	3N1	192	97%	187	139	48	1	C18	C
Arr-DL-3275	2	PAX	DL	STL	D	3275	15:45	223	130	88%	115	55	60	1	F05	F	0:45	Dep-DL-3276	2	PAX	DL	FLL	D	3276	16:30	223	130	86%	112	80	32	1	F05	F
Arr-DL-3751	2	PAX	DL	BOS	D	3751	15:45	3N1	192	96%	185	131	53	1	C17	C	1:15	Dep-DL-3752	2	PAX	DL	DEN	D	3752	17:00	3N1	192	96%	185	126	59	1	C17	C
Arr-DL-3353	2	PAX	DL	LHR	I	3353	15:54	339	281	100%	281	182	99	1	G06A	G	1:56	Dep-DL-3354	2	PAX	DL	LHR	I	3354	17:50	339	281	100%	281	186	95	1	G06A	G
Arr-DL-3595	2	PAX	DL	MKE	D	3595	16:00	32N	150	81%	121	40	80	1	C12	C	1:00	Dep-DL-3596	2	PAX	DL	PHL	D	3596	17:00	32N	150	90%	135	66	69	1	C12	C
Arr-DL-3753	2	PAX	DL	SEA	D	3753	16:00	3N1	192	97%	187	94	93	1	C04	C	1:30	Dep-DL-3754	2	PAX	DL	SFO	D	3754	17:30	3N1	192	95%	182	99	83	1	C04	C
Arr-DL-3755	2	PAX	DL	TPA	D	3755	16:00	3N1	192	90%	172	129	43	1	C07	C	1:35	Dep-DL-3756	2	PAX	DL	SLC	D	3756	17:35	3N1	192	93%	178	79	100	1	C07	C
Arr-DL-4073	2	PAX	DL	BIS	D	4073	16:06	E7W	76	60%	46	12	33	1	C05	C	1:24	Dep-DL-4074	2	PAX	DL	MDW	D	4074	17:30	E7W	76	82%	63	40	22	1	C05	C
Arr-DL-3113	2	PAX	DL	SDF	D	3113	16:25	221	109	78%	85	45	41	1	C22	C	1:05	Dep-DL-3114	2	PAX	DL	IAH	D	3114	17:30	221	109	88%	95	53	42	1	C22	C
Arr-DL-3757	2	PAX	DL	DEN	D	3757	16:29	3N1	192	96%	184	121	63	1	C19	C	1:14	Dep-DL-3758	2	PAX	DL	MCO	D	3758	17:43	3N1	192	95%	182	119	64	1	C19	C
Arr-DL-3115	2	PAX	DL	ALB	D	3115	16:30	221	109	85%	93	32	60	1	C01	C	1:00	Dep-DL-3116	2	PAX	DL	MSN	D	3116	17:30	221	109	77%	84	10	74	1	C01	C
Arr-DL-3117	2	PAX	DL	IAD	D	3117	16:30	221	109	89%	97	46	51	1	G25	G	1:00	Dep-DL-3118	2	PAX	DL	STL	D	3118	17:30	221	109	81%	88	38	50	1	G25	G
Arr-DL-3597	2	PAX	DL	JFK	D	3597	16:30	32N	150	94%	142	98	44	1	G24	G	1:00	Dep-DL-3598	2	PAX	DL	JFK	D	3598	17:30	32N	150	99%	148	104	43	1	G24	G
Arr-DL-4075	2	PAX	DL	ICT	D	4075	16:30	E7W	76	76%	58	21	36	1	C06	C	1:00	Dep-DL-4076	2	PAX	DL	MOT	D	4076	17:30	E7W	76	72%	54	15	40	1	C06	C
Arr-DL-3119	2	PAX	DL	RDU	D	3119	16:30	221	109	92%	100	56	45	1	C02	C	1:05	Dep-DL-3120	2	PAX	DL	MCI	D	3120	17:35	221	109	76%	82	27	56	1	C02	C
Arr-DL-3451	2	PAX	DL	GEG	D	3451	16:30	739	180	89%	160	38	121	1	C10	C	1:08	Dep-DL-3452	2	PAX	DL	BWI	D	3452	17:38	739	180	90%	163	93	70	1	C10	C
Arr-DL-3121	2	PAX	DL	RIC	D	3121	16:30	221	109	75%	81	44	38	1	C14	C	1:10	Dep-DL-3122	2	PAX	DL	JAC	D	3122	17:40	221	109	84%	92	29	64	1	C14	C
Arr-DL-3759	2	PAX	DL	LAX	D	3759	16:30	3N1	192	98%	188	96	92	1	C11	C	1:22	Dep-DL-3760	2	PAX	DL	ANC	D	3760	17:52	3N1	192	93%	179	37	142	1	C11	C
Arr-DL-3761	2	PAX	DL	SLC	D	3761	16:30	3N1	192	93%	178	81	97	1	C16	C	1:25	Dep-DL-3762	2	PAX	DL	SEA	D	3762	17:55	3N1	192	98%	188	73	115	1	C16	C
Arr-DL-3453	2	PAX	DL	DCA	D	3453	16:33	739	180	90%	161	86	75	1	G23	G	1:07	Dep-DL-3454	2	PAX	DL	MKE	D	3454	17:40	739	180	82%	148	40	107	1	G23	G
Arr-DL-3123	2	PAX	DL	FAR	D	3123	16:33	221	109	67%	73	3	70	1	F15A	F	1:11	Dep-DL-3124	2	PAX	DL	RIC	D	3124	17:44	221	109	75%	82	45	37	1	F15A	F
Arr-DL-3599	2	PAX	DL	LGA	D	3599	16:35	32N	150	100%	150	102	48	1	G26	G	0:57	Dep-DL-3600	2	PAX	DL	ORD	D	3600	17:32	32N	150	83%	125	77	48	1	G26	G
Arr-DL-3355	2	PAX	DL	DTW	D	3355	16:35	339	281	96%	271	154	117	1	G08	G	3:10	Dep-DL-3356	2	PAX	DL	SEA	D	3356	19:45	339	281	99%	279	74	206	1	G08	G
Arr-DL-3763	2	PAX	DL	LAS	D	3763	16:37	3N1	192	98%	188	85	103	1	E11	E	1:20	Dep-DL-3764	2	PAX	DL	BOS	D	3764	17:57	3N1	192	97%	187	138	49	1	E11	E
Arr-DL-3125	2	PAX	DL	EWR	D	3125	16:39	221	109	87%	94	55	39	1	C09	C	1:07	Dep-DL-3126	2	PAX	DL	CLT	D	3126	17:46	221	109	85%	93	44	49	1	C09	C
Arr-DL-3455	2	PAX	DL	GRR	D	3455	16:40	739	180	80%	144	37	108	1	F03	F	1:01	Dep-DL-3456	2	PAX	DL	DCA	D	3456	17:41	739	180	94%	168	95	73	1	F03	F
Arr-DL-3127	2	PAX	DL	CLE	D	3127	16:40	221	109	87%	95	59	36	1	F02	F	1:06	Dep-DL-3128	2	PAX	DL	SAT	D	3128	17:46	221	109	84%	91	53	38	1	F02	F
Arr-DL-3457	2	PAX	DL	MCO	D	3457	16:41	739	180	93%	168	140	28	1	F01	F	1:13	Dep-DL-3458	2	PAX	DL	LAS	D	3458	17:54	739	180	96%	172	91	81	1	F01	F
Arr-DL-3601	2	PAX	DL	OMA	D	3601	16:44	32N	150	73%	110	32	78	1	F06	F	0:51	Dep-DL-3602	2	PAX	DL	SMF	D	3602	17:35	32N	150	90%	136	53	83	1	F06	F
Arr-DL-3277	2	PAX	DL	IND	D	3277	16:45	223	130	90%	117	57	60	1	F07	F	0:45	Dep-DL-3278	2	PAX	DL	BIL	D	3278	17:30	223	130	75%	98	16	81	1	F07	F
Arr-DL-3129	2	PAX	DL	JAC	D	3129	16:45	221	109	81%	88	29	59	1	E12	E	1:15	Dep-DL-3130	2	PAX	DL	ABQ	D	3130	18:00	221	109	75%	82	46	36	1	E12	E
Arr-DL-3279	2	PAX	DL	JAX	D	3279	16:49	223	130	88%	114	64	51	1	F09	F	0:46	Dep-DL-3280	2	PAX	DL	SNA	D	3280	17:35	223	130	92%	119	62	58	1	F09	F
Arr-DL-4079	2	PAX	DL	MDW	D	4079	16:49	E7W	76	91%	69	45	24	1	F08	F	0:46	Dep-DL-4080	2	PAX	DL	FSD	D	4080	17:35	E7W	76	81%	62	17	45	1	F08	F
Arr-DL-3281	2	PAX	DL	MIA	D	3281	16:50	223	130	98%	127	75	51	1	C20	C	0:50	Dep-DL-3282	2	PAX	DL	DFW	D	3282	17:40	223	130	86%	112	70	42	1	C20	C
Arr-DL-4081	2	PAX	DL	RST	D	4081	16:50	E7W	76	72%	55	6	49	1	F10	F	0:50	Dep-DL-4082	2	PAX	DL	LEX	D	4082	17:40	E7W	76	75%	57	24	34	1	F10	F
Arr-DL-3603	2	PAX	DL	YVR	D	3603	16:51	32N	150	97%	146	37	109	1	E06	E	0:54	Dep-DL-3604	2	PAX	DL	OMA	D	3604	17:45	32N	150	76%	113	26	88	1	E06	E
Arr-DL-3605	2	PAX	DL	SJC	D	3605	16:52	32N	150	90%	135	56	79	1	G12	G	0:59	Dep-DL-3606	2	PAX	DL	DTW	D	3606	17:51	32N	150	98%	147	85	61	1	G12	G
Arr-DL-4083	2	PAX	DL	TVC	D	4083	16:52	E7W	76	85%	65	17	48	1	Unassigned	U	1:00	Dep-DL-4084	2	PAX	DL	GFK	D	4084	17:52	E7W	76	73%	56	16	40	1	Unassigned	U
Arr-DL-3135	2	PAX	DL	ORD	D	3135	16:53	221	109	99%	108	65	43	1	E13	E	1:07	Dep-DL-3136	2	PAX	DL	PIT	D	3136	18:00	221	109	78%	86	34	52	1	E13	E
Arr-DL-3503	2	PAX	DL	BOS	D	3503	16:53	753	240	96%	230	170	60	1	G19	G	1:32	Dep-DL-3504	2	PAX	DL	ATL	D	3504	18:25	753	240	100%	240	110	130	1	G19	G
Arr-DL-3283	2	PAX	DL	PHL	D	3283	16:54	223	130	100%	130	58	72	1	G21	G	1:01	Dep-DL-3284	2	PAX	DL	EWR	D	3284	17:55	223	130	81%	105	62	43	1	G21	G
Arr-DL-3459	2	PAX	DL	PHX	D	3459	16:54	739	180	87%	157	81	76	1	G22	G	1:01	Dep-DL-3460	2	PAX	DL	AUS	D	3460	17:55	739	180	93%	167	99	68	1	G22	G
Arr-DL-3607	2	PAX	DL	FCA	D	3607	16:55	32N	150	96%	144	34	109	1	F15	F	1:00	Dep-DL-3608	2	PAX	DL	SJC	D	3608	17:55	32N	150	81%	121	60	61	1	F15	F
Arr-DL-3765	2	PAX	DL	SEA	D	3765	16:57	3N1	192	99%	190	61	129	1	F11	F	1:02	Dep-DL-3766	2	PAX	DL	PDX	D	3766	17:59	3N1	192	91%	174	63	112	1	F11	F
Arr-DL-3609	2	PAX	DL	SMF	D	3609	16:59	32N	150	98%	147	56	91	1	G18	G	1:00	Dep-DL-3610	2	PAX	DL	FAI	D	3610	17:59	32N	150	88%	133	29	104	1	G18	G
Arr-DL-3285	2	PAX	DL	DFW	D	3285	16:59	223	130	93%	120	79	42	1	F05	F	1:01	Dep-DL-3286	2	PAX	DL	RDU	D	3286	18:00	223	130	91%	118	66	52	1	F05	F
Arr-DL-3767	2	PAX	DL	BZN	D	3767	16:59	3N1	192	100%	192	39	153	1	C03	C	1:05	Dep-DL-3768	2	PAX	DL	LAX	D	3768	18:04	3N1	192	91%	174	104	70	1	C03	C
Arr-DL-3505	2	PAX	DL	SAN	D	3505	16:59	753	240	95%	227	121	106	1	G20	G	1:27	Dep-DL-3506	2	PAX	DL	SAN	D	3506	18:26	753	240	94%	225	115	110	1	G20	G
Arr-DL-3769	2	PAX	DL	SFO	D	3769	16:59	3N1	192	99%	190	89	101	1	D05	D	1:31	Dep-DL-3770	2	PAX	DL	ATL	D	3770	18:30	3N1	192	99%	190	120	70	1	D05	D
Arr-DL-3137	2	PAX	DL	MCI	D	3137	17:00	221	109	87%	94	29	65	1	C08	C	1:00	Dep-DL-3138	2	PAX	DL	BHM	D	3138	18:00	221	109	84%	91	50	41	1	C08	C
Arr-DL-3331	2	PAX	DL	PDX	D	3331	17:00	321	192	99%	190	68	122	1	F04	F	1:00	Dep-DL-3332	2	PAX	DL	PDX	D	3332	18:00	321	192	94%	180	46	134	1	F04	F
Arr-DL-3611	2	PAX	DL	ABQ	D	3611	17:00	32N	150	87%	131	78	53	1	E14	E	1:00	Dep-DL-3612	2	PAX	DL	MSO	D	3612	18:00	32N	150	79%	119	22	97	1	E14	E
Arr-DL-3373	2	PAX	DL	AMS	I	3373	17:07	350	306	100%	306	144	162	1	G04B	G	2:25	Dep-DL-3374	2	PAX	DL	EUR2	I	3374	19:32	350	306	97%	297	119	178	1	G04B	G
Arr-DL-3375	2	PAX	DL	EUR3	I	3375	17:07	350	306	97%	295	118	178	1	G13B	G	5:00	Dep-DL-3376	2	PAX	DL	AMS	I	3376	22:07	350	306	100%	306	151	155	1	F13	F
Arr-DL-3461	2	PAX	DL	DTW	D	3461	17:15	739	180	96%	172	113	59	1	C13	C	1:00	Dep-DL-3462	2	PAX	DL	LAS	D	3462	18:15	739	180	98%	176	61	115	1	C13	C
Arr-DL-4091	2	PAX	DL	FSD	D	4091	17:15	E7W	76	86%	66	13	53	1	D06	D	1:00	Dep-DL-4092	2	PAX	DL	DLH	D	4092	18:15	E7W	76	87%	66	8	58	1	D06	D
Arr-DL-3771	2	PAX	DL	ANC	D	3771	17:30	3N1	192	100%	192	47	145	1	C17	C	0:59	Dep-DL-3772	2	PAX	DL	SLC	D	3772	18:29	3N1	192	98%	188	37	151	1	C17	C
Arr-DL-3613	2	PAX	DL	FLL	D	3613	17:30	32N	150	93%	140	92	48	1	E15A	E	1:00	Dep-DL-3614	2	PAX	DL	SLC	D	3614	18:30	32N	150	93%	140	58	82	1	E15A	E
Arr-DL-3463	2	PAX	DL	SFO	D	3463	17:35	739	180	98%	177	103	74	1	C18	C	1:00	Dep-DL-3464	2	PAX	DL	LGA	D	3464	18:35	739	180	93%	167	102	64	1	C18	C
Arr-DL-3377	2	PAX	DL	Asia	I	3377	17:44	350	306	97%	296	81	215	1	G03A	G	4:23	Dep-DL-3378	2	PAX	DL	EUR3	I	3378	22:07	350	306	97%	297	119	178	1	F14	F
Arr-DL-3287	2	PAX	DL	MSN	D	3287	17:45	223	130	86%	112	15	98	1	C15	C	1:15	Dep-DL-3288	2	PAX	DL	DTW	D	3288	19:00	223	130	98%	128	63	65	1	C15	C
Arr-DL-3789	2	PAX	DL	ATL	D	3789	17:45	3N1	192	97%	186	114	72	1	C12	C	1:15	Dep-DL-3790	2	PAX	DL	RDU	D	3790	19:00	3N1	192	96%	185	97	87	1	C12	C
Arr-DL-3475	2	PAX	DL	MKE	D	3475	17:53	739	180	90%	161	51	110	1	C06	C	1:00	Dep-DL-3476	2	PAX	DL	DEN	D	3476	18:53	739	180	98%	176	93	82	1	C06	C
Arr-DL-3615	2	PAX	DL	LGA	D	3615	18:00	32N	150	100%	150	101	49	1	C20	C	1:00	Dep-DL-3616	2	PAX	DL	LGA	D	3616	19:00	32N	150	92%	138	85	53	1	C20	C
Arr-DL-3773	2	PAX	DL	LAX	D	3773	18:00	3N1	192	98%	188	90	98	1	C14	C	1:30	Dep-DL-3774	2	PAX	DL	BZN	D	3774	19:30	3N1	192	100%	192	33	159	1	C14	C
Arr-DL-3379	2	PAX	DL	ICN	I	3379	18:04	350	306	97%	296	81	215	1	G09B	G	4:06	Dep-DL-3380	2	PAX	DL	KEF	I	3380	22:10	350	306	100%	306	101	205	1	G03A	G
Arr-DL-3467	2	PAX	DL	DEN	D	3467	18:05	739	180	95%	172	115	56	1	C19	C	1:00	Dep-DL-3468	2	PAX	DL	PHX	D	3468	19:05	739	180	93%	168	89	79	1	C19	C
Arr-DL-3465	2	PAX	DL	DCA	D	3465	18:15	739	180	92%	165	73	92	1	C09	C	1:00	Dep-DL-3466	2	PAX	DL	CMH	D	3466	19:15	739	180	82%	147	53	94	1	C09	C
Arr-DL-3289	2	PAX	DL	AUS	D	3289	18:15	223	130	83%	108	79	28	1	C22	C	1:10	Dep-DL-3290	2	PAX	DL	OKC	D	3290	19:25	223	130	93%	121	35	86	1	C22	C
Arr-DL-3139	2	PAX	DL	GTF	D	3139	18:15	221	109	77%	84	14	70	1	C10	C	1:15	Dep-DL-3140	2	PAX	DL	HLN	D	3140	19:30	221	109	80%	87	21	67	1	C10	C
Arr-DL-3291	2	PAX	DL	SLC	D	3291	18:15	223	130	95%	124	41	83	1	C07	C	1:15	Dep-DL-3292	2	PAX	DL	DFW	D	3292	19:30	223	130	94%	122	67	56	1	C07	C
Arr-DL-3293	2	PAX	DL	SNA	D	3293	18:15	223	130	89%	116	61	55	1	C11	C	1:20	Dep-DL-3294	2	PAX	DL	SNA	D	3294	19:35	223	130	100%	130	60	70	1	C11	C
Arr-DL-3469	2	PAX	DL	PDX	D	3469	18:15	739	180	100%	179	50	129	1	G22	G	2:20	Dep-DL-3470	2	PAX	DL	DTW	D	3470	20:35	739	180	98%	177	85	92	1	C18	C
Arr-DL-4093	2	PAX	DL	MOT	D	4093	18:18	E7W	76	77%	58	15	44	1	C21	C	1:12	Dep-DL-4094	2	PAX	DL	GFK	D	4094	19:30	E7W	76	93%	71	15	56	1	C21	C
Arr-DL-3295	2	PAX	DL	CMH	D	3295	18:24	223	130	87%	113	45	68	1	C01	C	1:47	Dep-DL-3296	2	PAX	DL	ORD	D	3296	20:11	223	130	84%	109	60	49	1	C01	C
Arr-DL-3775	2	PAX	DL	SFO	D	3775	18:29	3N1	192	99%	190	94	95	1	C04	C	1:16	Dep-DL-3776	2	PAX	DL	BIL	D	3776	19:45	3N1	192	82%	158	24	134	1	C04	C
Arr-DL-3141	2	PAX	DL	RAP	D	3141	18:30	221	109	77%	84	18	66	1	G23	G	1:00	Dep-DL-3142	2	PAX	DL	MSY	D	3142	19:30	221	109	78%	85	47	38	1	G23	G
Arr-DL-3777	2	PAX	DL	SEA	D	3777	18:30	3N1	192	99%	189	66	123	1	C03	C	1:15	Dep-DL-3778	2	PAX	DL	DEN	D	3778	19:45	3N1	192	98%	188	92	96	1	C03	C
Arr-DL-3297	2	PAX	DL	YYZ	D	3297	18:30	223	130	87%	114	50	64	1	C08	C	1:46	Dep-DL-3298	2	PAX	DL	CLT	D	3298	20:16	223	130	91%	118	52	67	1	C08	C
Arr-DL-3617	2	PAX	DL	MSO	D	3617	18:35	32N	150	89%	133	25	108	1	C16	C	0:54	Dep-DL-3618	2	PAX	DL	PHX	D	3618	19:29	32N	150	95%	142	61	81	1	C16	C
Arr-DL-3619	2	PAX	DL	MSN	D	3619	18:36	32N	150	78%	117	17	100	1	F13	F	0:54	Dep-DL-3620	2	PAX	DL	MKE	D	3620	19:30	32N	150	100%	150	30	120	1	F13	F
Arr-DL-3143	2	PAX	DL	BNA	D	3143	18:39	221	109	87%	95	55	40	1	G18	G	0:51	Dep-DL-3144	2	PAX	DL	YWG	D	3144	19:30	221	109	86%	94	11	84	1	G18	G
Arr-DL-3621	2	PAX	DL	PHL	D	3621	18:44	32N	150	100%	149	70	79	1	Unassigned	U	0:46	Dep-DL-3622	2	PAX	DL	SJC	D	3622	19:30	32N	150	89%	134	59	75	1	Unassigned	U
Arr-DL-4103	2	PAX	DL	GFK	D	4103	18:44	E7W	76	79%	60	8	52	1	F03	F	1:31	Dep-DL-4104	2	PAX	DL	CWA	D	4104	20:15	E7W	76	76%	57	3	54	1	F03	F
Arr-DL-3145	2	PAX	DL	ROC	D	3145	18:45	221	109	86%	93	30	63	1	G13	G	0:50	Dep-DL-3146	2	PAX	DL	YEG	D	3146	19:35	221	109	100%	109	12	97	1	G13	G
Arr-DL-3507	2	PAX	DL	JFK	D	3507	18:45	753	240	76%	181	125	56	1	G19	G	1:20	Dep-DL-3508	2	PAX	DL	LAX	D	3508	20:05	753	240	92%	220	120	100	1	G19	G
Arr-DL-3147	2	PAX	DL	FAR	D	3147	18:46	221	109	80%	87	3	84	1	F15A	F	0:51	Dep-DL-3148	2	PAX	DL	GTF	D	3148	19:37	221	109	71%	77	13	65	1	F15A	F
Arr-DL-3149	2	PAX	DL	IAD	D	3149	18:49	221	109	94%	103	47	55	1	C17	C	0:51	Dep-DL-3150	2	PAX	DL	DSM	D	3150	19:40	221	109	100%	109	9	100	1	C17	C
Arr-DL-3471	2	PAX	DL	DTW	D	3471	18:50	739	180	97%	175	86	89	1	G26	G	1:50	Dep-DL-3472	2	PAX	DL	MCI	D	3472	20:40	739	180	82%	148	44	104	1	G26	G
Arr-DL-3151	2	PAX	DL	STL	D	3151	18:54	221	109	93%	102	48	53	1	F15	F	0:51	Dep-DL-3152	2	PAX	DL	IAH	D	3152	19:45	221	109	94%	102	51	51	1	F15	F
Arr-DL-3623	2	PAX	DL	MSY	D	3623	18:55	32N	150	78%	117	64	53	1	F13A	F	0:40	Dep-DL-3624	2	PAX	DL	YYC	D	3624	19:35	32N	150	99%	148	24	124	1	F13A	F
Arr-DL-3625	2	PAX	DL	ORD	D	3625	18:55	32N	150	97%	146	94	52	1	G17	G	0:45	Dep-DL-3626	2	PAX	DL	BOI	D	3626	19:40	32N	150	100%	150	9	141	1	G17	G
Arr-DL-3779	2	PAX	DL	SLC	D	3779	18:55	3N1	192	95%	182	65	117	1	G11	G	0:50	Dep-DL-3780	2	PAX	DL	GEG	D	3780	19:45	3N1	192	100%	192	2	190	1	G11	G
Arr-DL-3153	2	PAX	DL	PSC	D	3153	18:55	221	109	95%	103	15	88	1	E13	E	1:00	Dep-DL-3154	2	PAX	DL	ORF	D	3154	19:55	221	109	77%	84	43	42	1	E13	E
Arr-DL-3301	2	PAX	DL	CLT	D	3301	18:55	223	130	83%	107	54	53	1	F06	F	1:25	Dep-DL-3302	2	PAX	DL	PHL	D	3302	20:20	223	130	100%	130	50	80	1	F06	F
Arr-DL-3509	2	PAX	DL	PIT	D	3509	18:59	753	240	53%	126	48	79	1	E15	E	1:21	Dep-DL-3510	2	PAX	DL	BOS	D	3510	20:20	753	240	97%	233	172	61	1	E15	E
Arr-DL-3627	2	PAX	DL	OKC	D	3627	19:00	32N	150	68%	102	35	67	1	F11	F	0:50	Dep-DL-3628	2	PAX	DL	OAK	D	3628	19:50	32N	150	87%	131	58	73	1	F11	F
Arr-DL-3781	2	PAX	DL	ATL	D	3781	19:00	3N1	192	97%	186	122	64	1	G14	G	0:55	Dep-DL-3782	2	PAX	DL	SMF	D	3782	19:55	3N1	192	96%	184	67	117	1	G14	G
Arr-DL-3477	2	PAX	DL	BOI	D	3477	19:00	739	180	96%	173	32	140	1	G21	G	0:58	Dep-DL-3478	2	PAX	DL	GRR	D	3478	19:58	739	180	83%	149	32	117	1	G21	G
Arr-DL-3783	2	PAX	DL	LAX	D	3783	19:00	3N1	192	98%	188	97	91	1	F14A	F	1:00	Dep-DL-3784	2	PAX	DL	ATL	D	3784	20:00	3N1	192	100%	191	98	93	1	F14A	F
Arr-DL-3629	2	PAX	DL	PHX	D	3629	19:09	32N	150	87%	130	70	59	1	F14	F	0:47	Dep-DL-3630	2	PAX	DL	YVR	D	3630	19:56	32N	150	90%	135	29	107	1	F14	F
Arr-DL-3785	2	PAX	DL	SFO	D	3785	19:15	3N1	192	98%	189	106	83	1	F07	F	1:00	Dep-DL-3786	2	PAX	DL	BDL	D	3786	20:15	3N1	192	96%	183	56	127	1	F07	F
Arr-DL-3303	2	PAX	DL	CVG	D	3303	19:15	223	130	95%	124	65	59	1	F04	F	1:10	Dep-DL-3304	2	PAX	DL	CVG	D	3304	20:25	223	130	96%	125	53	72	1	F04	F
Arr-DL-3305	2	PAX	DL	YYC	D	3305	19:15	223	130	99%	129	34	95	1	F05	F	1:10	Dep-DL-3306	2	PAX	DL	YYZ	D	3306	20:25	223	130	91%	118	35	83	1	F05	F
Arr-DL-3333	2	PAX	DL	DCA	D	3333	19:15	321	192	93%	178	70	108	1	D05	D	1:45	Dep-DL-3334	2	PAX	DL	DCA	D	3334	21:00	321	192	95%	183	84	99	1	D05	D
Arr-DL-3511	2	PAX	DL	BWI	D	3511	19:17	753	240	77%	185	97	88	1	G20	G	1:14	Dep-DL-3512	2	PAX	DL	SFO	D	3512	20:31	753	240	95%	227	125	102	1	G20	G
Arr-DL-3631	2	PAX	DL	SLC	D	3631	19:20	32N	150	95%	143	48	95	1	C02	C	0:40	Dep-DL-3632	2	PAX	DL	MSO	D	3632	20:00	32N	150	85%	127	22	105	1	C02	C
Arr-DL-3307	2	PAX	DL	MEX	I	3307	19:20	223	130	88%	114	86	29	1	G12	G	1:08	Dep-DL-3308	2	PAX	DL	FAR	D	3308	20:28	223	130	90%	117	3	114	1	G12	G
Arr-DL-4113	2	PAX	DL	YXE	I	4113	19:20	E7W	76	64%	48	5	44	1	G15	G	1:27	Dep-DL-4114	2	PAX	DL	AZO	D	4114	20:47	E7W	76	75%	57	21	36	1	G15	G
Arr-DL-3335	2	PAX	DL	PDX	D	3335	19:21	321	192	100%	192	43	149	1	G24	G	1:39	Dep-DL-3336	2	PAX	DL	PDX	D	3336	21:00	321	192	94%	180	46	133	1	G24	G
Arr-DL-3787	2	PAX	DL	LAS	D	3787	19:25	3N1	192	98%	187	90	98	1	G10	G	0:50	Dep-DL-3788	2	PAX	DL	JFK	D	3788	20:15	3N1	192	99%	190	130	59	1	G10	G
Arr-DL-3309	2	PAX	DL	EWR	D	3309	19:25	223	130	89%	115	68	47	1	C19	C	1:34	Dep-DL-3310	2	PAX	DL	GRB	D	3310	20:59	223	130	74%	97	14	83	1	C19	C
Arr-DL-4115	2	PAX	DL	FSD	D	4115	19:25	E7W	76	89%	67	11	57	1	C20	C	2:33	Dep-DL-4116	2	PAX	DL	GFK	D	4116	21:58	E7W	76	72%	55	14	41	1	C20	C
Arr-DL-3633	2	PAX	DL	SMF	D	3633	19:28	32N	150	97%	145	57	88	1	G09	G	0:47	Dep-DL-3634	2	PAX	DL	FCA	D	3634	20:15	32N	150	94%	142	28	113	1	G09	G
Arr-DL-3155	2	PAX	DL	IAH	D	3155	19:30	221	109	93%	102	63	39	1	E12	E	1:00	Dep-DL-3156	2	PAX	DL	PSC	D	3156	20:30	221	109	87%	95	13	82	1	E12	E
Arr-DL-3635	2	PAX	DL	SJC	D	3635	19:35	32N	150	88%	132	58	74	1	F09	F	0:45	Dep-DL-3636	2	PAX	DL	DCA	D	3636	20:20	32N	150	97%	146	44	103	1	F09	F
Arr-DL-3157	2	PAX	DL	MEM	D	3157	19:44	221	109	84%	92	41	51	1	F12A	F	0:39	Dep-DL-3158	2	PAX	DL	ALB	D	3158	20:23	221	109	85%	93	32	61	1	F12A	F
Arr-DL-3161	2	PAX	DL	MCI	D	3161	19:45	221	109	77%	84	31	53	1	F12	F	0:45	Dep-DL-3162	2	PAX	DL	ROC	D	3162	20:30	221	109	87%	95	30	65	1	F12	F
Arr-DL-3637	2	PAX	DL	PVD	D	3637	19:45	32N	150	88%	132	95	37	1	E11	E	0:51	Dep-DL-3638	2	PAX	DL	PIT	D	3638	20:36	32N	150	85%	128	46	82	1	E11	E
Arr-DL-3513	2	PAX	DL	DEN	D	3513	19:47	753	240	77%	184	115	69	1	G22	G	1:03	Dep-DL-3514	2	PAX	DL	LAX	D	3514	20:50	753	240	91%	218	127	91	1	G22	G
Arr-DL-3791	2	PAX	DL	SEA	D	3791	19:52	3N1	192	96%	184	122	62	1	C14	C	0:58	Dep-DL-3792	2	PAX	DL	BWI	D	3792	20:50	3N1	192	94%	180	95	85	1	C14	C
Arr-DL-3311	2	PAX	DL	YWG	D	3311	19:58	223	130	100%	130	1	129	1	C11	C	1:00	Dep-DL-3312	2	PAX	DL	DSM	D	3312	20:58	223	130	82%	106	10	96	1	C11	C
Arr-DL-3165	2	PAX	DL	BNA	D	3165	20:00	221	109	70%	76	56	20	1	C05	C	0:30	Dep-DL-3166	2	PAX	DL	SYR	D	3166	20:30	221	109	83%	90	31	59	1	C05	C
Arr-DL-3167	2	PAX	DL	EWR	D	3167	20:00	221	109	78%	85	60	25	1	C13	C	0:50	Dep-DL-3168	2	PAX	DL	CLE	D	3168	20:50	221	109	85%	92	48	44	1	C13	C
Arr-DL-3171	2	PAX	DL	MSN	D	3171	20:00	221	109	54%	59	13	46	1	C17	C	0:51	Dep-DL-3172	2	PAX	DL	DAY	D	3172	20:51	221	109	75%	82	30	52	1	C17	C
Arr-DL-3169	2	PAX	DL	MEM	D	3169	20:00	221	109	76%	82	42	41	1	C07	C	1:00	Dep-DL-3170	2	PAX	DL	MDW	D	3170	21:00	221	109	85%	92	57	36	1	C07	C
Arr-DL-3639	2	PAX	DL	PHX	D	3639	20:00	32N	150	82%	123	92	31	1	C10	C	1:00	Dep-DL-3640	2	PAX	DL	BOI	D	3640	21:00	32N	150	98%	147	49	98	1	C10	C
Arr-DL-3641	2	PAX	DL	LGA	D	3641	20:21	32N	150	93%	139	113	26	1	C04	C	0:39	Dep-DL-3642	2	PAX	DL	SJC	D	3642	21:00	32N	150	83%	125	57	67	1	C04	C
Arr-DL-3793	2	PAX	DL	ATL	D	3793	20:30	3N1	192	95%	183	157	26	1	C02	C	1:00	Dep-DL-3794	2	PAX	DL	SLC	D	3794	21:30	3N1	192	94%	181	68	113	1	C02	C
Arr-DL-3313	2	PAX	DL	SNA	D	3313	20:37	223	130	88%	114	62	52	1	C01	C	1:27	Dep-DL-3314	2	PAX	DL	FSD	D	3314	22:04	223	130	80%	104	32	72	1	C01	C
Arr-DL-3317	2	PAX	DL	IND	D	3317	20:40	223	130	90%	117	59	58	1	G23	G	1:26	Dep-DL-3318	2	PAX	DL	DLH	D	3318	22:06	223	130	66%	86	14	71	1	G23	G
Arr-DL-3795	2	PAX	DL	MCO	D	3795	20:43	3N1	192	95%	183	121	62	1	F10	F	1:12	Dep-DL-3796	2	PAX	DL	SFO	D	3796	21:55	3N1	192	95%	182	97	85	1	F10	F
Arr-DL-3797	2	PAX	DL	SLC	D	3797	20:52	3N1	192	88%	170	121	49	1	F11	F	1:18	Dep-DL-3798	2	PAX	DL	LAX	D	3798	22:10	3N1	192	91%	174	105	69	1	F11	F
Arr-DL-3799	2	PAX	DL	JFK	D	3799	20:53	3N1	192	93%	178	150	29	1	F03	F	1:22	Dep-DL-3800	2	PAX	DL	SEA	D	3800	22:15	3N1	192	98%	188	74	114	1	F03	F
Arr-DL-3801	2	PAX	DL	SEA	D	3801	20:57	3N1	192	96%	185	116	68	1	C18	C	1:19	Dep-DL-3802	2	PAX	DL	ANC	D	3802	22:16	3N1	192	91%	176	34	141	1	C18	C
Arr-DL-3479	2	PAX	DL	MCO	D	3479	21:00	739	180	95%	171	114	57	1	F15A	F	1:10	Dep-DL-3480	2	PAX	DL	PHX	D	3480	22:10	739	180	92%	165	103	63	1	F15A	F
Arr-DL-3643	2	PAX	DL	FAI	D	3643	21:00	32N	150	84%	126	30	96	1	G26	G	1:15	Dep-DL-3644	2	PAX	DL	RAP	D	3644	22:15	32N	150	69%	103	25	78	1	G26	G
Arr-DL-3481	2	PAX	DL	BDL	D	3481	21:01	739	180	89%	160	59	100	1	F04	F	1:15	Dep-DL-3482	2	PAX	DL	LAS	D	3482	22:16	739	180	96%	172	91	81	1	F04	F
Arr-DL-3645	2	PAX	DL	DCA	D	3645	21:04	32N	150	88%	132	84	48	1	F07	F	1:11	Dep-DL-3646	2	PAX	DL	YWG	D	3646	22:15	32N	150	95%	143	6	137	1	F07	F
Arr-DL-3647	2	PAX	DL	DTW	D	3647	21:05	32N	150	95%	142	106	36	1	F01	F	1:15	Dep-DL-3648	2	PAX	DL	FAR	D	3648	22:20	32N	150	73%	109	4	105	1	F01	F
Arr-DL-3803	2	PAX	DL	DEN	D	3803	21:06	3N1	192	94%	181	144	38	1	E13	E	1:19	Dep-DL-3804	2	PAX	DL	SAN	D	3804	22:25	3N1	192	94%	181	88	92	1	E13	E
Arr-DL-3173	2	PAX	DL	GRB	D	3173	21:07	221	109	59%	64	14	50	1	F15	F	0:53	Dep-DL-3174	2	PAX	DL	ATW	D	3174	22:00	221	109	75%	82	10	72	1	F15	F
Arr-DL-3175	2	PAX	DL	MCI	D	3175	21:11	221	109	57%	62	32	30	1	G12	G	0:49	Dep-DL-3176	2	PAX	DL	BIS	D	3176	22:00	221	109	71%	77	20	57	1	G12	G
Arr-DL-3649	2	PAX	DL	OMA	D	3649	21:11	32N	150	58%	86	34	53	1	C17	C	1:15	Dep-DL-3650	2	PAX	DL	MSN	D	3650	22:26	32N	150	73%	109	13	96	1	C17	C
Arr-DL-3805	2	PAX	DL	ANC	D	3805	21:15	3N1	192	100%	192	58	134	1	G11	G	1:11	Dep-DL-3806	2	PAX	DL	PDX	D	3806	22:26	3N1	192	90%	173	65	108	1	G11	G
Arr-DL-3177	2	PAX	DL	SAT	D	3177	21:16	221	109	71%	78	54	24	1	C13	C	0:50	Dep-DL-3178	2	PAX	DL	OMA	D	3178	22:06	221	109	73%	80	16	63	1	C13	C
Arr-DL-3179	2	PAX	DL	IAH	D	3179	21:20	221	109	83%	90	65	25	1	C11	C	0:50	Dep-DL-3180	2	PAX	DL	STL	D	3180	22:10	221	109	74%	80	32	48	1	C11	C
Arr-DL-3001	2	PAX	DL	STL	D	3001	21:20	221	109	71%	78	51	27	1	F08	F	TOW/RON	Dep-DL-3002	2	PAX	DL	BNA	D	3002	6:30	221	109	59%	64	51	13	1	F08	F
Arr-DL-3003	2	PAX	DL	BDL	D	3003	21:24	221	109	77%	84	38	46	1	F09	F	TOW/RON	Dep-DL-3004	2	PAX	DL	MSN	D	3004	7:05	221	109	51%	56	13	43	1	F09	F
Arr-DL-3005	2	PAX	DL	RSW	D	3005	22:15	221	109	85%	92	92	0	1	C14	C	TOW/RON	Dep-DL-3006	2	PAX	DL	IAH	D	3006	7:36	221	109	85%	92	64	28	1	C14	C
Arr-DL-3181	2	PAX	DL	RDU	D	3181	20:45	223	130	96%	125	70	55	1	D06	D	TOW/RON	Dep-DL-3182	2	PAX	DL	IND	D	3182	6:51	223	130	78%	101	56	45	1	D06	D
Arr-DL-3183	2	PAX	DL	DFW	D	3183	20:58	223	130	83%	108	84	24	1	G25	G	TOW/RON	Dep-DL-3184	2	PAX	DL	STL	D	3184	6:55	223	130	73%	95	59	36	1	G25	G
Arr-DL-3185	2	PAX	DL	CLT	D	3185	21:00	223	130	79%	103	59	44	1	E12	E	TOW/RON	Dep-DL-3186	2	PAX	DL	CVG	D	3186	7:00	223	130	86%	112	65	47	1	E12	E
Arr-DL-3187	2	PAX	DL	YYZ	D	3187	21:00	223	130	86%	112	50	61	1	E14	E	TOW/RON	Dep-DL-3188	2	PAX	DL	EWR	D	3188	7:00	223	130	81%	105	76	29	1	E14	E
Arr-DL-3189	2	PAX	DL	PIT	D	3189	21:05	223	130	69%	90	43	47	1	E11	E	TOW/RON	Dep-DL-3190	2	PAX	DL	PHL	D	3190	7:39	223	130	88%	114	68	45	1	E11	E
Arr-DL-3191	2	PAX	DL	DTW	D	3191	23:00	223	130	93%	120	120	0	1	C11	C	TOW/RON	Dep-DL-3192	2	PAX	DL	BNA	D	3192	7:56	223	130	63%	81	61	20	1	C11	C
Arr-DL-3319	2	PAX	DL	SAN	D	3319	19:45	321	192	95%	183	85	99	1	E06	E	TOW/RON	Dep-DL-3320	2	PAX	DL	PDX	D	3320	9:13	321	192	89%	171	72	98	1	E06	E
Arr-DL-3321	2	PAX	DL	SAN	D	3321	21:25	321	192	93%	179	114	66	1	C19	C	TOW/RON	Dep-DL-3322	2	PAX	DL	SAN	D	3322	11:25	321	192	94%	181	86	95	1	C19	C
Arr-DL-3337	2	PAX	DL	ATL	D	3337	16:51	339	281	97%	273	166	106	1	F14	F	TOW/RON	Dep-DL-3338	2	PAX	DL	ATL	D	3338	7:30	339	281	98%	276	223	53	1	G03A	G
Arr-DL-3339	2	PAX	DL	LAX	D	3339	17:01	339	281	98%	275	142	133	1	F12	F	TOW/RON	Dep-DL-3340	2	PAX	DL	SEA	D	3340	8:50	339	281	98%	274	120	154	1	G08	G

Arr-DL-3341	2	PAX	DL	ATL	D	3341	18:23	339	281	97%	273	168	105	1	F12	F	TOW/RON	Dep-DL-3342	2	PAX	DL	DTW	D	3342	11:15	339	281	97%	274	166	108	1	F13	F
Arr-DL-3343	2	PAX	DL	ATL	D	3343	21:17	339	281	95%	268	224	44	1	F12	F	TOW/RON	Dep-DL-3344	2	PAX	DL	OGG	D	3344	11:15	339	281	92%	258	101	157	1	F14	F
Arr-DL-3381	2	PAX	DL	GEG	D	3381	19:05	739	180	98%	176	12	165	1	C18	C	TOW/RON	Dep-DL-3382	2	PAX	DL	DTW	D	3382	6:30	739	180	96%	173	143	29	1	C18	C
Arr-DL-3383	2	PAX	DL	BUF	D	3383	19:25	739	180	96%	173	60	112	1	C15	C	TOW/RON	Dep-DL-3384	2	PAX	DL	BOS	D	3384	6:50	739	180	97%	174	149	25	1	C15	C
Arr-DL-3385	2	PAX	DL	YVR	D	3385	19:30	739	180	95%	171	45	125	1	C12	C	TOW/RON	Dep-DL-3386	2	PAX	DL	LAS	D	3386	6:50	739	180	93%	167	136	31	1	C12	C
Arr-DL-3387	2	PAX	DL	BZN	D	3387	19:45	739	180	92%	165	36	129	1	C06	C	TOW/RON	Dep-DL-3388	2	PAX	DL	DCA	D	3388	6:55	739	180	91%	163	128	36	1	C06	C
Arr-DL-3389	2	PAX	DL	LAS	D	3389	20:30	739	180	96%	173	118	54	1	C03	C	TOW/RON	Dep-DL-3390	2	PAX	DL	LGA	D	3390	6:55	739	180	96%	173	140	33	1	C03	C
Arr-DL-3391	2	PAX	DL	MKE	D	3391	21:07	739	180	66%	119	53	66	1	F02	F	TOW/RON	Dep-DL-3392	2	PAX	DL	MCI	D	3392	6:55	739	180	67%	120	56	64	1	F02	F
Arr-DL-3393	2	PAX	DL	GEG	D	3393	21:18	739	180	82%	147	59	88	1	F05	F	TOW/RON	Dep-DL-3394	2	PAX	DL	PHX	D	3394	7:00	739	180	90%	162	124	37	1	F05	F
Arr-DL-3395	2	PAX	DL	LAS	D	3395	23:24	739	180	93%	168	168	0	1	F03	F	TOW/RON	Dep-DL-3396	2	PAX	DL	BWI	D	3396	7:30	739	180	89%	159	110	49	1	F03	F
Arr-DL-3485	2	PAX	DL	LAS	D	3485	22:12	753	240	72%	173	114	59	1	E15	E	TOW/RON	Dep-DL-3486	2	PAX	DL	SAN	D	3486	8:45	753	240	92%	221	140	81	1	E15	E
Arr-DL-3515	2	PAX	DL	BOS	D	3515	21:53	32N	150	95%	143	119	24	1	G17	G	TOW/RON	Dep-DL-3516	2	PAX	DL	ORD	D	3516	6:50	32N	150	85%	127	99	28	1	G17	G
Arr-DL-3517	2	PAX	DL	AUS	D	3517	21:25	32N	150	88%	133	88	44	1	F06	F	TOW/RON	Dep-DL-3518	2	PAX	DL	MKE	D	3518	7:10	32N	150	63%	94	42	52	1	F06	F
Arr-DL-3519	2	PAX	DL	ORD	D	3519	21:25	32N	150	84%	126	99	28	1	D05	D	TOW/RON	Dep-DL-3520	2	PAX	DL	BOI	D	3520	7:35	32N	150	97%	145	60	86	1	D05	D
Arr-DL-3521	2	PAX	DL	PHX	D	3521	21:25	32N	150	82%	123	93	30	1	C05	C	TOW/RON	Dep-DL-3522	2	PAX	DL	ORD	D	3522	8:11	32N	150	84%	126	96	30	1	C05	C
Arr-DL-3523	2	PAX	DL	PHL	D	3523	21:38	32N	150	77%	116	73	43	1	C08	C	TOW/RON	Dep-DL-3524	2	PAX	DL	FCA	D	3524	8:50	32N	150	90%	135	32	103	1	C08	C
Arr-DL-3651	2	PAX	DL	SFO	D	3651	21:22	3N1	192	97%	187	143	44	1	G24	G	TOW/RON	Dep-DL-3652	2	PAX	DL	ATL	D	3652	5:30	3N1	192	94%	181	181	0	1	G24	G
Arr-DL-3653	2	PAX	DL	LAX	D	3653	21:23	3N1	192	96%	184	140	44	1	G22	G	TOW/RON	Dep-DL-3654	2	PAX	DL	ATL	D	3654	6:30	3N1	192	98%	188	169	19	1	G22	G
Arr-DL-3655	2	PAX	DL	TPA	D	3655	21:25	3N1	192	90%	173	135	38	1	G21	G	TOW/RON	Dep-DL-3656	2	PAX	DL	JFK	D	3656	6:50	3N1	192	98%	188	161	27	1	G21	G
Arr-DL-3657	2	PAX	DL	PDX	D	3657	22:06	3N1	192	95%	182	182	0	1	G20	G	TOW/RON	Dep-DL-3658	2	PAX	DL	LAX	D	3658	6:50	3N1	192	87%	167	141	26	1	G20	G
Arr-DL-3659	2	PAX	DL	SEA	D	3659	22:50	3N1	192	93%	179	179	0	1	G18	G	TOW/RON	Dep-DL-3660	2	PAX	DL	MCO	D	3660	6:50	3N1	192	94%	180	141	39	1	G18	G
Arr-DL-3661	2	PAX	DL	ATL	D	3661	22:53	3N1	192	94%	181	181	0	1	G15	G	TOW/RON	Dep-DL-3662	2	PAX	DL	SEA	D	3662	6:50	3N1	192	95%	182	132	50	1	G15	G
Arr-DL-3663	2	PAX	DL	LAX	D	3663	23:05	3N1	192	94%	181	181	0	1	G14	G	TOW/RON	Dep-DL-3664	2	PAX	DL	SLC	D	3664	6:50	3N1	192	88%	168	123	45	1	G14	G
Arr-DL-3665	2	PAX	DL	SFO	D	3665	23:49	3N1	192	96%	184	184	0	1	G19	G	TOW/RON	Dep-DL-3666	2	PAX	DL	DEN	D	3666	6:59	3N1	192	95%	183	146	37	1	G19	G
Arr-DL-3667	2	PAX	DL	SLC	D	3667	23:58	3N1	192	84%	161	161	0	1	C17	C	TOW/RON	Dep-DL-3668	2	PAX	DL	SFO	D	3668	7:00	3N1	192	92%	176	140	36	1	C17	C
Arr-DL-3955	2	PAX	DL	RAP	D	3955	19:44	E7W	76	78%	59	13	46	1	C09	C	TOW/RON	Dep-DL-3956	2	PAX	DL	GRR	D	3956	6:55	E7W	76	53%	40	18	22	1	C09	C
Arr-DL-3957	2	PAX	DL	RST	D	3957	19:45	E7W	76	73%	55	7	48	1	C22	C	TOW/RON	Dep-DL-3958	2	PAX	DL	MDW	D	3958	6:55	E7W	76	85%	65	52	13	1	C22	C
Arr-DL-3961	2	PAX	DL	FAR	D	3961	20:19	E7W	76	50%	38	2	36	1	C21	C	TOW/RON	Dep-DL-3962	2	PAX	DL	BIS	D	3962	7:00	E7W	76	54%	41	19	21	1	C21	C
Arr-DL-3971	2	PAX	DL	GFK	D	3971	22:50	E7W	76	61%	47	47	0	1	C20	C	TOW/RON	Dep-DL-3972	2	PAX	DL	MOT	D	3972	6:58	E7W	76	57%	43	19	24	1	C20	C
Arr-DL-3963	2	PAX	DL	FSD	D	3963	20:32	CR9	76	69%	53	26	26	1	A04	A	TOW/RON	Dep-DL-3808	2	PAX	DL	YYZ	D	3808	6:50	CR9	76	66%	50	26	24	1	A04	A
Arr-DL-3881	2	PAX	DL	DSM	D	3881	20:40	CR9	76	59%	45	8	37	1	B12	B	TOW/RON	Dep-DL-3810	2	PAX	DL	DFW	D	3810	7:00	CR9	76	85%	64	54	10	1	B12	B
Arr-DL-3965	2	PAX	DL	DLH	D	3965	20:40	CR9	76	53%	40	13	27	1	C21A	C	TOW/RON	Dep-DL-3812	2	PAX	DL	OMA	D	3812	7:02	CR9	76	52%	39	16	23	1	C21A	C
Arr-DL-3953	2	PAX	DL	GRR	D	3953	20:55	CR9	76	55%	42	42	0	1	A06	A	TOW/RON	Dep-DL-3964	2	PAX	DL	CHS	D	3964	7:30	CR9	76	89%	67	34	34	1	A06	A
Arr-DL-3807	2	PAX	DL	YUL	D	3807	21:10	CR9	76	91%	69	27	42	1	C20A	C	TOW/RON	Dep-DL-3966	2	PAX	DL	FAR	D	3966	7:50	CR9	76	64%	49	18	31	1	C20A	C
Arr-DL-3967	2	PAX	DL	MOT	D	3967	21:18	CR9	76	53%	40	15	25	1	A08	A	TOW/RON	Dep-DL-3968	2	PAX	DL	YEG	D	3968	8:00	CR9	76	63%	48	7	41	1	A08	A
Arr-DL-3969	2	PAX	DL	MDW	D	3969	21:20	CR9	76	82%	62	49	13	1	A09	A	TOW/RON	Dep-DL-3974	2	PAX	DL	XNA	D	3974	8:50	CR9	76	74%	56	32	24	1	A09	A
Arr-DL-3973	2	PAX	DL	TVC	D	3973	6:09	CR9	76	80%	61	14	47	1	B06	B	2:41	Dep-DL-3886	2	PAX	DL	LNK	D	3886	8:50	CR9	76	77%	59	20	39	1	A03	A
Arr-DL-3809	2	PAX	DL	BJI	D	3809	6:13	CR9	76	78%	60	5	55	1	B08	B	2:37	Dep-DL-3960	2	PAX	DL	MEM	D	3960	8:50	CR9	76	89%	67	30	38	1	B10	B
Arr-DL-3811	2	PAX	DL	ABR	D	3811	6:19	CR9	76	73%	56	3	53	1	B02	B	2:31	Dep-DL-3970	2	PAX	DL	MDW	D	3970	8:50	CR9	76	93%	71	50	21	1	B02	B
Arr-DL-3883	2	PAX	DL	MBS	D	3883	6:25	CR9	76	80%	61	18	43	1	B04	B	2:30	Dep-DL-3978	2	PAX	DL	MOT	D	3978	8:55	CR9	76	71%	54	18	36	1	B06	B
Arr-DL-3977	2	PAX	DL	RST	D	3977	7:15	CR9	76	72%	54	6	49	1	A04	A	1:40	Dep-DL-3814	2	PAX	DL	BDL	D	3814	8:55	CR9	76	90%	69	27	42	1	A04	A
Arr-DL-3813	2	PAX	DL	YUL	D	3813	7:52	CR9	76	96%	73	25	48	1	A07	A	1:18	Dep-DL-3816	2	PAX	DL	ATW	D	3816	9:10	CR9	76	70%	53	8	45	1	A07	A
Arr-DL-3815	2	PAX	DL	IND	D	3815	7:54	CR9	76	89%	67	26	42	1	C21A	C	1:16	Dep-DL-3818	2	PAX	DL	IAH	D	3818	9:10	CR9	76	92%	70	44	25	1	C21A	C
Arr-DL-3817	2	PAX	DL	MOT	D	3817	7:54	CR9	76	72%	54	12	43	1	A06	A	1:16	Dep-DL-3888	2	PAX	DL	INL	D	3888	9:10	CR9	76	67%	51	11	40	1	A06	A
Arr-DL-3819	2	PAX	DL	CIU	D	3819	7:59	CR9	76	75%	57	11	46	1	B06	B	1:16	Dep-DL-3890	2	PAX	DL	RHI	D	3890	9:15	CR9	76	76%	58	9	48	1	B04	B
Arr-DL-3885	2	PAX	DL	LSE	D	3885	8:02	CR9	76	84%	64	2	62	1	A03	A	1:13	Dep-DL-3892	2	PAX	DL	TUL	D	3892	9:15	CR9	76	70%	53	22	31	1	B08	B
Arr-DL-3821	2	PAX	DL	BRD	D	3821	8:03	CR9	76	72%	54	2	52	1	B10	B	1:12	Dep-DL-3898	2	PAX	DL	TVC	D	3898	9:15	CR9	76	75%	57	15	43	1	A02	A
Arr-DL-3887	2	PAX	DL	MQT	D	3887	8:04	CR9	76	83%	63	15	48	1	B12	B	1:46	Dep-DL-3820	2	PAX	DL	GRR	D	3820	9:50	CR9	76	88%	67	17	50	1	B12	B
Arr-DL-3987	2	PAX	DL	XWA	D	3987	8:05	CR9	76	67%	51	7	44	1	B14	B	1:45	Dep-DL-3822	2	PAX	DL	YYZ	D	3822	9:50	CR9	76	89%	68	24	43	1	B14	B
Arr-DL-3889	2	PAX	DL	HIB	D	3889	8:08	CR9	76	61%	46	9	37	1	B16	B	1:42	Dep-DL-3988	2	PAX	DL	DLH	D	3988	9:50	CR9	76	70%	53	10	43	1	B16	B
Arr-DL-3989	2	PAX	DL	CHS	D	3989	8:09	CR9	76	88%	67	33	34	1	F13	F	1:41	Dep-DL-3990	2	PAX	DL	LSE	D	3990	9:50	CR9	76	49%	37	1	36	1	F13	F
Arr-DL-3891	2	PAX	DL	XNA	D	3891	8:10	CR9	76	77%	59	26	33	1	F12A	F	1:45	Dep-DL-3992	2	PAX	DL	ATW	D	3992	9:55	CR9	76	78%	60	8	52	1	F12A	F
Arr-DL-3991	2	PAX	DL	AZO	D	3991	8:10	CR9	76	77%	58	20	38	1	F13A	F	1:45	Dep-DL-3994	2	PAX	DL	DAY	D	3994	9:55	CR9	76	76%	58	23	34	1	F13A	F
Arr-DL-3823	2	PAX	DL	MLI	D	3823	8:10	CR9	76	72%	55	17	38	1	C20A	C	1:49	Dep-DL-3824	2	PAX	DL	GRB	D	3824	9:59	CR9	76	79%	60	9	51	1	C20A	C
Arr-DL-3993	2	PAX	DL	TUL	D	3993	8:11	CR9	76	69%	52	18	34	1	F12	F	1:48	Dep-DL-3996	2	PAX	DL	MDW	D	3996	9:59	CR9	76	94%	71	49	23	1	F12	F
Arr-DL-3995	2	PAX	DL	CWA	D	3995	8:13	CR9	76	77%	59	7	52	1	F02	F	1:47	Dep-DL-3894	2	PAX	DL	SBN	D	3894	10:00	CR9	76	83%	63	27	36	1	F02	F
Arr-DL-3997	2	PAX	DL	DLH	D	3997	8:15	CR9	76	77%	59	10	48	1	C20	C	1:45	Dep-DL-3998	2	PAX	DL	XWA	D	3998	10:00	CR9	76	51%	39	6	33	1	C20	C
Arr-DL-3895	2	PAX	DL	LNK	D	3895	8:15	CR9	76	78%	59	16	43	1	B08	B	2:00	Dep-DL-3896	2	PAX	DL	LAN	D	3896	10:15	CR9	76	84%	64	24	40	1	B02	B
Arr-DL-3999	2	PAX	DL	FWA	D	3999	8:15	CR9	76	67%	51	18	33	1	B04	B	2:15	Dep-DL-4000	2	PAX	DL	CWA	D	4000	10:30	CR9	76	73%	56	3	52	1	A03	A
Arr-DL-3897	2	PAX	DL	RHI	D	3897	8:16	CR9	76	83%	63	9	54	1	A02	A	2:59	Dep-DL-3900	2	PAX	DL	BJI	D	3900	11:15	CR9	76	81%	62	5	57	1	A04	A
Arr-DL-3899	2	PAX	DL	MOT	D	3899	9:00	CR9	76	74%	56	11	45	1	A08	A	2:15	Dep-DL-3826	2	PAX	DL	OMA	D	3826	11:15	CR9	76	76%	58	15	43	1	A08	A
Arr-DL-3825	2	PAX	DL	MEM	D	3825	10:13	CR9	76	86%	65	24	41	1	A09	A	1:02	Dep-DL-3828	2	PAX	DL	SAT	D	3828	11:15	CR9	76	87%	66	41	26	1	A09	A
Arr-DL-3827	2	PAX	DL	LAN	D	3827	10:15	CR9	76	77%	59	24	35	1	A06	A	1:00	Dep-DL-4002	2	PAX	DL	BIS	D	4002	11:15	CR9	76	73%	56	17	38	1	A06	A
Arr-DL-4001	2	PAX	DL	PIA	D	4001	10:15	CR9	76	64%	49	13	36	1	B14	B	1:05	Dep-DL-3830	2	PAX	DL	YWG	D	3830	11:20	CR9	76	95%	72	3	69	1	B14	B
Arr-DL-3829	2	PAX	DL	TYS	D	3829	10:20	CR9	76	72%	54	22	32	1	A07	A	1:00	Dep-DL-3832	2	PAX	DL	YXE	I	3832	11:20	CR9	76	90%	68	7	61	1	A07	A
Arr-DL-3831	2	PAX	DL	BNA	D	3831	10:29	CR9	76	88%	67	33	34	1	B12	B	0:56	Dep-DL-3904	2	PAX	DL	ABR	D	3904	11:25	CR9	76	75%	57	3	54	1	B12	B
Arr-DL-3833	2	PAX	DL	YYZ	D	3833	10:32	CR9	76	96%	73	24	49	1	A02	A	0:58	Dep-DL-3834	2	PAX	DL	BIL	D	3834	11:30	CR9	76	74%	56	11	45	1	A02	A
Arr-DL-4015	2	PAX	DL	RAP	D	4015	10:41	CR9	76	89%	67	11	57	1	B02	B	1:29	Dep-DL-4016	2	PAX	DL	YEG	D	4016	12:10	CR9	76	77%	58	8	50	1	B02	B
Arr-DL-4017	2	PAX	DL	CID	D	4017	10:44	CR9	76	80%	61	7	53	1	B04	B	2:01	Dep-DL-4018	2	PAX	DL	BIS	D	4018	12:45	CR9	76	77%	59	17	42	1	B04	B
Arr-DL-4019	2	PAX	DL	MOT	D	4019	10:44	CR9	76	80%	61	13	48	1	B06	B	2:01	Dep-DL-4020	2	PAX	DL	DAY	D	4020	12:45	CR9	76	75%	57	22	34	1	B06	B
Arr-DL-3903	2	PAX	DL	SBN	D	3903	10:45	CR9	76	85%	65	26	39	1	B08	B	2:00	Dep-DL-4022	2	PAX	DL	FSD	D	4022	12:45	CR9	76	83%	63	16	47	1	B08	B
Arr-DL-4021	2	PAX	DL	MDW	D	4021	10:45	CR9	76	87%	66	39	27	1	B10	B	2:05	Dep-DL-4028	2	PAX	DL	DLH	D	4028	12:50	CR9	76	73%	55	10	46	1	B10	B
Arr-DL-3835	2	PAX	DL	DFW	D	3835	11:56	CR9	76	87%	66	40	26	1	A09	A	0:58	Dep-DL-3836	2	PAX	DL	ATW	D	3836	12:54	CR9	76	80%	61	8	53	1	A09	A
Arr-DL-3837	2	PAX	DL	IND	D	3837	12:00	CR9	76	96%	73	29	44	1	A08	A	0:56	Dep-DL-3838	2	PAX	DL	DFW	D	3838	12:56	CR9	76	95%	72	45	27	1	A08	A
Arr-DL-3905	2	PAX	DL	INL	D	3905	12:02	CR9	76	81%	62	16	46	1	A07	A	1:13	Dep-DL-3912	2	PAX	DL	SBN	D	3912	13:15	CR9	76	84%	63	26	37	1	A07	A
Arr-DL-3907	2	PAX	DL	IMT	D	3907	12:11	CR9	76	70%	53	13	40	1	A06	A	1:19	Dep-DL-4036	2	PAX	DL	XNA	D	4036	13:30	CR9	76	74%	56	30	26	1	A06	A
Arr-DL-4027	2	PAX	DL	GFK	D	4027	12:15	CR9	76	93%	71	12	58	1	A03	A	1:15	Dep-DL-3914	2	PAX	DL	TYS	D	3914	13:30	CR9	76	71%	54	25	28	1	A03	A
Arr-DL-3909	2	PAX	DL	LNK	D	3909	12:15	CR9	76	81%	62	17	45	1	A04	A	1:18	Dep-DL-3840	2	PAX	DL	DSM	D	3840	13:33	CR9	76	87%	66	7	59	1	A04	A
Arr-DL-3911	2	PAX	DL	RHI	D	3911	12:16	CR9	76	88%	67	9	57	1	A02	A	1:24	Dep-DL-4038	2	PAX	DL	RST	D	4038	13:40	CR9	76	74%	56	7	49	1	A02	A
Arr-DL-4035	2	PAX	DL	MOT	D	4035	12:34	CR9	76	72%	54	13	41	1	B02	B	1:34	Dep-DL-3842	2	PAX	DL	GRB	D	3842	14:08	CR9	76	77%	59	9	50	1	B02	B
Arr-DL-4037	2	PAX	DL	ATW	D	4037	12:44	CR9	76	76%	58	8	50	1	B12	B	1:37	Dep-DL-3916	2	PAX	DL	RHI	D	3916	14:21	CR9	76	83%	63	9	54	1	B12	B
Arr-DL-4041	2	PAX	DL	RST	D	4041	12:50	CR9	76	70%	53	6	47	1	B14	B	1:32	Dep-DL-3918	2	PAX	DL	LSE	D	3918	14:22	CR9	76	79%	60	1	59	1	B14	B
Arr-DL-3839	2	PAX	DL	GRB	D	3839	13:02	CR9	76	82%	62	9	54	1	B16	B	1:23	Dep-DL-3920	2	PAX	DL	BRD	D	3920	14:25	CR9	76	75%	57	2	54	1	B16	B
Arr-DL-3841	2	PAX	DL	GRR	D	3841	13:27	CR9	76	97%	74	14	60	1	A09	A	1:03	Dep-DL-4042	2	PAX	DL	CWA	D	4042	14:30	CR9	76	51%	39	2	37	1	A09	A
Arr-DL-3843	2	PAX	DL	OMA	D	3843	13:30	CR9	76	69%	52	15	37	1	A08	A	1:00	Dep-DL-3844	2	PAX	DL	BIL	D	3844	14:30	CR9	76	86%	65	10	55	1	A08	A
Arr-DL-3917	2	PAX	DL	BJI	D	3917	13:50	CR9	76	79%	60	5	55	1	A07	A	1:10	Dep-DL-3846	2	PAX	DL	YUL	D	3846	15:00	CR9	76	94%	71	26	46	1	A07	A
Arr-DL-3845	2	PAX	DL	ATW	D	3845	14:25	CR9	76	77%	59	7	52	1	A06	A	0:40	Dep-DL-4054	2	PAX	DL	ICT	D	4054	15:05	CR9	76	78%	59	20	39	1	A06	A
Arr-DL-3921	2	PAX	DL	TVC	D	3921	14:25	CR9	76	77%	58	16	43	1	A04	A	0:45	Dep-DL-3924	2	PAX	DL	IMT	D	3924	15:10	CR9	76	70%	53	12	42	1	A04	A
Arr-DL-4053	2	PAX	DL	GFK	D	4053	14:29	CR9	76	72%	55	15	39	1	A02	A	0:41	Dep-DL-3926	2	PAX	DL	MLI	D	3926	15:10	CR9	76	74%	56	15	42	1	A02	A
Arr-DL-3923	2	PAX	DL	ABR	D	3923	14:29	CR9	76	74%	56	3	53	1	A03	A	0:42	Dep-DL-4058	2	PAX	DL	TVC	D	4058	15:11	CR9	76	54%	41	9	33	1	A03	A
Arr-DL-3925	2	PAX	DL	TUL	D	3925	14:30	CR9	76	72%	54	18	36	1	B02	B	0:45	Dep-DL-3848	2	PAX	DL	HIB	D	3848	15:15	CR9	76	51%	39	8	31	1	B02	B
Arr-DL-4057	2	PAX	DL	BIS	D	4057	14:30	CR9	76	62%	47	12	35	1	B06	B	0:45	Dep-DL-3928	2	PAX	DL	LNK	D	3928	15:15	CR9	76	81%	62	18	43	1	B06	B
Arr-DL-4059	2	PAX	DL	CHS	D	4059	14:30	CR9	76	88%	67	33	34	1	B08	B	0:59	Dep-DL-4060	2	PAX	DL	GFK	D	4060	15:29	CR9	76	80%	61	17	44	1	B08	B
Arr-DL-4063	2	PAX	DL	MDW	D	4063	14:30	CR9	76	83%	63	42	20	1	B10	B	1:06	Dep-DL-3850	2	PAX	DL	GRB	D	3850	15:36	CR9	76	79%	60	8	52	1	B10	B
Arr-DL-3847	2	PAX	DL	BDL	D	3847	14:38	CR9	76	100%	76	22	54	1	B04	B	1:00	Dep-DL-3852	2	PAX	DL	ATW	D	3852	15:38	CR9	76	77%	59	7	52	1	B04	B
Arr-DL-3849	2	PAX	DL	YYZ	D	3849	14:45	CR9	76	85%	65	27	38	1	B12	B	1:02	Dep-DL-3930	2	PAX	DL	INL	D	3930	15:47	CR9	76	70%	53	11	43	1	B12	B
Arr-DL-3851	2	PAX	DL	YWG	D	3851	14:56	CR9	76	100%	76	0	76	1	A09	A	0:53	Dep-DL-3854	2	PAX	DL	DSM	D	3854	15:49	CR9	76	85%	64	6	58	1	A09	A
Arr-DL-3853	2	PAX	DL	ATW	D	3853	15:05	CR9	76	70%	53	8	45	1	A08	A	0:53	Dep-DL-4064	2	PAX	DL	CID	D	4064	15:58	CR9	76	70%	53	8	46	1	A08	A
Arr-DL-3855	2	PAX	DL	YXE	I	3855	16:35	CR9	76	84%	64	7	57	1	G11	G	0:55	Dep-DL-3856	2	PAX	DL	DSM	D	3856	17:30	CR9	76	83%	63	6	57	1	G11	G
Arr-DL-3857	2	PAX	DL	BIL	D	3857	16:41	CR9	76	88%	67	12	55	1	A09	A	0:49	Dep-DL-3932	2	PAX	DL	LSE	D	3932	17:30	CR9	76	74%	56	1	55	1	A09	A
Arr-DL-3859	2	PAX	DL	DSM	D	3859	16:43	CR9	76	92%	70	7	63	1	A08	A	0:52	Dep-DL-4078	2	PAX	DL	BIS	D	4078	17:35	CR9	76	72%	54	15	40	1	A08	A
Arr-DL-4077	2	PAX	DL	GFK	D	4077	16:44	CR9	76	81%	62	12	49	1	A07	A	1:02	Dep-DL-3858	2	PAX	DL	MEM	D	3858	17:46	CR9	76	85%	65	26	39	1	A07	A
Arr-DL-3931	2	PAX	DL	LSE	D	3931	16:49	CR9	76	85%	65	2	63	1	A06	A	1:06	Dep-DL-4086	2	PAX	DL	CHS	D	4086	17:55	CR9	76	89%	67	34	34	1	A06	A
Arr-DL-3933	2	PAX	DL	BRD	D	3933	16:55	CR9	76	82%	63	2	61	1	A04	A	1:00	Dep-DL-4088	2	PAX	DL	RAP	D	4088	17:55	CR9	76	68%	52	13	39	1	A04	A
Arr-DL-3935	2	PAX	DL	SBN	D	3935	16:58	CR9	76	86%	66	28	38	1	A03	A	1:02	Dep-DL-3860	2	PAX	DL	IND	D	3860	18:00	CR9	76	81%	62	25	36	1	A03	A
Arr-DL-4085	2	PAX	DL	AZO	D	4085	17:00	CR9	76	80%	61	22	39	1	B04	B	1:00	Dep-DL-3934	2	PAX	DL	GRR	D	3934	18:00	CR9	76	78%	59	11	47	1	B04	B
Arr-DL-4087	2	PAX	DL	CWA	D	4087	17:00	CR9	76	61%	46	5	42	1	B06	B	1:00	Dep-DL-3862	2	PAX	DL	BNA	D	3862	18:00	CR9	76	92%	70	36	34	1	B06	B
Arr-DL-3861	2	PAX	DL	GRB	D	3861	17:00	CR9	76	92%	70	9	60	1	A02	A	1:00	Dep-DL-3864	2	PAX	DL	YUL	D	3864	18:00	CR9	76	93%	71	25	46	1	A02	A
Arr-DL-3863	2	PAX	DL	IAH	D	3863	17:00	CR9	76	100%	76	41	35	1	B02	B	1:00	Dep-DL-4090	2	PAX	DL	DLH	D	4090	18:00	CR9	76	66%	50	8	42	1	B02	B
Arr-DL-4089	2	PAX	DL	DAY	D	4089	17:00	CR9	76	82%	62	22	40	1	B12	B	2:30	Dep-DL-4096	2	PAX	DL	SBN	D	4096	19:30	CR9	76	86%	65	25	41	1	B12	B
Arr-DL-4095	2	PAX	DL	YEG	D	4095	18:27	CR9	76	83%	63	8	55	1	C05	C	1:08	Dep-DL-4098	2	PAX	DL	FSD	D	4098	19:35	CR9	76	95%	72	6	66	1	C05	C
Arr-DL-4097	2	PAX	DL	DAY	D	4097	18:29	CR9	76	79%	60	22	38	1	A03	A	1:06	Dep-DL-4100	2	PAX	DL	ICT	D	4100	19:35	CR9	76	81%	62	19	43	1	A03	A
Arr-DL-4099	2	PAX	DL	BIS	D	4099	18:32	CR9	76	72%	55	13	42	1	F10	F	1:03	Dep-DL-3938	2	PAX	DL	LNK	D	3938	19:35	CR9	76	87%	66	17	49	1	F10	F
Arr-DL-3939	2	PAX	DL	MLI	D	3939	18:37	CR9	76	80%	61	18	43	1	C13	C	1:03	Dep-DL-3940	2	PAX	DL	XNA	D	3940	19:40	CR9	76	76%	57	28	30	1	C13	C
Arr-DL-3941	2	PAX	DL	RHI	D	3941	18:40	CR9	76	88%	67	10	57	1	F08	F	1:15	Dep-DL-4102	2	PAX	DL	TUL	D	4102	19:55	CR9	76	74%	57	20	37	1	F08	F
Arr-DL-3943	2	PAX	DL	LNK	D	3943	18:42	CR9	76	79%	60	19	42	1	A04	A	1:18	Dep-DL-3944	2	PAX	DL	MOT	D	3944	20:00	CR9	76	81%	62	13	49	1	A04	A
Arr-DL-4101	2	PAX	DL	DLH	D	4101	18:44	CR9	76	77%	58	13	46	1	C21A	C	1:31	Dep-DL-4106	2	PAX	DL	FWA	D	4106	20:15	CR9	76	72%	55	21	34	1	C21A	C
Arr-DL-3865	2	PAX	DL	ATW	D	3865	18:49	CR9	76	80%	61	9	52	1	F02	F	1:34	Dep-DL-3866	2	PAX	DL	TYS	D	3866	20:23	CR9	76	70%	54	25	29	1	F02	F
Arr-DL-3867	2	PAX	DL	DSM	D	3867	18:49	CR9	76	97%	74	7	66	1	D06	D	1:36	Dep-DL-4108	2	PAX	DL	TVC	D	4108	20:25	CR9	76	81%	61	12	49	1	D06	D
Arr-DL-3869	2	PAX	DL	OMA	D	3869	18:49	CR9	76	92%	70	17	53	1	B14	B	1:37	Dep-DL-3946	2	PAX	DL	LSE	D	3946	20:26	CR9	76	82%	62	1	61	1	B14	B
Arr-DL-4105	2	PAX	DL	MDW	D	4105	19:10	CR9	76	94%	71	47	25	1	B16	B	1:20	Dep-DL-3948	2	PAX	DL	HIB	D	3948	20:30	CR9	76	53%	40	8	32	1	B16	B
Arr-DL-4107	2	PAX	DL	TVC	D	4107	19:15	CR9	76	63%	48	11	36	1	F01	F	1:15	Dep-DL-3950	2	PAX	DL	MBS	D	3950	20:30	CR9	76	69%	53	13	39	1	F01	F
Arr-DL-4109	2	PAX	DL	XNA	D	4109	19:15	CR9	76	77%	59	30	29	1	E14	E	1:15	Dep-DL-3952	2	PAX	DL	MQT	D	3952	20:30	CR9	76	81%	62	15	47	1	E14	E
Arr-DL-4111	2	PAX	DL	ICT	D	4111	19:17	CR9	76	78%	60	22	37	1	G25	G	1:14	Dep-DL-3868	2	PAX	DL	IND	D	3868	20:31	CR9	76	91%	69	23	46	1	G25	G
Arr-DL-3871	2	PAX	DL	BIL	D	3871	19:18	CR9	76	90%	68	13	55	1	A06	A	1:17	Dep-DL-4110	2	PAX	DL	PIA	D	4110	20:35	CR9	76	66%	51	15	36	1	A06	A
Arr-DL-3873	2	PAX	DL	SAT	D	3873	19:23	CR9	76	80%	61	36	24	1	C20A	C	1:17	Dep-DL-3870	2	PAX	DL	LAN	D	3870	20:40	CR9	76	84%	64	22	42	1	C20A	C
Arr-DL-3945	2	PAX	DL	INL	D	3945	19:26	CR9	76	82%	62	17	45	1	A08	A	1:19	Dep-DL-4112	2	PAX	DL	XWA	D	4112	20:45	CR9	76	65%	50	6	44	1	A08	A
Arr-DL-3947	2	PAX	DL	LAN	D	3947	19:30	CR9	76	84%	64	25	39	1	A07	A	1:16	Dep-DL-3872	2	PAX	DL	CIU	D	3872	20:46	CR9	76	72%	55	10	45	1	A07	A
Arr-DL-3949	2	PAX	DL	LSE	D	3949	19:30	CR9	76	66%	50	2	48	1	A09	A	1:30	Dep-DL-3874	2	PAX	DL	MLI	D	3874	21:00	CR9	76	73%	55	14	41	1	A09	A
Arr-DL-3951	2	PAX	DL	TYS	D	3951	19:30	CR9	76	80%	61	23	38	1	B10	B	2:25	Dep-DL-3876	2	PAX	DL	MOT	D	3876	21:55	CR9	76	70%	53	13	40	1	B10	B
Arr-DL-3875	2	PAX	DL	HIB	D	3875	19:31	CR9	76	57%	43	11	33	1	B08	B	2:24	Dep-DL-3954	2	PAX	DL	RHI	D	3954	21:55	CR9	76	79%	60	8	52	1	B08	B
Arr-DL-4117	2	PAX	DL	RIC	D	4117	19:35	CR9	76	81%	62	31	31	1	B06	B	2:24	Dep-DL-3878	2	PAX	DL	ABR	D	3878	21:59	CR9	76	75%	57	3	54	1	B06	B
Arr-DL-3877	2	PAX	DL	GRB	D	3877	19:40	CR9	76	86%	66	10	56	1	B04	B	2:20	Dep-DL-4118	2	PAX	DL	RST	D	4118	22:00	CR9	76	73%	55	6	50	1	B04	B
Arr-DL-4119	2	PAX	DL	TUL	D	4119	19:42	CR9	76	69%	53	19	33	1	B02	B	2:18	Dep-DL-3880	2	PAX	DL	BRD	D	3880	22:00	CR9	76	71%	54	2	52	1	B02	B
Arr-DL-3879	2	PAX	DL	DFW	D	3879	19:46	CR9	76	100%	76	48	28	1	A02	A	2:17	Dep-DL-3882	2	PAX	DL	BJI	D	3882	22:03	CR9	76	82%	62	5	57	1	A02	A
Arr-DL-3959	2	PAX	DL	CID	D	3959	19:47	CR9	76	77%	58	8	50	1	C16	C	2:23	Dep-DL-4120	2	PAX	DL	YXE	I	4120	22:10	CR9	76	89%	68	6	61	1	C16	C
Arr-EI-1121	2	PAX	EI	DUB	D	1121	16:55	32Q	184	94%	174	156	17	2	H06	H	1:50	Dep-EI-1122	2	PAX	EI	DUB	D	1122	18:45	32Q	184	95%	175	157	17	2	H06	H
Arr-F9-2011	1	PAX	F9	TTN	D	2011	7:53	321	230	98%	225	222	3	1	E09	E	0:50	Dep-F9-2012	1	PAX	F9	DEN	D	2012	8:43	321	230	88%	203	202	1	1	E09	E
Arr-F9-2013	1	PAX	F9	DEN	D	2013	9:12	321	230	85%	196	195	1	1	E10	E	0:40	Dep-F9-2014	1	PAX	F9	CLE	D	2014	9:52	321	230	99%	229	229	0	1	E10	E
Arr-F9-2015	1	PAX	F9	AUS	D	2015	10:11	321	230	99%	227	225	2	1	E09	E	0:50	Dep-F9-2016	1	PAX	F9	AUS	D	2016	11:01	321	230	100%	229	229	0	1	E09	E
Arr-F9-2021	1	PAX	F9	MCO	D	2021	11:54	32N	180	91%	164	164	0	1	E09	E	1:51	Dep-F9-2022	1	PAX	F9	DEN	D	2022	13:45	32N	180	88%	159	158	1	1	E09	E
Arr-F9-2023	1	PAX	F9	DEN	D	2023	13:00	32N	180	85%	153	153	1	1	E10	E	1:30	Dep-F9-2024	1	PAX	F9	MCO	D	2024	14:30	32N	180	92%	165	165	0	1	E10	E
Arr-F9-2017	1	PAX	F9	COS	D	2017	15:23	321	230	99%	228	228	0	1	E10	E	0:50	Dep-F9-2018	1	PAX	F9	COS	D	2018	16:13	321	230	100%	229	229	0	1	E10	E
Arr-F9-2025	1	PAX	F9	DEN	D	2025	17:59	32N	180	85%	153	153	1	1	E10	E	0:51	Dep-F9-2026	1	PAX	F9	TTN	D	2026	18:50	32N	180	90%	162	162	0	1	E10	E
Arr-F9-2027	1	PAX	F9	MCO	D	2027	18:54	32N	180	91%	164	164	0	1	E15A	E	0:59	Dep-F9-2028	1	PAX	F9	DEN	D	2028	19:53	32N	180	88%	159	158	1	1	E15A	E
Arr-F9-2019	1	PAX	F9	CLE	D	2019	21:30	32N	180	91%	163	163	0	1	E03	E	TOW/RON	Dep-F9-2020	1	PAX	F9	MCO	D	2020	8:00	32N	180	92%	165	165	0	1	E10	E
Arr-FI-2029	2	PAX	FI	KEF	I	2029	18:05	7M9	220	82%	181	180	1	2	H03	H	1:15	Dep-FI-2030	2	PAX	FI	KEF	I	2030	19:20	7M9	220	83%	182	181	1	2	H03	H
Arr-KL-1123	2	PAX	KL	AMS	I	1123	11:20	781	344	99%	340	102	238	1	G13B	G	3:40	Dep-KL-1124	2	PAX	KL	AMS	I	1124	15:00	781	344	100%	342	122	220	1	G04B	G
Arr-NK-1127	2	PAX	NK	LAX	D	1127	6:00	319	150	96%	143	143	0	2	H24	H	1:00	Dep-NK-1128	2	PAX	NK	ATL	D	1128	7:00	319	150	93%	139	136	3	2	H24	H
Arr-NK-1137	2	PAX	NK	LAS	D	1137	6:15	32N	182	99%	180	180	0	2	H21	H	1:15	Dep-NK-1138	2	PAX	NK	MYR	D	1138	7:30	32N	182	100%	181	181	0	2	H21	H
Arr-NK-1141	2	PAX	NK	IAH	D	1141	11:15	3N1	228	99%	226	210	16	2	H21	H	1:00	Dep-NK-1142	2	PAX	NK	DTW	D	1142	12:15	3N1	228	79%	181	168	13	2	H21	H
Arr-NK-1129	2	PAX	NK	ATL	D	1129	11:41	319	150	97%	146	143	2	2	H22	H	0:49	Dep-NK-1130	2	PAX	NK	DFW	D	1130	12:30	319	150	92%	138	131	8	2	H22	H
Arr-NK-1143	2	PAX	NK	BWI	D	1143	13:39	3N1	228	99%	226	225	0	2	H22	H	0:51	Dep-NK-1144	2	PAX	NK	DEN	D	1144	14:30	3N1	228	100%	227	220	7	2	H22	H
Arr-NK-1145	2	PAX	NK	MCO	D	1145	13:51	3N1	228	99%	226	222	4	2	H21	H	1:09	Dep-NK-1146	2	PAX	NK	MCO	D	1146	15:00	3N1	228	100%	227	225	2	2	H21	H
Arr-NK-1131	2	PAX	NK	DFW	D	1131	15:00	319	150	96%	143	143	0	2	H22	H	2:00	Dep-NK-1132	2	PAX	NK	ATL	D	1132	17:00	319	150	93%	139	136	3	2	H22	H
Arr-NK-1147	2	PAX	NK	DTW	D	1147	16:57	3N1	228	79%	180	170	10	2	H23	H	0:50	Dep-NK-1148	2	PAX	NK	BWI	D	1148	17:47	3N1	228	100%	227	226	1	2	H23	H
Arr-NK-1139	2	PAX	NK	MYR	D	1139	19:10	32N	182	99%	180	176	4	2	H23	H	1:00	Dep-NK-1140	2	PAX	NK	LAS	D	1140	20:10	32N	182	100%	181	174	7	2	H23	H
Arr-NK-1149	2	PAX	NK	DEN	D	1149	19:23	3N1	228	99%	226	221	5	2	H24	H	0:50	Dep-NK-1150	2	PAX	NK	IAH	D	1150	20:13	3N1	228	100%	227	211	16	2	H24	H
Arr-NK-1133	2	PAX	NK	ATL	D	1133	20:20	319	150	97%	146	143	2	2	H22	H	1:15	Dep-NK-1134	2	PAX	NK	DFW	D	1134	21:35	319	150	92%	138	131	8	2	H22	H
Arr-NK-1135	2	PAX	NK	DFW	D	1135	20:50	319	150	96%	143	143	0	2	H23	H	1:00	Dep-NK-1136	2	PAX	NK	LAX	D	1136	21:50	319	150	96%	144	144	0	2	H23	H
Arr-NK-1125	2	PAX	NK	LAX	D	1125	23:59	319	150	96%	143	143	0	2	H22	H	TOW/RON	Dep-NK-1126	2	PAX	NK	LAX	D	1126	6:32	319	150	96%	144	144	0	2	H22	H
Arr-SY-2113	2	PAX	SY	[illegible]	D	2113	[illegible]	[illegible]	186	[illegible]	162	162	0	2	H12	H	[illegible]	Dep-SY-2114	2	PAX	SY	EWR	D	2114	7:00	738	186	92%	171	115	56	2	H12	H

Arr-SY-2115	2	PAX	SY	PHX	D	2115	4:30	738	186	89%	165	129	37	2	H11	H	2:35	Dep-SY-2116	2	PAX	SY	BNA	D	2116	7:05	738	186	88%	163	135	28	2	H11	H
Arr-SY-2117	2	PAX	SY	PDX	D	2117	5:00	738	186	89%	165	112	53	2	H10	H	2:05	Dep-SY-2118	2	PAX	SY	ORD	D	2118	7:05	738	186	88%	164	125	39	2	H10	H
Arr-SY-2119	2	PAX	SY	ANC	D	2119	5:04	738	186	91%	170	114	56	2	H09	H	2:06	Dep-SY-2120	2	PAX	SY	DCA	D	2120	7:10	738	186	92%	171	116	55	2	H09	H
Arr-SY-2121	2	PAX	SY	SEA	D	2121	5:06	738	186	92%	172	90	82	2	H08	H	2:19	Dep-SY-2122	2	PAX	SY	PHL	D	2122	7:25	738	186	91%	169	157	11	2	H08	H
Arr-SY-2123	2	PAX	SY	LAX	D	2123	5:10	738	186	90%	168	124	43	2	H03	H	2:20	Dep-SY-2124	2	PAX	SY	DEN	D	2124	7:30	738	186	92%	172	158	13	2	H02	H
Arr-SY-2125	2	PAX	SY	SAN	D	2125	5:15	738	186	92%	171	122	49	2	H01	H	2:50	Dep-SY-2126	2	PAX	SY	LAS	D	2126	8:05	738	186	91%	170	147	23	2	H01	H
Arr-SY-2127	2	PAX	SY	DCA	D	2127	7:15	738	186	92%	172	116	56	2	H03	H	1:15	Dep-SY-2128	2	PAX	SY	BNA	D	2128	8:30	738	186	88%	163	135	28	2	H03	H
Arr-SY-2129	2	PAX	SY	ORD	D	2129	7:15	738	186	90%	168	126	42	2	H07	H	1:15	Dep-SY-2130	2	PAX	SY	LAX	D	2130	8:30	738	186	92%	172	149	23	2	H07	H
Arr-SY-2131	2	PAX	SY	PHL	D	2131	7:15	738	186	91%	169	116	53	2	H06	H	1:15	Dep-SY-2132	2	PAX	SY	PHX	D	2132	8:30	738	186	89%	166	147	18	2	H06	H
Arr-SY-2133	2	PAX	SY	BOS	D	2133	7:45	738	186	90%	167	109	59	2	H04	H	0:45	Dep-SY-2134	2	PAX	SY	SAN	D	2134	8:30	738	186	92%	172	155	17	2	H04	H
Arr-SY-2135	2	PAX	SY	ATL	D	2135	7:55	738	186	91%	170	146	24	2	H05	H	0:55	Dep-SY-2136	2	PAX	SY	AUS	D	2136	8:50	738	186	92%	172	157	14	2	H05	H
Arr-SY-2137	2	PAX	SY	MCO	D	2137	8:00	738	186	90%	167	137	31	2	H08	H	0:50	Dep-SY-2138	2	PAX	SY	SAT	D	2138	8:50	738	186	91%	169	155	14	2	H08	H
Arr-SY-2139	2	PAX	SY	RSW	D	2139	8:00	738	186	90%	168	139	29	2	H02	H	1:15	Dep-SY-2140	2	PAX	SY	PDX	D	2140	9:15	738	186	91%	168	114	55	2	H02	H
Arr-SY-2141	2	PAX	SY	DEN	D	2141	9:50	738	186	90%	167	143	24	2	H06	H	3:40	Dep-SY-2142	2	PAX	SY	BOS	D	2142	13:30	738	186	90%	167	109	58	2	H06	H
Arr-SY-2143	2	PAX	SY	LAS	D	2143	12:00	738	186	91%	170	104	65	2	H02	H	1:30	Dep-SY-2144	2	PAX	SY	MCO	D	2144	13:30	738	186	89%	166	146	20	2	H02	H
Arr-SY-2145	2	PAX	SY	SAT	D	2145	12:05	738	186	90%	168	147	20	2	H11	H	1:25	Dep-SY-2146	2	PAX	SY	PHL	D	2146	13:30	738	186	91%	169	96	73	2	H11	H
Arr-SY-2147	2	PAX	SY	DEN	D	2147	12:20	738	186	90%	167	143	24	2	H10	H	1:10	Dep-SY-2148	2	PAX	SY	RSW	D	2148	13:30	738	186	90%	168	148	20	2	H10	H
Arr-SY-2149	2	PAX	SY	PHX	D	2149	12:30	738	186	89%	165	129	37	2	H09	H	1:05	Dep-SY-2150	2	PAX	SY	ATL	D	2150	13:35	738	186	90%	167	146	21	2	H09	H
Arr-SY-2151	2	PAX	SY	LAX	D	2151	12:30	738	186	90%	168	124	43	2	H08	H	1:05	Dep-SY-2152	2	PAX	SY	DCA	D	2152	13:35	738	186	92%	171	116	55	2	H08	H
Arr-SY-2153	2	PAX	SY	PDX	D	2153	12:35	738	186	89%	165	112	53	2	H07	H	1:10	Dep-SY-2154	2	PAX	SY	BNA	D	2154	13:45	738	186	88%	163	135	28	2	H07	H
Arr-SY-2155	2	PAX	SY	SFO	D	2155	12:35	738	186	93%	174	92	82	2	H01	H	2:20	Dep-SY-2156	2	PAX	SY	ORD	D	2156	14:55	738	186	88%	164	125	39	2	H01	H
Arr-SY-2157	2	PAX	SY	AUS	D	2157	12:39	738	186	91%	170	150	20	2	H12	H	2:21	Dep-SY-2158	2	PAX	SY	SEA	D	2158	15:00	738	186	92%	171	86	85	2	H12	H
Arr-SY-2159	2	PAX	SY	BOS	D	2159	13:45	738	186	90%	167	109	59	2	H05	H	1:25	Dep-SY-2160	2	PAX	SY	SAN	D	2160	15:10	738	186	92%	172	129	42	2	H05	H
Arr-SY-2161	2	PAX	SY	PHL	D	2161	13:55	738	186	91%	169	116	53	2	H03	H	1:20	Dep-SY-2162	2	PAX	SY	SAT	D	2162	15:15	738	186	91%	169	155	14	2	H03	H
Arr-SY-2163	2	PAX	SY	DCA	D	2163	14:00	738	186	92%	172	116	56	2	H06	H	1:15	Dep-SY-2164	2	PAX	SY	SFO	D	2164	15:15	738	186	93%	174	89	85	2	H06	H
Arr-SY-2165	2	PAX	SY	EWR	D	2165	14:00	738	186	96%	178	66	112	2	H02	H	1:20	Dep-SY-2166	2	PAX	SY	AUS	D	2166	15:20	738	186	92%	172	157	14	2	H02	H
Arr-SY-2167	2	PAX	SY	SEA	D	2167	14:00	738	186	92%	172	90	82	2	H11	H	1:25	Dep-SY-2168	2	PAX	SY	LAX	D	2168	15:25	738	186	92%	172	115	57	2	H11	H
Arr-SY-2169	2	PAX	SY	RSW	D	2169	14:03	738	186	90%	168	139	29	2	H10	H	1:27	Dep-SY-2170	2	PAX	SY	BOS	D	2170	15:30	738	186	90%	167	109	58	2	H10	H
Arr-SY-2171	2	PAX	SY	BNA	D	2171	14:10	738	186	89%	166	135	31	2	H09	H	1:20	Dep-SY-2172	2	PAX	SY	EWR	D	2172	15:30	738	186	92%	171	115	56	2	H09	H
Arr-SY-2173	2	PAX	SY	MCO	D	2173	14:10	738	186	90%	167	137	31	2	H08	H	1:20	Dep-SY-2174	2	PAX	SY	LAS	D	2174	15:30	738	186	91%	170	113	57	2	H08	H
Arr-SY-2175	2	PAX	SY	SFO	D	2175	14:30	738	186	93%	174	92	82	2	H07	H	2:00	Dep-SY-2176	2	PAX	SY	ANC	D	2176	16:30	738	186	92%	171	115	56	2	H07	H
Arr-SY-2177	2	PAX	SY	LAS	D	2177	15:25	738	186	91%	170	104	65	2	H01	H	2:00	Dep-SY-2178	2	PAX	SY	PDX	D	2178	17:25	738	186	91%	168	114	55	2	H01	H
Arr-SY-2179	2	PAX	SY	ORD	D	2179	16:00	738	186	90%	168	126	42	2	H12	H	3:00	Dep-SY-2180	2	PAX	SY	ATL	D	2180	19:00	738	186	90%	167	146	21	2	H12	H
Arr-SY-2181	2	PAX	SY	ATL	D	2181	16:25	738	186	91%	170	146	24	2	H10	H	2:35	Dep-SY-2182	2	PAX	SY	PHL	D	2182	19:00	738	186	91%	169	96	73	2	H10	H
Arr-SY-2183	2	PAX	SY	BNA	D	2183	16:30	738	186	89%	166	135	31	2	H08	H	2:30	Dep-SY-2184	2	PAX	SY	RSW	D	2184	19:00	738	186	90%	168	148	20	2	H08	H
Arr-SY-2185	2	PAX	SY	SAN	D	2185	16:45	738	186	92%	171	122	49	2	H11	H	2:20	Dep-SY-2186	2	PAX	SY	DCA	D	2186	19:05	738	186	92%	171	116	55	2	H11	H
Arr-SY-2187	2	PAX	SY	SAT	D	2187	18:00	738	186	90%	168	147	20	2	H14	H	1:15	Dep-SY-2188	2	PAX	SY	MCO	D	2188	19:15	738	186	89%	166	146	20	2	H14	H
Arr-SY-2189	2	PAX	SY	PDX	D	2189	18:05	738	186	89%	165	112	53	2	H09	H	1:10	Dep-SY-2190	2	PAX	SY	ORD	D	2190	19:15	738	186	88%	164	125	39	2	H09	H
Arr-SY-2191	2	PAX	SY	LAX	D	2191	18:15	738	186	90%	168	124	43	2	H02	H	2:20	Dep-SY-2192	2	PAX	SY	LAS	D	2192	20:35	738	186	91%	170	113	57	2	H02	H
Arr-SY-2193	2	PAX	SY	AUS	D	2193	18:30	738	186	91%	170	150	20	2	H13	H	2:05	Dep-SY-2194	2	PAX	SY	PHX	D	2194	20:35	738	186	89%	166	120	46	2	H13	H
Arr-SY-2195	2	PAX	SY	PHX	D	2195	18:30	738	186	89%	165	129	37	2	H01	H	2:15	Dep-SY-2196	2	PAX	SY	SAN	D	2196	20:45	738	186	92%	172	129	42	2	H01	H
Arr-SY-2197	2	PAX	SY	BNA	D	2197	18:50	738	186	89%	166	135	31	2	H15	H	2:00	Dep-SY-2198	2	PAX	SY	LAX	D	2198	20:50	738	186	92%	172	115	57	2	H15	H
Arr-SY-2199	2	PAX	SY	ORD	D	2199	18:55	738	186	90%	168	126	42	2	H07	H	2:00	Dep-SY-2200	2	PAX	SY	SFO	D	2200	20:55	738	186	93%	174	89	85	2	H07	H
Arr-SY-2201	2	PAX	SY	DCA	D	2201	19:45	738	186	92%	172	116	56	2	H12	H	1:15	Dep-SY-2202	2	PAX	SY	DEN	D	2202	21:00	738	186	92%	172	132	40	2	H12	H
Arr-SY-2203	2	PAX	SY	ATL	D	2203	19:50	738	186	91%	170	146	24	2	H11	H	1:15	Dep-SY-2204	2	PAX	SY	SEA	D	2204	21:05	738	186	92%	171	86	85	2	H11	H
Arr-SY-2205	2	PAX	SY	PHL	D	2205	20:00	738	186	91%	169	116	53	2	H10	H	1:10	Dep-SY-2206	2	PAX	SY	PDX	D	2206	21:10	738	186	91%	168	114	55	2	H10	H
Arr-SY-2207	2	PAX	SY	BOS	D	2207	20:05	738	186	90%	167	109	59	2	H09	H	1:40	Dep-SY-2208	2	PAX	SY	AUS	D	2208	21:45	738	186	92%	172	157	14	2	H09	H
Arr-SY-2209	2	PAX	SY	MCO	D	2209	21:00	738	186	88%	163	163	0	2	H03	H	1:00	Dep-SY-2210	2	PAX	SY	PHX	D	2210	22:00	738	186	89%	166	120	46	2	H03	H
Arr-SY-2211	2	PAX	SY	RSW	D	2211	21:15	738	186	88%	164	164	0	2	H01	H	0:45	Dep-SY-2212	2	PAX	SY	SAT	D	2212	22:00	738	186	91%	169	155	14	2	H01	H
Arr-SY-2101	2	PAX	SY	SEA	D	2101	22:51	738	186	85%	159	159	0	2	H02	H	TOW/RON	Dep-SY-2102	2	PAX	SY	SFO	D	2102	6:00	738	186	93%	174	174	0	2	H02	H
Arr-SY-2103	2	PAX	SY	EWR	D	2103	23:00	738	186	87%	162	162	0	2	H03	H	TOW/RON	Dep-SY-2104	2	PAX	SY	SEA	D	2104	6:10	738	186	92%	171	171	0	2	H03	H
Arr-SY-2105	2	PAX	SY	LAS	D	2105	23:00	738	186	86%	159	159	0	2	H01	H	TOW/RON	Dep-SY-2106	2	PAX	SY	RSW	D	2106	6:25	738	186	90%	168	148	20	2	H01	H
Arr-SY-2107	2	PAX	SY	SAT	D	2107	23:10	738	186	89%	165	165	0	2	H06	H	TOW/RON	Dep-SY-2108	2	PAX	SY	MCO	D	2108	6:40	738	186	89%	166	146	20	2	H06	H
Arr-SY-2109	2	PAX	SY	AUS	D	2109	23:11	738	186	90%	168	168	0	2	H05	H	TOW/RON	Dep-SY-2110	2	PAX	SY	BOS	D	2110	6:50	738	186	90%	167	109	58	2	H05	H
Arr-SY-2111	2	PAX	SY	SAN	D	2111	23:30	738	186	89%	165	165	0	2	H04	H	TOW/RON	Dep-SY-2112	2	PAX	SY	ATL	D	2112	7:00	738	186	90%	167	146	21	2	H04	H
Arr-UA-1185	2	PAX	UA	ORD	D	1185	0:22	7M8	166	91%	150	144	6	1	E02	E	4:38	Dep-UA-1186	2	PAX	UA	ORD	D	1186	5:00	7M8	166	91%	151	145	6	1	E02	E
Arr-UA-1187	2	PAX	UA	SFO	D	1187	5:23	7M8	166	75%	124	114	10	1	E01	E	1:02	Dep-UA-1188	2	PAX	UA	SFO	D	1188	6:25	7M8	166	75%	125	115	10	1	E01	E
Arr-UA-1167	2	PAX	UA	ORD	D	1167	7:31	223	130	91%	118	113	5	1	E05	E	1:04	Dep-UA-1168	2	PAX	UA	ORD	D	1168	8:35	223	130	91%	118	113	5	1	E05	E
Arr-UA-1155	2	PAX	UA	EWR	D	1155	8:08	221	109	92%	100	98	2	1	E03	E	0:37	Dep-UA-1156	2	PAX	UA	EWR	D	1156	8:45	221	109	88%	96	94	2	1	E03	E
Arr-UA-1189	2	PAX	UA	DEN	D	1189	8:35	7M8	166	94%	156	153	3	1	E04	E	0:52	Dep-UA-1190	2	PAX	UA	DEN	D	1190	9:27	7M8	166	92%	153	149	3	1	E04	E
Arr-UA-1169	2	PAX	UA	ORD	D	1169	9:31	223	130	91%	118	113	5	1	E03	E	0:49	Dep-UA-1170	2	PAX	UA	ORD	D	1170	10:20	223	130	91%	118	113	5	1	E03	E
Arr-UA-1203	2	PAX	UA	IAD	D	1203	9:59	E7W	76	99%	75	74	1	1	E02	E	1:11	Dep-UA-1204	2	PAX	UA	EWR	D	1204	11:10	E7W	76	88%	67	65	1	1	E02	E
Arr-UA-1191	2	PAX	UA	DEN	D	1191	10:41	7M8	166	94%	156	153	3	1	E06	E	0:44	Dep-UA-1192	2	PAX	UA	DEN	D	1192	11:25	7M8	166	92%	153	149	3	1	E06	E
Arr-UA-1205	2	PAX	UA	IAH	D	1205	10:46	E7W	76	86%	65	64	1	1	E04	E	1:29	Dep-UA-1206	2	PAX	UA	IAD	D	1206	12:15	E7W	76	100%	76	74	1	1	E04	E
Arr-UA-1207	2	PAX	UA	EWR	D	1207	11:02	E7W	76	92%	70	68	1	1	E03	E	1:08	Dep-UA-1208	2	PAX	UA	EWR	D	1208	12:10	E7W	76	88%	67	65	1	1	E03	E
Arr-UA-1171	2	PAX	UA	ORD	D	1171	12:23	223	130	91%	118	113	5	1	E05	E	1:00	Dep-UA-1172	2	PAX	UA	ORD	D	1172	13:23	223	130	91%	118	113	5	1	E05	E
Arr-UA-1193	2	PAX	UA	DEN	D	1193	12:38	7M8	166	94%	156	153	3	1	E01	E	0:37	Dep-UA-1194	2	PAX	UA	DEN	D	1194	13:15	7M8	166	92%	153	149	3	1	E01	E
Arr-UA-1209	2	PAX	UA	EWR	D	1209	12:49	E7W	76	92%	70	68	1	1	E03	E	1:21	Dep-UA-1210	2	PAX	UA	IAH	D	1210	14:10	E7W	76	93%	71	70	1	1	E03	E
Arr-UA-1211	2	PAX	UA	IAH	D	1211	12:56	E7W	76	86%	65	64	1	1	E02	E	5:03	Dep-UA-1212	2	PAX	UA	IAH	D	1212	17:59	E7W	76	93%	71	70	1	1	E02	E
Arr-UA-1173	2	PAX	UA	ORD	D	1173	14:25	223	130	91%	118	113	5	1	E05	E	0:52	Dep-UA-1174	2	PAX	UA	ORD	D	1174	15:17	223	130	91%	118	113	5	1	E05	E
Arr-UA-1157	2	PAX	UA	EWR	D	1157	14:40	221	109	92%	100	98	2	1	E04	E	0:55	Dep-UA-1158	2	PAX	UA	EWR	D	1158	15:35	221	109	88%	96	94	2	1	E04	E
Arr-UA-1195	2	PAX	UA	IAH	D	1195	14:44	7M8	166	86%	143	141	2	1	E03	E	1:16	Dep-UA-1196	2	PAX	UA	IAH	D	1196	16:00	7M8	166	93%	155	152	2	1	E03	E
Arr-UA-1175	2	PAX	UA	DEN	D	1175	16:18	223	130	94%	122	120	2	1	E05	E	0:42	Dep-UA-1176	2	PAX	UA	ORD	D	1176	17:00	223	130	91%	118	113	5	1	E05	E
Arr-UA-1177	2	PAX	UA	ORD	D	1177	16:18	223	130	91%	118	113	5	1	E01	E	0:46	Dep-UA-1178	2	PAX	UA	DEN	D	1178	17:04	223	130	92%	120	117	3	1	E01	E
Arr-UA-1159	2	PAX	UA	SFO	D	1159	16:45	221	109	75%	81	75	6	1	E03	E	1:15	Dep-UA-1160	2	PAX	UA	SFO	D	1160	18:00	221	109	75%	82	75	6	1	E03	E
Arr-UA-1213	2	PAX	UA	IAH	D	1213	17:06	E7W	76	86%	65	64	1	1	E04	E	1:19	Dep-UA-1214	2	PAX	UA	ORD	D	1214	18:25	E7W	76	91%	69	66	3	1	E04	E
Arr-UA-1179	2	PAX	UA	EWR	D	1179	17:44	223	130	92%	119	117	2	1	E05	E	1:01	Dep-UA-1180	2	PAX	UA	EWR	D	1180	18:45	223	130	88%	114	112	2	1	E05	E
Arr-UA-1181	2	PAX	UA	DEN	D	1181	18:40	223	130	94%	122	120	2	1	E02	E	0:50	Dep-UA-1182	2	PAX	UA	DEN	D	1182	19:30	223	130	92%	120	117	3	1	E02	E
Arr-UA-1183	2	PAX	UA	ORD	D	1183	18:40	7M1	198	91%	179	172	8	1	E01	E	1:30	Dep-UA-1184	2	PAX	UA	ORD	D	1184	20:10	7M1	198	91%	180	173	8	1	E01	E
Arr-UA-1161	2	PAX	UA	EWR	D	1161	18:56	221	109	92%	100	98	2	1	E03	E	1:14	Dep-UA-1162	2	PAX	UA	EWR	D	1162	20:10	221	109	88%	96	94	2	1	E03	E
Arr-UA-1151	2	PAX	UA	IAD	D	1151	19:45	221	109	99%	108	106	1	1	E04	E	TOW/RON	Dep-UA-1152	2	PAX	UA	IAH	D	1152	8:00	221	109	93%	101	100	1	1	E01	E
Arr-UA-1153	2	PAX	UA	IAH	D	1153	22:46	221	109	86%	94	92	1	1	E01	E	TOW/RON	Dep-UA-1154	2	PAX	UA	IAD	D	1154	8:16	221	109	100%	108	106	2	1	E02	E
Arr-UA-1163	2	PAX	UA	ORD	D	1163	22:48	223	130	91%	118	113	5	1	E04	E	TOW/RON	Dep-UA-1164	2	PAX	UA	DEN	D	1164	6:00	223	130	92%	120	117	3	1	E04	E
Arr-UA-1165	2	PAX	UA	DEN	D	1165	23:18	223	130	94%	122	120	2	1	E03	E	TOW/RON	Dep-UA-1166	2	PAX	UA	ORD	D	1166	6:35	223	130	91%	118	113	5	1	E03	E
Arr-UA-1197	2	PAX	UA	ORD	D	1197	19:32	E7W	76	91%	69	66	3	1	E05	E	TOW/RON	Dep-UA-1198	2	PAX	UA	EWR	D	1198	6:00	E7W	76	88%	67	65	1	1	E05	E
Arr-UA-1199	2	PAX	UA	ORD	D	1199	21:18	E7W	76	91%	69	66	3	1	E05	E	TOW/RON	Dep-UA-1200	2	PAX	UA	ORD	D	1200	7:30	E7W	76	91%	69	66	3	1	E04	E
Arr-UA-1201	2	PAX	UA	EWR	D	1201	23:14	E7W	76	92%	70	68	1	1	E05	E	TOW/RON	Dep-UA-1202	2	PAX	UA	IAH	D	1202	11:15	E7W	76	93%	71	70	1	1	E05	E
Arr-WN-2407	2	PAX	WN	PHX	D	2407	1:15	73W	143	99%	141	140	2	2	H26	H	4:25	Dep-WN-2408	2	PAX	WN	PHX	D	2408	5:40	73W	143	95%	136	134	3	2	H26	H
Arr-WN-2431	2	PAX	WN	DEN	D	2431	1:20	7M8	175	99%	173	170	3	2	H24	H	6:10	Dep-WN-2432	2	PAX	WN	DAL	D	2432	7:30	7M8	175	96%	168	164	4	2	H26	H
Arr-WN-2433	2	PAX	WN	MDW	D	2433	8:10	7M8	175	75%	132	130	2	2	H25	H	0:45	Dep-WN-2434	2	PAX	WN	DEN	D	2434	8:55	7M8	175	97%	169	167	2	2	H25	H
Arr-WN-2435	2	PAX	WN	DEN	D	2435	9:00	7M8	175	99%	173	170	3	2	H29	H	0:45	Dep-WN-2436	2	PAX	WN	MCI	D	2436	9:45	7M8	175	95%	166	158	8	2	H29	H
Arr-WN-2437	2	PAX	WN	DAL	D	2437	9:15	7M8	175	95%	167	164	3	2	H28	H	0:45	Dep-WN-2438	2	PAX	WN	DEN	D	2438	10:00	7M8	175	97%	169	167	2	2	H28	H
Arr-WN-2439	2	PAX	WN	BNA	D	2439	9:45	7M8	175	70%	122	122	1	2	H25	H	0:45	Dep-WN-2440	2	PAX	WN	DAL	D	2440	10:30	7M8	175	96%	168	164	4	2	H25	H
Arr-WN-2409	2	PAX	WN	BWI	D	2409	9:50	73W	143	93%	133	132	1	2	H27	H	0:55	Dep-WN-2410	2	PAX	WN	BWI	D	2410	10:45	73W	143	94%	134	133	1	2	H27	H
Arr-WN-2441	2	PAX	WN	ATL	D	2441	10:20	7M8	175	95%	166	165	1	2	H29	H	0:45	Dep-WN-2442	2	PAX	WN	MDW	D	2442	11:05	7M8	175	75%	132	130	2	2	H29	H
Arr-WN-2443	2	PAX	WN	MDW	D	2443	10:25	7M8	175	75%	132	130	2	2	H26	H	0:45	Dep-WN-2444	2	PAX	WN	DEN	D	2444	11:10	7M8	175	97%	169	167	2	2	H26	H
Arr-WN-2445	2	PAX	WN	MCI	D	2445	10:50	7M8	175	99%	173	168	6	2	H28	H	0:45	Dep-WN-2446	2	PAX	WN	STL	D	2446	11:35	7M8	175	81%	141	137	4	2	H28	H
Arr-WN-2411	2	PAX	WN	STL	D	2411	12:10	73W	143	82%	117	115	2	2	H25	H	0:40	Dep-WN-2412	2	PAX	WN	BNA	D	2412	12:50	73W	143	70%	101	100	1	2	H25	H
Arr-WN-2413	2	PAX	WN	MDW	D	2413	12:35	73W	143	75%	107	106	2	2	H27	H	0:45	Dep-WN-2414	2	PAX	WN	MDW	D	2414	13:20	73W	143	75%	108	106	1	2	H27	H
Arr-WN-2447	2	PAX	WN	DEN	D	2447	13:55	7M8	175	99%	173	170	3	2	H25	H	0:45	Dep-WN-2448	2	PAX	WN	DEN	D	2448	14:40	7M8	175	97%	169	167	2	2	H25	H
Arr-WN-2415	2	PAX	WN	PHX	D	2415	14:40	73W	143	99%	141	140	2	2	H29	H	0:45	Dep-WN-2416	2	PAX	WN	MDW	D	2416	15:25	73W	143	75%	108	106	1	2	H29	H
Arr-WN-2449	2	PAX	WN	MDW	D	2449	14:50	7M8	175	75%	132	130	2	2	H26	H	0:45	Dep-WN-2450	2	PAX	WN	ATL	D	2450	15:35	7M8	175	96%	167	166	1	2	H26	H
Arr-WN-2451	2	PAX	WN	MDW	D	2451	15:55	7M8	175	75%	132	130	2	2	H27	H	1:05	Dep-WN-2452	2	PAX	WN	MDW	D	2452	17:00	7M8	175	75%	132	130	2	2	H27	H
Arr-WN-2417	2	PAX	WN	BNA	D	2417	16:10	73W	143	70%	100	99	1	2	H28	H	0:45	Dep-WN-2418	2	PAX	WN	PHX	D	2418	16:55	73W	143	95%	136	134	3	2	H28	H
Arr-WN-2419	2	PAX	WN	ATL	D	2419	16:40	73W	143	95%	136	135	1	2	H29	H	0:45	Dep-WN-2420	2	PAX	WN	MCI	D	2420	17:25	73W	143	95%	136	129	7	2	H29	H
Arr-WN-2453	2	PAX	WN	BWI	D	2453	17:00	7M8	175	93%	163	161	2	2	H26	H	0:45	Dep-WN-2454	2	PAX	WN	BWI	D	2454	17:45	7M8	175	94%	164	163	2	2	H26	H
Arr-WN-2421	2	PAX	WN	MDW	D	2421	17:15	73W	143	75%	107	106	2	2	H25	H	0:45	Dep-WN-2422	2	PAX	WN	ATL	D	2422	18:00	73W	143	96%	137	136	1	2	H25	H
Arr-WN-2455	2	PAX	WN	STL	D	2455	17:35	7M8	175	82%	143	140	3	2	H27	H	0:30	Dep-WN-2456	2	PAX	WN	BNA	D	2456	18:05	7M8	175	70%	123	122	1	2	H27	H
Arr-WN-2457	2	PAX	WN	DEN	D	2457	18:30	7M8	175	99%	173	170	3	2	H29	H	0:45	Dep-WN-2458	2	PAX	WN	STL	D	2458	19:15	7M8	175	81%	141	137	4	2	H29	H
Arr-WN-2459	2	PAX	WN	DAL	D	2459	18:50	7M8	175	95%	167	164	3	2	H26	H	0:45	Dep-WN-2460	2	PAX	WN	MDW	D	2460	19:35	7M8	175	75%	132	130	2	2	H26	H
Arr-WN-2461	2	PAX	WN	MDW	D	2461	19:35	7M8	175	75%	132	130	2	2	H30	H	0:45	Dep-WN-2462	2	PAX	WN	DEN	D	2462	20:20	7M8	175	97%	169	167	2	2	H30	H
Arr-WN-2463	2	PAX	WN	DEN	D	2463	20:35	7M8	175	99%	173	170	3	2	H28	H	0:45	Dep-WN-2464	2	PAX	WN	MDW	D	2464	21:20	7M8	175	75%	132	130	2	2	H28	H
Arr-WN-2465	2	PAX	WN	MDW	D	2465	21:00	7M8	175	75%	132	130	2	2	H25	H	0:45	Dep-WN-2466	2	PAX	WN	PHX	D	2466	21:45	7M8	175	95%	167	163	3	2	H25	H
Arr-WN-2423	2	PAX	WN	BWI	D	2423	21:20	73W	143	93%	133	132	1	2	H27	H	0:40	Dep-WN-2424	2	PAX	WN	MDW	D	2424	22:00	73W	143	75%	108	106	1	2	H27	H
Arr-WN-2401	2	PAX	WN	ATL	D	2401	21:40	73W	143	95%	136	135	1	2	H30	H	TOW/RON	Dep-WN-2402	2	PAX	WN	BWI	D	2402	6:45	73W	143	94%	134	133	1	2	H30	H
Arr-WN-2403	2	PAX	WN	STL	D	2403	21:50	73W	143	82%	117	115	2	2	H28	H	TOW/RON	Dep-WN-2404	2	PAX	WN	STL	D	2404	6:10	73W	143	81%	116	112	4	2	H28	H
Arr-WN-2405	2	PAX	WN	MCI	D	2405	22:00	73W	143	99%	142	137	5	2	H29	H	TOW/RON	Dep-WN-2406	2	PAX	WN	ATL	D	2406	6:30	73W	143	96%	137	136	1	2	H29	H
Arr-WN-2425	2	PAX	WN	DEN	D	2425	22:45	7M8	175	99%	173	170	3	2	H25	H	TOW/RON	Dep-WN-2426	2	PAX	WN	MDW	D	2426	5:30	7M8	175	75%	132	130	2	2	H25	H
Arr-WN-2427	2	PAX	WN	PHX	D	2427	23:30	7M8	175	99%	173	171	2	2	H27	H	TOW/RON	Dep-WN-2428	2	PAX	WN	DEN	D	2428	5:55	7M8	175	97%	169	167	2	2	H27	H
Arr-WN-2429	2	PAX	WN	MDW	D	2429	23:50	7M8	175	75%	132	130	2	2	H24	H	TOW/RON	Dep-WN-2430	2	PAX	WN	MDW	D	2430	7:00	7M8	175	75%	132	130	2	2	H25	H

Attachment B

QATAR Output Files

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Summary of Inputs and Assumptions

Model run by: Tom Lehnherr on 2/10/2022

Airport	MSP
Roadway location	Terminal 1
Scenario	Scenario 1
Level / type of roadway	Arrivals
Total lanes / approach lanes	5 / 2
Number of curbside zones	1
% of 1st lane full when next vehicle double parks	80%
% of 2nd lane full when next vehicle triple parks	50%
Crosswalk adjustment factor	100%
Regional adjustment factor	95%

Frontage and dwell time per curbside operation

Vehicle class	Vehicle parking length (feet)	Average dwell time (minutes)
POV	25.0	3.4
Staff	25.0	0.7
Recirc	25.0	0.2

Assumptions by zone

Zone ID	Zone 1
Name	T1 Arr
Type	active
Curbside frontage (feet)	840.0
Number of lanes	5.0
Number of approach lanes	2.0

Volume of vehicles using roadway (vph)

POV	746
Staff	8
Recirc	151

Volume of vehicles using curbside (vph)

POV	596
Staff	8
Recirc	151

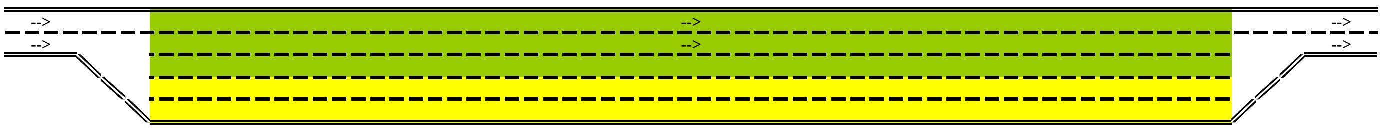
Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Level-of-Service by Zone

Model run by: Tom Lehnherr on 2/10/2022

Airport	MSP
Roadway location	Terminal 1
Scenario	Scenario 1
Level / type of roadway	Arrivals
Total lanes / approach lanes	5 / 2
Number of curbside zones	1



Zone ID	**Zone 1**
Name/description	T1 Arr
Curb length (feet)	840
Zone type	active
Roadway volume (vph)	905
Roadway capacity (vph)	2,706
Roadway V/C ratio	0.334
Roadway LOS	B
Curb demand (# in sys 95% of time)	44.0
Curb capacity per lane (vehicles)	34.0
Curb utilization ratio	1.294
Curb LOS	C

Level-of-service (LOS) key:

A
B
C
D
E
F

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Summary of Inputs and Assumptions

Model run by: Tom Lehnherr on 11/17/2022

Airport	MSP
Roadway location	Terminal 1
Scenario	Existing Conditions
Level / type of roadway	Departures
Total lanes / approach lanes	4 / 2
Number of curbside zones	2
% of 1st lane full when next vehicle double parks	80%
% of 2nd lane full when next vehicle triple parks	50%
Crosswalk adjustment factor	100%
Regional adjustment factor	95%

Frontage and dwell time per curbside operation

Vehicle class	Vehicle parking length (feet)	Average dwell time (minutes)
POV DO	25.0	2.4
TNC DO	25.0	0.9
Taxi DO	25.0	1.3
Limo DO	30.0	1.2
Staff DO	25.0	0.7
Drive By	25.0	1.0
Recirc	25.0	0.2
POV PU	25.0	4.9
Staff PU	25.0	0.7

Assumptions by zone

Zone ID	Zone 1	Zone 2
Name		
Type	active	active
Curbside frontage (feet)	840	50
Number of lanes	4	4
Number of approach lanes	2	2

Volume of vehicles using roadway (vph)

POV DO	696	696
TNC DO	326	326
Taxi DO	42	42
Limo DO	8	8

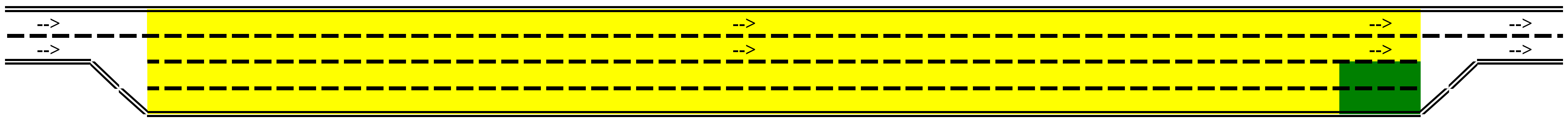
Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Level-of-Service by Zone

Model run by: Tom Lehnherr on 11/17/2022

Airport	MSP
Roadway location	Terminal 1
Scenario	Existing Conditions
Level / type of roadway	Departures
Total lanes / approach lanes	4 / 2
Number of curbside zones	2



Zone ID	Zone 1	Zone 2
Name/description		
Curb length (feet)	840	50
Zone type	active	active
Roadway volume (vph)	1,087	1,087
Roadway capacity (vph)	2,543	2,706
Roadway V/C ratio	0.428	0.402
Roadway LOS	C	C
Curb demand (# in sys 95% of time)	44.0	0.0
Curb capacity per lane (vehicles)	34.0	0.0
Curb utilization ratio	1.294	0.000
Curb LOS	C	A

Level-of-service (LOS) key:

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Detailed Report By Zone

Model run by: Tom Lehnherr on 11/17/2022

ID	Zone 1	Zone 2
Name		
Type of zone	active	active
Curbside length (feet)	840	50
Number of lanes	4	4
Number of approach lanes	2	2
Roadway volume (vph)	1,087	1,087
Curbside demand (vph)	1,087	-
Average dwell time (minutes)	1.88	-
Average vehicle length (feet)	25.04	-
Average vehicle arrival rate (vph)	1,087.00	-
Crosswalk adjustment factor	100.0%	100.0%
Regional adjustment factor	95.0%	95.0%
Through lane roadway capacity	2,678	2,850
Adjusted through lane roadway capacity	2,543	2,706
Estimated roadway V/C ratio	0.428	0.402
Curb capacity per lane (vehicles)	34.00	-
Curb utilization ratio	1.294	-
% occupancy in lane 1	1.000	-
% occupancy in lane 2	0.290	-
% occupancy in lane 3	-	-
# of cars in curbside lane	34.00	-
# of double-parked cars	9.86	-
# of triple-parked cars	-	-
Curbside LOS	C	A
Roadway LOS	C	C

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Summary of Inputs and Assumptions

Model run by: Armando Tineo on 5/9/2022

Airport	MSP
Roadway location	Terminal 1
Scenario	PAL 1 Scenario 2
Level / type of roadway	Arrivals
Total lanes / approach lanes	5 / 2
Number of curbside zones	1
% of 1st lane full when next vehicle double parks	80%
% of 2nd lane full when next vehicle triple parks	50%
Crosswalk adjustment factor	100%
Regional adjustment factor	95%

Frontage and dwell time per curbside operation

Vehicle class	Vehicle parking length (feet)	Average dwell time (minutes)
POV	25.0	3.4
Staff	25.0	0.7
Recirc	25.0	0.2

Assumptions by zone

Zone ID	Zone 1
Name	
Type	active
Curbside frontage (feet)	490.0
Number of lanes	5.0
Number of approach lanes	2.0

Volume of vehicles using roadway (vph)

POV	325
Staff	8
Recirc	74

Volume of vehicles using curbside (vph)

POV	325
Staff	8
Recirc	74

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Summary of Inputs and Assumptions

Model run by: Tom Lehnherr on 3/14/2022

Airport	MSP
Roadway location	Terminal 2
Scenario	Scenario 1
Level / type of roadway	Mixed
Total lanes / approach lanes	4 / 2
Number of curbside zones	2
% of 1st lane full when next vehicle double parks	80%
% of 2nd lane full when next vehicle triple parks	50%
Crosswalk adjustment factor	100%
Regional adjustment factor	95%

Frontage and dwell time per curbside operation

Vehicle class	Vehicle parking length (feet)	Average dwell time (minutes)
DO POV	25.0	2.5
DO TNC	25.0	1.1
DO Taxi	25.0	1.0
DO Limo	30.0	1.4
DO Staff	25.0	0.7
PU POV	25.0	4.9
PU Staff	25.0	0.7
PU Recirc	25.0	0.2

Assumptions by zone

Zone ID	Zone 1	Zone 2
Name	Departures	Arrivals
Type	active	active
Curbside frontage (feet)	465	340
Number of lanes	4	4
Number of approach lanes	2	2

Volume of vehicles using roadway (vph)

DO POV	353	353
DO TNC	118	118
DO Taxi	14	14
DO Limo	1	1
DO Staff	15	15
PU POV	131	131
PU Staff	4	4
PU Recirc	38	38

Volume of vehicles using curbside (vph)

DO POV	353	-
DO TNC	118	-
DO Taxi	14	-
DO Limo	1	-
DO Staff	15	-
PU POV	-	131
PU Staff	-	4
PU Recirc	-	38

Baseline - Terminal 2 - Combined

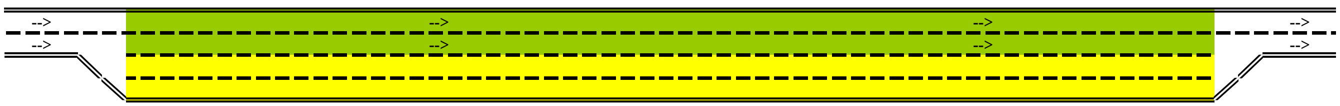
Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Level-of-Service by Zone

Model run by: Tom Lehnherr on 3/14/2022

Airport	MSP
Roadway location	Terminal 2
Scenario	Scenario 1
Level / type of roadway	Mixed
Total lanes / approach lanes	4 / 2
Number of curbside zones	2



Zone ID	Zone 1	Zone 2
Name/description	Departures	Arrivals
Curb length (feet)	465	340
Zone type	active	active
Roadway volume (vph)	674	674
Roadway capacity (vph)	2,562	2,593
Roadway V/C ratio	0.263	0.260
Roadway LOS	B	B
Curb demand (# in sys 95% of time)	24.0	17.0
Curb capacity per lane (vehicles)	19.0	14.0
Curb utilization ratio	1.263	1.214
Curb LOS	C	C

Level-of-service (LOS) key:

A
B
C
D
E
F

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Detailed Report By Zone

Model run by: Tom Lehnherr on 3/14/2022

ID	Zone 1	Zone 2
Name	Departures	Arrivals
Type of zone	active	active
Curbside length (feet)	465	340
Number of lanes	4	4
Number of approach lanes	2	2
Roadway volume (vph)	674	674
Curbside demand (vph)	501	173
Average dwell time (minutes)	2.07	3.77
Average vehicle length (feet)	25.01	25.00
Average vehicle arrival rate (vph)	501.00	173.00
Crosswalk adjustment factor	100.0%	100.0%
Regional adjustment factor	95.0%	95.0%
Through lane roadway capacity	2,699	2,731
Adjusted through lane roadway capacity	2,562	2,593
Estimated roadway V/C ratio	0.263	0.260
Curb capacity per lane (vehicles)	19.00	14.00
Curb utilization ratio	1.263	1.214
% occupancy in lane 1	1.000	1.000
% occupancy in lane 2	0.260	0.210
% occupancy in lane 3	-	-
# of cars in curbside lane	19.00	14.00
# of double-parked cars	4.94	2.94
# of triple-parked cars	-	-
Curbside LOS	C	C
Roadway LOS	B	B

Baseline - Terminal 2 - Arrivals

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Summary of Inputs and Assumptions

Model run by: Tom Lehnherr on 3/14/2022

Airport	MSP
Roadway location	Terminal 2
Scenario	Scenario 1
Level / type of roadway	Mixed
Total lanes / approach lanes	4 / 2
Number of curbside zones	2
% of 1st lane full when next vehicle double parks	80%
% of 2nd lane full when next vehicle triple parks	50%
Crosswalk adjustment factor	100%
Regional adjustment factor	95%

Frontage and dwell time per curbside operation

Vehicle class	Vehicle parking length (feet)	Average dwell time (minutes)
DO POV	25.0	2.5
DO TNC	25.0	1.1
DO Taxi	25.0	1.0
DO Limo	30.0	1.4
DO Staff	25.0	0.7
PU POV	25.0	4.9
PU Staff	25.0	0.7
PU Recirc	25.0	0.2

Assumptions by zone

Zone ID	Zone 1	Zone 2
Name	Departures	Arrivals
Type	active	active
Curbside frontage (feet)	340	590
Number of lanes	4	4
Number of approach lanes	2	2

Volume of vehicles using roadway (vph)

DO POV	243	243
DO TNC	49	49
DO Taxi	8	8
DO Limo	2	2
DO Staff	8	8
PU POV	266	266
PU Staff	7	7
PU Recirc	70	70

Volume of vehicles using curbside (vph)

DO POV	243	-
DO TNC	49	-
DO Taxi	8	-
DO Limo	2	-
DO Staff	8	-
PU POV	-	266
PU Staff	-	7
PU Recirc	-	70

Baseline - Terminal 2 - Arrivals

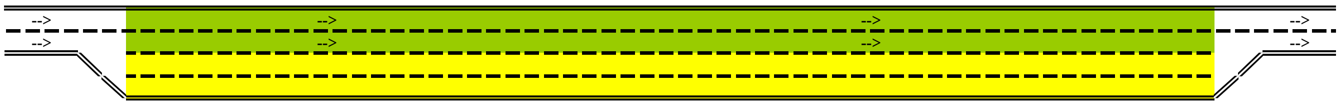
Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Level-of-Service by Zone

Model run by: Tom Lehnherr on 3/14/2022

Airport	MSP
Roadway location	Terminal 2
Scenario	Scenario 1
Level / type of roadway	Mixed
Total lanes / approach lanes	4 / 2
Number of curbside zones	2



Zone ID	Zone 1	Zone 2
Name/description	Departures	Arrivals
Curb length (feet)	340	590
Zone type	active	active
Roadway volume (vph)	653	653
Roadway capacity (vph)	2,593	2,569
Roadway V/C ratio	0.252	0.254
Roadway LOS	B	B
Curb demand (# in sys 95% of time)	17.0	30.0
Curb capacity per lane (vehicles)	14.0	24.0
Curb utilization ratio	1.214	1.250
Curb LOS	C	C

Level-of-service (LOS) key:

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Detailed Report By Zone

Model run by: Tom Lehnherr on 3/14/2022

ID	Zone 1	Zone 2
Name	Departures	Arrivals
Type of zone	active	active
Curbside length (feet)	340	590
Number of lanes	4	4
Number of approach lanes	2	2
Roadway volume (vph)	653	653
Curbside demand (vph)	310	343
Average dwell time (minutes)	2.19	3.86
Average vehicle length (feet)	25.03	25.00
Average vehicle arrival rate (vph)	310.00	343.00
Crosswalk adjustment factor	100.0%	100.0%
Regional adjustment factor	95.0%	95.0%
Through lane roadway capacity	2,731	2,706
Adjusted through lane roadway capacity	2,593	2,569
Estimated roadway V/C ratio	0.252	0.254
Curb capacity per lane (vehicles)	14.00	24.00
Curb utilization ratio	1.214	1.250
% occupancy in lane 1	1.000	1.000
% occupancy in lane 2	0.210	0.240
% occupancy in lane 3	-	-
# of cars in curbside lane	14.00	24.00
# of double-parked cars	2.94	5.76
# of triple-parked cars	-	-
Curbside LOS	C	C
Roadway LOS	B	B

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Summary of Inputs and Assumptions

Model run by: Tom Lehnherr on 3/14/2022

Airport	MSP
Roadway location	Terminal 2
Scenario	Scenario 1
Level / type of roadway	Mixed
Total lanes / approach lanes	4 / 2
Number of curbside zones	2
% of 1st lane full when next vehicle double parks	80%
% of 2nd lane full when next vehicle triple parks	50%
Crosswalk adjustment factor	100%
Regional adjustment factor	95%

Frontage and dwell time per curbside operation

Vehicle class	Vehicle parking length (feet)	Average dwell time (minutes)
DO POV	25.0	2.5
DO TNC	25.0	1.1
DO Taxi	25.0	1.0
DO Limo	30.0	1.4
DO Staff	25.0	0.7
PU POV	25.0	4.9
PU Staff	25.0	0.7
PU Recirc	25.0	0.2

Assumptions by zone

Zone ID	Zone 1	Zone 2
Name	Departures	Arrivals
Type	active	active
Curbside frontage (feet)	490	220
Number of lanes	4	4
Number of approach lanes	2	2

Volume of vehicles using roadway (vph)

DO POV	370	370
DO TNC	120	120
DO Taxi	13	13
DO Limo	2	2
DO Staff	25	25
PU POV	75	75
PU Staff	2	2
PU Recirc	19	19

Volume of vehicles using curbside (vph)

DO POV	370	-
DO TNC	120	-
DO Taxi	13	-
DO Limo	2	-
DO Staff	25	-
PU POV	-	75
PU Staff	-	2
PU Recirc	-	19

Baseline - Terminal 2 - Departures

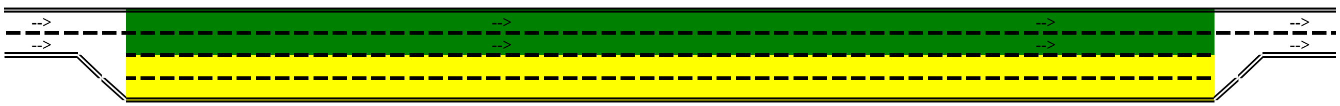
Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Level-of-Service by Zone

Model run by: Tom Lehnherr on 3/14/2022

Airport	MSP
Roadway location	Terminal 2
Scenario	Scenario 1
Level / type of roadway	Mixed
Total lanes / approach lanes	4 / 2
Number of curbside zones	2



Zone ID	Zone 1	Zone 2
Name/description	Departures	Arrivals
Curb length (feet)	490	220
Zone type	active	active
Roadway volume (vph)	626	626
Roadway capacity (vph)	2,569	2,587
Roadway V/C ratio	0.244	0.242
Roadway LOS	A	A
Curb demand (# in sys 95% of time)	25.0	11.0
Curb capacity per lane (vehicles)	20.0	9.0
Curb utilization ratio	1.250	1.222
Curb LOS	C	C

Level-of-service (LOS) key:

A
B
C
D
E
F

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Detailed Report By Zone

Model run by: Tom Lehnherr on 3/14/2022

ID	Zone 1	Zone 2
Name	Departures	Arrivals
Type of zone	active	active
Curbside length (feet)	490	220
Number of lanes	4	4
Number of approach lanes	2	2
Roadway volume (vph)	626	626
Curbside demand (vph)	530	96
Average dwell time (minutes)	2.06	3.88
Average vehicle length (feet)	25.02	25.00
Average vehicle arrival rate (vph)	530.00	96.00
Crosswalk adjustment factor	100.0%	100.0%
Regional adjustment factor	95.0%	95.0%
Through lane roadway capacity	2,706	2,725
Adjusted through lane roadway capacity	2,569	2,587
Estimated roadway V/C ratio	0.244	0.242
Curb capacity per lane (vehicles)	20.00	9.00
Curb utilization ratio	1.250	1.222
% occupancy in lane 1	1.000	1.000
% occupancy in lane 2	0.240	0.220
% occupancy in lane 3	-	-
# of cars in curbside lane	20.00	9.00
# of double-parked cars	4.80	1.98
# of triple-parked cars	-	-
Curbside LOS	C	C
Roadway LOS	A	A

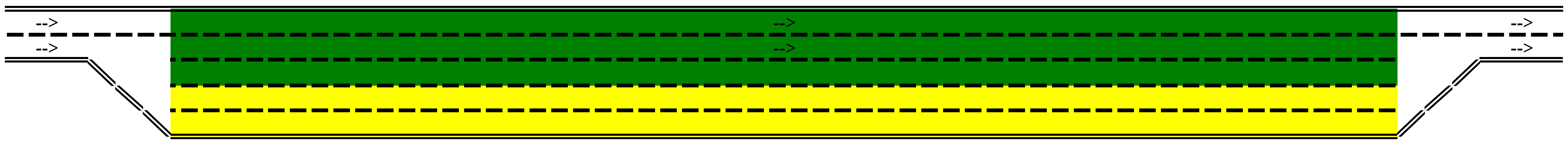
Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Level-of-Service by Zone

Model run by: Armando Tineo on 5/9/2022

Airport	MSP
Roadway location	Terminal 1
Scenario	PAL 1 Scenario 2
Level / type of roadway	Arrivals
Total lanes / approach lanes	5 / 2
Number of curbside zones	1



Zone ID	Zone 1
Name/description	
Curb length (feet)	490
Zone type	active
Roadway volume (vph)	407
Roadway capacity (vph)	2,706
Roadway V/C ratio	0.150
Roadway LOS	A
Curb demand (# in sys 95% of time)	26.0
Curb capacity per lane (vehicles)	20.0
Curb utilization ratio	1.300
Curb LOS	C

Level-of-service (LOS) key:

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Detailed Report By Zone

Model run by: Armando Tineo on 5/9/2022

ID	Zone 1
Name	
Type of zone	active
Curbside length (feet)	490
Number of lanes	5
Number of approach lanes	2
Roadway volume (vph)	407
Curbside demand (vph)	407
Average dwell time (minutes)	2.77
Average vehicle length (feet)	25.00
Average vehicle arrival rate (vph)	407.00
Crosswalk adjustment factor	100.0%
Regional adjustment factor	95.0%
Through lane roadway capacity	2,850
Adjusted through lane roadway capacity	2,706
Estimated roadway V/C ratio	0.150
Curb capacity per lane (vehicles)	20.00
Curb utilization ratio	1.300
% occupancy in lane 1	1.000
% occupancy in lane 2	0.290
% occupancy in lane 3	-
# of cars in curbside lane	20.00
# of double-parked cars	5.80
# of triple-parked cars	-
Curbside LOS	C
Roadway LOS	A

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Summary of Inputs and Assumptions

Model run by: Tom Lehnherr on 11/17/2022

Airport	MSP
Roadway location	Terminal 1
Scenario	PAL 1 High POV
Level / type of roadway	Departures
Total lanes / approach lanes	4 / 2
Number of curbside zones	1
% of 1st lane full when next vehicle double parks	80%
% of 2nd lane full when next vehicle triple parks	50%
Crosswalk adjustment factor	100%
Regional adjustment factor	95%

Frontage and dwell time per curbside operation

Vehicle class	Vehicle parking length (feet)	Average dwell time (minutes)
POV DO	25.0	2.4
TNC DO	25.0	0.9
Taxi DO	25.0	1.3
Limo DO	30.0	1.2
Staff DO	25.0	0.7
Drive By	25.0	1.0
Recirc	25.0	0.2
POV PU	25.0	4.9
Staff PU	25.0	0.7

Assumptions by zone

Zone ID	Zone 1
Name	Dep
Type	active
Curbside frontage (feet)	860
Number of lanes	4
Number of approach lanes	2

Volume of vehicles using roadway (vph)

POV DO	694
TNC DO	364
Taxi DO	33
Limo DO	11

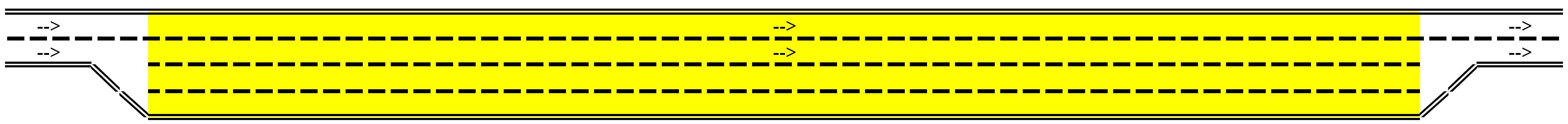
Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Level-of-Service by Zone

Model run by: Tom Lehnherr on 11/17/2022

Airport	MSP
Roadway location	Terminal 1
Scenario	PAL 1 High POV
Level / type of roadway	Departures
Total lanes / approach lanes	4 / 2
Number of curbside zones	1



Zone ID	**Zone 1**
Name/description	Dep
Curb length (feet)	860
Zone type	active
Roadway volume (vph)	1,117
Roadway capacity (vph)	2,543
Roadway V/C ratio	0.439
Roadway LOS	C
Curb demand (# in sys 95% of time)	44.0
Curb capacity per lane (vehicles)	34.0
Curb utilization ratio	1.294
Curb LOS	C

Level-of-service (LOS) key:

A
B
C
D
E
F

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Detailed Report By Zone

Model run by: Tom Lehnherr on 11/17/2022

ID	Zone 1
Name	Dep
Type of zone	active
Curbside length (feet)	860
Number of lanes	4
Number of approach lanes	2
Roadway volume (vph)	1,117
Curbside demand (vph)	1,117
Average dwell time (minutes)	1.84
Average vehicle length (feet)	25.05
Average vehicle arrival rate (vph)	1,117.00
Crosswalk adjustment factor	100.0%
Regional adjustment factor	95.0%
Through lane roadway capacity	2,678
Adjusted through lane roadway capacity	2,543
Estimated roadway V/C ratio	0.439
Curb capacity per lane (vehicles)	34.00
Curb utilization ratio	1.294
% occupancy in lane 1	1.000
% occupancy in lane 2	0.290
% occupancy in lane 3	-
# of cars in curbside lane	34.00
# of double-parked cars	9.86
# of triple-parked cars	-
Curbside LOS	C
Roadway LOS	C

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Summary of Inputs and Assumptions

Model run by: Armando Tineo on 4/27/2022

Airport	MSP
Roadway location	Terminal 2
Scenario	PAL 1 Scenario 3
Level / type of roadway	Mixed
Total lanes / approach lanes	4 / 2
Number of curbside zones	2
% of 1st lane full when next vehicle double parks	80%
% of 2nd lane full when next vehicle triple parks	50%
Crosswalk adjustment factor	100%
Regional adjustment factor	95%

Frontage and dwell time per curbside operation

Vehicle class	Vehicle parking length (feet)	Average dwell time (minutes)
DO POV	25.0	2.5
DO TNC	25.0	1.1
DO Taxi	25.0	1.0
DO Limo	30.0	1.4
DO Staff	25.0	0.7
PU POV	25.0	4.9
PU Staff	25.0	0.7
PU Recirc	25.0	0.2

Assumptions by zone

Zone ID	Zone 1	Zone 2
Name	Departures	Arrivals
Type	active	active
Curbside frontage (feet)	365	740
Number of lanes	4	4
Number of approach lanes	2	2

Volume of vehicles using roadway (vph)

DO POV	273	273
DO TNC	73	73
DO Taxi	13	13
DO Limo	1	1
DO Staff	15	15
PU POV	446	446
PU Staff	4	4
PU Recirc	101	101

Volume of vehicles using curbside (vph)

DO POV	273	-
DO TNC	73	-
DO Taxi	13	-
DO Limo	1	-
DO Staff	15	-
PU POV	-	345
PU Staff	-	4
PU Recirc	-	101

PAL 1 High POV - Terminal 2 - Arrival/Combined

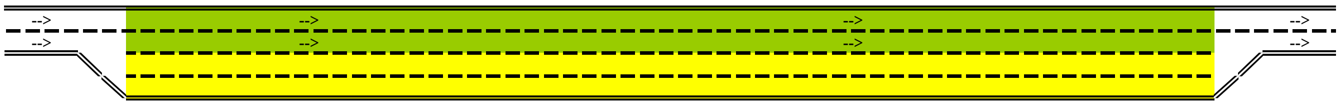
Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Level-of-Service by Zone

Model run by: Armando Tineo on 4/27/2022

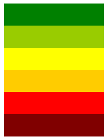
Airport	MSP
Roadway location	Terminal 2
Scenario	PAL 1 Scenario 3
Level / type of roadway	Mixed
Total lanes / approach lanes	4 / 2
Number of curbside zones	2



Zone ID	Zone 1	Zone 2
Name/description	Departures	Arrivals
Curb length (feet)	365	740
Zone type	active	active
Roadway volume (vph)	926	926
Roadway capacity (vph)	2,562	2,562
Roadway V/C ratio	0.361	0.361
Roadway LOS	B	B
Curb demand (# in sys 95% of time)	19.0	38.0
Curb capacity per lane (vehicles)	15.0	30.0
Curb utilization ratio	1.267	1.267
Curb LOS	C	C

Level-of-service (LOS) key:

A
B
C
D
E
F



PAL 1 High POV - Terminal 2 - Arrival/Combined

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Detailed Report By Zone

Model run by: Armando Tineo on 4/27/2022

ID	Zone 1	Zone 2
Name	Departures	Arrivals
Type of zone	active	active
Curbside length (feet)	365	740
Number of lanes	4	4
Number of approach lanes	2	2
Roadway volume (vph)	926	926
Curbside demand (vph)	375	450
Average dwell time (minutes)	2.10	3.81
Average vehicle length (feet)	25.01	25.00
Average vehicle arrival rate (vph)	375.00	450.00
Crosswalk adjustment factor	100.0%	100.0%
Regional adjustment factor	95.0%	95.0%
Through lane roadway capacity	2,699	2,699
Adjusted through lane roadway capacity	2,562	2,562
Estimated roadway V/C ratio	0.361	0.361
Curb capacity per lane (vehicles)	15.00	30.00
Curb utilization ratio	1.267	1.267
% occupancy in lane 1	1.000	1.000
% occupancy in lane 2	0.260	0.260
% occupancy in lane 3	-	-
# of cars in curbside lane	15.00	30.00
# of double-parked cars	3.90	7.80
# of triple-parked cars	-	-
Curbside LOS	C	C
Roadway LOS	B	B

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Summary of Inputs and Assumptions

Model run by: Armando Tineo on 4/27/2022

Airport	MSP
Roadway location	Terminal 2
Scenario	PAL 1 Scenario 3
Level / type of roadway	Mixed
Total lanes / approach lanes	4 / 2
Number of curbside zones	2
% of 1st lane full when next vehicle double parks	80%
% of 2nd lane full when next vehicle triple parks	50%
Crosswalk adjustment factor	100%
Regional adjustment factor	95%

Frontage and dwell time per curbside operation

Vehicle class	Vehicle parking length (feet)	Average dwell time (minutes)
DO POV	25.0	2.5
DO TNC	25.0	1.1
DO Taxi	25.0	1.0
DO Limo	30.0	1.4
DO Staff	25.0	0.7
PU POV	25.0	4.9
PU Staff	25.0	0.7
PU Recirc	25.0	0.2

Assumptions by zone

Zone ID	Zone 1	Zone 2
Name	Departures	Arrivals
Type	active	active
Curbside frontage (feet)	465	100
Number of lanes	4	4
Number of approach lanes	2	2

Volume of vehicles using roadway (vph)

DO POV	330	330
DO TNC	135	135
DO Taxi	12	12
DO Limo	-	-
DO Staff	25	25
PU POV	10	10
PU Staff	2	2
PU Recirc	9	9

Volume of vehicles using curbside (vph)

DO POV	330	-
DO TNC	135	-
DO Taxi	12	-
DO Limo	-	-
DO Staff	25	-
PU POV	-	1
PU Staff	-	2
PU Recirc	-	9

PAL 1 High POV - Terminal 2 - Departures

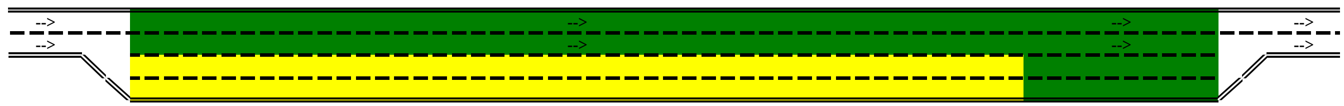
Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Level-of-Service by Zone

Model run by: Armando Tineo on 4/27/2022

Airport	MSP
Roadway location	Terminal 2
Scenario	PAL 1 Scenario 3
Level / type of roadway	Mixed
Total lanes / approach lanes	4 / 2
Number of curbside zones	2



Zone ID	Zone 1	Zone 2
Name/description	Departures	Arrivals
Curb length (feet)	465	100
Zone type	active	active
Roadway volume (vph)	523	523
Roadway capacity (vph)	2,562	2,706
Roadway V/C ratio	0.204	0.193
Roadway LOS	A	A
Curb demand (# in sys 95% of time)	24.0	1.0
Curb capacity per lane (vehicles)	19.0	4.0
Curb utilization ratio	1.263	0.250
Curb LOS	C	A

Level-of-service (LOS) key:

A
B
C
D
E
F

PAL 1 High POV - Terminal 2 - Departures

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Detailed Report By Zone

Model run by: Armando Tineo on 4/27/2022

ID	Zone 1	Zone 2
Name	Departures	Arrivals
Type of zone	active	active
Curbside length (feet)	465	100
Number of lanes	4	4
Number of approach lanes	2	2
Roadway volume (vph)	523	523
Curbside demand (vph)	502	12
Average dwell time (minutes)	2.00	0.68
Average vehicle length (feet)	25.00	25.00
Average vehicle arrival rate (vph)	502.00	12.00
Crosswalk adjustment factor	100.0%	100.0%
Regional adjustment factor	95.0%	95.0%
Through lane roadway capacity	2,699	2,850
Adjusted through lane roadway capacity	2,562	2,706
Estimated roadway V/C ratio	0.204	0.193
Curb capacity per lane (vehicles)	19.00	4.00
Curb utilization ratio	1.263	0.250
% occupancy in lane 1	1.000	0.240
% occupancy in lane 2	0.260	-
% occupancy in lane 3	-	-
# of cars in curbside lane	19.00	0.96
# of double-parked cars	4.94	-
# of triple-parked cars	-	-
Curbside LOS	C	A
Roadway LOS	A	A

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Summary of Inputs and Assumptions

Model run by: Armando Tineo on 4/26/2022

Airport	MSP
Roadway location	Terminal 1
Scenario	PAL Scenario 1
Level / type of roadway	Arrivals
Total lanes / approach lanes	5 / 2
Number of curbside zones	1
% of 1st lane full when next vehicle double parks	80%
% of 2nd lane full when next vehicle triple parks	50%
Crosswalk adjustment factor	100%
Regional adjustment factor	95%

Frontage and dwell time per curbside operation

Vehicle class	Vehicle parking length (feet)	Average dwell time (minutes)
POV	25.0	3.4
Staff	25.0	0.7
Recirc	25.0	0.2

Assumptions by zone

Zone ID	Zone 1
Name	
Type	active
Curbside frontage (feet)	815.0
Number of lanes	5.0
Number of approach lanes	2.0

Volume of vehicles using roadway (vph)

POV	703
Staff	16
Recirc	138

Volume of vehicles using curbside (vph)

POV	565
Staff	16
Recirc	138

PAL 1 Low POV - Terminal 1 - Arrivals

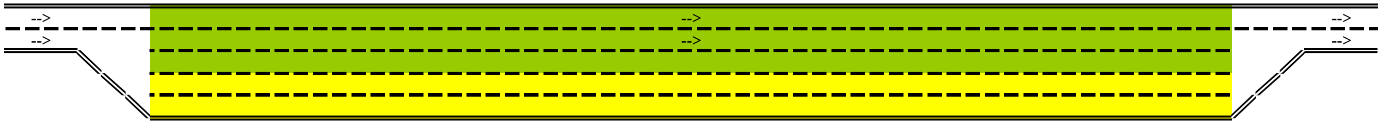
Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Level-of-Service by Zone

Model run by: Armando Tineo on 4/26/2022

Airport	MSP
Roadway location	Terminal 1
Scenario	PAL Scenario 1
Level / type of roadway	Arrivals
Total lanes / approach lanes	5 / 2
Number of curbside zones	1



Zone ID	Zone 1
Name/description	
Curb length (feet)	815
Zone type	active
Roadway volume (vph)	857
Roadway capacity (vph)	2,706
Roadway V/C ratio	0.317
Roadway LOS	B
Curb demand (# in sys 95% of time)	42.0
Curb capacity per lane (vehicles)	33.0
Curb utilization ratio	1.273
Curb LOS	C

Level-of-service (LOS) key:

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Detailed Report By Zone

Model run by: Armando Tineo on 4/26/2022

ID	Zone 1
Name	
Type of zone	active
Curbside length (feet)	815
Number of lanes	5
Number of approach lanes	2
Roadway volume (vph)	857
Curbside demand (vph)	719
Average dwell time (minutes)	2.73
Average vehicle length (feet)	25.00
Average vehicle arrival rate (vph)	719.00
Crosswalk adjustment factor	100.0%
Regional adjustment factor	95.0%
Through lane roadway capacity	2,850
Adjusted through lane roadway capacity	2,706
Estimated roadway V/C ratio	0.317
Curb capacity per lane (vehicles)	33.00
Curb utilization ratio	1.273
% occupancy in lane 1	1.000
% occupancy in lane 2	0.270
% occupancy in lane 3	-
# of cars in curbside lane	33.00
# of double-parked cars	8.91
# of triple-parked cars	-
Curbside LOS	C
Roadway LOS	B

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Summary of Inputs and Assumptions

Model run by: Tom Lehnherr on 11/17/2022

Airport	MSP
Roadway location	Terminal 1
Scenario	PAL 1 Low POV
Level / type of roadway	Departures
Total lanes / approach lanes	4 / 2
Number of curbside zones	1
% of 1st lane full when next vehicle double parks	80%
% of 2nd lane full when next vehicle triple parks	50%
Crosswalk adjustment factor	100%
Regional adjustment factor	95%

Frontage and dwell time per curbside operation

Vehicle class	Vehicle parking length (feet)	Average dwell time (minutes)
POV DO	25.0	2.4
TNC DO	25.0	0.9
Taxi DO	25.0	1.3
Limo DO	30.0	1.2
Staff DO	25.0	0.7
Drive By	25.0	1.0
Recirc	25.0	0.2
POV PU	25.0	4.9
Staff PU	25.0	0.7

Assumptions by zone

Zone ID	Zone 1
Name	Dep
Type	active
Curbside frontage (feet)	840
Number of lanes	4
Number of approach lanes	2

Volume of vehicles using roadway (vph)

POV DO	683
TNC DO	323
Taxi DO	35
Limo DO	10

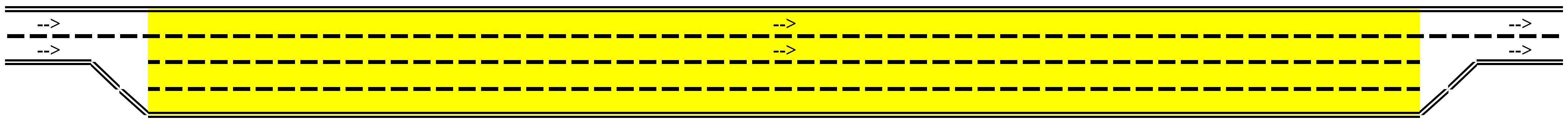
Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Level-of-Service by Zone

Model run by: Tom Lehnherr on 11/17/2022

Airport	MSP
Roadway location	Terminal 1
Scenario	PAL 1 Low POV
Level / type of roadway	Departures
Total lanes / approach lanes	4 / 2
Number of curbside zones	1



Zone ID	**Zone 1**
Name/description	Dep
Curb length (feet)	840
Zone type	active
Roadway volume (vph)	1,069
Roadway capacity (vph)	2,562
Roadway V/C ratio	0.417
Roadway LOS	C
Curb demand (# in sys 95% of time)	43.0
Curb capacity per lane (vehicles)	34.0
Curb utilization ratio	1.265
Curb LOS	C

Level-of-service (LOS) key:

A
B
C
D
E
F

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Detailed Report By Zone

Model run by: Tom Lehnherr on 11/17/2022

ID	Zone 1
Name	Dep
Type of zone	active
Curbside length (feet)	840
Number of lanes	4
Number of approach lanes	2
Roadway volume (vph)	1,069
Curbside demand (vph)	1,069
Average dwell time (minutes)	1.87
Average vehicle length (feet)	25.05
Average vehicle arrival rate (vph)	1,069.00
Crosswalk adjustment factor	100.0%
Regional adjustment factor	95.0%
Through lane roadway capacity	2,699
Adjusted through lane roadway capacity	2,562
Estimated roadway V/C ratio	0.417
Curb capacity per lane (vehicles)	34.00
Curb utilization ratio	1.265
% occupancy in lane 1	1.000
% occupancy in lane 2	0.260
% occupancy in lane 3	-
# of cars in curbside lane	34.00
# of double-parked cars	8.84
# of triple-parked cars	-
Curbside LOS	C
Roadway LOS	C

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Summary of Inputs and Assumptions

Model run by: Armando Tineo on 4/27/2022

Airport	MSP
Roadway location	Terminal 2
Scenario	PAL Scenario 1
Level / type of roadway	Mixed
Total lanes / approach lanes	4 / 2
Number of curbside zones	2
% of 1st lane full when next vehicle double parks	80%
% of 2nd lane full when next vehicle triple parks	50%
Crosswalk adjustment factor	100%
Regional adjustment factor	95%

Frontage and dwell time per curbside operation

Vehicle class	Vehicle parking length (feet)	Average dwell time (minutes)
DO POV	25.0	2.5
DO TNC	25.0	1.1
DO Taxi	25.0	1.0
DO Limo	30.0	1.4
DO Staff	25.0	0.7
PU POV	25.0	4.9
PU Staff	25.0	0.7
PU Recirc	25.0	0.2

Assumptions by zone

Zone ID	Zone 1	Zone 2
Name	Departures	Arrivals
Type	active	active
Curbside frontage (feet)	340	815
Number of lanes	4	4
Number of approach lanes	2	2

Volume of vehicles using roadway (vph)

DO POV	251	251
DO TNC	59	59
DO Taxi	12	12
DO Limo	3	3
DO Staff	15	15
PU POV	500	500
PU Staff	4	4
PU Recirc	112	112

Volume of vehicles using curbside (vph)

DO POV	251	-
DO TNC	59	-
DO Taxi	12	-
DO Limo	3	-
DO Staff	15	-
PU POV	-	388
PU Staff	-	4
PU Recirc	-	112

PAL 1 Low POV - Terminal 2 - Arrivals/Combined

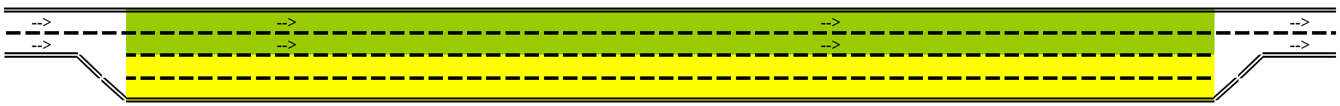
Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Level-of-Service by Zone

Model run by: Armando Tineo on 4/27/2022

Airport	MSP
Roadway location	Terminal 2
Scenario	PAL Scenario 1
Level / type of roadway	Mixed
Total lanes / approach lanes	4 / 2
Number of curbside zones	2



Zone ID	**Zone 1**	**Zone 2**
Name/description	Departures	Arrivals
Curb length (feet)	340	815
Zone type	active	active
Roadway volume (vph)	956	956
Roadway capacity (vph)	2,549	2,556
Roadway V/C ratio	0.375	0.374
Roadway LOS	B	B
Curb demand (# in sys 95% of time)	18.0	42.0
Curb capacity per lane (vehicles)	14.0	33.0
Curb utilization ratio	1.286	1.273
Curb LOS	C	C

Level-of-service (LOS) key:

A
B
C
D
E
F

PAL 1 Low POV - Terminal 2 - Arrivals/Combined

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Detailed Report By Zone

Model run by: Armando Tineo on 4/27/2022

ID	Zone 1	Zone 2
Name	Departures	Arrivals
Type of zone	active	active
Curbside length (feet)	340	815
Number of lanes	4	4
Number of approach lanes	2	2
Roadway volume (vph)	956	956
Curbside demand (vph)	340	504
Average dwell time (minutes)	2.12	3.82
Average vehicle length (feet)	25.04	25.00
Average vehicle arrival rate (vph)	340.00	504.00
Crosswalk adjustment factor	100.0%	100.0%
Regional adjustment factor	95.0%	95.0%
Through lane roadway capacity	2,685	2,692
Adjusted through lane roadway capacity	2,549	2,556
Estimated roadway V/C ratio	0.375	0.374
Curb capacity per lane (vehicles)	14.00	33.00
Curb utilization ratio	1.286	1.273
% occupancy in lane 1	1.000	1.000
% occupancy in lane 2	0.280	0.270
% occupancy in lane 3	-	-
# of cars in curbside lane	14.00	33.00
# of double-parked cars	3.92	8.91
# of triple-parked cars	-	-
Curbside LOS	C	C
Roadway LOS	B	B

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Summary of Inputs and Assumptions

Model run by: Armando Tineo on 4/26/2022

Airport	MSP
Roadway location	Terminal 2
Scenario	PAL Scenario 1
Level / type of roadway	Mixed
Total lanes / approach lanes	4 / 2
Number of curbside zones	2
% of 1st lane full when next vehicle double parks	80%
% of 2nd lane full when next vehicle triple parks	50%
Crosswalk adjustment factor	100%
Regional adjustment factor	95%

Frontage and dwell time per curbside operation

Vehicle class	Vehicle parking length (feet)	Average dwell time (minutes)
DO POV	25.0	2.5
DO TNC	25.0	1.1
DO Taxi	25.0	1.0
DO Limo	30.0	1.4
DO Staff	25.0	0.7
PU POV	25.0	4.9
PU Staff	25.0	0.7
PU Recirc	25.0	0.2

Assumptions by zone

Zone ID	Zone 1	Zone 2
Name	Departures	Arrivals
Type	active	active
Curbside frontage (feet)	440	100
Number of lanes	4	4
Number of approach lanes	2	2
Volume of vehicles using roadway (vph)		
DO POV	310	310
DO TNC	136	136
DO Taxi	13	13
DO Limo	5	5
DO Staff	25	25
PU POV	1	1
PU Staff	2	2
PU Recirc	7	7
Volume of vehicles using curbside (vph)		
DO POV	303	-
DO TNC	136	-
DO Taxi	13	-
DO Limo	5	-
DO Staff	25	-
PU POV	-	1
PU Staff	-	2
PU Recirc	-	7

PAL 1 Low POV - Terminal 2 - Departures

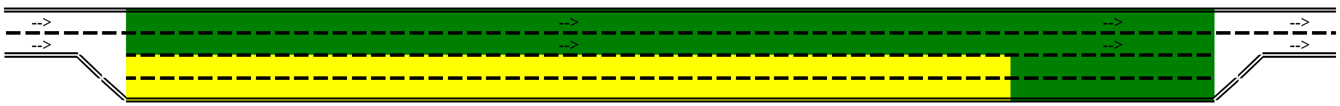
Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Level-of-Service by Zone

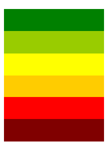
Model run by: Armando Tineo on 4/26/2022

Airport	MSP
Roadway location	Terminal 2
Scenario	PAL Scenario 1
Level / type of roadway	Mixed
Total lanes / approach lanes	4 / 2
Number of curbside zones	2



Zone ID	Zone 1	Zone 2
Name/description	Departures	Arrivals
Curb length (feet)	440	100
Zone type	active	active
Roadway volume (vph)	499	499
Roadway capacity (vph)	2,556	2,706
Roadway V/C ratio	0.195	0.184
Roadway LOS	A	A
Curb demand (# in sys 95% of time)	23.0	1.0
Curb capacity per lane (vehicles)	18.0	4.0
Curb utilization ratio	1.278	0.250
Curb LOS	C	A

Level-of-service (LOS) key:



A
B
C
D
E
F

PAL 1 Low POV - Terminal 2 - Departures

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Detailed Report By Zone

Model run by: Armando Tineo on 4/26/2022

ID	Zone 1	Zone 2
Name	Departures	Arrivals
Type of zone	active	active
Curbside length (feet)	440	100
Number of lanes	4	4
Number of approach lanes	2	2
Roadway volume (vph)	499	499
Curbside demand (vph)	482	10
Average dwell time (minutes)	1.96	0.77
Average vehicle length (feet)	25.05	25.00
Average vehicle arrival rate (vph)	482.00	10.00
Crosswalk adjustment factor	100.0%	100.0%
Regional adjustment factor	95.0%	95.0%
Through lane roadway capacity	2,692	2,850
Adjusted through lane roadway capacity	2,556	2,706
Estimated roadway V/C ratio	0.195	0.184
Curb capacity per lane (vehicles)	18.00	4.00
Curb utilization ratio	1.278	0.250
% occupancy in lane 1	1.000	0.240
% occupancy in lane 2	0.270	-
% occupancy in lane 3	-	-
# of cars in curbside lane	18.00	0.96
# of double-parked cars	4.86	-
# of triple-parked cars	-	-
Curbside LOS	C	A
Roadway LOS	A	A

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Summary of Inputs and Assumptions

Model run by: Armando Tineo on 6/20/2022

Airport	MSP
Roadway location	Terminal 1
Scenario	PAL 3 Arrivals Peak Concept 2
Level / type of roadway	Arrivals
Total lanes / approach lanes	5 / 2
Number of curbside zones	1
% of 1st lane full when next vehicle double parks	80%
% of 2nd lane full when next vehicle triple parks	50%
Crosswalk adjustment factor	100%
Regional adjustment factor	95%

Frontage and dwell time per curbside operation

Vehicle class	Vehicle parking length (feet)	Average dwell time (minutes)
POV	25.0	3.4
Staff	25.0	0.7
Recirc	25.0	0.2

Assumptions by zone

Zone ID	Zone 1
Name	Arr
Type	active
Curbside frontage (feet)	565.0
Number of lanes	5.0
Number of approach lanes	2.0

Volume of vehicles using roadway (vph)

POV	462
Staff	3
Recirc	90

Volume of vehicles using curbside (vph)

POV	372
Staff	3
Recirc	90

PAL 3 Concept 2 (Spring) - Terminal 1 - Arrivals

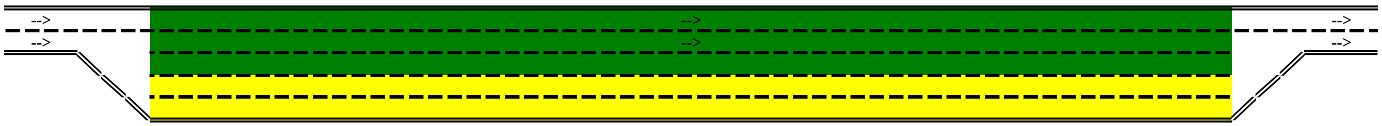
Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Level-of-Service by Zone

Model run by: Armando Tineo on 6/20/2022

Airport	MSP
Roadway location	Terminal 1
Scenario	PAL 3 Arrivals Peak Concept 2
Level / type of roadway	Arrivals
Total lanes / approach lanes	5 / 2
Number of curbside zones	1



Zone ID	**Zone 1**
Name/description	Arr
Curb length (feet)	565
Zone type	active
Roadway volume (vph)	555
Roadway capacity (vph)	2,706
Roadway V/C ratio	0.205
Roadway LOS	A
Curb demand (# in sys 95% of time)	29.0
Curb capacity per lane (vehicles)	23.0
Curb utilization ratio	1.261
Curb LOS	C

Level-of-service (LOS) key:

A
B
C
D
E
F

PAL 3 Concept 2 (Spring) - Terminal 1 - Arrivals

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Detailed Report By Zone

Model run by: Armando Tineo on 6/20/2022

ID	Zone 1
Name	Arr
Type of zone	active
Curbside length (feet)	565
Number of lanes	5
Number of approach lanes	2
Roadway volume (vph)	555
Curbside demand (vph)	465
Average dwell time (minutes)	2.76
Average vehicle length (feet)	25.00
Average vehicle arrival rate (vph)	465.00
Crosswalk adjustment factor	100.0%
Regional adjustment factor	95.0%
Through lane roadway capacity	2,850
Adjusted through lane roadway capacity	2,706
Estimated roadway V/C ratio	0.205
Curb capacity per lane (vehicles)	23.00
Curb utilization ratio	1.261
% occupancy in lane 1	1.000
% occupancy in lane 2	0.260
% occupancy in lane 3	-
# of cars in curbside lane	23.00
# of double-parked cars	5.98
# of triple-parked cars	-
Curbside LOS	C
Roadway LOS	A

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Summary of Inputs and Assumptions

Model run by: Tom Lehnherr on 11/17/2022

Airport	MSP
Roadway location	Terminal 1
Scenario	PAL 3 Concept 2 Spring
Level / type of roadway	Departures
Total lanes / approach lanes	4 / 2
Number of curbside zones	2
% of 1st lane full when next vehicle double parks	80%
% of 2nd lane full when next vehicle triple parks	50%
Crosswalk adjustment factor	100%
Regional adjustment factor	95%

Frontage and dwell time per curbside operation

Vehicle class	Vehicle parking length (feet)	Average dwell time (minutes)
POV DO	25.0	2.4
TNC DO	25.0	0.9
Taxi DO	25.0	1.3
Limo DO	30.0	1.2
Staff DO	25.0	0.7
Drive By	25.0	1.0
Recirc	25.0	0.2
POV PU	25.0	4.9
Staff PU	25.0	0.7

Assumptions by zone

Zone ID	Zone 1	Zone 2
Name	Dep	Dep
Type	active	active
Curbside frontage (feet)	640	640
Number of lanes	4	4
Number of approach lanes	2	2

Volume of vehicles using roadway (vph)

POV DO	940	940
TNC DO	600	600
Taxi DO	66	66
Limo DO	16	16

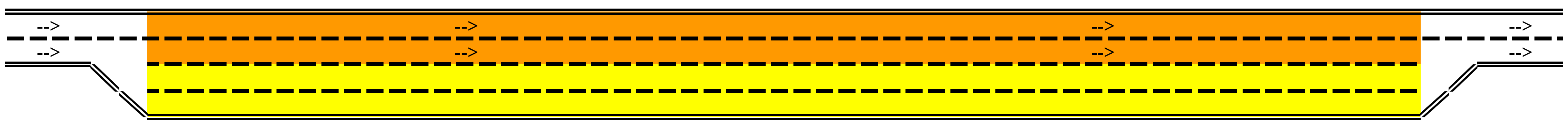
Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Level-of-Service by Zone

Model run by: Tom Lehnherr on 11/17/2022

Airport	MSP
Roadway location	Terminal 1
Scenario	PAL 3 Concept 2 Spring
Level / type of roadway	Departures
Total lanes / approach lanes	4 / 2
Number of curbside zones	2



Zone ID	**Zone 1**	**Zone 2**
Name/description	Dep	Dep
Curb length (feet)	640	640
Zone type	active	active
Roadway volume (vph)	1,631	1,631
Roadway capacity (vph)	2,562	2,562
Roadway V/C ratio	0.636	0.636
Roadway LOS	D	D
Curb demand (# in sys 95% of time)	33.0	33.0
Curb capacity per lane (vehicles)	26.0	26.0
Curb utilization ratio	1.269	1.269
Curb LOS	C	C

Level-of-service (LOS) key:

A
B
C
D
E
F

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Detailed Report By Zone

Model run by: Tom Lehnherr on 11/17/2022

ID	Zone 1	Zone 2
Name	Dep	Dep
Type of zone	active	active
Curbside length (feet)	640	640
Number of lanes	4	4
Number of approach lanes	2	2
Roadway volume (vph)	1,631	1,631
Curbside demand (vph)	815	816
Average dwell time (minutes)	1.78	1.78
Average vehicle length (feet)	25.05	25.05
Average vehicle arrival rate (vph)	815.00	816.00
Crosswalk adjustment factor	100.0%	100.0%
Regional adjustment factor	95.0%	95.0%
Through lane roadway capacity	2,699	2,699
Adjusted through lane roadway capacity	2,562	2,562
Estimated roadway V/C ratio	0.636	0.636
Curb capacity per lane (vehicles)	26.00	26.00
Curb utilization ratio	1.269	1.269
% occupancy in lane 1	1.000	1.000
% occupancy in lane 2	0.260	0.260
% occupancy in lane 3	-	-
# of cars in curbside lane	26.00	26.00
# of double-parked cars	6.76	6.76
# of triple-parked cars	-	-
Curbside LOS	C	C
Roadway LOS	D	D

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Summary of Inputs and Assumptions

Model run by: Armando Tineo on 6/20/2022

Airport	MSP
Roadway location	Terminal 2
Scenario	PAL 3 Arrivals Peak Concept 2
Level / type of roadway	Mixed
Total lanes / approach lanes	4 / 2
Number of curbside zones	2
% of 1st lane full when next vehicle double parks	80%
% of 2nd lane full when next vehicle triple parks	50%
Crosswalk adjustment factor	100%
Regional adjustment factor	95%

Frontage and dwell time per curbside operation

Vehicle class	Vehicle parking length (feet)	Average dwell time (minutes)
DO POV	25.0	2.5
DO TNC	25.0	1.1
DO Taxi	25.0	1.0
DO Limo	30.0	1.4
DO Staff	25.0	0.7
PU POV	25.0	4.9
PU Staff	25.0	0.7
PU Recirc	25.0	0.2

Assumptions by zone

Zone ID	Zone 1	Zone 2
Name	Dep	Arr
Type	active	active
Curbside frontage (feet)	100	940
Number of lanes	4	4
Number of approach lanes	2	2

Volume of vehicles using roadway (vph)

DO POV	-	-
DO TNC	-	-
DO Taxi	-	-
DO Limo	-	-
DO Staff	8	8
PU POV	596	596
PU Staff	7	7
PU Recirc	126	126

Volume of vehicles using curbside (vph)

DO POV	-	-
DO TNC	-	-
DO Taxi	-	-
DO Limo	-	-
DO Staff	8	-
PU POV	-	470
PU Staff	-	7
PU Recirc	-	126

PAL 3 Concept 2 (Spring) - Terminal 2 - Arrivals

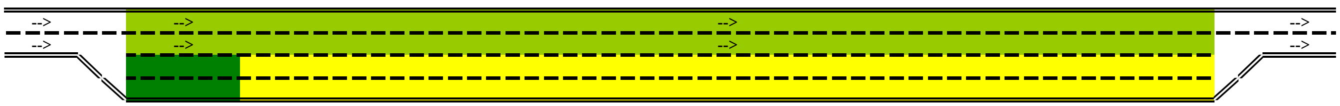
Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Level-of-Service by Zone

Model run by: Armando Tineo on 6/20/2022

Airport	MSP
Roadway location	Terminal 2
Scenario	PAL 3 Arrivals Peak Concept 2
Level / type of roadway	Mixed
Total lanes / approach lanes	4 / 2
Number of curbside zones	2



Zone ID	Zone 1	Zone 2
Name/description	Dep	Arr
Curb length (feet)	100	940
Zone type	active	active
Roadway volume (vph)	737	737
Roadway capacity (vph)	2,706	2,549
Roadway V/C ratio	0.272	0.289
Roadway LOS	B	B
Curb demand (# in sys 95% of time)	1.0	49.0
Curb capacity per lane (vehicles)	4.0	38.0
Curb utilization ratio	0.250	1.289
Curb LOS	A	C

Level-of-service (LOS) key:

A
B
C
D
E
F

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Detailed Report By Zone

Model run by: Armando Tineo on 6/20/2022

ID	Zone 1	Zone 2
Name	Dep	Arr
Type of zone	active	active
Curbside length (feet)	100	940
Number of lanes	4	4
Number of approach lanes	2	2
Roadway volume (vph)	737	737
Curbside demand (vph)	8	603
Average dwell time (minutes)	0.70	3.87
Average vehicle length (feet)	25.00	25.00
Average vehicle arrival rate (vph)	8.00	603.00
Crosswalk adjustment factor	100.0%	100.0%
Regional adjustment factor	95.0%	95.0%
Through lane roadway capacity	2,850	2,685
Adjusted through lane roadway capacity	2,706	2,549
Estimated roadway V/C ratio	0.272	0.289
Curb capacity per lane (vehicles)	4.00	38.00
Curb utilization ratio	0.250	1.289
% occupancy in lane 1	0.240	1.000
% occupancy in lane 2	-	0.280
% occupancy in lane 3	-	-
# of cars in curbside lane	0.96	38.00
# of double-parked cars	-	10.64
# of triple-parked cars	-	-
Curbside LOS	A	C
Roadway LOS	B	B

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Summary of Inputs and Assumptions

Model run by: Armando Tineo on 6/20/2022

Airport	MSP
Roadway location	Terminal 2
Scenario	PAL 3 Combined Peak Concept 2
Level / type of roadway	Mixed
Total lanes / approach lanes	4 / 2
Number of curbside zones	2
% of 1st lane full when next vehicle double parks	80%
% of 2nd lane full when next vehicle triple parks	50%
Crosswalk adjustment factor	100%
Regional adjustment factor	95%

Frontage and dwell time per curbside operation

Vehicle class	Vehicle parking length (feet)	Average dwell time (minutes)
DO POV	25.0	2.5
DO TNC	25.0	1.1
DO Taxi	25.0	1.0
DO Limo	30.0	1.4
DO Staff	25.0	0.7
PU POV	25.0	4.9
PU Staff	25.0	0.7
PU Recirc	25.0	0.2

Assumptions by zone

Zone ID	Zone 1	Zone 2
Name	Dep	Arr
Type	active	active
Curbside frontage (feet)	415	915
Number of lanes	4	4
Number of approach lanes	2	2
Volume of vehicles using roadway (vph)		
DO POV	308	308
DO TNC	81	81
DO Taxi	9	9
DO Limo	2	2
DO Staff	15	15
PU POV	579	579
PU Staff	4	4
PU Recirc	130	130
Volume of vehicles using curbside (vph)		
DO POV	308	-
DO TNC	81	-
DO Taxi	9	-
DO Limo	2	-
DO Staff	15	-
PU POV	-	449
PU Staff	-	4
PU Recirc	-	130

PAL 3 Concept 2 (Spring) - Terminal 2 - Combined

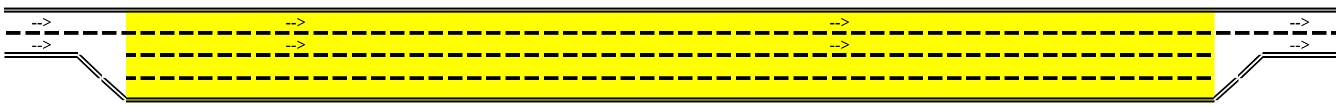
Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Level-of-Service by Zone

Model run by: Armando Tineo on 6/20/2022

Airport	MSP
Roadway location	Terminal 2
Scenario	PAL 3 Combined Peak Concept 2
Level / type of roadway	Mixed
Total lanes / approach lanes	4 / 2
Number of curbside zones	2



Zone ID	Zone 1	Zone 2
Name/description	Dep	Arr
Curb length (feet)	415	915
Zone type	active	active
Roadway volume (vph)	1,128	1,128
Roadway capacity (vph)	2,581	2,556
Roadway V/C ratio	0.437	0.441
Roadway LOS	C	C
Curb demand (# in sys 95% of time)	21.0	47.0
Curb capacity per lane (vehicles)	17.0	37.0
Curb utilization ratio	1.235	1.270
Curb LOS	C	C

Level-of-service (LOS) key:

A
B
C
D
E
F

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Detailed Report By Zone

Model run by: Armando Tineo on 6/20/2022

ID	Zone 1	Zone 2
Name	Dep	Arr
Type of zone	active	active
Curbside length (feet)	415	915
Number of lanes	4	4
Number of approach lanes	2	2
Roadway volume (vph)	1,128	1,128
Curbside demand (vph)	415	583
Average dwell time (minutes)	2.12	3.82
Average vehicle length (feet)	25.02	25.00
Average vehicle arrival rate (vph)	415.00	583.00
Crosswalk adjustment factor	100.0%	100.0%
Regional adjustment factor	95.0%	95.0%
Through lane roadway capacity	2,719	2,692
Adjusted through lane roadway capacity	2,581	2,556
Estimated roadway V/C ratio	0.437	0.441
Curb capacity per lane (vehicles)	17.00	37.00
Curb utilization ratio	1.235	1.270
% occupancy in lane 1	1.000	1.000
% occupancy in lane 2	0.230	0.270
% occupancy in lane 3	-	-
# of cars in curbside lane	17.00	37.00
# of double-parked cars	3.91	9.99
# of triple-parked cars	-	-
Curbside LOS	C	C
Roadway LOS	C	C

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Summary of Inputs and Assumptions

Model run by: Armando Tineo on 6/20/2022

Airport	MSP
Roadway location	Terminal 2
Scenario	PAL 3 Departures Peak Concept 2
Level / type of roadway	Mixed
Total lanes / approach lanes	4 / 2
Number of curbside zones	2
% of 1st lane full when next vehicle double parks	80%
% of 2nd lane full when next vehicle triple parks	50%
Crosswalk adjustment factor	100%
Regional adjustment factor	95%

Frontage and dwell time per curbside operation

Vehicle class	Vehicle parking length (feet)	Average dwell time (minutes)
DO POV	25.0	2.5
DO TNC	25.0	1.1
DO Taxi	25.0	1.0
DO Limo	30.0	1.4
DO Staff	25.0	0.7
PU POV	25.0	4.9
PU Staff	25.0	0.7
PU Recirc	25.0	0.2

Assumptions by zone

Zone ID	Zone 1	Zone 2
Name	Dep	Arr
Type	active	active
Curbside frontage (feet)	690	100
Number of lanes	4	4
Number of approach lanes	2	2

Volume of vehicles using roadway (vph)

DO POV	533	533
DO TNC	208	208
DO Taxi	21	21
DO Limo	4	4
DO Staff	25	25
PU POV	21	21
PU Staff	2	2
PU Recirc	7	7

Volume of vehicles using curbside (vph)

DO POV	533	-
DO TNC	208	-
DO Taxi	21	-
DO Limo	4	-
DO Staff	25	-
PU POV	-	14
PU Staff	-	2
PU Recirc	-	7

PAL 3 Concept 2 (Spring) - Terminal 2 - Departures

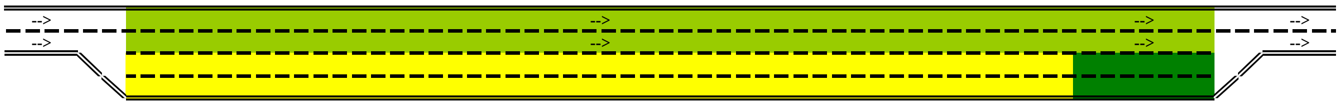
Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Level-of-Service by Zone

Model run by: Armando Tineo on 6/20/2022

Airport	MSP
Roadway location	Terminal 2
Scenario	PAL 3 Departures Peak Concept 2
Level / type of roadway	Mixed
Total lanes / approach lanes	4 / 2
Number of curbside zones	2



Zone ID	Zone 1	Zone 2
Name/description	Dep	Arr
Curb length (feet)	690	100
Zone type	active	active
Roadway volume (vph)	821	821
Roadway capacity (vph)	2,549	2,720
Roadway V/C ratio	0.322	0.302
Roadway LOS	B	B
Curb demand (# in sys 95% of time)	36.0	3.0
Curb capacity per lane (vehicles)	28.0	4.0
Curb utilization ratio	1.286	0.750
Curb LOS	C	A

Level-of-service (LOS) key:

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Detailed Report By Zone

Model run by: Armando Tineo on 6/20/2022

ID	Zone 1	Zone 2
Name	Dep	Arr
Type of zone	active	active
Curbside length (feet)	690	100
Number of lanes	4	4
Number of approach lanes	2	2
Roadway volume (vph)	821	821
Curbside demand (vph)	791	23
Average dwell time (minutes)	2.03	3.10
Average vehicle length (feet)	25.03	25.00
Average vehicle arrival rate (vph)	791.00	23.00
Crosswalk adjustment factor	100.0%	100.0%
Regional adjustment factor	95.0%	95.0%
Through lane roadway capacity	2,685	2,865
Adjusted through lane roadway capacity	2,549	2,720
Estimated roadway V/C ratio	0.322	0.302
Curb capacity per lane (vehicles)	28.00	4.00
Curb utilization ratio	1.286	0.750
% occupancy in lane 1	1.000	0.740
% occupancy in lane 2	0.280	-
% occupancy in lane 3	-	-
# of cars in curbside lane	28.00	2.96
# of double-parked cars	7.84	-
# of triple-parked cars	-	-
Curbside LOS	C	A
Roadway LOS	B	B

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Summary of Inputs and Assumptions

Model run by: Armando Tineo on 6/20/2022

Airport	MSP
Roadway location	Terminal 1
Scenario	PAL 3 Arrivals Peak Concept 2
Level / type of roadway	Arrivals
Total lanes / approach lanes	5 / 2
Number of curbside zones	1
% of 1st lane full when next vehicle double parks	80%
% of 2nd lane full when next vehicle triple parks	50%
Crosswalk adjustment factor	100%
Regional adjustment factor	95%

Frontage and dwell time per curbside operation

Vehicle class	Vehicle parking length (feet)	Average dwell time (minutes)
POV	25.0	3.4
Staff	25.0	0.7
Recirc	25.0	0.2

Assumptions by zone

Zone ID	Zone 1
Name	Arr
Type	active
Curbside frontage (feet)	565.0
Number of lanes	5.0
Number of approach lanes	2.0

Volume of vehicles using roadway (vph)

POV	460
Staff	9
Recirc	90

Volume of vehicles using curbside (vph)

POV	370
Staff	9
Recirc	90

PAL 3 Concept 2 (Summer) - Terminal 1 - Arrivals

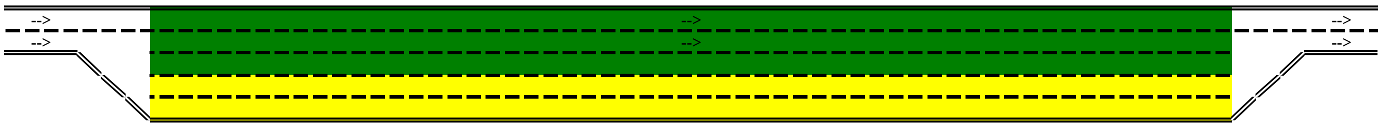
Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Level-of-Service by Zone

Model run by: Armando Tineo on 6/20/2022

Airport	MSP
Roadway location	Terminal 1
Scenario	PAL 3 Arrivals Peak Concept 2
Level / type of roadway	Arrivals
Total lanes / approach lanes	5 / 2
Number of curbside zones	1



Zone ID	**Zone 1**
Name/description	Arr
Curb length (feet)	565
Zone type	active
Roadway volume (vph)	559
Roadway capacity (vph)	2,706
Roadway V/C ratio	0.207
Roadway LOS	A
Curb demand (# in sys 95% of time)	29.0
Curb capacity per lane (vehicles)	23.0
Curb utilization ratio	1.261
Curb LOS	C

Level-of-service (LOS) key:

A
B
C
D
E
F

PAL 3 Concept 2 (Summer) - Terminal 1 - Arrivals

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Detailed Report By Zone

Model run by: Armando Tineo on 6/20/2022

ID	Zone 1
Name	Arr
Type of zone	active
Curbside length (feet)	565
Number of lanes	5
Number of approach lanes	2
Roadway volume (vph)	559
Curbside demand (vph)	469
Average dwell time (minutes)	2.73
Average vehicle length (feet)	25.00
Average vehicle arrival rate (vph)	469.00
Crosswalk adjustment factor	100.0%
Regional adjustment factor	95.0%
Through lane roadway capacity	2,850
Adjusted through lane roadway capacity	2,706
Estimated roadway V/C ratio	0.207
Curb capacity per lane (vehicles)	23.00
Curb utilization ratio	1.261
% occupancy in lane 1	1.000
% occupancy in lane 2	0.260
% occupancy in lane 3	-
# of cars in curbside lane	23.00
# of double-parked cars	5.98
# of triple-parked cars	-
Curbside LOS	C
Roadway LOS	A

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Summary of Inputs and Assumptions

Model run by: Tom Lehnherr on 11/17/2022

Airport	MSP
Roadway location	Terminal 1
Scenario	PAL 3 Concept 2 Summer
Level / type of roadway	Departures
Total lanes / approach lanes	4 / 2
Number of curbside zones	2
% of 1st lane full when next vehicle double parks	80%
% of 2nd lane full when next vehicle triple parks	50%
Crosswalk adjustment factor	100%
Regional adjustment factor	95%

Frontage and dwell time per curbside operation

Vehicle class	Vehicle parking length (feet)	Average dwell time (minutes)
POV DO	25.0	2.4
TNC DO	25.0	0.9
Taxi DO	25.0	1.3
Limo DO	30.0	1.2
Staff DO	25.0	0.7
Drive By	25.0	1.0
Recirc	25.0	0.2
POV PU	25.0	4.9
Staff PU	25.0	0.7

Assumptions by zone

Zone ID	Zone 1	Zone 2
Name	Dep	Dep
Type	active	active
Curbside frontage (feet)	565	565
Number of lanes	4	4
Number of approach lanes	2	2

Volume of vehicles using roadway (vph)

POV DO	856	856
TNC DO	463	463
Taxi DO	61	61
Limo DO	11	11

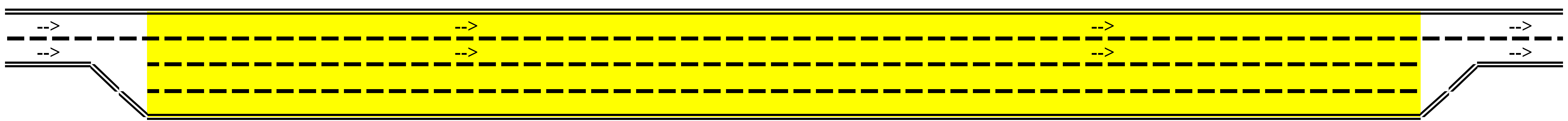
Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Level-of-Service by Zone

Model run by: Tom Lehnherr on 11/17/2022

Airport	MSP
Roadway location	Terminal 1
Scenario	PAL 3 Concept 2 Summer
Level / type of roadway	Departures
Total lanes / approach lanes	4 / 2
Number of curbside zones	2



Zone ID	Zone 1	Zone 2
Name/description	Dep	Dep
Curb length (feet)	565	565
Zone type	active	active
Roadway volume (vph)	1,400	1,400
Roadway capacity (vph)	2,562	2,562
Roadway V/C ratio	0.546	0.546
Roadway LOS	C	C
Curb demand (# in sys 95% of time)	29.0	29.0
Curb capacity per lane (vehicles)	23.0	23.0
Curb utilization ratio	1.261	1.261
Curb LOS	C	C

Level-of-service (LOS) key:

A
B
C
D
E
F

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Detailed Report By Zone

Model run by: Tom Lehnherr on 11/17/2022

ID	Zone 1	Zone 2
Name	Dep	Dep
Type of zone	active	active
Curbside length (feet)	565	565
Number of lanes	4	4
Number of approach lanes	2	2
Roadway volume (vph)	1,400	1,400
Curbside demand (vph)	700	700
Average dwell time (minutes)	1.84	1.84
Average vehicle length (feet)	25.04	25.04
Average vehicle arrival rate (vph)	700.00	700.00
Crosswalk adjustment factor	100.0%	100.0%
Regional adjustment factor	95.0%	95.0%
Through lane roadway capacity	2,699	2,699
Adjusted through lane roadway capacity	2,562	2,562
Estimated roadway V/C ratio	0.546	0.546
Curb capacity per lane (vehicles)	23.00	23.00
Curb utilization ratio	1.261	1.261
% occupancy in lane 1	1.000	1.000
% occupancy in lane 2	0.260	0.260
% occupancy in lane 3	-	-
# of cars in curbside lane	23.00	23.00
# of double-parked cars	5.98	5.98
# of triple-parked cars	-	-
Curbside LOS	C	C
Roadway LOS	C	C

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Summary of Inputs and Assumptions

Model run by: Armando TIneo on 6/16/2022

Airport	MSP
Roadway location	Terminal 2
Scenario	PAL 3 Combined Peak Concept 2
Level / type of roadway	Mixed
Total lanes / approach lanes	4 / 2
Number of curbside zones	2
% of 1st lane full when next vehicle double parks	80%
% of 2nd lane full when next vehicle triple parks	50%
Crosswalk adjustment factor	100%
Regional adjustment factor	95%

Frontage and dwell time per curbside operation

Vehicle class	Vehicle parking length (feet)	Average dwell time (minutes)
DO POV	25.0	2.5
DO TNC	25.0	1.1
DO Taxi	25.0	1.0
DO Limo	30.0	1.4
DO Staff	25.0	0.7
PU POV	25.0	4.9
PU Staff	25.0	0.7
PU Recirc	25.0	0.2

Assumptions by zone

Zone ID	Zone 1	Zone 2
Name	Dep	Arr
Type	active	active
Curbside frontage (feet)	365	690
Number of lanes	4	4
Number of approach lanes	2	2

Volume of vehicles using roadway (vph)

DO POV	362	362
DO TNC	61	61
DO Taxi	8	8
DO Limo	3	3
DO Staff	15	15
PU POV	324	324
PU Staff	4	4
PU Recirc	89	89

Volume of vehicles using curbside (vph)

DO POV	273	-
DO TNC	61	-
DO Taxi	8	-
DO Limo	3	-
DO Staff	15	-
PU POV	-	324
PU Staff	-	4
PU Recirc	-	89

PAL 3 Concept 2 (Summer) - Terminal 2 - Arrivals/Combined

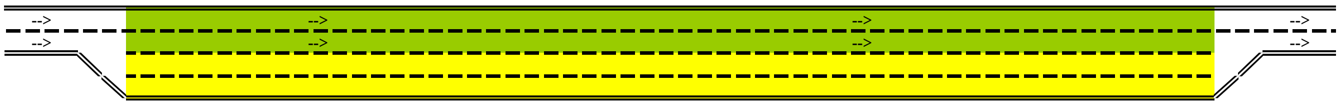
Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Level-of-Service by Zone

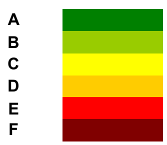
Model run by: Armando TIneo on 6/16/2022

Airport	MSP
Roadway location	Terminal 2
Scenario	PAL 3 Combined Peak Concept 2
Level / type of roadway	Mixed
Total lanes / approach lanes	4 / 2
Number of curbside zones	2



Zone ID	Zone 1	Zone 2
Name/description	Dep	Arr
Curb length (feet)	365	690
Zone type	active	active
Roadway volume (vph)	866	866
Roadway capacity (vph)	2,562	2,549
Roadway V/C ratio	0.338	0.340
Roadway LOS	B	B
Curb demand (# in sys 95% of time)	19.0	36.0
Curb capacity per lane (vehicles)	15.0	28.0
Curb utilization ratio	1.267	1.286
Curb LOS	C	C

Level-of-service (LOS) key:



Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Detailed Report By Zone

Model run by: Armando TIneo on 6/16/2022

ID	Zone 1	Zone 2
Name	Dep	Arr
Type of zone	active	active
Curbside length (feet)	365	690
Number of lanes	4	4
Number of approach lanes	2	2
Roadway volume (vph)	866	866
Curbside demand (vph)	360	417
Average dwell time (minutes)	2.15	3.86
Average vehicle length (feet)	25.04	25.00
Average vehicle arrival rate (vph)	360.00	417.00
Crosswalk adjustment factor	100.0%	100.0%
Regional adjustment factor	95.0%	95.0%
Through lane roadway capacity	2,699	2,685
Adjusted through lane roadway capacity	2,562	2,549
Estimated roadway V/C ratio	0.338	0.340
Curb capacity per lane (vehicles)	15.00	28.00
Curb utilization ratio	1.267	1.286
% occupancy in lane 1	1.000	1.000
% occupancy in lane 2	0.260	0.280
% occupancy in lane 3	-	-
# of cars in curbside lane	15.00	28.00
# of double-parked cars	3.90	7.84
# of triple-parked cars	-	-
Curbside LOS	C	C
Roadway LOS	B	B

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Summary of Inputs and Assumptions

Model run by: Armando Tineo on 6/29/2022

Airport	MSP
Roadway location	Terminal 2
Scenario	PAL 3 Summer Concept 2 Departures Peak
Level / type of roadway	Mixed
Total lanes / approach lanes	4 / 2
Number of curbside zones	2
% of 1st lane full when next vehicle double parks	80%
% of 2nd lane full when next vehicle triple parks	50%
Crosswalk adjustment factor	100%
Regional adjustment factor	95%

Frontage and dwell time per curbside operation

Vehicle class	Vehicle parking length (feet)	Average dwell time (minutes)
DO POV	25.0	2.5
DO TNC	25.0	1.1
DO Taxi	25.0	1.0
DO Limo	30.0	1.4
DO Staff	25.0	0.7
PU POV	25.0	4.9
PU Staff	25.0	0.7
PU Recirc	25.0	0.2

Assumptions by zone

Zone ID	Zone 1	Zone 2
Name	Dep	arr
Type	active	active
Curbside frontage (feet)	365	290
Number of lanes	4	4
Number of approach lanes	2	2

Volume of vehicles using roadway (vph)

DO POV	243	243
DO TNC	105	105
DO Taxi	9	9
DO Limo	4	4
DO Staff	25	25
PU POV	136	136
PU Staff	2	2
PU Recirc	23	23

Volume of vehicles using curbside (vph)

DO POV	243	-
DO TNC	105	-
DO Taxi	9	-
DO Limo	4	-
DO Staff	25	-
PU POV	-	113
PU Staff	-	2
PU Recirc	-	23

PAL 3 Concept 2 (Summer) - Terminal 2 - Departures

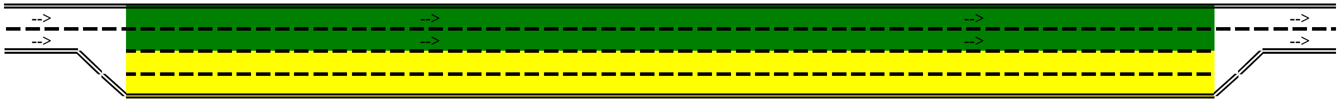
Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Level-of-Service by Zone

Model run by: Armando Tineo on 6/29/2022

Airport	MSP
Roadway location	Terminal 2
Scenario	PAL 3 Summer Concept 2 Departures Peak
Level / type of roadway	Mixed
Total lanes / approach lanes	4 / 2
Number of curbside zones	2



Zone ID	Zone 1	Zone 2
Name/description	Dep	arr
Curb length (feet)	365	290
Zone type	active	active
Roadway volume (vph)	547	547
Roadway capacity (vph)	2,562	2,569
Roadway V/C ratio	0.213	0.213
Roadway LOS	A	A
Curb demand (# in sys 95% of time)	19.0	15.0
Curb capacity per lane (vehicles)	15.0	12.0
Curb utilization ratio	1.267	1.250
Curb LOS	C	C

Level-of-service (LOS) key:

PAL 3 Concept 2 (Summer) - Terminal 2 - Departures

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Detailed Report By Zone

Model run by: Armando Tineo on 6/29/2022

ID	Zone 1	Zone 2
Name	Dep	arr
Type of zone	active	active
Curbside length (feet)	365	290
Number of lanes	4	4
Number of approach lanes	2	2
Roadway volume (vph)	547	547
Curbside demand (vph)	386	138
Average dwell time (minutes)	1.96	4.06
Average vehicle length (feet)	25.05	25.00
Average vehicle arrival rate (vph)	386.00	138.00
Crosswalk adjustment factor	100.0%	100.0%
Regional adjustment factor	95.0%	95.0%
Through lane roadway capacity	2,699	2,706
Adjusted through lane roadway capacity	2,562	2,569
Estimated roadway V/C ratio	0.213	0.213
Curb capacity per lane (vehicles)	15.00	12.00
Curb utilization ratio	1.267	1.250
% occupancy in lane 1	1.000	1.000
% occupancy in lane 2	0.260	0.240
% occupancy in lane 3	-	-
# of cars in curbside lane	15.00	12.00
# of double-parked cars	3.90	2.88
# of triple-parked cars	-	-
Curbside LOS	C	C
Roadway LOS	A	A

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Summary of Inputs and Assumptions

Model run by: Armando Tineo on 8/23/2022

Airport	MSP
Roadway location	Terminal 1
Scenario	ALT 3.1A
Level / type of roadway	Arrivals
Total lanes / approach lanes	5 / 2
Number of curbside zones	1
% of 1st lane full when next vehicle double parks	80%
% of 2nd lane full when next vehicle triple parks	50%
Crosswalk adjustment factor	100%
Regional adjustment factor	95%

Frontage and dwell time per curbside operation

Vehicle class	Vehicle parking length (feet)	Average dwell time (minutes)
POV	25.0	3.4
Staff	25.0	0.7
Recirc	25.0	0.2

Assumptions by zone

Zone ID	Zone 1
Name	Arrivals
Type	active
Curbside frontage (feet)	765.0
Number of lanes	5.0
Number of approach lanes	2.0

Volume of vehicles using roadway (vph)

POV	660
Staff	13
Recirc	133

Volume of vehicles using curbside (vph)

POV	527
Staff	13
Recirc	133

PAL 3 Concept 3.1A (Spring) - Terminal 1 - Arrivals

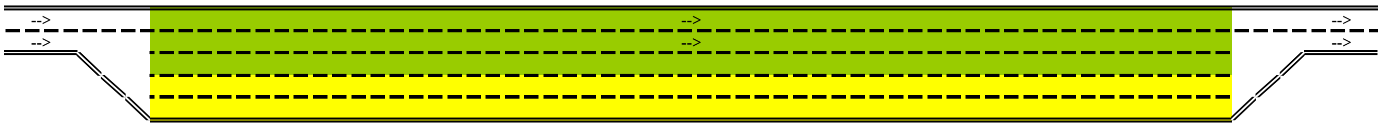
Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Level-of-Service by Zone

Model run by: Armando Tineo on 8/23/2022

Airport	MSP
Roadway location	Terminal 1
Scenario	ALT 3.1A
Level / type of roadway	Arrivals
Total lanes / approach lanes	5 / 2
Number of curbside zones	1



Zone ID	**Zone 1**
Name/description	Arrivals
Curb length (feet)	765
Zone type	active
Roadway volume (vph)	806
Roadway capacity (vph)	2,706
Roadway V/C ratio	0.298
Roadway LOS	B
Curb demand (# in sys 95% of time)	40.0
Curb capacity per lane (vehicles)	31.0
Curb utilization ratio	1.290
Curb LOS	C

Level-of-service (LOS) key:

PAL 3 Concept 3.1A (Spring) - Terminal 1 - Arrivals

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Detailed Report By Zone

Model run by: Armando Tineo on 8/23/2022

ID	Zone 1
Name	Arrivals
Type of zone	active
Curbside length (feet)	765
Number of lanes	5
Number of approach lanes	2
Roadway volume (vph)	806
Curbside demand (vph)	673
Average dwell time (minutes)	2.72
Average vehicle length (feet)	25.00
Average vehicle arrival rate (vph)	673.00
Crosswalk adjustment factor	100.0%
Regional adjustment factor	95.0%
Through lane roadway capacity	2,850
Adjusted through lane roadway capacity	2,706
Estimated roadway V/C ratio	0.298
Curb capacity per lane (vehicles)	31.00
Curb utilization ratio	1.290
% occupancy in lane 1	1.000
% occupancy in lane 2	0.290
% occupancy in lane 3	-
# of cars in curbside lane	31.00
# of double-parked cars	8.99
# of triple-parked cars	-
Curbside LOS	C
Roadway LOS	B

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Summary of Inputs and Assumptions

Model run by: Armando Tineo on 8/23/2022

Airport	MSP
Roadway location	Terminal 2
Scenario	ALT 3.1A
Level / type of roadway	Mixed
Total lanes / approach lanes	4 / 2
Number of curbside zones	2
% of 1st lane full when next vehicle double parks	80%
% of 2nd lane full when next vehicle triple parks	50%
Crosswalk adjustment factor	100%
Regional adjustment factor	95%

Frontage and dwell time per curbside operation

Vehicle class	Vehicle parking length (feet)	Average dwell time (minutes)
DO POV	25.0	2.5
DO TNC	25.0	1.1
DO Taxi	25.0	1.0
DO Limo	30.0	1.4
DO Staff	25.0	0.7
PU POV	25.0	4.9
PU Staff	25.0	0.7
PU Recirc	25.0	0.2

Assumptions by zone

Zone ID	Zone 1	Zone 2
Name	Departures	Arrivals
Type	active	active
Curbside frontage (feet)	25	940
Number of lanes	4	4
Number of approach lanes	2	2

Volume of vehicles using roadway (vph)

DO POV	-	-
DO TNC	-	-
DO Taxi	-	-
DO Limo	-	-
DO Staff	8	8
PU POV	601	601
PU Staff	8	8
PU Recirc	131	131

Volume of vehicles using curbside (vph)

DO POV	-	-
DO TNC	-	-
DO Taxi	-	-
DO Limo	-	-
DO Staff	8	-
PU POV	-	470
PU Staff	-	8
PU Recirc	-	131

PAL 3 Concept 3.1A (Spring) - Terminal 2 - Arrivals

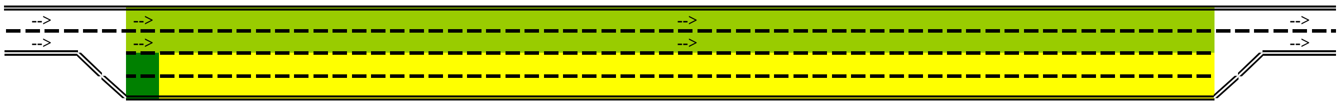
Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Level-of-Service by Zone

Model run by: Armando Tineo on 8/23/2022

Airport	MSP
Roadway location	Terminal 2
Scenario	ALT 3.1A
Level / type of roadway	Mixed
Total lanes / approach lanes	4 / 2
Number of curbside zones	2



Zone ID	Zone	Zone 2
Name/description	Departures	Arrivals
Curb length (feet)	25	940
Zone type	active	active
Roadway volume (vph)	748	748
Roadway capacity (vph)	###	2,549
Roadway V/C ratio	###	0.293
Roadway LOS	B	B
Curb demand (# in sys 95% of time)	1.0	49.0
Curb capacity per lane (vehicles)	1.0	38.0
Curb utilization ratio	###	1.289
Curb LOS	A	C

Level-of-service (LOS) key:

A
B
C
D
E
F

PAL 3 Concept 3.1A (Spring) - Terminal 2 - Arrivals

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Detailed Report By Zone

Model run by: Armando Tineo on 8/23/2022

ID	Zone 1	Zone 2
Name	Departures	Arrivals
Type of zone	active	active
Curbside length (feet)	25	940
Number of lanes	4	4
Number of approach lanes	2	2
Roadway volume (vph)	748	748
Curbside demand (vph)	8	609
Average dwell time (minutes)	0.70	3.83
Average vehicle length (feet)	25.00	25.00
Average vehicle arrival rate (vph)	8.00	609.00
Crosswalk adjustment factor	100.0%	100.0%
Regional adjustment factor	95.0%	95.0%
Through lane roadway capacity	2,825	2,685
Adjusted through lane roadway capacity	2,682	2,549
Estimated roadway V/C ratio	0.279	0.293
Curb capacity per lane (vehicles)	1.00	38.00
Curb utilization ratio	1.000	1.289
% occupancy in lane 1	0.895	1.000
% occupancy in lane 2	0.095	0.280
% occupancy in lane 3	-	-
# of cars in curbside lane	0.90	38.00
# of double-parked cars	0.10	10.64
# of triple-parked cars	-	-
Curbside LOS	A	C
Roadway LOS	B	B

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Summary of Inputs and Assumptions

Model run by: Armando Tineo on 8/23/2022

Airport	MSP
Roadway location	Terminal 2
Scenario	ALT 3.1A
Level / type of roadway	Mixed
Total lanes / approach lanes	4 / 2
Number of curbside zones	2
% of 1st lane full when next vehicle double parks	80%
% of 2nd lane full when next vehicle triple parks	50%
Crosswalk adjustment factor	100%
Regional adjustment factor	95%

Frontage and dwell time per curbside operation

Vehicle class	Vehicle parking length (feet)	Average dwell time (minutes)
DO POV	25.0	2.5
DO TNC	25.0	1.1
DO Taxi	25.0	1.0
DO Limo	30.0	1.4
DO Staff	25.0	0.7
PU POV	25.0	4.9
PU Staff	25.0	0.7
PU Recirc	25.0	0.2

Assumptions by zone

Zone ID	Zone 1	Zone 2
Name	Departures	Arrivals
Type	active	active
Curbside frontage (feet)	490	765
Number of lanes	4	4
Number of approach lanes	2	2
Volume of vehicles using roadway (vph)		
DO POV	334	334
DO TNC	167	167
DO Taxi	14	14
DO Limo	3	3
DO Staff	15	15
PU POV	457	457
PU Staff	4	4
PU Recirc	89	89
Volume of vehicles using curbside (vph)		
DO POV	334	-
DO TNC	167	-
DO Taxi	14	-
DO Limo	3	-
DO Staff	15	-
PU POV	-	368
PU Staff	-	4
PU Recirc	-	89

PAL 3 Concept 3.1A (Spring) - Terminal 2 - Combined

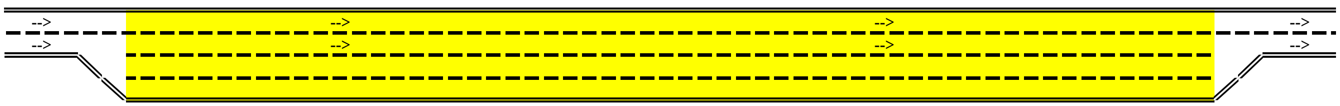
Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Level-of-Service by Zone

Model run by: Armando Tineo on 8/23/2022

Airport	MSP
Roadway location	Terminal 2
Scenario	ALT 3.1A
Level / type of roadway	Mixed
Total lanes / approach lanes	4 / 2
Number of curbside zones	2



Zone ID	Zone 1	Zone 2
Name/description	Departures	Arrivals
Curb length (feet)	490	765
Zone type	active	active
Roadway volume (vph)	1,083	1,083
Roadway capacity (vph)	2,569	2,543
Roadway V/C ratio	0.422	0.426
Roadway LOS	C	C
Curb demand (# in sys 95% of time)	25.0	40.0
Curb capacity per lane (vehicles)	20.0	31.0
Curb utilization ratio	1.250	1.290
Curb LOS	C	C

Level-of-service (LOS) key:

A
B
C
D
E
F

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Detailed Report By Zone

Model run by: Armando Tineo on 8/23/2022

ID	Zone 1	Zone 2
Name	Departures	Arrivals
Type of zone	active	active
Curbside length (feet)	490	765
Number of lanes	4	4
Number of approach lanes	2	2
Roadway volume (vph)	1,083	1,083
Curbside demand (vph)	533	461
Average dwell time (minutes)	1.97	3.96
Average vehicle length (feet)	25.03	25.00
Average vehicle arrival rate (vph)	533.00	461.00
Crosswalk adjustment factor	100.0%	100.0%
Regional adjustment factor	95.0%	95.0%
Through lane roadway capacity	2,706	2,678
Adjusted through lane roadway capacity	2,569	2,543
Estimated roadway V/C ratio	0.422	0.426
Curb capacity per lane (vehicles)	20.00	31.00
Curb utilization ratio	1.250	1.290
% occupancy in lane 1	1.000	1.000
% occupancy in lane 2	0.240	0.290
% occupancy in lane 3	-	-
# of cars in curbside lane	20.00	31.00
# of double-parked cars	4.80	8.99
# of triple-parked cars	-	-
Curbside LOS	C	C
Roadway LOS	C	C

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Summary of Inputs and Assumptions

Model run by: Armando Tineo on 8/23/2022

Airport	MSP
Roadway location	Terminal 2
Scenario	ALT 3.1A
Level / type of roadway	Mixed
Total lanes / approach lanes	4 / 2
Number of curbside zones	2
% of 1st lane full when next vehicle double parks	80%
% of 2nd lane full when next vehicle triple parks	50%
Crosswalk adjustment factor	100%
Regional adjustment factor	95%

Frontage and dwell time per curbside operation

Vehicle class	Vehicle parking length (feet)	Average dwell time (minutes)
DO POV	25.0	2.5
DO TNC	25.0	1.1
DO Taxi	25.0	1.0
DO Limo	30.0	1.4
DO Staff	25.0	0.7
PU POV	25.0	4.9
PU Staff	25.0	0.7
PU Recirc	25.0	0.2

Assumptions by zone

Zone ID	Zone 1	Zone 2
Name	Departures	Arrivals
Type	active	active
Curbside frontage (feet)	840	90
Number of lanes	4	4
Number of approach lanes	2	2

Volume of vehicles using roadway (vph)

DO POV	680	680
DO TNC	241	241
DO Taxi	26	26
DO Limo	7	7
DO Staff	25	25
PU POV	25	25
PU Staff	2	2
PU Recirc	-	-

Volume of vehicles using curbside (vph)

DO POV	680	-
DO TNC	241	-
DO Taxi	26	-
DO Limo	7	-
DO Staff	25	-
PU POV	-	25
PU Staff	-	2
PU Recirc	-	-

PAL 3 Concept 3.1A (Spring) - Terminal 2 - Departures

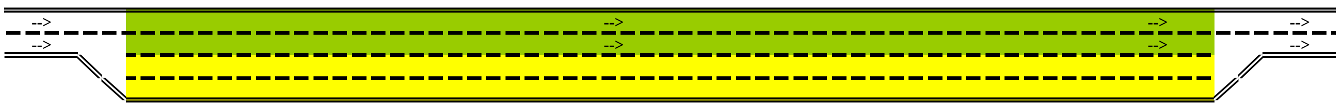
Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Level-of-Service by Zone

Model run by: Armando Tineo on 8/23/2022

Airport	MSP
Roadway location	Terminal 2
Scenario	ALT 3.1A
Level / type of roadway	Mixed
Total lanes / approach lanes	4 / 2
Number of curbside zones	2



Zone ID	Zone 1	Zone 2
Name/description	Departures	Arrivals
Curb length (feet)	840	90
Zone type	active	active
Roadway volume (vph)	1,006	1,006
Roadway capacity (vph)	2,562	2,569
Roadway V/C ratio	0.393	0.392
Roadway LOS	B	B
Curb demand (# in sys 95% of time)	43.0	5.0
Curb capacity per lane (vehicles)	34.0	4.0
Curb utilization ratio	1.265	1.250
Curb LOS	C	C

Level-of-service (LOS) key:

A
B
C
D
E
F

PAL 3 Concept 3.1A (Spring) - Terminal 2 - Departures

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Detailed Report By Zone

Model run by: Armando Tineo on 8/23/2022

ID	Zone 1	Zone 2
Name	Departures	Arrivals
Type of zone	active	active
Curbside length (feet)	840	90
Number of lanes	4	4
Number of approach lanes	2	2
Roadway volume (vph)	1,006	1,006
Curbside demand (vph)	979	27
Average dwell time (minutes)	2.06	4.59
Average vehicle length (feet)	25.04	25.00
Average vehicle arrival rate (vph)	979.00	27.00
Crosswalk adjustment factor	100.0%	100.0%
Regional adjustment factor	95.0%	95.0%
Through lane roadway capacity	2,699	2,706
Adjusted through lane roadway capacity	2,562	2,569
Estimated roadway V/C ratio	0.393	0.392
Curb capacity per lane (vehicles)	34.00	4.00
Curb utilization ratio	1.265	1.250
% occupancy in lane 1	1.000	1.000
% occupancy in lane 2	0.260	0.240
% occupancy in lane 3	-	-
# of cars in curbside lane	34.00	4.00
# of double-parked cars	8.84	0.96
# of triple-parked cars	-	-
Curbside LOS	C	C
Roadway LOS	B	B

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Summary of Inputs and Assumptions

Model run by: Tom Lehnherr on 11/17/2022

Airport	MSP
Roadway location	Terminal 1
Scenario	PAL 3 Concept 3.1A Spring
Level / type of roadway	Departures
Total lanes / approach lanes	4 / 2
Number of curbside zones	1
% of 1st lane full when next vehicle double parks	80%
% of 2nd lane full when next vehicle triple parks	50%
Crosswalk adjustment factor	100%
Regional adjustment factor	95%

Frontage and dwell time per curbside operation

Vehicle class	Vehicle parking length (feet)	Average dwell time (minutes)
POV DO	25.0	2.4
TNC DO	25.0	0.9
Taxi DO	25.0	1.3
Limo DO	30.0	1.2
Staff DO	25.0	0.7
Drive By	25.0	1.0
Recirc	25.0	0.2
POV PU	25.0	4.9
Staff PU	25.0	0.7

Assumptions by zone

Zone ID	Zone 1
Name	Dep
Type	active
Curbside frontage (feet)	890
Number of lanes	4
Number of approach lanes	2

Volume of vehicles using roadway (vph)

POV DO	711
TNC DO	385
Taxi DO	50
Limo DO	9

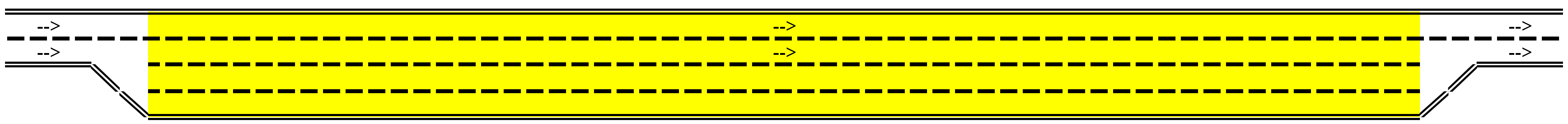
Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Level-of-Service by Zone

Model run by: Tom Lehnherr on 11/17/2022

Airport	MSP
Roadway location	Terminal 1
Scenario	PAL 3 Concept 3.1A Spring
Level / type of roadway	Departures
Total lanes / approach lanes	4 / 2
Number of curbside zones	1



Zone ID	**Zone 1**
Name/description	Dep
Curb length (feet)	890
Zone type	active
Roadway volume (vph)	1,166
Roadway capacity (vph)	2,556
Roadway V/C ratio	0.456
Roadway LOS	C
Curb demand (# in sys 95% of time)	46.0
Curb capacity per lane (vehicles)	36.0
Curb utilization ratio	1.278
Curb LOS	C

Level-of-service (LOS) key:

A
B
C
D
E
F

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Detailed Report By Zone

Model run by: Tom Lehnherr on 11/17/2022

ID	Zone 1
Name	Dep
Type of zone	active
Curbside length (feet)	890
Number of lanes	4
Number of approach lanes	2
Roadway volume (vph)	1,166
Curbside demand (vph)	1,166
Average dwell time (minutes)	1.83
Average vehicle length (feet)	25.04
Average vehicle arrival rate (vph)	1,166.00
Crosswalk adjustment factor	100.0%
Regional adjustment factor	95.0%
Through lane roadway capacity	2,692
Adjusted through lane roadway capacity	2,556
Estimated roadway V/C ratio	0.456
Curb capacity per lane (vehicles)	36.00
Curb utilization ratio	1.278
% occupancy in lane 1	1.000
% occupancy in lane 2	0.270
% occupancy in lane 3	-
# of cars in curbside lane	36.00
# of double-parked cars	9.72
# of triple-parked cars	-
Curbside LOS	C
Roadway LOS	C

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Summary of Inputs and Assumptions

Model run by: Tom Lehnherr on 8/31/2022

Airport	MSP
Roadway location	Terminal 1
Scenario	PAL 3 3.1A Summer
Level / type of roadway	Departures
Total lanes / approach lanes	4 / 2
Number of curbside zones	1
% of 1st lane full when next vehicle double parks	80%
% of 2nd lane full when next vehicle triple parks	50%
Crosswalk adjustment factor	100%
Regional adjustment factor	95%

Frontage and dwell time per curbside operation

Vehicle class	Vehicle parking length (feet)	Average dwell time (minutes)
POV DO	25.0	1.3
TNC DO	25.0	0.9
Taxi DO	25.0	1.3
Limo DO	30.0	1.2
Staff DO	25.0	0.7
Drive By	25.0	1.0
Recirc	25.0	0.7
POV PU	25.0	3.4
Staff PU	25.0	0.2

Assumptions by zone

Zone ID	Zone 1
Name	T1 Arr
Type	active
Curbside frontage (feet)	940
Number of lanes	4
Number of approach lanes	2

Volume of vehicles using roadway (vph)

POV DO	-
TNC DO	-
Taxi DO	-
Limo DO	-

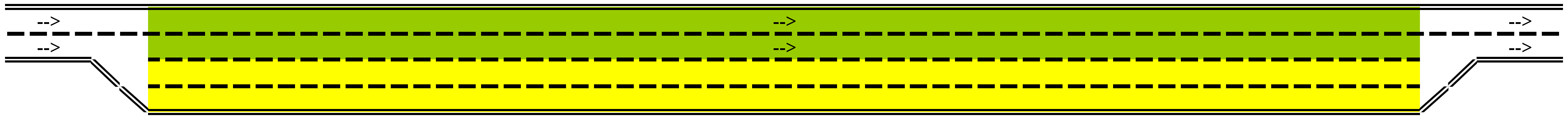
Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Level-of-Service by Zone

Model run by: Tom Lehnherr on 8/31/2022

Airport	MSP
Roadway location	Terminal 1
Scenario	PAL 3 3.1A Summer
Level / type of roadway	Departures
Total lanes / approach lanes	4 / 2
Number of curbside zones	1



Zone ID	**Zone 1**
Name/description	T1 Arr
Curb length (feet)	940
Zone type	active
Roadway volume (vph)	1,010
Roadway capacity (vph)	2,549
Roadway V/C ratio	0.396
Roadway LOS	B
Curb demand (# in sys 95% of time)	49.0
Curb capacity per lane (vehicles)	38.0
Curb utilization ratio	1.289
Curb LOS	C

Level-of-service (LOS) key:

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Detailed Report By Zone

Model run by: Tom Lehnherr on 8/31/2022

ID	Zone 1
Name	T1 Arr
Type of zone	active
Curbside length (feet)	940
Number of lanes	4
Number of approach lanes	2
Roadway volume (vph)	1,010
Curbside demand (vph)	836
Average dwell time (minutes)	2.80
Average vehicle length (feet)	25.00
Average vehicle arrival rate (vph)	836.00
Crosswalk adjustment factor	100.0%
Regional adjustment factor	95.0%
Through lane roadway capacity	2,685
Adjusted through lane roadway capacity	2,549
Estimated roadway V/C ratio	0.396
Curb capacity per lane (vehicles)	38.00
Curb utilization ratio	1.289
% occupancy in lane 1	1.000
% occupancy in lane 2	0.280
% occupancy in lane 3	-
# of cars in curbside lane	38.00
# of double-parked cars	10.64
# of triple-parked cars	-
Curbside LOS	C
Roadway LOS	B

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Summary of Inputs and Assumptions

Model run by: Tom Lehnherr on 11/17/2022

Airport	MSP
Roadway location	Terminal 1
Scenario	PAL 3 Concept 3.1A Summer
Level / type of roadway	Departures
Total lanes / approach lanes	4 / 2
Number of curbside zones	2
% of 1st lane full when next vehicle double parks	80%
% of 2nd lane full when next vehicle triple parks	50%
Crosswalk adjustment factor	100%
Regional adjustment factor	95%

Frontage and dwell time per curbside operation

Vehicle class	Vehicle parking length (feet)	Average dwell time (minutes)
POV DO	25.0	2.4
TNC DO	25.0	0.9
Taxi DO	25.0	1.3
Limo DO	30.0	1.2
Staff DO	25.0	0.7
Drive By	25.0	1.0
Recirc	25.0	0.2
POV PU	25.0	4.9
Staff PU	25.0	0.7

Assumptions by zone

Zone ID	Zone 1	Zone 2
Name	dep	dep
Type	active	active
Curbside frontage (feet)	540	540
Number of lanes	4	4
Number of approach lanes	2	2

Volume of vehicles using roadway (vph)

POV DO	784	784
TNC DO	496	496
Taxi DO	49	49
Limo DO	26	26

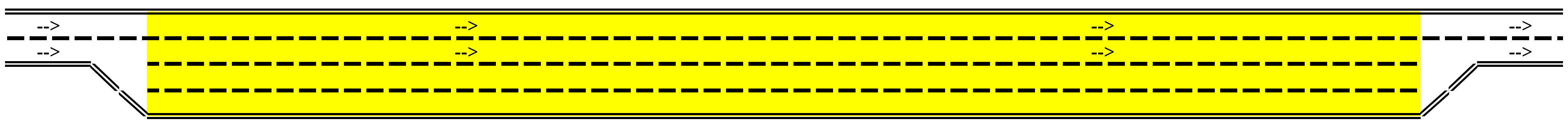
Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Level-of-Service by Zone

Model run by: Tom Lehnherr on 11/17/2022

Airport	MSP
Roadway location	Terminal 1
Scenario	PAL 3 Concept 3.1A Summer
Level / type of roadway	Departures
Total lanes / approach lanes	4 / 2
Number of curbside zones	2



Zone ID	Zone 1	Zone 2
Name/description	dep	dep
Curb length (feet)	540	540
Zone type	active	active
Roadway volume (vph)	1,368	1,368
Roadway capacity (vph)	2,556	2,556
Roadway V/C ratio	0.535	0.535
Roadway LOS	C	C
Curb demand (# in sys 95% of time)	28.0	28.0
Curb capacity per lane (vehicles)	22.0	22.0
Curb utilization ratio	1.273	1.273
Curb LOS	C	C

Level-of-service (LOS) key:

A
B
C
D
E
F

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Detailed Report By Zone

Model run by: Tom Lehnherr on 11/17/2022

ID	Zone 1	Zone 2
Name	dep	dep
Type of zone	active	active
Curbside length (feet)	540	540
Number of lanes	4	4
Number of approach lanes	2	2
Roadway volume (vph)	1,368	1,368
Curbside demand (vph)	684	684
Average dwell time (minutes)	1.78	1.78
Average vehicle length (feet)	25.10	25.10
Average vehicle arrival rate (vph)	684.00	684.00
Crosswalk adjustment factor	100.0%	100.0%
Regional adjustment factor	95.0%	95.0%
Through lane roadway capacity	2,692	2,692
Adjusted through lane roadway capacity	2,556	2,556
Estimated roadway V/C ratio	0.535	0.535
Curb capacity per lane (vehicles)	22.00	22.00
Curb utilization ratio	1.273	1.273
% occupancy in lane 1	1.000	1.000
% occupancy in lane 2	0.270	0.270
% occupancy in lane 3	-	-
# of cars in curbside lane	22.00	22.00
# of double-parked cars	5.94	5.94
# of triple-parked cars	-	-
Curbside LOS	C	C
Roadway LOS	C	C

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Summary of Inputs and Assumptions

Model run by: Tom Lehnherr on 8/31/2022

Airport	MSP
Roadway location	Terminal 1
Scenario	PAL 3 3.1A Summer
Level / type of roadway	Departures
Total lanes / approach lanes	4 / 2
Number of curbside zones	2
% of 1st lane full when next vehicle double parks	80%
% of 2nd lane full when next vehicle triple parks	50%
Crosswalk adjustment factor	100%
Regional adjustment factor	95%

Frontage and dwell time per curbside operation

Vehicle class	Vehicle parking length (feet)	Average dwell time (minutes)
POV DO	25.0	2.5
TNC DO	25.0	1.1
Taxi DO	25.0	1.0
Limo DO	30.0	1.4
Staff DO	25.0	0.7
Drive By	25.0	1.0
Recirc	25.0	0.2
POV PU	25.0	4.9
Staff PU	25.0	0.7

Assumptions by zone

Zone ID	Zone 1	Zone 2
Name	T2 Dep	T2 Arr
Type	active	active
Curbside frontage (feet)	465	890
Number of lanes	4	4
Number of approach lanes	2	2

Volume of vehicles using roadway (vph)

POV DO	359	359
TNC DO	82	82
Taxi DO	11	11
Limo DO	1	1

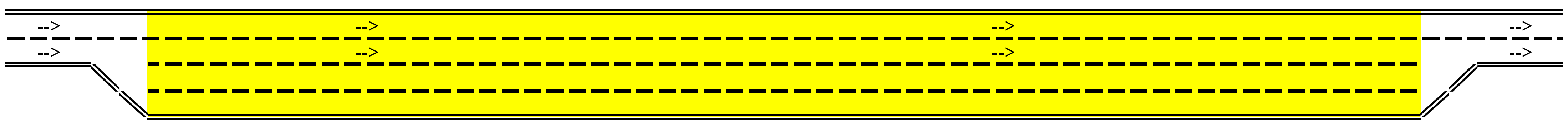
Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Level-of-Service by Zone

Model run by: Tom Lehnherr on 8/31/2022

Airport	MSP
Roadway location	Terminal 1
Scenario	PAL 3 3.1A Summer
Level / type of roadway	Departures
Total lanes / approach lanes	4 / 2
Number of curbside zones	2



Zone ID	Zone 1	Zone 2
Name/description	T2 Dep	T2 Arr
Curb length (feet)	465	890
Zone type	active	active
Roadway volume (vph)	1,157	1,157
Roadway capacity (vph)	2,562	2,556
Roadway V/C ratio	0.452	0.453
Roadway LOS	C	C
Curb demand (# in sys 95% of time)	24.0	46.0
Curb capacity per lane (vehicles)	19.0	36.0
Curb utilization ratio	1.263	1.278
Curb LOS	C	C

Level-of-service (LOS) key:

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Detailed Report By Zone

Model run by: Tom Lehnherr on 8/31/2022

ID	Zone 1	Zone 2
Name	T2 Dep	T2 Arr
Type of zone	active	active
Curbside length (feet)	465	890
Number of lanes	4	4
Number of approach lanes	2	2
Roadway volume (vph)	1,157	1,157
Curbside demand (vph)	461	567
Average dwell time (minutes)	2.18	3.78
Average vehicle length (feet)	25.01	25.00
Average vehicle arrival rate (vph)	461.00	567.00
Crosswalk adjustment factor	100.0%	100.0%
Regional adjustment factor	95.0%	95.0%
Through lane roadway capacity	2,699	2,692
Adjusted through lane roadway capacity	2,562	2,556
Estimated roadway V/C ratio	0.452	0.453
Curb capacity per lane (vehicles)	19.00	36.00
Curb utilization ratio	1.263	1.278
% occupancy in lane 1	1.000	1.000
% occupancy in lane 2	0.260	0.270
% occupancy in lane 3	-	-
# of cars in curbside lane	19.00	36.00
# of double-parked cars	4.94	9.72
# of triple-parked cars	-	-
Curbside LOS	C	C
Roadway LOS	C	C

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Summary of Inputs and Assumptions

Model run by: Tom Lehnherr on 8/31/2022

Airport	MSP
Roadway location	Terminal 1
Scenario	PAL 3 3.1A Summer
Level / type of roadway	Departures
Total lanes / approach lanes	4 / 2
Number of curbside zones	2
% of 1st lane full when next vehicle double parks	80%
% of 2nd lane full when next vehicle triple parks	50%
Crosswalk adjustment factor	100%
Regional adjustment factor	95%

Frontage and dwell time per curbside operation

Vehicle class	Vehicle parking length (feet)	Average dwell time (minutes)
POV DO	25.0	2.5
TNC DO	25.0	1.1
Taxi DO	25.0	1.0
Limo DO	30.0	1.4
Staff DO	25.0	0.7
Drive By	25.0	1.0
Recirc	25.0	0.2
POV PU	25.0	4.9
Staff PU	25.0	0.7

Assumptions by zone

Zone ID	Zone 1	Zone 2
Name	T2 Dep	T2 Arr
Type	active	active
Curbside frontage (feet)	540	815
Number of lanes	4	4
Number of approach lanes	2	2

Volume of vehicles using roadway (vph)

POV DO	429	429
TNC DO	85	85
Taxi DO	18	18
Limo DO	4	4

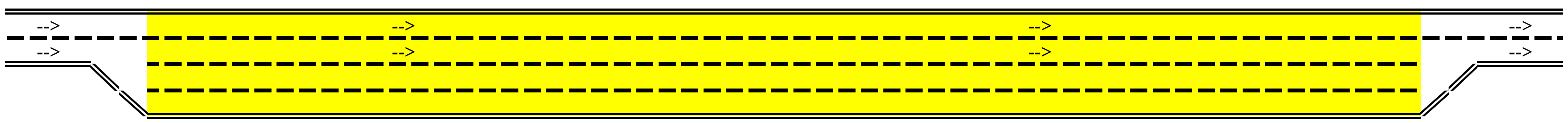
Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Level-of-Service by Zone

Model run by: Tom Lehnherr on 8/31/2022

Airport	MSP
Roadway location	Terminal 1
Scenario	PAL 3 3.1A Summer
Level / type of roadway	Departures
Total lanes / approach lanes	4 / 2
Number of curbside zones	2



Zone ID	Zone 1	Zone 2
Name/description	T2 Dep	T2 Arr
Curb length (feet)	540	815
Zone type	active	active
Roadway volume (vph)	1,214	1,214
Roadway capacity (vph)	2,556	2,556
Roadway V/C ratio	0.475	0.475
Roadway LOS	C	C
Curb demand (# in sys 95% of time)	28.0	42.0
Curb capacity per lane (vehicles)	22.0	33.0
Curb utilization ratio	1.273	1.273
Curb LOS	C	C

Level-of-service (LOS) key:

A
B
C
D
E
F

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Detailed Report By Zone

Model run by: Tom Lehnherr on 8/31/2022

ID	Zone 1	Zone 2
Name	T2 Dep	T2 Arr
Type of zone	active	active
Curbside length (feet)	540	815
Number of lanes	4	4
Number of approach lanes	2	2
Roadway volume (vph)	1,214	1,214
Curbside demand (vph)	683	399
Average dwell time (minutes)	1.80	4.86
Average vehicle length (feet)	25.03	25.00
Average vehicle arrival rate (vph)	683.00	399.00
Crosswalk adjustment factor	100.0%	100.0%
Regional adjustment factor	95.0%	95.0%
Through lane roadway capacity	2,692	2,692
Adjusted through lane roadway capacity	2,556	2,556
Estimated roadway V/C ratio	0.475	0.475
Curb capacity per lane (vehicles)	22.00	33.00
Curb utilization ratio	1.273	1.273
% occupancy in lane 1	1.000	1.000
% occupancy in lane 2	0.270	0.270
% occupancy in lane 3	-	-
# of cars in curbside lane	22.00	33.00
# of double-parked cars	5.94	8.91
# of triple-parked cars	-	-
Curbside LOS	C	C
Roadway LOS	C	C

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Summary of Inputs and Assumptions

Model run by: Tom Lehnherr on 8/31/2022

Airport	MSP
Roadway location	Terminal 1
Scenario	PAL 3 3.1A Summer
Level / type of roadway	Departures
Total lanes / approach lanes	4 / 2
Number of curbside zones	2
% of 1st lane full when next vehicle double parks	80%
% of 2nd lane full when next vehicle triple parks	50%
Crosswalk adjustment factor	100%
Regional adjustment factor	95%

Frontage and dwell time per curbside operation

Vehicle class	Vehicle parking length (feet)	Average dwell time (minutes)
POV DO	25.0	2.5
TNC DO	25.0	1.1
Taxi DO	25.0	1.0
Limo DO	30.0	1.4
Staff DO	25.0	0.7
Drive By	25.0	1.0
Recirc	25.0	0.2
POV PU	25.0	4.9
Staff PU	25.0	0.7

Assumptions by zone

Zone ID	Zone 1	Zone 2
Name	T2 Dep	T2 Arr
Type	active	active
Curbside frontage (feet)	715	215
Number of lanes	4	4
Number of approach lanes	2	2

Volume of vehicles using roadway (vph)

POV DO	553	553
TNC DO	228	228
Taxi DO	25	25
Limo DO	9	9

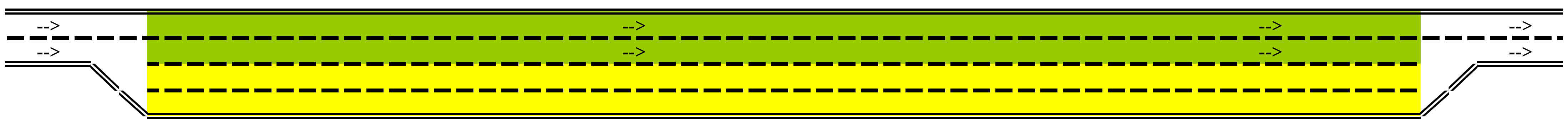
Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Level-of-Service by Zone

Model run by: Tom Lehnherr on 8/31/2022

Airport	MSP
Roadway location	Terminal 1
Scenario	PAL 3 3.1A Summer
Level / type of roadway	Departures
Total lanes / approach lanes	4 / 2
Number of curbside zones	2



Zone ID	Zone 1	Zone 2
Name/description	T2 Dep	T2 Arr
Curb length (feet)	715	215
Zone type	active	active
Roadway volume (vph)	954	954
Roadway capacity (vph)	2,556	2,587
Roadway V/C ratio	0.373	0.369
Roadway LOS	B	B
Curb demand (# in sys 95% of time)	37.0	11.0
Curb capacity per lane (vehicles)	29.0	9.0
Curb utilization ratio	1.276	1.222
Curb LOS	C	C

Level-of-service (LOS) key:

A
B
C
D
E
F

Quick Analysis Tool for Airport Roadways

QATAR v0.6 developed by LeighFisher in association with Dowling Associates, Inc.

Results: Detailed Report By Zone

Model run by: Tom Lehnherr on 8/31/2022

ID	Zone 1	Zone 2
Name	T2 Dep	T2 Arr
Type of zone	active	active
Curbside length (feet)	715	215
Number of lanes	4	4
Number of approach lanes	2	2
Roadway volume (vph)	954	954
Curbside demand (vph)	840	99
Average dwell time (minutes)	2.01	4.10
Average vehicle length (feet)	25.05	25.00
Average vehicle arrival rate (vph)	840.00	99.00
Crosswalk adjustment factor	100.0%	100.0%
Regional adjustment factor	95.0%	95.0%
Through lane roadway capacity	2,692	2,725
Adjusted through lane roadway capacity	2,556	2,587
Estimated roadway V/C ratio	0.373	0.369
Curb capacity per lane (vehicles)	29.00	9.00
Curb utilization ratio	1.276	1.222
% occupancy in lane 1	1.000	1.000
% occupancy in lane 2	0.270	0.220
% occupancy in lane 3	-	-
# of cars in curbside lane	29.00	9.00
# of double-parked cars	7.83	1.98
# of triple-parked cars	-	-
Curbside LOS	C	C
Roadway LOS	B	B

TECHNICAL MEMORANDUM

To: Eric Gilles
Metropolitan Airports Commission

From: William J. Schmitz, P.E.
Kimley-Horn and Associates, Inc.

Date: June 30th, 2022

Subject: ***MSP Airport 2040 LTP***
Future Landside Facility Requirements – Parking, Rental Cars, and Commercial Ground Transportation

CONTENT

1 OVERVIEW

This memorandum describes future landside parking, rental car, and commercial ground transportation (GT) facility requirements for the Minneapolis-St. Paul International Airport (MSP). This work is being completed as part of the MSP 2040 Long Term Plan (LTP). Kimley-Horn determined the future facility requirements using a data driven approach that incorporated parking and commercial vehicle data provided by the Metropolitan Airports Commission (MAC) and a rental car company survey.

Future landside facility requirements established in this technical memorandum will inform landside development alternatives.

2 PLANNING ASSUMPTIONS

2.1 Planning Activity Levels

Planning Activity Levels (PALs) based on projections of future annual enplanement activity were determined by Ricondo and Associates, Inc. as part of the MSP 2040 Long Term Plan Forecast Technical Memorandum dated November 2021. The PALs established in the MSP 2040 LTP forecast were used for the future requirements. The forecast enplanement values used for the landside requirements assume an aggressive recovery from the COVID-19 pandemic. Each PAL, estimated year, and corresponding activity are presented in **Table 1.**

Since landside facilities are only used by originating and departing (O&D) passengers, the projected enplanements were split between O&D enplanements and connecting enplanements. The *Forecast Technical Memorandum,* prepared by Ricondo & Associates, Inc., identifies that O&D passengers will vary to consist of between 59% and 63% of enplanements over the planning horizon.

Table 1. PAL Activity Summary

	Forecast			
	2019	**PAL 1 (2025)**	**PAL 2 (2030)**	**PAL 3 (2040)**
Passenger Aircraft Operations (000)	372.1	382.1	407.1	465.0
Enplaned Passengers (mil)	19.8	22.3	24.1	28.1
O&D Enplaned Passengers (mil)	12.1	13.6	14.6	16.7

Source: Ricondo & Associates, Inc., Forecast Technical Memo, Section 10 – Revised Baseline Forecast and DDFS Tables.

2.2 Design Day Flight Schedules

Design Day Flight Schedules (DDFSs), prepared by Ricondo & Associates, Inc., were used to determine peak hour activity through the planning horizon. The number of terminating passengers for the peak hour was determined using the summer design day flight schedule. The DDFS activity was adjusted using an early arrival curve and a late departure curve. Refer to the *Curbfront and Access Roadway Requirements Technical Memorandum* for curve description. The summer design day was used because passenger and flight peaking activity impacts commercial vehicle forecasts, which typically peaks during the summer. The number of arriving and departing flights in the peak hour were obtained directly from the Ricondo DDFS forecast. Since departing and arriving air traffic activity peak at different times throughout the day, the total number of peak hour flights indicates the peak of the combined originating and departing activity. **Table 2** presents projected peak hour activity at MSP, inclusive of activity at Terminal 1 and Terminal 2.

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Table 2. Summer Design Day Peak Hour Activity

	2019 (1)	PAL 1	PAL 2	PAL 3
Terminating Passengers	4,668	3,724	4,470	5,767
Total Flights	99	102	103	124

(1) Flight schedule from August 8th, 2019.

Sources: Kimley-Horn and Associates, Inc.; Ricondo & Associates, Inc., Forecast Technical Memo, Section 10 – Revised Baseline Forecast and DDFS Tables.

2.3 Existing Landside Facility Requirements

The *Existing Landside Facility Requirements Technical Memorandum,* prepared by Kimley-Horn and Associates, Inc., served as the basis for the future landside facility requirements. For further details regarding methodologies utilized for existing requirements, refer to the *Existing Landside Facility Requirements Technical Memorandum* dated October 8, 2021.

2.4 Electric Vehicle (EV) Considerations – Public and Employee Parking

EV use has grown substantially over the past several years. The current EV fleet has driven an increasing demand for EV charging infrastructure. Kimley-Horn researched the goals for EVs set by the federal government, the State of Minnesota, and vehicle manufacturers to inform future EV utilization and potential infrastructure requirements.

2.4.1 Public Policy Research

2.4.1.1 US Government

Support for increased EV infrastructure is greatly supported by the Biden Administration, which has stated their intentions to invest $15 billion by 2030 to fund a nationwide network of over 500,000 EV charging stations[1]. In support of this goal, the FHWA launched its 5th round of "Alternative Fuel Corridors" to help install infrastructure that supports electric vehicle operations along the interstate system as well as state and local roadways. The Biden Administration has indicated that the national goal is for 50 percent of all new vehicles sales to be EV by 2030.

2.4.1.2 Minnesota State

In the 2019 *Pathways to Decarbonizing Transportation in Minnesota*[2] report, three EV sales growth scenarios were identified. The 80x50 scenario combines several strategies to achieve an 80% reduction in emissions by 2050 to meet the Next Generation Energy Act goal. The 100x50 scenario hopes to achieve a 100% reduction in emissions below 2005 levels by 2050. This scenario was explored to account for other sectors not reaching emission targets and to prevent catastrophic climate change. Given the current trajectory of emission reduction in Minnesota, the 80x50 scenario seems more realistic to achieve than the 100x50 goal. The 80x50 scenario would require 40% of new vehicles sales to be EV by 2030, and 80% by 2050.

[1] The White House, *Fact Sheet: Biden Administration Advances Electric Vehicle Charging Infrastructure*, 2021.
[2] Minnesota Department of Transportation, *Pathways to Decarbonizing Transportation*, August 2019.

2.4.1.3 Automotive Manufacturing

Many vehicle manufacturers have developed plans for EV market expansion in the next 5 to 15 years. Several auto manufacturers, including Hyundai, Jaguar, Lexus, Mercedes-Benz, and Volvo, have committed to have 100 percent EV sales by 2030. Others, such as BMW, Ford, Honda, Nissan, and Volkswagen, have stated that 40 or 50 percent of all their vehicle sales will be EV by 2030. All manufacturers with stated commitments to advancing EV sales anticipate 100 percent of their new vehicle sales to be EVs by 2040.

2.4.2 EV Fleet Projections

EVs currently represent a small percentage of total passenger vehicles on the road. In 2021, EVs represented only 1.33% of total registered vehicles in Minnesota. To estimate the number of EVs in the fleet through the planning horizon, three sales scenarios were explored. The scenarios were developed based on professional judgement and available research data. The assumptions of each scenario are described in **Table 3** and take into consideration national goals, auto manufacturer plans, and MN-specific goals.

Table 3. EV Sales Scenarios and Descriptions

Sales Scenario	Description	Assumptions
Scenario 1	National Goals	2030: EV sales account for 50% of all new vehicle sales. 2050: EV sales account for 100% of all new vehicle sales.
Scenario 2	Auto Manufacturer Plans	2030: EV sales account for 40% of all new vehicle sales. 2035: EV sales account for 80% of all new vehicle sales. 2040: EV sales account for 100% of all new vehicle sales.
Scenario 3	MN 80 x 50 Goal	2030: EV sales account for 40% of all new vehicle sales. 2050: EV sales account for 80% of all new vehicle sales.

Annual light-duty vehicle sales forecasts through 2050 were obtained from the U.S. Energy Information Administration[3] for the West North Central region. State motor vehicle registrations for 2020 were used to estimate the percent of vehicle sales in the West North Central region attributed to Minnesota residents[4]. This percent was assumed to stay constant through the planning horizon. Using these scenarios, historical data, and the projected vehicle sales information, the number of EVs on the road and the total number of registered vehicles was estimated. Vehicles were assumed to reach their end of life based on a normal distribution with a mean of 15 years and a variance of 5 years. The total number of registered vehicles in Minnesota is anticipated to decrease for the next 10 to 15 years, as consistent with historical trends, to approximately 1.5 million registered vehicles in 2040.

Kimley-Horn recommends planning for Scenario 2 for EV adoption and fleet percentages through 2030. The auto manufacturers will be a driving force in the adoption of EVs as they control the types and quantity of EVs and conventional internal combustion engine vehicles that are available. Kimley-Horn recommends planning for Scenario 3 after 2030 since this reflects the stated goals for Minnesota and is supported by

[3] U.S. Energy Information Administration, *AEO2022 National Energy Modeling System* (accessed April 2022).
[4] U.S. Department of Transportation, Federal Highway Administration, *State Motor-Vehicle Registrations – 2020*.

current policy. **Table 4** presents the details of each sales scenario and the Kimley-Horn recommendation. The recommended values will be used later in this document for EV charger planning recommendations.

Table 4. EV Fleet Percentage in Minnesota

Year	Total Projected Vehicle Fleet [(1)]	EV Fleet (Percent Total Fleet)			
		Scenario 1	Scenario 2	Scenario 3	Recommendation
2019		0.44%			
2020		0.57%			
2021		0.84%			
2025 (PAL 1)	1,900,384	3.5%	3.1%	3.1%	3.1%
2030 (PAL 2)	1,652,872	14.9%	12.3%	12.3%	12.3%
2040 (PAL 3)	1,563,340	52.3%	60.4%	42.0%	42.0%

[(1)] *Total vehicle fleet only includes light-duty vehicles. The electrification of trucks was not analyzed as part of this study.*

2.5 EV Considerations – Rental Car Agencies

Similar to public and employee parking, rental car fleets will transition from internal combustion engine (ICE) vehicles to primarily EVs. The percent EVs in the rental car fleet will differ from the public and employee parking fleet because of a shorter rental car fleet vehicle lifespan. Rental car agencies operating at MSP are contractually obligated to replace vehicles every three years. This will increase the percent EVs in the rental car fleet faster than the public.

Rental car agencies have stated a business desire to convert their fleets to EVs, including one large national brand planning to convert their entire fleet by 2025. Aggressive corporate goals may not immediately manifest in greater rates of EVs within the fleet, but the trend towards fleet electrification should not be diminished due to the significant electrical loads associated with maintaining an all-EV fleet.

Kimley-Horn recommends planning for aggressive EV fleet growth at MSP, consistent with Scenario 1 identified in Section 2.4.2 above. **Table 5** presents the Kimley-Horn recommended rental car EV fleet projection. The recommended values will be used later in this document for EV charger planning recommendations.

Table 5. Rental Car EV Fleet Percentage

	EV Fleet (Percent Total Fleet)
2025 (PAL 1)	19%
2030 (PAL 2)	53%
2040 (PAL 3)	96%

2.6 Autonomous Vehicles (AVs)

Autonomous vehicles (AVs) have been a topic of great discussion in the transportation industry for the last couple of years. However, the discussion surrounding AVs has since subdued. While the technology for some levels of autonomy is available, legal and liability issues are currently being discussed. The regulatory environment for how AVs would operate within the general fleet is also undefined. Currently, vehicles with autonomy Levels 1 and 2 are commercially available. Vehicles with Level 1 automation require the human to drive the vehicle but the vehicle may support the driver with features such as lane centering or adaptive cruise control[5]. Experts predict that it will take at least 20 years or more until Level 4 and Level 5 vehicles are available to consumers. Level 5 vehicles are fully autonomous vehicles that can drive everywhere in all conditions without human assistance or supervision[5]. Since cars can have a life span of up to 30 years, the ubiquitous adoption of AVs can lag significantly behind when these vehicles are first introduced so the widespread implementation of fully autonomous vehicles is likely to occur much after 2040. Airport roadway networks are also particularly complex for wayfinding and navigating. As such, this study assumes that AVs will not have a significant impact on future facility requirements through 2040. MAC should continue to monitor the trends in the AV industry to be able to prepare for facility improvements to accommodate AVs when/if the time comes.

3 PARKING REQUIREMENTS

The MSP public parking ramps accommodate both public parkers and a subset of airline, tenant, and concessionaire employees. Additional public and employee parking supply is currently provided in off-airport, private facilities and surface parking lots distributed across the MSP campus serving specific tenants.

Kimley-Horn performed a baseline parking requirements analysis (see Section 3.1) assuming no change in passenger and employee behavior over the planning horizon. Changes in customer behavior over time could result in changing parking requirements at a given PAL. Kimley-Horn assessed potential changes in customer behavior through PAL 1 (see Section 3.2) to test the resiliency of the existing parking system and inform potential near-term development requirements.

3.1 Baseline Requirements

3.1.1 Employee Parking

The employee parking stall requirement includes airline staff, based flight crews, tenant staff, and concessionaire staff, and MAC staff authorized to park in the airport operated parking ramps. Some Delta Airlines employees currently parking in privately operated lots accessible from 34th Avenue. Delta Airlines employee parking requirements are estimated separately from other parking requirements since MAC does not currently provide parking for these users but may as part of the alternatives development process. Parking requirements related to tenants and MAC staff parking in surface lots distributed across the MSP campus are not included in this analysis.

The existing employee parking stall requirement was grown at the same rate as annual passenger aircraft operations through the planning horizon to determine future requirements. Aircraft operations, rather than passenger enplanements, was used because there is not a direct, linear relationship between employees and passengers. More employees are generally required to accommodate additional flight operations and the passengers aboard these flights. As discussed in the *Existing Landside Facilities Requirements Technical*

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[5] SAE International, *SAE J3016 Levels of Driving Automation* (accessed April 2022).

Memorandum, the parking requirement accounts for a 10% service factor to account for inefficiencies in parking operations and enhanced demand during shift changes. The resulting employee parking stall requirements for PAL 1, PAL 2, and PAL 3 are presented in **Table 6.**

Table 6. Employee Parking Requirement

	Requirement (1)			
	2019	**PAL 1**	**PAL 2**	**PAL 3**
On-Airport Employees	1,900	1,950	2,080	2,380
Delta Airlines Off-Airport Employees (2)(3)	1,660	1,700	1,810	2,070
Total	3,560	3,650	2,890	4,450

(1) Rounded to the nearest 10 stalls.

(2) Requirement estimated from observed traffic activity in March 2021 and employee parking occupancy in Silver Ramp in January 2021. Future studies should verify Delta employee parking requirement.

(3) Growth based on Delta flight operation growth.

3.1.2 Public Parking

The existing public parking stall requirement was grown at the same rate as the annual O&D enplanements through the planning horizon to determine future requirements. The parking requirement includes an assessment of both on-airport and off-airport parking requirements, consistent with existing conditions. As discussed in the *Existing Landside Facilities Requirements Technical Memorandum*, the parking requirement accounts for a 5% service factor to account for parking inefficiencies. The resulting public parking stall requirements for PAL 1, PAL 2, and PAL 3 are presented in **Table 7**.

Table 7. Public Parking Requirement - Baseline

	Requirement (1)			
	2019	**PAL 1**	**PAL 2**	**PAL 3**
On-Airport	18,800	21,090	22,640	25,900
Off-Airport	5,700	6,370	6,840	7,820
Total	24,500	27,460	29,480	33,720

(1) Rounded to the nearest 10 stalls.

3.1.3 Airport Requirements

The baseline forecast, presented in **Table 8**, provides the parking requirements for the airport as a whole; terminal specific parking requirements will be explored in more detail as part of the Alternatives chapter. Mode choices and customer behavior are also difficult to anticipate with emerging technology.

Table 8. Baseline Parking Requirement

	Requirement [1]		
	PAL 1	PAL 2	PAL 3
Public Parking [2]	27,460	29,480	33,720
Employee Parking [3]	1,950	2,080	2,380
Total Requirement	**29,410**	**31,560**	**36,100**

[1] Rounded to the nearest 10 stalls.

[2] Includes on- and off-airport public parking

[3] Excludes Delta employee parking

Anticipated changes to on-airport and off-airport parking supply will result in significant parking supply changes at the airport. Various parking supply scenarios were analyzed to estimate the future surplus or deficits. The supply scenarios analyzed include:

- **Supply Stage 1: Existing –** Assumes all existing MAC parking facilities are open and no developments have impacted the supply of off-airport operators. **Table 9** provides the estimated surplus/deficit for Stage 1.
- **Supply Stage 2: Off-Airport Development and Red/Blue Ramps CIP –** Assumes off-airport developments have reduced the private operator parking supply with the loss of the Park 'N Fly surface lot, approximately 1,000 stalls. This stage also assumes the Red and Blue Ramps Levels 2 and 3 are converted to public parking, adding an additional 1,700 public parking stalls. **Table 10** provides the estimated surplus/deficit for Stage 2.
- **Supply Stage 3: Green/Gold Ramps Demolition –** In addition to the impacts to the parking supply from Supply Stage 2, Supply Stage 3 accounts for the loss of on-airport parking with the demotion of the Green and Gold Ramps. It also includes the additional reduction of off-airport parking supply with the loss of the Park 'N Go surface lot and the Park 'N Fly parking ramp, approximately 2,100 stalls. **Table 11** provides the estimated surplus/deficit for Stage 3.

Table 9. Parking Surplus/Deficit – Stage 1

	Number of Stalls [1]		
	PAL 1	PAL 2	PAL 3
Total Requirement	29,410	31,560	36,100
Total Parking Supply		33,220	
Surplus/(Deficit)	3,810	1,660	(2,880)

[1] Rounded to the nearest 10 stalls.

Table 10. Parking Surplus/Deficit – Stage 2

	Number of Stalls [1]		
	PAL 1	PAL 2	PAL 3
Total Requirement	29,410	31,560	36,100
Total Parking Supply		33,920	
Surplus/(Deficit)	4,510	2,360	(2,180)

[1] Rounded to the nearest 10 stalls.

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Table 11. Parking Surplus/Deficit – Stage 3

	Number of Stalls (1)		
	PAL 1	PAL 2	PAL 3
Total Requirement	29,410	31,560	36,100
Total Parking Supply		23,870	
Surplus/(Deficit)	(5,540)	(7,690)	(12,230)

(1) *Rounded to the nearest 10 stalls.*

3.2 PAL 1 Parking Gap Analysis

Parking scenarios were evaluated at PAL 1 as part of the gap analysis to assess campus wide and terminal specific parking requirements and near-term development priorities.

3.2.1 Considerations

Elements that were analyzed as part of the PAL 1 scenarios include:

- Propensity to Park
- Requirements by Terminal
- Employee Allocations
- Existing On-Airport Parking Supply
- Off-Airport Parking Developments

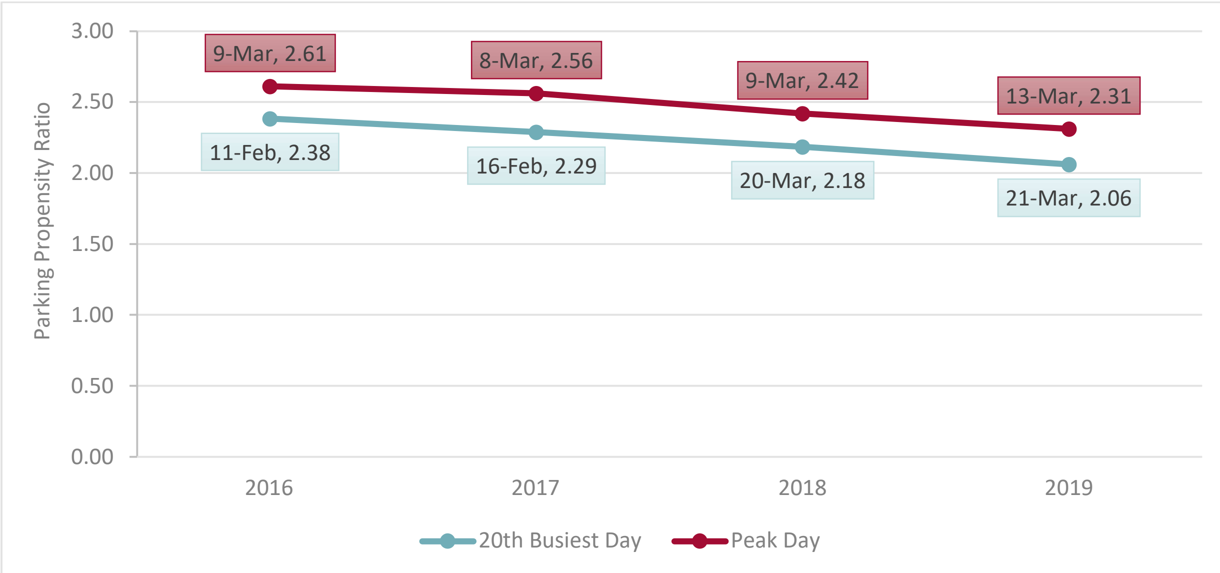
While off-airport parking is operated by private entities, the loss of off-airport parking availability due to private developments will impact the on-airport parking stall requirement.

3.2.1.1 Propensity to Park

The propensity to park is a metric that correlates parking occupancy with O&D passenger activity, which provides insight into passenger preference over time. For this study, propensity to park was calculated as the parking occupancy per 1,000 annual O&D enplanements. The propensity to park was calculated as a function of the observed on-airport and estimated off-airport parking occupancy to comprehensively understand airport parking demand.

The propensity to park at MSP has been steadily decreasing since 2016. The design day propensity to park has fallen approximately 16% between 2016 and 2019, as shown in **Figure 1**. The peak day propensity to park followed a parallel trajectory, suggesting that parking behavior is relatively consistent between the peak day and the design day.

Figure 1. Historical Propensity (2016 to 2019)

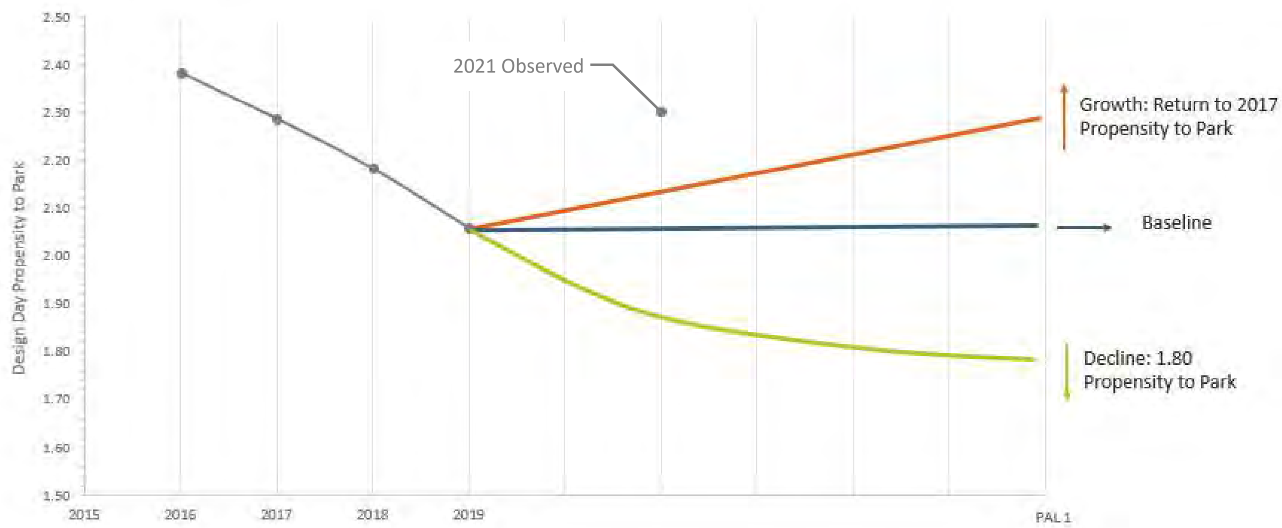


The COVID-19 pandemic had dramatic impacts on the propensity to park. In 2020, passenger activity was low and parking activity was high, resulting in a spike in the propensity to park. In 2021, the propensity to park normalized, but did see an increase from 2019. The design day propensity to park in 2021 was 2.31 vehicles per 1,000 enplanements, similar to 2017 levels.

A range of propensity to park values were evaluated for the PAL 1 gap analysis, as described below and illustrated in **Figure 2**:

- **Decline** – Assumes the design day propensity to park declines to 1.80 vehicles per 1,000 annual enplanements at PAL 1. This situation would indicate that historical trends continue, with an equilibrium point reached in the mode share market at a propensity to park of approximately 1.80. A continued decline in propensity to park would suggest that changes in passenger behavior observed during the pandemic will not be sustained in the long term.
- **Baseline** – Assumes the design day propensity to park through PAL 1 remains at 2.06 vehicles per 1,000 annual enplanements, consistent with the propensity observed in 2019. The baseline propensity to park indicates that customer behavior does not substantially change between 2019 and PAL 1.
- **Growth** – Assumes a design day propensity to park increase to 2.29 vehicles per 1,000 annual enplanements, consistent with the propensity observed in 2017 and again in 2021. A growth in propensity to park would reflect a lasting change in passenger behavior. In addition, the parking supply increase associated with the opening of the Silver Ramp may stimulate a natural increase in propensity to park, as passengers feel more confident that they will be able to find a parking spot at Terminal 1.

Figure 2. PAL 1 Propensity to Park Scenarios



3.2.1.2 Activity By Terminal

To assess the impacts of future parking requirements on each terminal's facilities, the terminal specific parking stall requirement was estimated for employee and public parking, assuming unconstrained facilities. Product-specific parking stall requirement is an important metric for planning because overbuilding certain products, regardless of the total airport parking demand, can result in underutilized parking facilities and investments that do not align with the Airport's goals.

Terminal specific employee parking stall requirements for PAL 1 were based on the existing percent of gates located at each terminal. The number of gates serves as a proxy for the number of ticket counters, gate agents, concessions staff, ground service, etc. needed at each terminal. The parking scenarios evaluate employee parking at both terminals to determine if operational changes are feasible to enhance the employee parking experience.

For public parking facilities at PAL 1, the demand was refined based on the split between passengers at Terminal 1 and Terminal 2. Monthly passenger data by airline for 2019 was obtained from the Bureau of Transportation Statistics (BTS). The airline operational conditions for 2019 determined which airlines operated at each terminal and are assumed to remain the same through PAL 1. The split of passenger activity for March, the peak month for public parking, was used throughout the future public parking requirements analysis. It was assumed that the total number of passengers at each terminal is proportional to the number of O&D passengers at each terminal. **Table 12** presents the assumed percent of passenger and employee activity at each terminal.

Table 12. Terminal Specific Activity

Activity Type	Terminal	
	Terminal 1	Terminal 2
Employee	88.1%	11.9%
Public Parking	79.6%	20.4%

Sources: Bureau of Transportation Statistics (BTS); MSP Airport Website.

3.2.1.3 On-Airport Parking Supply

This assessment assumes that the Quick Ride Ramp reopens to Terminal 1 public parking customers and that all other existing MSP parking ramps remain open for public or employee use through PAL 1. Refer to **Table 13** and **Table 14** for the assumed PAL 1 On-Airport parking supply.

Table 13. PAL 1 On-Airport Parking Supply – Terminal 1

	Stalls
Valet Ramp	389
Brown/Gold Ramp	3,721
Pink/Green Ramp	3,835
Red Ramp	2,806
Blue Ramp	2,650
Silver Ramp	3,394
Quick Ride Ramp	1,704
Total	18,499

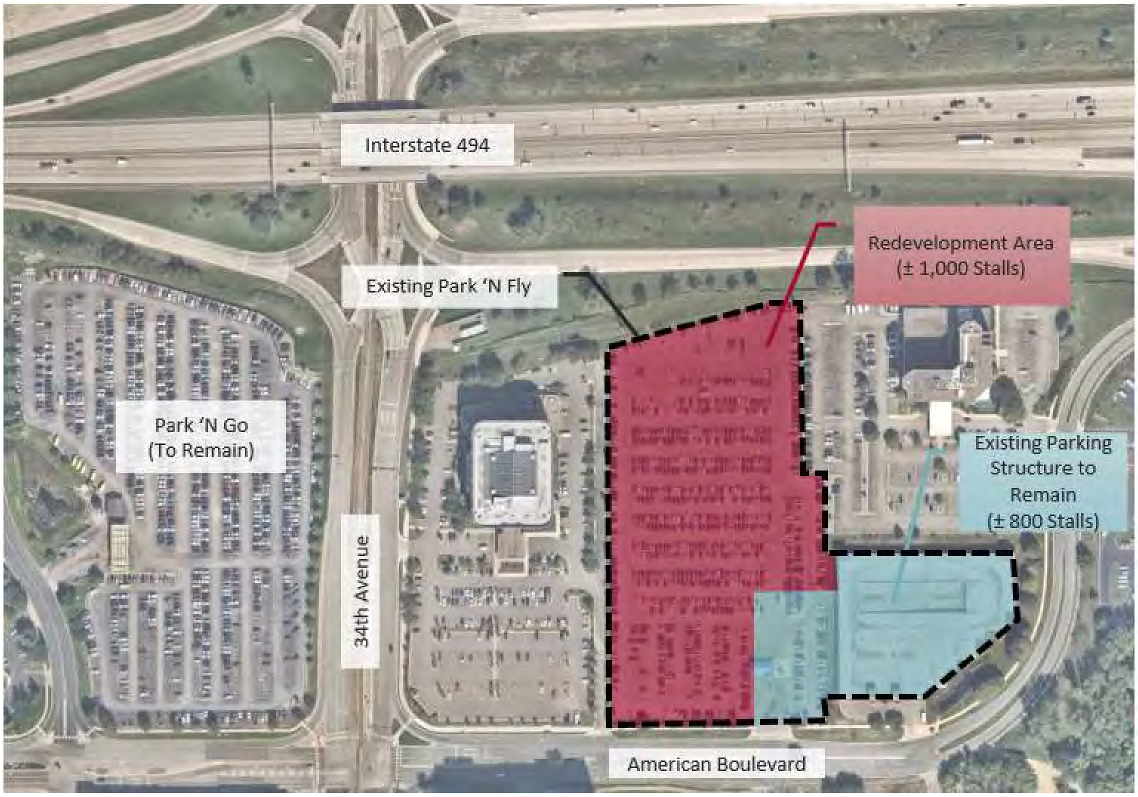
Table 14. PAL 1 On-Airport Parking Supply – Terminal 2

	Stalls
Purple Ramp	4,002
Orange Ramp	4,668
Total	8,716

3.2.1.4 Off-Airport Public Parking Re-Development

Off-airport parking options provide an alternative parking product for passengers. A new development, occupying part of the existing Park 'N Fly facility has been approved by the City of Bloomington, with construction anticipated to begin in 2022. **Figure 3** illustrates the anticipated impacts to available off-airport parking supply, reducing the estimated available supply from 6,000 stalls in 2019 to 5,000 available stalls by PAL 1.

Figure 3. Off-Airport Parking Redevelopment Footprint



A decrease in off-airport parking stall supply will increase on-airport parking stall requirements. This study assumed that off-airport parking customers would utilize on-airport parking when the off-airport parking demand exceeds available supply. Off-airport parkers re-assigned to on-airport parking are assumed to park at each Terminal consistent with the assumptions in Section 3.2.1.2.

3.2.1.5 Delta Airlines Off-Airport Employee Parking

This study assumes the existing Delta Airlines employee parking lots accessed from 34th Avenue are not impacted and remain available for employee parking through PAL 1.

3.2.2 PAL 1 Scenarios

The analyzed parking scenarios are outlined in **Table 15** and described in detail in the sections below.

Table 15. Parking Scenarios Assumptions

	Propensity to Park	Off-Airport Development	Employee Parking at Terminal 1
Scenario 1.1	Decline	Yes	Yes
Scenario 1.2	Baseline	Yes	Yes
Scenario 1.3	Growth	Yes	No

3.2.2.1 Scenario 1.1

Public parking Scenario 1.1 evaluates a future scenario with a reduced propensity to park and off-airport development impacts. To analyze holistic parking demand at each terminal, Scenario 1.1 would operationally allow all employees to park at the terminal of their choice. Public parking demand is also calculated by terminal, based on the specifications outlined in **Section 3.2.1.2**.

Scenario 1.1 public parking requirements were calculated by reducing the baseline requirement to account for a change in design day propensity to park from 2.06 to 1.80 vehicles per 1,000 annual originating enplanements. Future off-airport parking requirements were calculated using the same methodology. Due to the reduction in available off-airport parking supply, the off-airport parking requirement that cannot be met with the off-airport parking supply was added to the on-airport parking requirement. The parking requirements for Scenario 1.1 are presented in **Table 16**.

Table 16. Design Day Parking Requirements – PAL 1 Scenario 1.1

	Supply (1)	Requirement (1)				Surplus/ (Deficit) (1)
		Public Parking	Employee Parking (2)	Excess Off-Airport Parking	Total	
On-Airport: Terminal 1	18,500	14,680	1,720	450	16,850	**1,650**
On-Airport: Terminal 2	8,720	3,760	230	120	4,110	**4,610**
Off-Airport	5,000	5,570	--	(570)	5,000	**0**
Total	**32,220**	**24,010**	**1,950**	**0**	**25,960**	**6,260**

(1) Rounded to the nearest 10 stalls.

(2) Excludes Delta Employee Parking

With Scenario 1.1, the results presented in **Table 16** show that:

- The projected total parking supply can meet the design day requirement with an excess of parking stalls at each terminal.
- Terminal 2 is underutilized with a design day requirement of only approximately 47% of the available capacity.
- Employees would be able to park at either terminal without compromising public parking revenue.

3.2.2.2 Scenario 1.2

Scenario 1.2 evaluates a future situation where the propensity to park remains consistent with observed 2019 levels. Park ‘N Fly development will decrease off-airport parking supply and employees can park at the terminal of their choice. The parking requirements for Scenario 1.2 are presented in **Table 17**.

Table 17. Design Day Parking Requirements – PAL 1 Scenario 1.2

	Supply (1)	Requirement (1)				Surplus/ (Deficit) (1)
		Public Parking	Employee Parking (2)	Excess Off-Airport Parking	Total	
On-Airport: Terminal 1	18,500	16,800	1,720	1,090	19,610	**(1,110)**
On-Airport: Terminal 2	8,720	4,300	230	280	4,810	**3,910**
Off-Airport	5,000	6,370	--	(1,370)	5,000	**0**
Total	**32,220**	**27,470**	**1,950**	**0**	**29,420**	**2,800**

(1) Rounded to the nearest 10 stalls.

(3) Excludes Delta Employee Parking

With Scenario 1.2, the results presented in **Table 17** show that:

- The projected total parking supply can meet the design day requirement with an excess of parking stalls at Terminal 2.
- The projected total parking supply cannot meet the Terminal 1 design day requirement with an excess of parking stalls. Additional parking development at Terminal 1 is required to accommodate Scenario 1.2.
- Terminal 2 is underutilized with a design day requirement of only approximately 55% of the available capacity.
- Off-airport parking supply is required to meet the total parking requirement on the design day. This suggests that the continued loss of additional off-airport parking supply could trigger the need for on-airport parking development by PAL 1.

3.2.2.3 Scenario 1.3

Scenario 1.3 stress tests the existing facilities by increasing the propensity to park to 2.29 vehicles per 1,000 enplanements, in addition to the loss of off-airport parking supply. Employees are not provided the option of parking at their preferred terminal and must utilize the Terminal 2 parking ramps. Only employees parking at Terminal 1 before the pandemic were assumed to remain. The parking requirements for Scenario 1.3 are presented in **Table 18**.

Table 18. Design Day Parking Requirements – PAL 1 Scenario 1.3

	Supply (1)	Requirement (1)				Surplus/ (Deficit) (1)
		Public Parking	Employee Parking (2)	Excess Off-Airport Parking	Total	
On-Airport: Terminal 1	18,500	18,670	250	1,660	20,580	**(2,080)**
On-Airport: Terminal 2	8,720	4,780	1,700	420	6,900	**1,820**
Off-Airport	5,000	7,080	--	(2,080)	5,000	**0**
Total	**32,220**	**30,530**	**1,950**	**0**	**32,480**	**(260)**

(1) Rounded to the nearest 10 stalls.
(4) Excludes Delta Employee Parking

With Scenario 1.3, the results presented in **Table 18** show that:

- The projected total parking supply cannot meet the Terminal 1 design day requirement. Additional parking development at Terminal 1 is required to accommodate Scenario 1.3.
- Terminal 2 is better utilized with 79% occupancy on the design day.
- The projected total parking supply cannot meet the design day requirement.

3.2.4 PAL 1 Gap Analysis Summary and Recommendations

A summary of the PAL 1 scenario results for total airport parking, Terminal 1 and Terminal 2 are presented in **Figure 4**, **Figure 5**, and **Figure 6,** respectively. Based on these results, Kimley-Horn recommends:

- *Employee parking should remain at Terminal 2.* Employees parking at Terminal 2 prior to the COVID-19 pandemic should return to Terminal 2. Only employees previously parking in the nested Terminal 1 area should remain at Terminal 1. This will help minimize the number of public parking diversions needed throughout the year. If employees remain at Terminal 1, only Scenario 1.1 can be accommodated with the existing facilities (see **Figure 5**). Additionally, moving employees back to Terminal 2 will not impact the ability for Terminal 2 ramps to meet the projected demand.
- *Near-term Terminal 1 parking development.* MAC should move forward with the proposed CIP project to convert Red and Blue Ramps Levels 2 and 3 to public parking at Terminal 1. The additional public parking will help meet Terminal 1 design day parking requirements for Scenario 1.2 and will almost cover the demand in Scenario 1.3. This is the lowest cost parking MSP can develop as all other locations, such as the Purple Ramp, Orange Ramp, or Silver Ramp expansions, require new structures.

Figure 4. PAL 1 Parking Gap Analysis – Total Airport

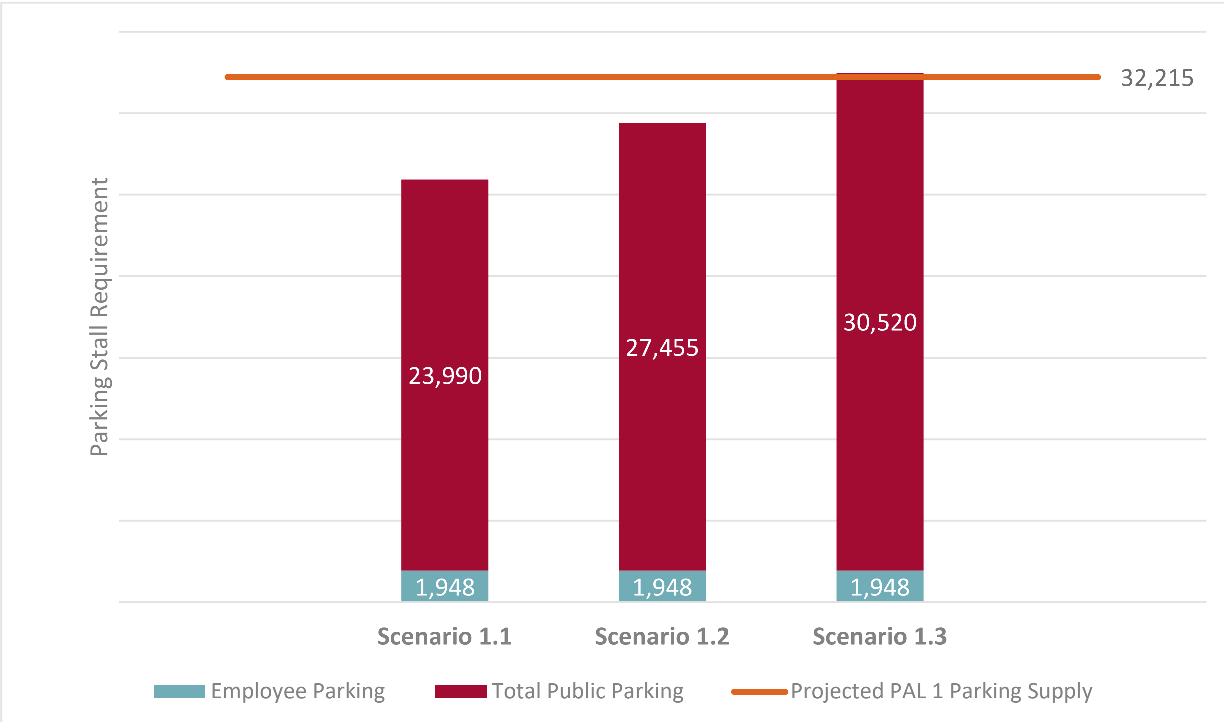


Figure 5. PAL 1 Parking Gap Analysis – Terminal 1

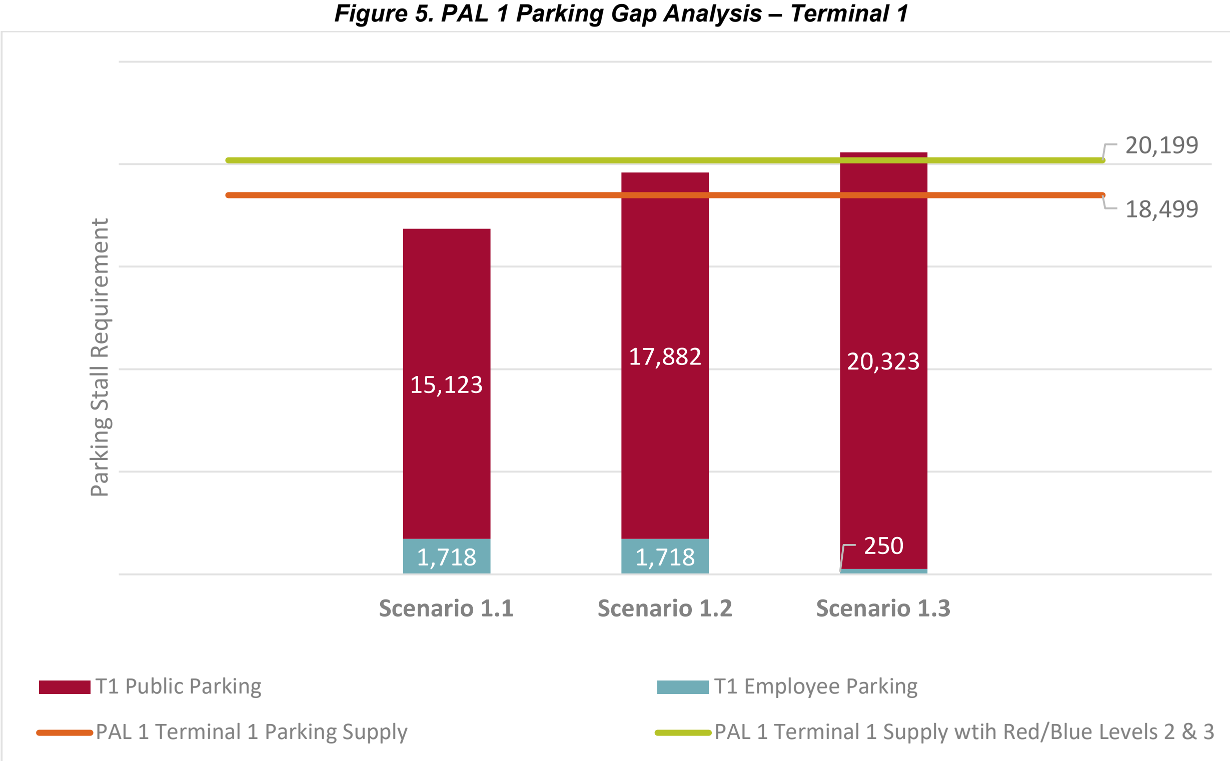
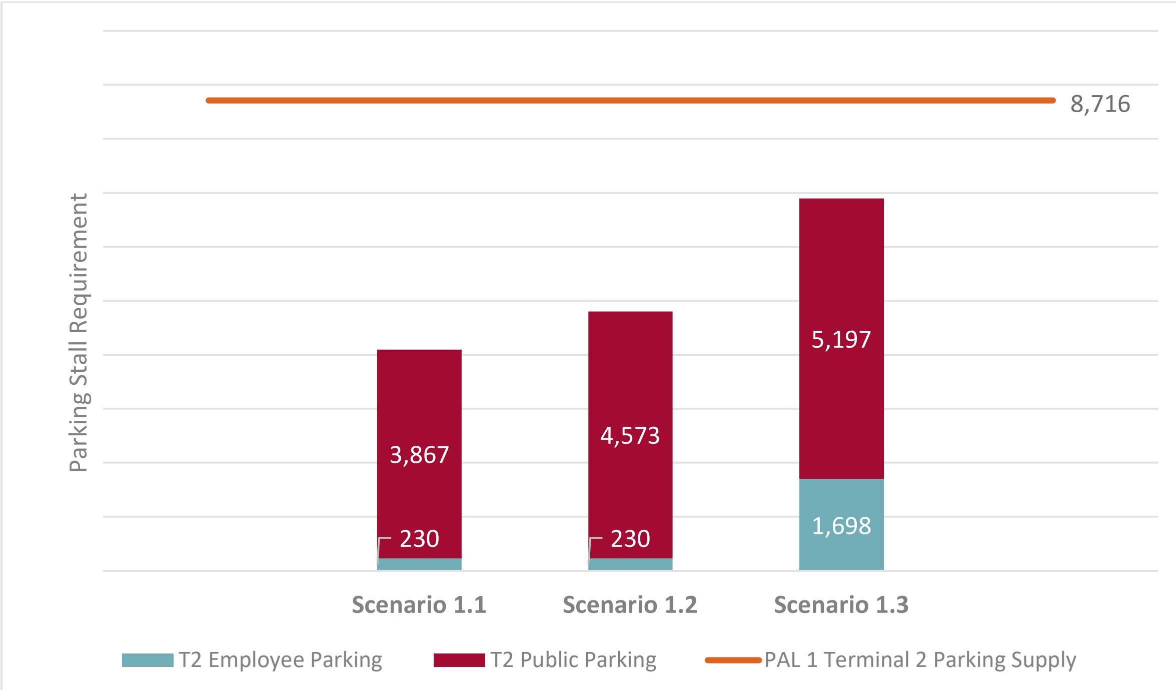


Figure 6. PAL 1 Parking Gap Analysis – Terminal 2



3.3 EV Parking Stall Requirements

The number of EV chargers provided by MAC will depend on the number of EV vehicles on the road, the driving range of customers, and the level of customer experience that MAC would like to provide. Not all EV drivers parking at the Airport will need to charge. The recommended number of EV parking stalls will vary based on:

- Projected EV percent of total vehicles fleet on the road
- Demand of on-airport parking stalls at MSP (public and employees)
- Percent of EV drivers requiring a charge at the Airport
  - Drive Electric Minnesota estimates that approximately 80% of charging occurs at home, overnight[6].
  - In 2021, only approximately 17 percent of the EVs in Minnesota were registered outside the Twin Cities metro region[7]. This indicates that the majority of EVs are located within 50 miles of MSP.

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[6] Drive Electric Minnesota, Electric Vehicle Fast Facts.

[7] Minnesota Department of Transportation, 2021 Minnesota Electric Vehicle Assessment Chapter 3: Electric Vehicles in Minnesota.

This study assumes that 25% of EVs parked at the Airport at a given time will want or need access to an EV charger at the Airport. Changes in driver habits, battery technology, charging technology, and available off-airport charging options may alter the number of EVs needing access to an EV charger at the Airport over the planning horizon. Also, vehicles may require different charging intensity based on the stay duration. Future study work exploring EV chargers should explore the number of chargers at different levels (i.e. Level 1, Level 2, and DC Fast Charge) to provide a range of services that align with customer demand, while balancing electrical demands to the power grid. Industry trends suggest that long duration and employee parking facilities are typically equipped with Level 1 or Level 2 chargers and short duration parking facilities have DC Fast Chargers installed.

Table 19 provides a summary of the recommended number of EV stalls for public parking facilities at each PAL. Evaluating the type and level of EV charger is outside the scope of this study and can be evaluated as part of a future study.

Table 19. Recommended Number of EV Stalls in Public Parking Facilities

	On -Airport Parking Requirement (1) (2)	Percent EV Fleet	EV Stall Requirement
PAL 1	24,410	3.1%	**191**
PAL 2	28,660	12.3%	**884**
PAL 3	33,200	42%	**3,485**

(1) Rounded to the nearest 10 stalls.

(2) Includes on-airport public parking requirement, excess off-airport parking, and employee parking. Excludes Delta employee requirement.

4 RENTAL CAR OPERATIONAL FACILITIES REQUIREMENTS

There were four rental car agency (RAC or RACs) families operating on-airport at MSP in 2019. The four families consisted of Enterprise Holding Inc. (Alamo, Enterprise, and National), Dollar Thrifty Automotive Group (Dollar, Hertz, and Thrifty), Avis Budget Group (Avis, Budget, and Payless), and SIXT Rental Car. The on-airport RACs utilize MAC constructed, and tenant financed, facilities to rent and service customer vehicles. The current rental car fleet at MSP consists of approximately 12,400 vehicles. Rental car agencies are contractually obligated to replace vehicles every three years at MSP.

Kimley-Horn performed a baseline requirements analysis (see Section 4.1) assuming no change in passenger behavior over the planning horizon. Changes in customer behavior over time could result in changing rental car facility requirements at a given PAL. Kimley-Horn assessed PAL 1 (see Section 4.2) to test the resiliency of terminal specific existing rental car facilities and inform potential near-term development requirements.

To determine future rental car facility requirements, the 2019 peak hour returns and peak hour rentals were grown at the same rate as annual O&D enplanement growth at each PAL. Using updated peak hour rentals and returns for each PAL, the same methodology used for to determine existing rental car requirements was utilized to determine future requirements. The methodology is based on industry-standard formulas and accounts for surges in activity.

4.1 Baseline Requirements

Requirements within this section are determined for the airport as a whole. Terminal specific allocations depend on the airlines assigned to each terminal and RAC preferences for serving customers at a single or multiple facilities. Terminal specific requirements will be further explored during the alternatives phase of the 2040 LTP.

4.1.1 Customer Service Building (CSB)

Table 20 provides CSB requirements at each PAL. Based on the evaluation, the airport currently has adequate CSB positions to meet customer demand. Airline terminal allocations may impact the terminal specific CSB adequacy. Future requirements could also be impacted by RAC operational considerations and continually changing needs for customers to visit a counter before renting a vehicle.

Table 20. CSB Counter Requirements

	2019	PAL 1	PAL 2	PAL 3
CSB Counter Requirement (1)	55	61	66	75
Existing Supply	77			
Surplus/(Deficit)	22	16	9	2

(1) Includes 1.25x surge factor.

4.1.2 Ready Return (RR)

Table 21 provides RR requirements at each PAL. Based on the evaluation, the airport currently has adequate RR stalls to meet customer demand. Airline terminal allocations may impact the terminal specific RR adequacy.

Table 21. RR Stall Requirements

	2019	PAL 1	PAL 2	PAL 3
RR Stall Requirement (1)	1,650	1,855	1,990	2,275
Existing Supply	2,715			
Surplus/(Deficit)	1,065	860	725	440

(1) Includes 1.25x surge factor.

4.1.3 Quick Turnaround (QTA)

Table 22 and **Table 23** provide QTA requirements at each PAL for functions that are not impacted by EV fleet conversion. Fueling position requirements are highly dependent upon the RAC fleet conversion to EVs and the location/procedure RAC's use to charge EVs. **Table 24** provides QTA requirements at each PAL assuming an internal combustion engine (ICE) fleet continues operating at MSP through the planning horizon. This is unlikely, but it provides a conservative estimate of the number of fueling positions and vehicle storage positions based on the existing fleet characteristics. Refer to **Section 4.3** for additional context regarding EV charger requirements.

Table 22. Car Wash Bay Requirements

	2019	PAL 1	PAL 2	PAL 3
Car Wash Bay Requirement (1)	24	26	27	32
Existing Supply	20			
Surplus/(Deficit)	(4)	(6)	(7)	(12)

(1) Includes 1.25x surge factor.

Table 23. Vehicle Storage Requirements

	2019	PAL 1	PAL 2	PAL 3
Vehicle Storage Requirement	1,160	1,310	1,400	1,610
Existing Supply	1,260			
Surplus/(Deficit)	100	(50)	(140)	(350)

(1) Includes 1.25x surge factor.

Table 24. Fueling Position Requirement (No EV Fleet Conversion)

	2019	PAL 1	PAL 2	PAL 3
ICE Fueling Position Requirement	92	102	109	125
Existing Supply	100			
Surplus/(Deficit)	8	(2)	(9)	(25)

(1) Includes 1.25x surge factor.

The airport currently has a fueling position deficit. Given the anticipated fleet conversion to EVs, adding more ICE fueling positions is not recommended. Kimley-Horn recommends coordinating with RACs to add EV chargers to existing facilities to support fleet conversion from ICE to EV. **Section 4.3** provides more insight into the projected EV charger demand. The airport has projected car wash bay and vehicle storage deficits that should be addressed as part of the alternatives evaluation.

4.2 PAL 1 Rental Car Gap Analysis

Table 25 and Table 26 provides terminal specific rental car requirements for PAL 1 at Terminal 1 and Terminal 2, respectively. It was assumed that 90% of the total demand occurred at Terminal 1 and 20% occurred at Terminal 2, which accounts for peaking at different times. Through PAL 1, the QTA rental car facilities at Terminal 1 will experience deficiencies.

Table 25. Terminal 1 Rental Car Facility Requirements (PAL 1)

Facility	Requirement [(1)]	Existing Supply	Surplus/(Deficit)
CSB Counter Positions [(2)]	50	48	(2)
RR Stalls	1,515	2,050	535
ICE Fueling Positions [(2)]	68	76	8
Wash Bays [(2)]	21	12	(9)
QTA Storage (On-Site Vehicles)	1,070	575	(495)

(1) Terminal Split: 90% Terminal 1, 20% Terminal 2.
(2) Includes 1.25x surge factor.

Table 26. Terminal 2 Rental Car Facility Requirements (PAL 1)

Facility	Requirement [(1)]	Existing Supply	Surplus/(Deficit)
CSB Counter Positions [(2)]	11	29	18
RR Stalls	340	665	325
ICE Fueling Positions [(2)]	16	24	8
Wash Bays [(2)]	5	8	3
QTA Storage (On-Site Vehicles)	240	685	445

(1) Terminal Split: 90% Terminal 1, 20% Terminal 2.
(2) Includes 1.25x surge factor.
(3) *Assumes DC Fast Chargers in the QTA. Refer to* ***Section 4.3****.*

The Silver Ramp CSB and RR stalls at Terminal 1 were sized to accommodate rental car demand through 2030 (PAL 2). The Silver Ramp CSB was constructed to add counter positions if needed through the planning horizon. The fueling positions, wash bays, and QTA storage facilities had deficits when evaluated in 2015. **Table 25** confirms that the Terminal 1 CSB and RR stalls are adequate, while the QTA is inadequate. The Terminal 2 CSB, RR, and QTA are all adequate through PAL 1.

4.3 Rental Car EV Charger Demand

The shift in the rental car fleet towards EVs could change the turnaround process, as vehicles require electric fueling rather than gasoline fueling. The demand for EV chargers will be dependent on the rental car agency's operational model. Three operational scenarios are feasible, as described in the sections below:

- Ready/Return (RR) Charging
- Quick Turnaround (QTA) Charging
- RR and QTA Charging

4.3.1 Ready/Return (RR) Charging

A Ready/Return charging scenario assumes all EVs are charged in the RR area using either Level 2 chargers or a variety of Level 2 and DC Fast Chargers. The same percentage of EV within the fleet should be applied to the RR stalls to determine how many stalls need an EV charger. The ICE fueling position requirement also decreases by the percentage of EV in the fleet.

4.3.2 Quick Turnaround (QTA) Charging

A QTA electric fueling operation would parallel the existing operation, using DC Fast chargers for power. The number of DC Fast chargers needed at the QTA will depend on the vehicle fleet battery size and the charging load of the QTA chargers. As charging load increases, the number of QTA EV fueling positions may decrease.

4.3.3 RR and QTA Charging

Vehicles can charge in both the RR area and the QTA area. Vehicles would be charged for a fixed time of 15 minutes in the QTA area using a DC fast charger, while undergoing other servicing functions, such as vacuuming. Vehicles requiring additional charging will be charged in the RR area using a Level 2 charger. This scenario would not impact the total requirement for number of fueling positions in the QTA since QTA ICE requirements assume a servicing time of 15 minutes. The split between ICE fueling positions and EV fueling positions in the QTA is based on the percent of the rental car fleet that is electric. The number of EV chargers needed in the RR area will be a function of the fleet vehicle battery sizes, the charging load of the QTA chargers, the percent of the fleet that is electric, and the rental car agencies service requirements (e.g., acceptable return and rental battery level).

Rental car agencies have expressed the desire to operate with DC Fast Charging in the QTA and additional charging within the RR. Additional coordination with the rental car agencies and studies will be needed to determine the power demand for the electrified rental car operation.

5 COMMERCIAL GROUND TRANSPORTATION REQUIREMENTS

Numerous commercial ground transportation modes serve MSP at both Terminal 1 and Terminal 2. Commercial ground transportation operators include:

- Limo
- Taxi
- Transportation Network Company (TNC)
- Charter Bus
- Metro Transit
- Hotel Courtesy Shuttle
- Off-Airport Parking Shuttle
- Off-Airport Rental Car Shuttle
- Out State Shuttle
- Shared Ride

In this study, on-demand ground transportation modes include TNCs, taxis, and limo services, whereas scheduled services accounts for the other commercial modes. Kimley-Horn performed a baseline GT requirements analysis (see **Section 5.1**) assuming no change in passenger behavior over the planning horizon. Changes in customer behavior over time could result in different GT requirements at a given PAL. Kimley-Horn assessed potential changes in customer mode choice through PAL 1 (see **Section 5.2**) to inform near-term development requirements.

5.1 Baseline Requirements

The existing on-demand commercial vehicle requirements were grown by the peak hour terminating passengers between the flight schedule for August 8th, 2019, and the 2025, 2030, and 2040 DDFS, provided by Ricondo, to determine future requirements. Only pick-up transactions occur on the commercial curb, so the on-demand requirements only accounted for terminating passenger activity.

The existing scheduled service requirements were grown at the same rate as the number of peak hour total flights. Peak hour arriving and departing flights were used for scheduled service requirements because scheduled service drop-off and pick-up transactions occur on the commercial curb. The peak hour for flights does not correlate directly to the peak hour for terminating passengers.

The baseline requirements for the number of on-demand and scheduled service positions are presented in **Table 27.** A reduction in terminating peak hour passengers at PAL 1 and PAL 2 suggest that on-demand commercial vehicle requirements will not change until PAL 3.

Table 27. Commercial Vehicle Position Requirements by Service Type

	Existing (2019)	PAL 2 (2030)	PAL 3 (2040)
On-Demand	106	106	133
Scheduled	51	63	71
Total Positions	157	169	204

5.1.1 PAL 3 Requirements

The baseline forecast, presented in **Table 28**, provides the PAL 3 on-demand commercial vehicle requirements by operator type. **Table 29** presents the PAL 3 scheduled service requirements by operator type. Many external factors can influence a GT customer's choice of operator, so this study assumes that the operator splits remain consistent with those observed in 2019. Tables 30 and 31 present GT requirements for the airport as a whole; terminal specific GT requirements will be explored in more detail as part of the Alternatives chapter.

Table 28. On-Demand Commercial Vehicle Requirements – PAL 3

Mode Type	Requirement	Existing Supply	Surplus/(Deficit)
Limo	43	32	(11)
Taxi	34	56	22
TNC	56	38	(18)
Total	**133**	**126**	**(7)**

Table 29. Scheduled Commercial Vehicle Requirements – PAL 3

Mode Type	Requirement
Bus	17
Metro Transit	2
Hotel Courtesy Shuttle	17
Off-Airport Parking Shuttle	14
Off-Airport Rental Shuttle	6
Out State Shuttle	11
Shared Ride	6
Total	**73**
Existing Airport Supply	*63*
Surplus/(Deficit)	*(10)*

By PAL 3, on-demand services and scheduled services are anticipated to have a deficit of loading positions.

5.2 PAL 1 GT Gap Analysis

GT scenarios were evaluated at PAL 1 as part of the gap analysis to assess campus wide and terminal specific GT requirements and near-term development priorities.

5.2.1 Considerations

A variety of factors may impact the need or desire for on-demand services, such as:

- **Recovery of On-Demand Activity from the COVID-19 Pandemic:** Demand may fluctuate depending on concerns regarding vehicle cleanliness and driver health status.
- **Driver Supply:** Driver shortages for TNC and taxi companies have resulted in increased wait times and higher fares.
- **External Factors**: Mode choice is dependent on external factors, such as parking availability and price, leisure vs. business travelers, weather, etc.

5.2.2 PAL 1 On-Demand Service Scenarios

The proposed PAL 1 scenarios for GT requirements are independent of the scenarios presented for parking in **Section 3.2**. The analyzed parking scenarios are differentiated by the number of transactions per 1,000 enplanements, as shown in **Figure 7**, and described in more detail in the sections below.

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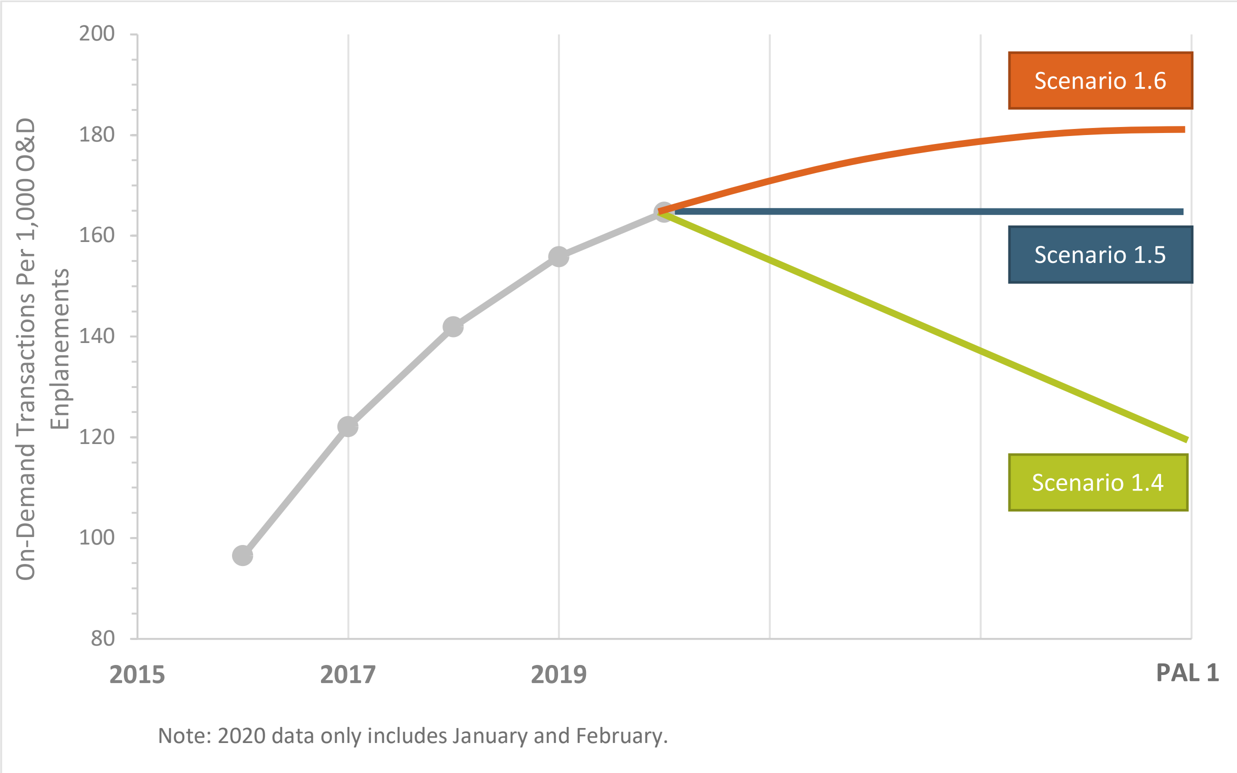
Figure 7. PAL 1 On-Demand Transactions Per 1,000 O&D Enplanements Scenarios



5.2.2.1 PAL 1 Scenario 1.4

Scenario 1.4 explores a decline in on-demand services between 2019 and 2025. This scenario represents a future where on-demand services do not recover from the dip in activity that occurred during the COVID-19 pandemic. Increased fares and waiting times may encourage passengers to use alternative modes of transportation. On-demand mode choice was estimated to return to levels of activity seen historically at the beginning of the introduction of TNCs in 2017, with about 125 transactions per 1,000 O&D enplanements. The requirements for loading positions are presented in **Table 30** for Terminal 1 and in **Table 31** for Terminal 2.

Table 30. Terminal 1 On-Demand Commercial Vehicle Requirements – PAL 1 Scenario 1.4

Mode Type	Requirement	Existing Supply	Surplus/(Deficit)
Limo	22	23	1
Taxi	17	44	27
TNC	31	30	(1)
Total	**70**	**97**	**27**

Table 31. Terminal 2 On-Demand Commercial Vehicle Requirements – PAL 1 Scenario 1.4

Mode Type	Requirement	Existing Supply	Surplus/(Deficit)
Limo	5	9	4
Taxi	4	12	8
TNC	7	8	1
Total	**16**	**29**	**13**

The results presented in **Tables 30 and 31** suggest that in Scenario 1.4:

- Terminal 1 and Terminal 2 have an excess number of on-demand loading positions for PAL 1.
- A reduction in the propensity to use on-demand services may provide the Airport an opportunity to reduce the size of the commercial vehicle areas at both terminals to open the space for alternative uses.

5.2.2.2 PAL 1 Scenario 1.5

Scenario 1.5 serves as a baseline scenario. This scenario assumes that passenger mode choice remains constant, and passengers use the ground transportation services at the same rate as in 2019, at approximately 156 transactions per 1,000 O&D enplanements. The requirements for loading positions are presented in **Table 32** for Terminal 1 and in **Table 33** for Terminal 2.

Table 32. Terminal 1 On-Demand Commercial Vehicle Requirements – PAL 1 Scenario 1.5

Mode Type	Requirement	Existing Supply	Surplus/(Deficit)
Limo	28	23	(5)
Taxi	21	44	23
TNC	38	30	(8)
Total	**87**	**97**	**10**

Table 33. Terminal 2 On-Demand Commercial Vehicle Requirements – PAL 1 Scenario 1.5

Mode Type	Requirement	Existing Supply	Surplus/(Deficit)
Limo	6	9	3
Taxi	6	12	6
TNC	7	8	1
Total	**19**	**29**	**10**

The results presented in **Tables 32 and 33** suggest that in Scenario 1.5:

- Both Terminal 1 and Terminal 2 have an adequate number of loading positions for PAL 1.
- At Terminal 1, the taxi loading positions are underutilized, while there is a projected deficit for TNC and Limo positions. Reallocation of positions between operator types would improve operational efficiency.

5.2.2.3 PAL 1 Scenario 1.6

Scenario 1.6 explores the continued growth of on-demand services. The historical trends of the on-demand services suggests that an equilibrium will be reached for passenger mode choice. In 2019, approximately 15.6% of terminating passengers chose to utilize on-demand services as their mode choice from the Airport. Scenario 1.6 predicts that growth will continue to occur through PAL 1 before stabilizing. At PAL 1, a rate of 180 transactions per 1,000 O&D enplanements is estimated. **Table 34** presents the on-demand requirements based on a growth of passenger tendency to choose an on-demand mode for Terminal 1. Terminal 2 requirements are included in **Table 35**.

Table 34. Terminal 1 On-Demand Commercial Vehicle Requirements – PAL 1 Scenario 1.6

Mode Type	Requirement	Existing Supply	Surplus/(Deficit)
Limo	33	23	(10)
Taxi	24	44	20
TNC	44	30	(14)
Total	**101**	**97**	**(4)**

Table 35. Terminal 2 On-Demand Commercial Vehicle Requirements – PAL 1 Scenario 1.6

Mode Type	Requirement	Existing Supply	Surplus/(Deficit)
Limo	7	9	2
Taxi	5	12	7
TNC	10	8	(2)
Total	**22**	**29**	**7**

The results presented in **Tables 34 and 35** suggest that in Scenario 1.6:

- An increase in the desire to use on-demand services will result in a slight deficit of loading positions at Terminal 1. Like Scenario 1.5, reallocation of positions between operator types would result in better utilization of the existing space.
- Terminal 2 has an adequate number of on-demand positions to meet PAL 1 requirements.

5.2.3 PAL 1 Scheduled Services

Due to their operational model, scheduled service requirements do not vary by the PAL 1 scenarios presented for on-demand services. The scheduled service requirements for both terminals at PAL 1 are presented in **Table 36**. At PAL 1, a slight deficit of shuttle positions will exist at Terminal 1.

Table 36. Scheduled Commercial Vehicle Requirements – PAL 1 Scheduled Vehicles

Mode Type	Required Loading Positions		
	Terminal 1	Terminal 2	Airport Total
Bus	9	5	14
Metro Transit	2	-	2
Hotel Courtesy Shuttle	11	4	15
Off-Airport Parking Shuttle	6	6	12
Off-Airport Rental Shuttle	3	3	6
Out State Shuttle	7	3	10
Shared Ride	3	3	6
Total	**41**	**24**	**65**
Existing Airport Supply	*36*	*26*	*62*

The results presented in **Table 36** suggest that Terminal 1 will experience a deficit of 5 shuttle positions at PAL 1. Terminal 2 has an adequate number of positions through PAL 1.

6 SUMMARY

Future landside facility requirements established in this technical memorandum will inform landside development alternatives. **Table 37**, **Table 38**, and **Table 39** summarize the baseline facility requirements analyzed in this memorandum. The requirements include parking stalls, rental car facilities, and commercial ground transportation positions.

Table 37. Parking Requirements - Baseline

	Requirement (1)			
	2019	**PAL 1**	**PAL 2**	**PAL 3**
On-Airport	18,800	21,090	22,640	25,900
Off-Airport	5,700	6,370	6,840	7,820
Employee	1,900	1,950	2,080	2,380
Total	26,400	29,410	31,560	36,100

Table 38. Rental Car Facility Requirements

	2019	PAL 1	PAL 2	PAL 3
CSB Counter Requirement	55	61	66	75
RR Stall Requirement (1)	1,650	1,855	1,990	2,275
Car Wash Bay Requirement (1)	24	26	27	32
Vehicle Storage Requirement	1,160	1,310	1,400	1,610
ICE Fueling Position Requirement (1)	92	102	109	125

(1) *ICE fueling position requirement assumes there is no EV fleet conversion. Refer to **Section 4.3** for requirements assuming EV conversion.*

Table 39. Commercial Vehicle Position Requirements

	Existing (2019)	PAL 1 (2025)	PAL 2 (2030)	PAL 3 (2040)
On-Demand (1)	106	106	106	133
Scheduled (2)	51	63	63	71
Total Positions	157	169	169	204

(1) *On-demand services include TNCs, Taxis, and Limos.*
(2) *Scheduled services include shuttles and buses.*

Appendix D: Aircraft Noise Contour Input Details

Minneapolis St. Paul International Airport (MSP) Long-Term Plan (LTP)
Noise Contour Final Technical Memorandum

HNTB has been tasked to assist the Metropolitan Airports Commission (MAC) in support of the development of the 2040 Long-Term Plan (LTP) Noise Contours for the Minneapolis-St. Paul International Airport (MSP). This technical memorandum presents a summary of the methodologies and data sources used in the noise analysis, including the development of 2040 fleet mixes and subsequent modeling of the 2040 baseline, high scenario, and low scenario noise contours with the Federal Aviation Administration's (FAA) Aviation Environmental Design Tool (AEDT), version 3e. The 2018 Actual Noise Contour completed in February 2019 was used as the 2018 noise contour, which was modeled using AEDT version 2d.

1 Introduction

The MAC provided HNTB the summer Design Day Flight Schedule (DDFS) for the 2040 baseline condition. The DDFS was converted into an Average Annual Day (AAD) fleet mix as required by AEDT. The high and low scenario fleet mixes were developed from the 2040 baseline AAD fleet mix using adjustment factors. Following the development of the 2040 fleet mixes, the AEDT model was used to create the 2040 baseline, high scenario, and low scenario noise contours. The following sections describe the inputs and outputs of the AEDT modeling process.

2 AEDT Inputs

HNTB prepared the 2018 and 2040 noise contours using AEDT. The 2040 baseline fleet mix input was based on the 2040 baseline AAD fleet mix as documented in **Attachment 1: Noise Contour Fleet Mix Final Technical Memorandum**. The high and low scenario fleet mixes were based on the 2040 Long-Term Plan activity forecast[1] (2040 LTP Forecast). For the noise analysis, HNTB assigned AEDT Aircraft Noise and Performance (ANP) aircraft types and custom profiles, determined AEDT Equipment IDs, calculated day/night split, and estimated stage lengths. In instances when aircraft types did not have a direct AEDT ANP aircraft type, HNTB informally coordinated with the FAA's Office of Environment and Energy (AEE). The runway and flight track usages were based on the 2018 annual MAC Noise & Operations Monitoring System (MACNOMS) data. The proposed relocation of the Ground Run-up Enclosure (GRE) was also incorporated in the noise analysis. Engine maintenance run-up operations were projected based on operations growth from 2018 to 2040 for individual aircraft types that performed run-up operations in 2018. Default weather parameters in AEDT were applied.

2.1 Fleet Mix

The 2018 fleet mix was based on the 2018 annual MACNOMS data. The development of the 2040 baseline fleet mix input is documented in **Attachment 1: Noise Contour Fleet Mix Final Technical Memorandum**. The AEE coordination is included in **Attachment 2: AEE Coordination**. The fleet mixes with the AEDT ANP types are shown in **Attachment 3: 2040 Baseline, High Scenario, and Low Scenario AEDT Fleet Mixes**. This study modeled 1,115 AAD operations (406,913 annual operations) for 2018, 1,396 AAD operations (509,700 annual operations) for the 2040 baseline, 1,520 AAD operations (554,900 annual operations) for the 2040 high scenario, and 1,262 AAD operations (460,600 annual operations) for the 2040 low scenario.

[1] Minneapolis-Saint Paul International Airport, 2040 Long-Term Plan: Activity Forecast Summary Technical Memorandum, Ricondo, November 2021.

The baseline, high scenario, and low scenario operations were based on the 2040 LTP Forecast. The original baseline forecast was summarized in Chapter 8 of the 2040 LTP Forecast and was revised in September and October 2021 to consider the impacts of the COVID-19 pandemic and Delta Air Lines' systematic fleet mix changes. **Table 1** summarizes the revised baseline forecast high, and low forecasts.

Table 1: Baseline, High Scenario, and Low Scenario Annual Operations

Category	Revised Baseline	High	Low
Passenger	464,900	508,100	416,600
Air Cargo	19,700	21,500	18,600
GA/Air Taxi	22,900	23,100	23,200
Military[1]	2,200	2,200	2,200
Total	509,700	554,900	460,600

[1]: Military operations were assumed to remain constant.

Source: 2040 Long-Term Plan: Activity Forecast Summary Technical Memorandum, Ricondo, Nov 2021.

2.1.1 AEDT 3e ANP Aircraft and Substitution

The AEDT model includes a group of representative civilian fixed-wing, military fixed-wing, and helicopter types with noise parameters, referred to as ANP aircraft types. It also provides pre-approved aircraft substitutions for instances where an aircraft type does not have a direct match with the ANP aircraft types. However, in some instances, aircraft do not have an AEDT aircraft type or substitute aircraft. In these situations, the AEE provides guidance on the identification of a suitable aircraft (with similar noise characteristics) for use in the model.

Although this study is not a federally funded project, HNTB conducted an informal AEE coordination effort to seek AEE's technical recommendation of the appropriate ANP aircraft type for the Boeing 737 MAX 10. **Table 2** shows AEE's recommended AEDT aircraft parameters for the Boeing 737 MAX 10.

Table 2: Boeing 737 MAX 10 AEDT Inputs per AEE Recommendation

ID	ANP Code	Equipment ID	Airframe Code	Engine Model	BADA Code
B3XM	7378MAX	6383	5336	LEAP-1B27	B39M

Source: AEE recommendation, August 15, 2022.

2.2 Weather Parameters

The AEDT model allows for the modeling of atmospheric conditions when calculating noise exposure, taking into consideration temperature and humidity. Temperature is an important factor in aircraft performance, as higher temperatures decrease the density of air, which increases aircraft takeoff distance and reduces climb performance. This phenomenon generally results in increased noise propagation in hot temperatures as compared to colder temperatures.

Default weather parameters were applied in both the 2018 and 2040 noise analyses, as per FAA guidance on the AEDT application to the National Environmental Policy Act (NEPA)[2]. The default weather parameters in AEDT 3e represent 10-year average values and the default weather parameters in AEDT 2d represent 30-year average values recorded at the MSP weather station. The weather data in the AEDT Airport Database was obtained from station ID 25160 (MINNEAPOLIS-ST PAUL INTL/WOLD-CHAMBERLIN) from the Integrated Surface Database (ISD) of the National Oceanic and Atmospheric Administration (NOAA). **Table 3** shows the weather parameters used in the study that reflect the most recent 10-year average (2012 through 2021) for the 2040 baseline noise contour in AEDT 3e and the 30-year average when the 2018 Actual Noise Contour was modeled in AEDT 2d.

Table 3: 2018 and 2040 AEDT Weather Inputs

Variable	2018 AEDT Inputs[1]	2040 AEDT Inputs[2]
Temperature	45.0 degrees F	46.7 degrees F
Dew Point	35.9 degrees F	36.5 degrees F
Pressure	985.4 Millibars	984.5 Millibars
Humidity	67.7 %	67.4 %
Wind Speed	8.4 knots	8.1 knots

[1]: AEDT 2d.
[2]: AEDT 3e.
Source: AEDT default parameters at MSP, HNTB analysis, 2022.

2.3 Terrain

Terrain data is used to account for the effects that variations in terrain have on noise propagation. The 1/3 arc-second data from the United States Geological Survey (USGS) National Map (TNM) was used in this study.

2.4 DNL and Day/Night Split

The FAA uses the Day-Night Average Sound Level (DNL) metric to analyze noise impacts, with the exception of California, which uses the Community Noise Equivalent Level (CNEL). In DNL, a 10 decibel (dB) penalty is added to noise events occurring at nighttime (between 10 p.m. and 7 a.m.) to reflect the added intrusiveness of nighttime noise when background noise levels are low and people are at rest. From a noise modeling perspective, one nighttime operation is equivalent to ten daytime operations because of this penalty. To account for this penalty, fleet mixes were categorized into daytime operations (between 7 a.m. to 10 p.m.) and nighttime operations (between 10 p.m. and 7 a.m.), creating a day/night split.

Table 4 compares the day/night split in the 2018 Actual Noise Contour and 2040 scenarios. The percentage of nighttime operations is expected to increase slightly from 10.8% in 2018 to 11.5% in 2040 as a result of increased nighttime operations projected in the DDFS. Since one nighttime operation is equivalent to ten daytime operations, a 0.7%% increase in nighttime operations is equivalent to 7% increase in daytime operations.

[2] Guidance on Using the Aviation Environmental Design Tool (AEDT) to Conduct Environmental Modeling for FAA Actions Subject to NEPA, FAA, revised Oct 27, 2018.

Table 4: 2018 and 2040 AAD Day/Night Split Comparison

Day/Night Split	2018		2040 Baseline		2040 High		2040 Low	
Day	995	89.2%	1,236	88.5%	1,345	88.5%	1,116	88.5%
Night	120	10.8%	161	11.5%	175	11.5%	146	11.5%
Total	1,115	100.0%	1,396	100.0%	1,520	100.0%	1,262	100.0%

Totals may not sum up due to rounding
Sources: MAC and HNTB analysis, 2023.

2.5 Stage Length

Stage length is a term used in noise modeling that refers to trip distance for an aircraft departure from origin to destination and is a surrogate for aircraft weight. Each stage length assumes an aircraft take-off weight that increases when the stage length is higher. The trip distance influences the take-off weight (and therefore the thrust and performance) of the aircraft, as more fuel is required to fly longer distances, which adds weight to the aircraft. Departure stage lengths were calculated by the distances between MSP and destinations. In cases where there was no destination airport information, the average stage length in 2018 (Stage Length 2) was applied. **Table 5** compares the stage lengths in 2018 and 2040. The comparison shows that the percentage of departures with stage lengths 2 and 3 is expected to increase at the expense of stage length 1. This is due to a higher percentage of departures between 500 and 1,500 nautical mile ranges projected in the DDFS. Changes in other stage length brackets were expected to be relatively small.

Table 5: 2018 and 2040 Stage Length Comparison

Stage Length	Distance (nautical miles)	2018		2040 Baseline		2040 High		2040 Low	
		AAD	Percentage	AAD	Percentage	AAD	Percentage	AAD	Percentage
1	**0 - 500**	228	40.9%	221	31.7%	239	31.5%	202	32.1%
2	**500 - 1,000**	211	37.8%	321	46.0%	351	46.1%	289	45.8%
3	**1,000 - 1,500**	104	18.7%	137	19.6%	149	19.6%	123	19.4%
4	**1,500 - 2,500**	6	1.0%	7	1.0%	7	1.0%	6	1.0%
5	**2,500 - 3,500**	3	0.5%	4	0.5%	4	0.5%	3	0.5%
6	**3,500 - 4,500**	5	0.8%	7	1.0%	8	1.0%	6	1.0%
7	**4,500 - 5,500**	1	0.2%	1	0.1%	1	0.1%	1	0.1%
8	**5,500 - 6,500**	-	-	1	0.1%	1	0.1%	1	0.1%
Total		558	100.0%	698	100.0%	760	100.0%	631	100.0%

Number is shown as 0 when less than 0.5. Percentage is shown as 0.0% when less than 0.05%. Number is shown as "-" when it is 0.
Totals may not sum up due to rounding.
Sources: MAC and HNTB analysis, 2023.

2.6 Custom Profiles

AEDT provides 'standard' aircraft performance profiles for each ANP aircraft type that can be used in the noise modeling. In addition, HNTB and the MAC developed a group of custom profiles (DAL_DST, GEN_DST, CPZ_DST, and FDX_DST) to model the Noise Abatement Departure Procedure (NADP) flown at MSP. These custom profiles were developed for specific airlines or specific aircraft. The first three letters represent the airline code (GEN represents general NADP profiles that apply to all airlines) and the last three letters represent NADP Distant procedures. The NADP Distant procedures are designed to abate noise impacts for areas further from the airport as compared with NADP Close-in procedures that are designed to abate noise impacts closer to the runway end. **Table 6** compares the 2018 and 2040 scenarios departure profiles. The percentage of departures modeled with 'standard' profiles in 2040 are much higher than in 2018 because the 2040 fleet mixes contain a significant portion of operations by newer aircraft types without custom profiles developed.

Table 6: 2021 and 2040 Departure Profile Comparison

Departure Profile[1]	2018		2040 Baseline		2040 High		2040 Low	
	AAD	Percentage	AAD	Percentage	AAD	Percentage	AAD	Percentage
STANDARD	219	39.2%	425	60.9%	462	60.9%	385	61.0%
DAL_DST	192	34.5%	157	22.5%	171	22.5%	140	22.3%
GEN_DST	143	25.6%	116	16.6%	126	16.6%	105	16.6%
CPZ_DST	4	0.7%	-	-	-		-	
FDX_DST	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Total	558	100.0%	697	100.0%	759	100.0%	630	100.0%

Note: [1]: Excluding Military NOISEMAP Profiles.

Number is shown as 0 when less than 0.5. Percentage is shown as 0.0% when less than 0.05%. Number is shown as "-" when it is 0.

Totals may not sum up due to rounding.

Sources: MAC Data and HNTB Analysis, 2023.

2.7 Runway Use

Runway use represents how aircraft utilize the runway(s) and helipad(s) at an airport and is a primary factor in the determination of noise exposure. Runway uses in 2040 scenarios by airline and aircraft were assumed to be consistent with the 2018 runway use. For aircraft not included in the 2018 fleet mix, it was assumed that their runway use would be the same as the aircraft they are expected to replace or similar aircraft types.

Table 7 compares the runway use in 2018 and 2040 scenarios. In general, the projected 2040 runway use is consistent with the 2018 runway use with minor variances. Compared with the 2018 runway use, the 2040 departures from Runway 12L decrease by approximately 1.7% and, from Runway 30L, increase by approximately 1.6% - 1.7%. The 2040 arrivals to Runway 30L increase by approximately 1.4% - 1.6%. Changes in other runways are less than 1%.

Table 7: 2018 and 2040 Runway Use Comparison

Average Annual Runway Use %[1]	Arrivals			Departures		
	Day	Night	Total	Day	Night	Total
2018 Base Year Condition						
Runway 4	0.1%	0.3%	0.1%	0.5%	1.0%	0.5%
Runway 22	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Runway 12L	22.2%	14.2%	21.3%	14.2%	18.6%	14.7%
Runway 30R	21.9%	16.6%	21.3%	21.6%	18.5%	21.3%
Runway 12R	25.6%	27.5%	25.8%	4.1%	24.9%	6.2%

Table 7: 2018 and 2040 Runway Use Comparison

Average Annual Runway Use %[1]	Arrivals			Departures		
	Day	Night	Total	Day	Night	Total
Runway 30L	24.8%	34.7%	25.9%	23.2%	25.0%	23.4%
Runway 17	0.0%	0.6%	0.1%	36.3%	11.7%	33.8%
Runway 35	5.4%	6.1%	5.5%	0.0%	0.2%	0.0%
Total	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*
2040 Baseline Forecast Scenario						
Runway 4	0.0%	0.2%	0.1%	0.5%	0.9%	0.5%
Runway 22	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Runway 12L	21.2%	15.4%	20.5%	12.3%	18.3%	13.0%
Runway 30R	20.8%	17.2%	20.3%	20.4%	19.9%	20.4%
Runway 12R	26.7%	25.2%	26.5%	4.8%	22.0%	6.7%
Runway 30L	26.6%	33.4%	27.4%	24.7%	27.7%	25.0%
Runway 17	0.0%	0.5%	0.1%	37.3%	11.0%	34.4%
Runway 35	4.7%	8.2%	5.1%	0.0%	0.2%	0.0%
Total	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*
2040 High Forecast Scenario						
Runway 4	0.0%	0.2%	0.1%	0.5%	0.9%	0.5%
Runway 22	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Runway 12L	21.2%	15.4%	20.5%	12.3%	18.4%	13.0%
Runway 30R	20.8%	17.2%	20.4%	20.4%	19.9%	20.4%
Runway 12R	26.7%	25.2%	26.5%	4.8%	22.0%	6.7%
Runway 30L	26.5%	33.3%	27.3%	24.6%	27.7%	25.0%
Runway 17	0.0%	0.5%	0.1%	37.3%	11.0%	34.4%
Runway 35	4.7%	8.2%	5.1%	0.0%	0.2%	0.0%
Total	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*
2040 Low Forecast Scenario						
Runway 4	0.0%	0.2%	0.1%	0.5%	0.9%	0.5%
Runway 22	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Runway 12L	21.2%	15.2%	20.4%	12.3%	18.2%	12.9%
Runway 30R	20.7%	17.0%	20.3%	20.4%	19.9%	20.3%
Runway 12R	26.7%	25.2%	26.5%	4.9%	21.9%	6.7%
Runway 30L	26.6%	33.7%	27.5%	24.7%	27.8%	25.1%
Runway 17	0.0%	0.5%	0.1%	37.2%	11.1%	34.3%
Runway 35	4.7%	8.1%	5.1%	0.0%	0.2%	0.0%
Total	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*

[1]: Excluding helipads.

Number is shown as 0 when less than 0.5. Percentage is shown as 0.0% when less than 0.05%. Number is shown as "-" when it is 0. Totals may not sum up due to rounding.

Sources: MAC Data and HNTB Analysis, 2023.

2.8 Flight Track Locations and Use

To determine projected noise levels on the ground, it is necessary to determine not only the frequency of aircraft operations, but also their altitudes and locations. Flight routes to and from an airport are generally a function of the geometry of the airport's runways and the surrounding airspace structure near the airfield. The 2040 flight track uses were assumed to be same as the 2018 flight track use for the same airline and aircraft. Detailed track use is included in **Attachment 4: Track Use**.

2.9 Maintenance Run-Up Operations

Engine run-ups can be modeled in AEDT, and depending on their frequency, may influence the size and location of noise exposure contours. The MAC provided 2018 run-up operations by daytime hours and nighttime hours. It was assumed that the 2040 run-up operations would increase at the same rate as an individual aircraft's growth rate from 2018 to 2040 by daytime hours and nighttime hours. Therefore, the day/night split of the 2040 run-up operations were based on the daytime and nighttime operation growth rates for individual aircraft from 2018 to 2040. **Table 8** depicts the 2018 and 2040 run-up operations. The LTP proposes relocating the GRE slightly to the east. The new GRE location was used for the 2040 run-up operations while the current location was used for the 2018 run-up operations.

Table 8: Run-up Operations

AEDT ANP Code	2018		2040 Baseline		2040 High		2040 Low	
	Day	Night	Day	Night	Day	Night	Day	Night
777200	16	-	-	-	-	-	-	-
717200	20	10	-	-	-	-	-	-
737700	-	6	-	32	-	35	-	29
737800	32	44	56	79	61	86	50	71
757300	110	50	392	109	428	119	351	98
757PW	2	-	-	-	0	-	0	-
A319-131	42	16	6	10	7	11	5	9
A320-232	44	12	9	4	10	4	8	4
A321-232	32	2	393	20	430	22	352	18
A330-301	50	12	-	-	-	-	-	-
BD-700-1A10	2	-	12	-	13	-	11	-
CL600	18	2	5	1	5	1	4	1
CNA208	2	-	1	-	1	-	1	-
CNA500	16	-	-	-	-	-	-	-
CNA510	2	-	7	-	8	-	6	-
CNA55B	6	-	12	-	13	-	11	-
CNA560U	6	2	21	-	23	-	19	-
CNA560XL	6	-	17	-	19	-	15	-
CNA680	12	-	13	-	14	-	12	-
CNA750	22	-	26	-	28	-	23	-
CRJ9-ER	92	42	48	19	52	21	43	17
EMB145	2	-	-	-	-	-	-	-
EMB170	4	-	1	-	1	-	1	-

Table 8: Run-up Operations

AEDT ANP Code	2018		2040 Baseline		2040 High		2040 Low	
	Day	Night	Day	Night	Day	Night	Day	Night
F-18	2	-	-	-	-	-	-	-
GV	12	-	14	-	15	-	13	-
IA1125	2	-	-	-	-	-	-	-
MD83	10	4	-	-	-	-	-	-
MD9025	166	114	1	-	1	-	1	-
Total	730	316	1,036	274	1,132	299	928	246

Number is shown as 0 when less than 0.5. Number is shown as "-" when it is 0.

Source: MAC and HNTB analysis, 2023.

3 AEDT Outputs

Using inputs described in the previous section, DNL noise exposure was calculated using AEDT in one decibel (dB) increments between 55 and 85 DNL with a standard grid. A standard grid is comprised of a group of evenly spaced grid points. In this study, a spacing of 0.025 nautical miles, approximately 152 feet, was applied. **Figure 1** depicts the 60 – 75 DNL noise contours in 5 dB increments for the 2018 Actual Noise Contour. **Figure 2** through

Figure 4 depict the 60 – 75 DNL noise contours in 5 dB increments for the 2040 baseline, high scenario, and low scenario noise contours. **Figure 5** compares the 2018 Actual Noise Contour, 2040 baseline, high scenario, and low scenario noise contours. **Table 9** compares the 60+ and 65+ DNL noise areas of the 2018 Actual Noise Contour and the 2040 baseline, high scenario, and low scenario noise contours.

Table 9: Noise Contour Area (acres)

DNL	2018 Area	2040 Area			% Changes vs. 2018		
		Baseline	High	Low	Baseline	High	Low
60+	11,323	15,775	17,017	14,443	39.3%	50.3%	27.6%
65+	4,444	5,933	6,393	5,435	33.5%	43.9%	22.3%

Sources: MAC Data and HNTB Analysis, 2023.

The 60+ DNL noise area of the 2040 baseline, high scenario, and low scenario noise contours are expected to increase 39.3%, 50.3%, and 27.6% as compared with the 2018 Actual Noise Contour. The 65+ DNL noise area of the 2040 baseline, high scenario, and low scenario noise contours are expected to increase 33.5%, 43.9%, and 22.3% as compared with the 2018 Actual Noise Contour. There are several factors that contribute to the increase of the contour size as described below.

First, the total number of operations in the 2040 baseline, high scenario, and low scenario noise contours are expected to increase 25.3%, 36.4%, and 13.2% from 2018. In addition, the nighttime operations in the 2040 baseline, high scenario, and low scenario noise contours are expected to increase 0.8%. Since one nighttime operation is equivalent to ten daytime operations, a 0.8% increase in nighttime operations is equivalent to 8% increase in daytime operations.

Second, there is an increase of approximately 9.1% - 10.7% of operations with stage lengths 2 and 3 at the expense of stage length 1 operations. Since departures with higher stage lengths require more fuel, their climb rates are slower (closer to the ground). Therefore, the noise impacts of higher departure stage lengths are greater.

Third, the projected changes in the 2040 baseline, high scenario, and low scenario fleet mixes as compared with the 2018 fleet mix also contribute to a larger noise contour area. In the 2018 fleet mix, the top two aircraft types with the highest operations are regional jets (Bombardier CRJ-200 and CRJ-900). In the 2040 fleet mixes, the top two aircraft types with the highest operations are projected to be narrow body aircraft types (Airbus A220-100 and Airbus A319-NEO). Since noise signatures of narrow body aircraft are generally larger than those of regional jets, the increase of narrow body operations in the fleet mix is expected to contribute to the larger 2040 contours as well.

Finally, the 2018 Actual Noise Contour was modeled using AEDT 2d and the 2040 LTP Noise Contours was modeled using AEDT 3e. Differences between AEDT 2d and 3e that may contribute to changes in noise contours are included in **Attachment 5: AEDT 2d vs. AEDT 3e Comparison**.

Figure 1: MSP 2018 Actual Noise Contour

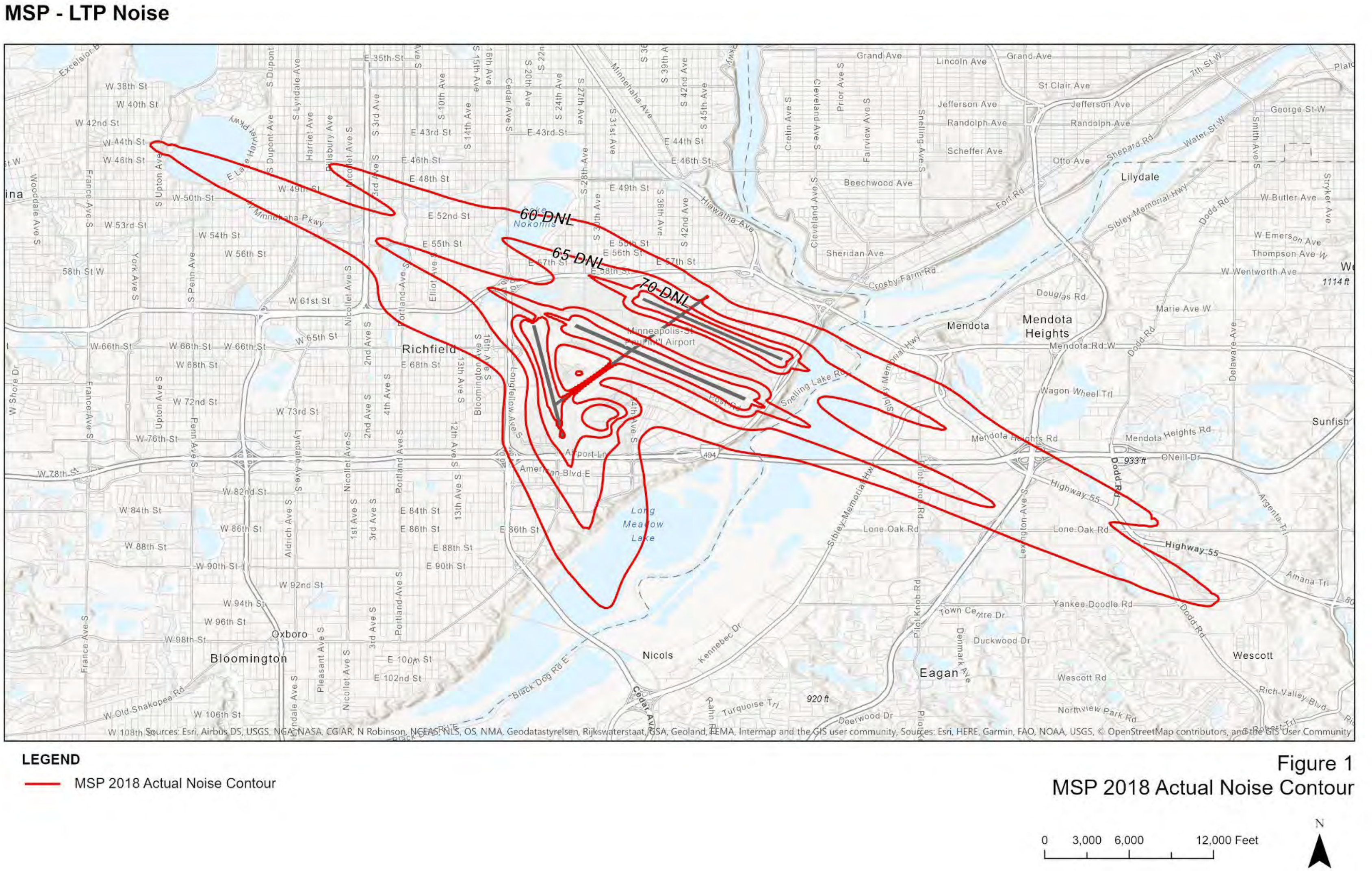
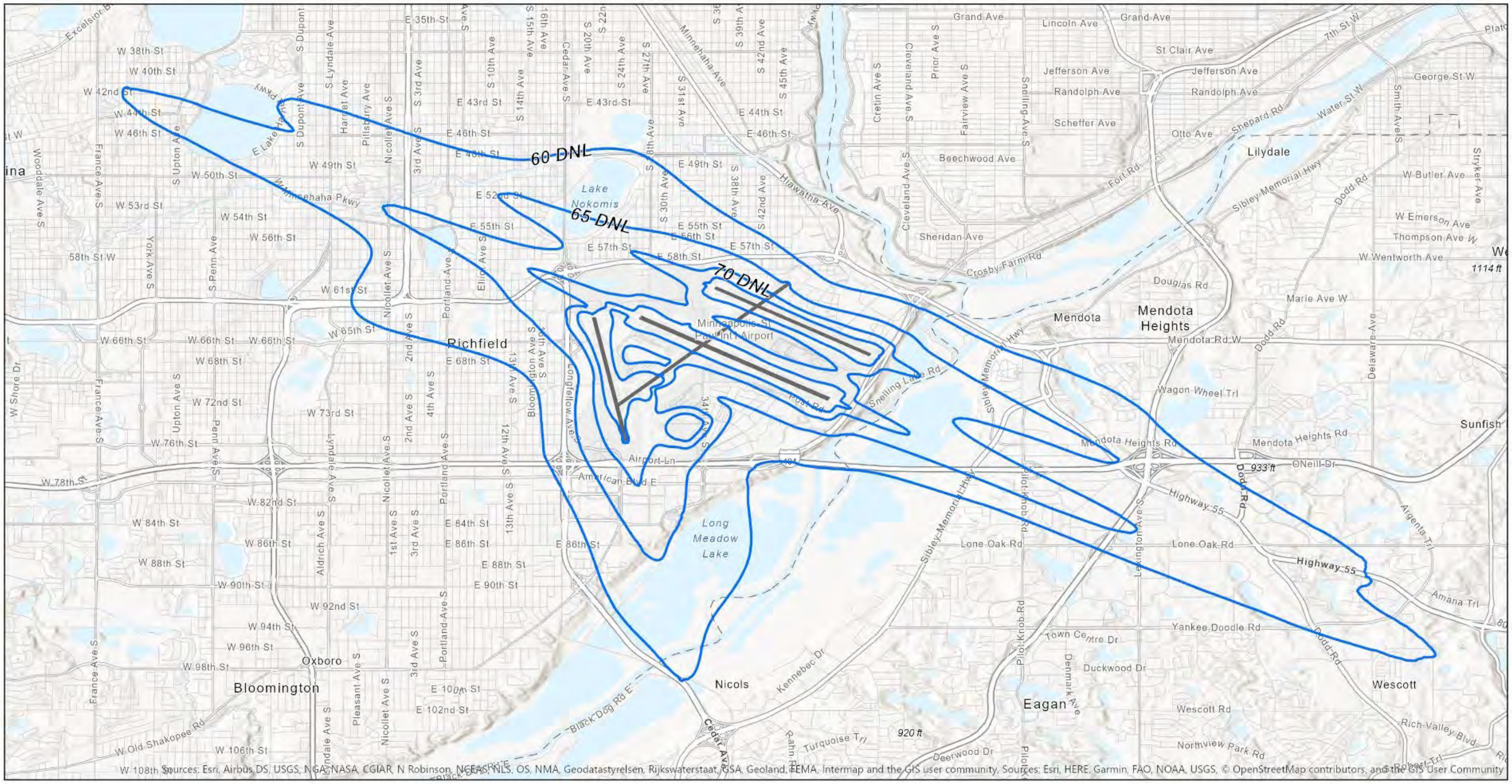


Figure 1
MSP 2018 Actual Noise Contour

Figure 2: MSP 2040 Baseline Noise Contour

MSP - LTP Noise



LEGEND

MSP 2040 Baseline Noise Contour

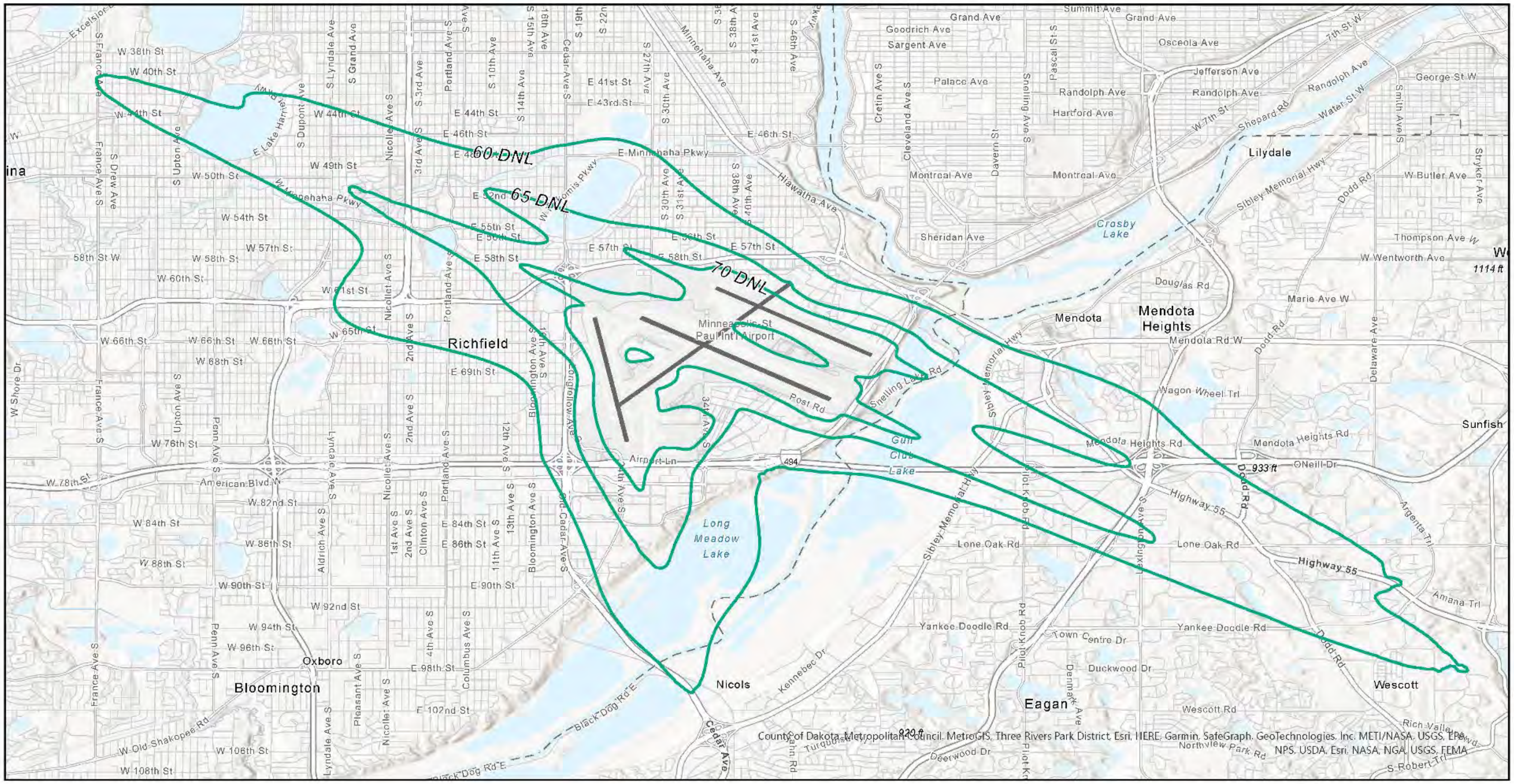
Figure 2
MSP 2040 Baseline Noise Contour

0 3,000 6,000 12,000 Feet

N

Figure 3: MSP 2040 High Scenario Noise Contour

MSP - LTP Noise



LEGEND

— MSP 2040 High Scenario Noise Contour

Figure 3
MSP 2040 High Scenario Noise Contour

0 3,000 6,000 12,000 Feet

N

Figure 4: MSP 2040 Low Scenario Noise Contour

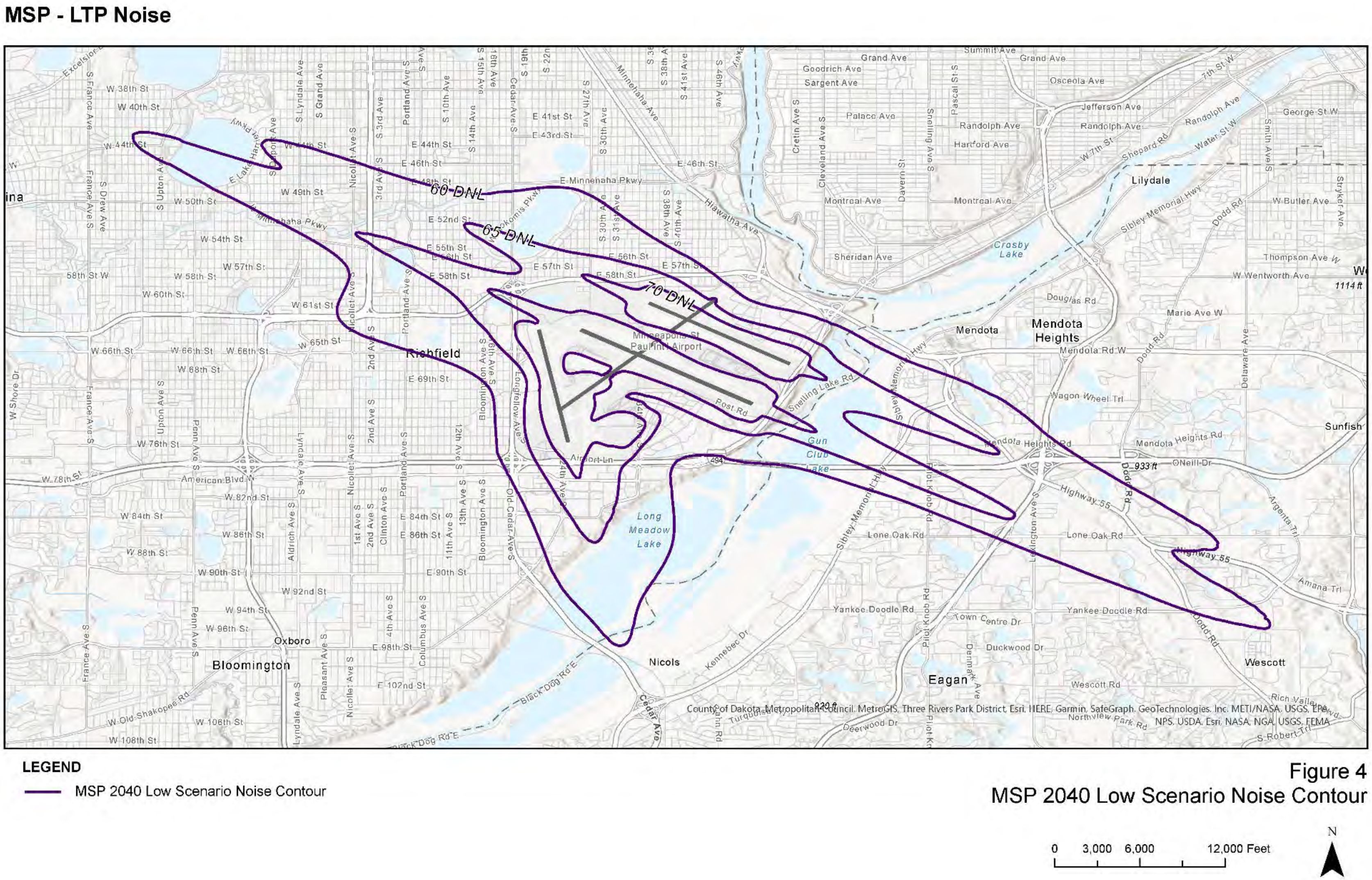
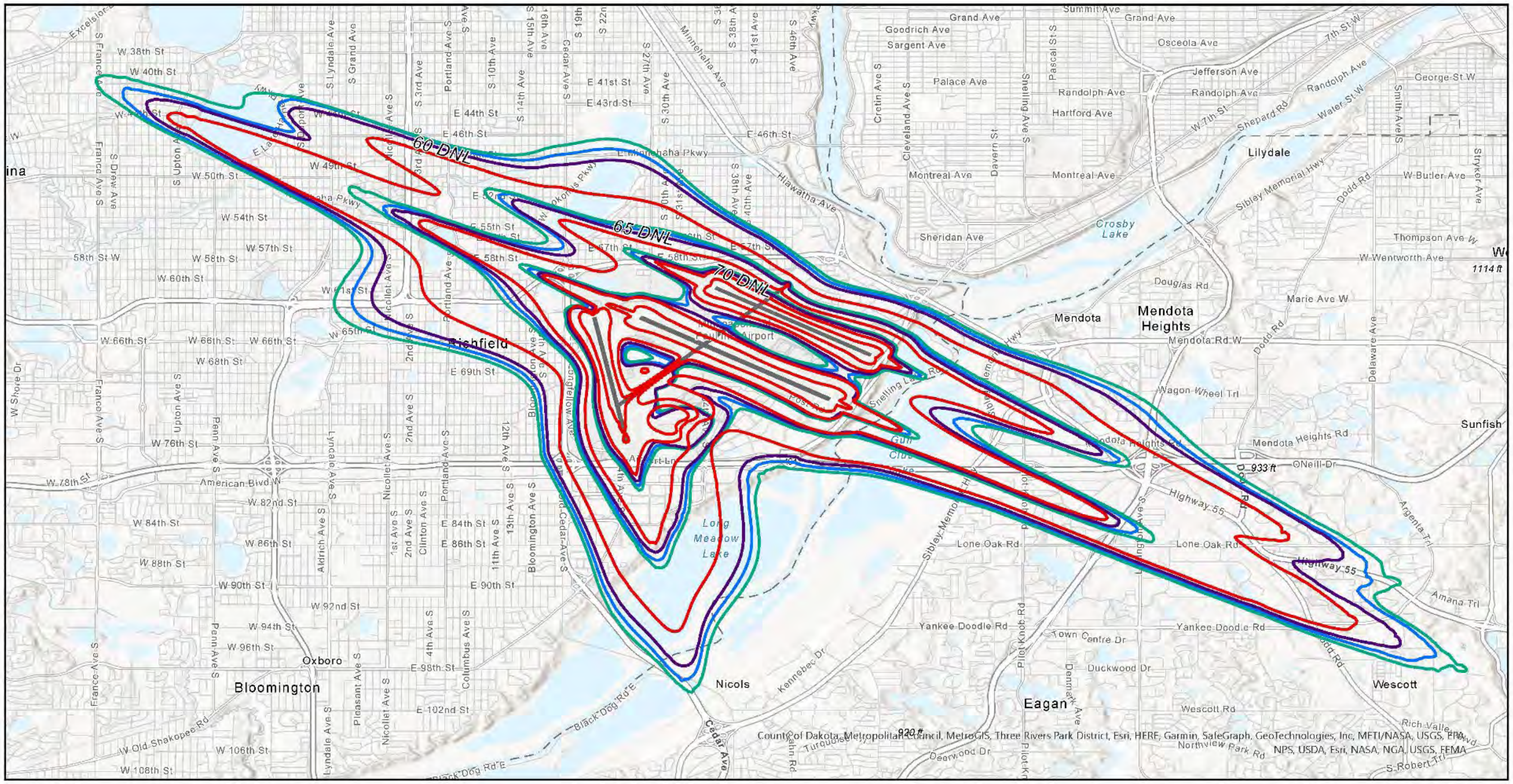


Figure 5: MSP 2018 Actual Noise Contour vs. MSP 2040 LTP Noise Contours

MSP - LTP Noise



LEGEND

- MSP 2018 Actual Noise Contour
- MSP 2040 Baseline Noise Contour
- MSP 2040 High Scenario Noise Contour
- MSP 2040 Low Scenario Noise Contour

Figure 5
MSP Baseline, High Scenario, and Low Scenario Noise Contours vs. 2018 Contour

0 3,000 6,000 12,000 Feet

N

4 Summary

This technical memorandum documents the methodologies and data sources in the modeling of the 2040 baseline, high scenario, and low scenario noise contours. A brief description of factors that may contribute to an increase of noise areas from 2018 Actual Noise Contour to 2040 noise contours was also included in the technical memorandum.

As always, we appreciate the opportunity to provide noise analysis and support to the MAC. Should you have any questions regarding the content of this technical memorandum, please do not hesitate to call me at 540-257-3728 or email yxu@hntb.com.

Best Regards,

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Attachment 1
Noise Contour Fleet Mix Final Technical Memorandum

Minneapolis St. Paul International Airport (MSP) Long-Term Plan (LTP)
Fleet Mix Final Technical Memorandum

HNTB has been tasked to assist the Metropolitan Airports Commission (MAC) in support of the development of the 2040 Long-Term Plan (LTP) Noise Contour for the Minneapolis-St. Paul International Airport (MSP). This technical memorandum presents a summary of the methodologies and data sources used in the analysis, specifically the development of a 2040 fleet mix and subsequent adjustments/refinements to various input parameters to facilitate modeling of the 2040 contour with the Federal Aviation Administration's (FAA) Aviation Environmental Design Tool (AEDT).

1. Methodology and Input Data

The MAC provided HNTB the summer Design Day Flight Schedule (DDFS) for the 2040 baseline condition. The DDFS was based on an Average Day of the Peak Month (ADPM) that includes operations by passenger carriers, cargo carriers, air taxi, General Aviation (GA), charter, and military. Since the DDFS represents an ADPM condition whereas the 2040 noise contour represents an Average Annual Day (AAD) condition, it was necessary to convert the ADPM fleet mix to the AAD fleet mix. Following the development and acceptance of the 2040 fleet mix, the FAA AEDT model, version 3e, will be used to create the 2040 baseline noise contours. The following sections describe the procedure of the fleet mix conversion as well as other inputs that will be used with the AEDT modeling process.

1.1 2040 Baseline AAD Fleet Mix

The latest annual MAC Noise & Operations Monitoring System (MACNOMS) and United States Department of Transportation (USDOT) T100 data (2021) were used to develop the ADPM-to-AAD conversion factors for passenger (domestic and international) and all-cargo airlines, as well as the airline market share. The 2021 data were used to ensure the forecast reflects the most recent market trends. Nighttime adjustment factors based on 2018 baseline simulation results and 2018 MACNOMS data were also incorporated to account for various delay components. Ultimately, operations were scaled to match the total 2040 baseline forecast operation by each operation category.

For other categories, including air taxi, charter, GA, and military, operations were scaled proportionally to match the total 2040 baseline forecast by category. **Table 1-1** shows the 2040 baseline forecast operations by category.

Table 1-1: 2040 Baseline Forecast

Category	Operations
Domestic Passenger	432,000
International Passenger	32,900
Air Cargo	19,700
GA/Air Taxi/ Charter	22,900
Military	2,200
Total	509,700

Source: Ricondo Forecast, 2021.

1.1.1 Operation Balancing

The baseline DDFS operations were balanced such that the number of arrivals would equal the number of departures for the same airline and aircraft. In instances where arrivals or departures for each airline and aircraft type were not equal, the operations were scaled up or down to ensure they were balanced.

1.1.2 ADPM to AAD Conversion

Using the 2021 MACNOMS data, ADPM to AAD conversion factors were developed by comparing the ADPM operations (July 28, 2021, Wednesday) with total annual operations of the same airline and aircraft. If a certain combination of airline and aircraft in the DDFS was not available on that day, the next date in July with operations closest to the July average was used to develop conversion factors.

The passenger and all-cargo airline market shares (domestic and international) in 2021 were calculated using MACNOMS data and were assumed to remain constant in 2040. The total baseline 2040 passenger (domestic and international) and all-cargo operations were multiplied by the airline market share to obtain total 2040 operations by each airline. Operations by each airline were subsequently scaled proportionally to match the total forecast 2040 baseline operations in **Table 1-1**.

1.1.3 Seasonal International Flights

There are several international carriers that provide seasonal flights from/to MSP. Since these carriers operate mostly during the summer months, assumptions were made to develop projections of 2040 operations. In general, the operational growth factor from 2021 to 2040 was applied to project the 2040 operations for these airlines. A weekly operation frequency was estimated to produce an annual operations projection close to the projected 2040 operation levels. The seasonal international airlines and their forecast operations are discussed below:

- **Air France**

Air France operates flights to/from MSP from June through September. In 2021, there were 126 operations. It was assumed that Air France would operate daily flights from June through September in 2040, which results in a total of 224 operations.

- **Icelandair**

Icelandair operates flights to/from MSP from June through mid-October. In 2021, there were 164 operations. It was assumed that Icelandair would operate ten weekly flights from June through mid-October in 2040, which results in a total of 280 operations.

- **KLM Royal Dutch Airlines**

KLM Royal Dutch Airlines operates flights to/from MSP from August through November. In 2021, there were 76 operations. It was assumed that KLM Royal Dutch Airlines would operate four weekly flights from August through November in 2040, which results in a total of 128 operations.

- **Condor Flugdienst**

Condor Flugdienst operates flights to/from MSP from June through mid-September. The route was dropped in 2021 but resumed in 2022. It was assumed that KLM Royal Dutch Airlines would operate five weekly flights from June through November in 2040, which results in a total of 140 operations.

- **Aer Lingus**

Aer Lingus operated flights to/from MSP in 2019 but suspended the route in 2020 due to the pandemic. The 2040 baseline DDFS assumed that Aer Lingus operation would resume post-pandemic. In 2019, there were five weekly flights in July, daily operations from August through November, and four weekly flights in December. It was assumed that Aer Lingus would operate daily flights in spring, summer, and fall. During the winter months (December to March), it was assumed that Aer Lingus would operate four weekly flights. These assumptions result in a total of 632 flights.

1.1.4 Day / Night Split Adjustment

AEDT considers different levels of annoyance during daytime hours (07:00 AM – 22:00 PM) as compared to nighttime hours (22:01 PM – 6:59 AM). "Day" and "Night" for noise modeling purposes are defined by the time an aircraft lands or takes off from a runway. A 10-dB penalty is added to nighttime operations due to their additional perceived annoyance when people are at rest and the ambient noise level is low, making it important to accurately capture whether operations would occur during daytime hours or nighttime hours (day/night split). Since the DDFS provides an At-Gate time stamp, the following steps were applied to estimate an overall day/night split that accounts for taxi times, airfield delay, system delay, non-airfield delay, and seasonality.

<u>Step 1: Develop At-Gate Day Night Fleet Mix from Design Day DDFS:</u>

- Average the arrivals and departures for each aircraft type when they differed.
- Annualize by multiplying the average by the ratio of annual forecast operations to design day operations from the DDFS in each major category (passenger, cargo, GA / air taxi / charter, military).
- Calculate the At-Gate day/night split and stage length distribution based on gate time and destination information in the DDFS.
- Convert to preliminary AAD by dividing by 365.

<u>Step 2: Adjust At-Gate Day Night Fleet Mix for Taxi Time and Airfield Delay:</u>

- Develop percentage of arrival and departure nighttime operations for each major category (passenger, cargo, other, etc.) for each runway use configuration that was simulated.
- Weight the percentage above by the assumed 2040 percentage of runway use configurations to arrive at a weighted nighttime average.
- Calculate the ratios of At-Runway nighttime percentages to At-Gate nighttime percentages for arrivals and departures for each major use category.
- Apply the nighttime ratios to the At-Gate Day/Night Fleet Mix to develop preliminary At-Runway Day/Night Fleet Mix.

<u>Step 3: Adjust for System Delay, Non-Airfield Delay, and Seasonality:</u>

- Factors that are not captured by the airfield simulation include propagated system delay generated outside of MSP, non-airfield delay such as mechanical issues, gate holds, holds for late arriving connecting passengers, and seasonal schedule changes.
- The 2018 MACNOMS AAD nighttime percentages for arrivals and departures in each major use category were divided by the nighttime percentages calculated from the 2018 airfield simulations to develop adjustment ratios for converting the At-Runway Day Night Fleet mix to a final AAD fleet mix that incorporates annual system delay, non-airfield delay and seasonality.
- These ratios were applied to the 2040 At-Runway Day Night Fleet Mix to develop a fleet mix for use in noise modeling.

Table 1-2 depicts the day / night splits for the 2018 base year, the 2040 baseline DDFS, and the 2040 baseline AAD scenarios. The 2040 baseline AAD nighttime percentage is lower than the 2040 baseline DDFS nighttime percentages as the DDFS represents the ADPM condition with more operations than the AAD condition. The 2040 baseline AAD nighttime percentage is higher than the 2018 AAD nighttime percentages because of the higher projected nighttime operations in the 2040 baseline DDFS.

Table 1-2: Day / Night Split

Operation Type	2018		2040 DDFS		2040 AAD	
	Day	Night	Day	Night	Day	Night
Arrival	88.6%	11.4%	86.2%	13.8%	88.0%	12.0%
Departure	89.8%	10.2%	85.8%	14.2%	89.0%	11.0%
Total	89.2%	10.8%	86.0%	14.0%	88.5%	11.5%

Source: MACNOMS data and HNTB analysis, 2022.

1.1.5 2040 Baseline AAD Fleet Mix

Table 1-3 shows the 2040 baseline AAD fleet mix.

Table 1-3: 2040 Baseline AAD Fleet Mix

Category	Type	Airline	Aircraft	Operations
Passenger	Domestic	Delta Air Lines	BCS1	142,117
			A19N	55,275
			B739	35,086
			A20N	34,781
			CRJ2	17,134
			CRJ9	13,401
			B753	11,625
			BCS3	11,509
			E175	7,670
			A321	5,652
			A339	3,729
			A350	311
		DAL Total		338,288
		United Airlines	E175	6,071
			BCS1	3,468
			BCS3	3,179
			B38M	1,921
			B3XM	388
		UAL Total		15,025
		American Airlines	B738	9,664
			BCS1	7,962
			E175	2,473
			B38M	899
		AAL Total		20,997

Table 1-3: 2040 Baseline AAD Fleet Mix

Category	Type	Airline	Aircraft	Operations
		Alaska Airlines	E175	1,640
			B39M	763
			B38M	562
		ASA Total		2,965
		Frontier Airlines	A20N	1,181
			A321	787
		FFT Total		1,968
		Sun Country Airlines	B738	29,589
		SCX Total		29,589
		Southwest Airlines	B737	8,778
			B38M	6,343
		SWA Total		15,121
		JetBlue Airways	A320	1,293
		JBU Total		1,293
		Spirit Airlines	A319	2,890
		Spirit Airlines	A19N	1,949
		Spirit Airlines	A20N	779
		NKS Total		5,618
		Boutique Air	PC12	695
		BTQ Total		695
		Air Choice One	C208	442
		ACO Total		442
	International	Delta Air Lines	BCS1	10,281
		Delta Air Lines	A350	7,118
		Delta Air Lines	CRJ9	4,029
		Delta Air Lines	BCS3	3,376
		Delta Air Lines	B739	2,617
		Delta Air Lines	A20N	1,465
		Delta Air Lines	E175	1,125
		Delta Air Lines	A339	326
		DAL Total		30,338
		Air Canada	E175	1,158
		ACA Total		1,158
		Air France	A359	224
		AFR Total		224
		Condor	B788	140
		CFG Total		140
		Aer Lingus	A21N	632
		EIN Total		632
		Icelandair	B39M	280

Table 1-3: 2040 Baseline AAD Fleet Mix

Category	Type	Airline	Aircraft	Operations
		ICE Total		280
		KLM	B78X	128
		KLM Total		128
Passenger Total				**464,900**
Cargo	Cargo	Bemidji Airlines	BE99	2,304
		Bemidji Airlines	BE65	2,004
		Bemidji Airlines	BE80	1,896
		Bemidji Airlines	SW4	1,540
		BMJ Total		7,743
		Kalitta Air	B763	6
		CKS Total		6
		FedEx	B763	2,472
		FedEx	B752	1,228
		FedEx	MD11	671
		FedEx	B77F	671
		FDX Total		5,042
		Atlas Air	B748	9
		Atlas Air	B763	9
		GTI Total		19
		Mountain Air Cargo	AT43	745
		MTN Total		745
		Polar Air Cargo	B748	5
		PAC Total		5
		Contract Air Cargo	CRJ2	550
		TSU Total		550
		UPS	B752	3,320
		UPS	B763	1,280
		UPS	MD11	702
		UPS	B748	288
		UPS Total		5,590
Cargo Total				**19,700**
Air Taxi	Air Taxi	Miscellaneous	B350	108
		Miscellaneous	C56X	1,341
		Miscellaneous	C680	268
		Miscellaneous	C68A	283
		Miscellaneous	C750	536
		Miscellaneous	CL30	1,846
		Miscellaneous	CL35	268
		Miscellaneous	CL60	536
		Miscellaneous	CRJ7	268
		Miscellaneous	E545	136

Table 1-3: 2040 Baseline AAD Fleet Mix

Category	Type	Airline	Aircraft	Operations
		Miscellaneous	E55P	777
		Miscellaneous	G280	268
		Miscellaneous	GLEX	268
		Miscellaneous	GLF4	536
		Miscellaneous	H25B	268
		Miscellaneous	HA4T	268
		Miscellaneous	LJ55	268
		Miscellaneous	SW4	145
Air Taxi Total				**8,392**
Charter	Charter	Miscellaneous	A319	142
		Miscellaneous	B738	1,743
		Miscellaneous	CRJ7	128
		Miscellaneous	CRJ9	104
		Miscellaneous	E170	258
		Miscellaneous	E75L	352
		Miscellaneous	MD90	117
Charter Total				**2,845**
GA	GA	Miscellaneous	B190	1,514
		Miscellaneous	B350	257
		Miscellaneous	BE20	513
		Miscellaneous	BE55	396
		Miscellaneous	C208	513
		Miscellaneous	C25B	513
		Miscellaneous	C560	513
		Miscellaneous	C56X	770
		Miscellaneous	C680	513
		Miscellaneous	C750	396
		Miscellaneous	CL35	257
		Miscellaneous	CL60	257
		Miscellaneous	F2TH	1,026
		Miscellaneous	FA50	513
		Miscellaneous	GLEX	257
		Miscellaneous	GLF4	513
		Miscellaneous	GLF5	653
		Miscellaneous	H25B	513
		Miscellaneous	LJ40	257
		Miscellaneous	LJ60	257
		Miscellaneous	M20P	494
		Miscellaneous	PC12	513
		Miscellaneous	SF50	257
GA Total				**11,663**

Table 1-3: 2040 Baseline AAD Fleet Mix

Category	Type	Airline	Aircraft	Operations
Military	Military	Miscellaneous	C130	1,833
	Military	Miscellaneous	K35R	367
Military Total				**2,200**
Grand Total				**509,700**

Source: HNTB analysis, 2022.

2. Summary

This technical memorandum documents the methodologies and data sources in the conversion of the 2040 DDFS fleet mix to the 2040 AAD fleet mix. The 2040 DDFS fleet mix (ADPM based) was converted to the 2040 AAD fleet mix by using the ADPM/AAD conversion factors after the arrivals and departures were balanced. Specific assumptions were made regarding future seasonal international flights. The day / night split was adjusted to account for taxi times, airfield delay, system delay, non-airfield delay, and seasonality. The total number of operations were scaled proportionally to match the forecast operations by category.

As always, we appreciate the opportunity to provide noise analysis and support to the MAC. Should you have any questions regarding the content of this technical memorandum, please do not hesitate to call me at 540-257-3728 or email yxu@hntb.com.

Best Regards,

Yue Xu, Ph.D., P.E.
Aviation/Environmental Planner
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Attachment 2
AEE Coordination

MEMORANDUM

HNTB

To
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Environmental Protection Specialist
Great Lakes Region
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6020 28th Ave S, Ste 102
Minneapolis, MN 55450-2700

From
Yue Xu, HNTB

Cc
Brad Juffer, MAC
Michele Ross, MAC
Kim Hughes, HNTB

Subject
Submittal to FAA of Non-standard AEDT Aircraft Substitution for Minneapolis-St. Paul International Airport and Flying Cloud Airport Long Term Plan Noise Analysis

Date
August 1, 2022

For development of the Minneapolis-St. Paul International Airport (MSP) and Flying Cloud Airport (FCM) Long Term Plan (LTP), HNTB is conducting noise analyses for the base year (2021) and the future year (2040) using the Aviation Environmental Design Tool (AEDT) 3e. This request is in accordance with the required protocol to obtain approval of non-standard aircraft substitution related to AEDT. The Metropolitan Airports Commission (MAC), owner and operator of MSP and FCM, is requesting recommendation of eight non-standard substitutions (for both facilities), as discussed in **Section 1**. We understand the MSP and FCM LTP planning studies are not part of a federal process and thus a formal AEE coordination is not required. To ensure accuracy of the noise analyses, we would like to request AEE's technical opinions on the non-standard aircraft substitution through this informal coordination request.

1. Non-Standard Aircraft Substitution Table

The base year and future year fleet mixes prepared for this LTP include aircraft types for which there is no direct AEDT 3e type or pre-approved FAA substitution identified in the model. Consistent with FAA's policy for non-standard modeling procedures, this memorandum provides a list of these aircraft types with a suggested substitution. **Table 2-1** lists aircraft that are present in the base year and future year fleet mixes for which no suitable AEDT aircraft exists. HNTB requests concurrence or suggested replacement aircraft for use in the model.

Table 2-1: AEDT 3e Substitution Table

Non-standard AEDT Aircraft Substitution for MSP and FCM LTP

Aircraft ID	Aircraft Description	AEDT Equipment ID	AEDT ANP Code	AEDT Air Frame Code	AEDT Engine Model	AEDT BADA Code
B3XM	Boeing 737 MAX 10	6406	7378MAX	5337	LEAP-1B28/28B1/28B2/28B3	B39M
HCG2	Guimbal Cabri G2	3808	SC300C	5179	IO-360-B	P28A
R66	Robinson R66	3161	R44	5080	TIO-540-J2B2	P28A
PA16	Piper PA-16 Clipper	6311	GASEPF	5639	O-200	C172
STOL	Cub Crafters Carbon Cub CCK-2000	1880	GASEPF	5004	IO-320-D1AD	P28A
B58T	Beechcraft Baron 58 Turbo	6251	BEC58P	5630	TIO-540-J2B2	BE58
A5	ICON A5	1901	GASEPV	4950	TIO-540-J2B2	P28A
GYRO	AutoGyro GmbH Cavalon	3807	R22	5178	IO-320-D1AD	P28A

Source: HNTB Analysis, 2022.

2. Background Information

Boeing 737 MAX 10 (MSP LTP)

The Boeing 737 MAX 10 is the largest variant of the Boeing 737 MAX family with a Maximum Takeoff Weight (MTOW) of 197,900 lbs and a Maximum Landing Weight (MLW) of 163,900 lbs. It is equipped with two CFM LEAP-1B engines. HNTB proposes to use AEDT equipment 6406 as a substitute, which maps to ANP code 7378MAX, airframe 5337 (Boeing 737-9), engine model LEAP-1B28/28B1/28B2/28B3, and BADA code B39M.

Guimbal Cabri G2 (FCM LTP)

The Guimbal Cabri G2 is a light helicopter developed by Hélicoptères Guimbal. It has a maximum gross weight of 1,540 lbs and is equipped with a Lycoming O-360 J2A engine rated at 145 shp. HNTB proposes to use AEDT equipment 3808 as a substitute, which maps to ANP code SC300C, airframe code 5179 (Schweizer 300C), engine model IO-360-B, and BADA code P28A. The SC300C (Schweizer 300C) has a MTOW of 2,050 lbs and is equipped with a Lycoming HIO-360 D1A engine rated at 190 hp. It has heavier weights and is equipped with a similar but more powerful engine than the Guimbal Cabri G2. Therefore, it represents a conservative substitute for the Guimbal Cabri G2.

Robinson R66 (FCM LTP)

The Robinson R66 is a derived version of the Robinson R44. It has a maximum gross weight of 2,700 lbs and is equipped with a Rolls-Royce RR300 engine rated at 224 shp. AEDT airframe 5134 represents a direct representation of the Robinson R66. However, there's no AEDT equipment mapped to airframe 5134. Therefore, HNTB proposes to use AEDT equipment 3161 as a substitute, which maps to ANP code R44, airframe 5080 (Robinson R44 Raven / Lycoming O-540-F1B5), engine model TIO-540-J2B2, and BADA code P28A.

Piper PA-16 Clipper (FCM LTP)

The Piper PA-16 Clipper is a light high-wing single engine piston aircraft. It has an MTOW of 1,650 lbs and is equipped with a Lycoming O-235 engine rated at 115 hp. The PA-16 Clipper is an extended version of the PA-15 Vagabond, which shares many structural components of the Piper J-3 Cub. The Piper J-3 Cub has a standard substitution in AEDT 3e. Therefore, HNTB proposes to use equipment 6311 as a substitute, which maps to ANP code GASEPF, airframe 5639 (Piper J-3 Cub (FAS)), engine model O-200, and BADA code C172.

Cub Crafters Carbon Cub CCK-2000 (FCM LTP)

The Cub Crafters Carbon Cub CCK-2000 is an amateur built aircraft developed by Cub Crafters with an ECi CC340 engine rated at 180 hp. It has an MTOW of 1,865 lbs and is equipped with a two-bladed fixed pitch propeller. HNTB proposes to use the generic GA fixed pitch aircraft of equipment 1880 as a substitute, which maps to ANP code GASEPF, airframe 5004 (EADS Socata TB-9 Tampico), engine IO-320-D1AD, and BADA code P28A.

Beechcraft Baron 58 Turbo (FCM LTP)

The Beechcraft Baron 58 Turbo is powered by a pair of turbocharged Continental TIO-520s of 310–325 hp engines (310 hp – 325 hp) with a gross weight of 6,200. HNTB proposes to use equipment 6251 as a substitute, which maps to ANP code BEC58P, airframe 5630 (Beechcraft 56TC Baron (FAS)), engine model TIO-540-J2B2, and BADA code BE58.

ICON A5 (FCM LTP)

The ICON A5 is an amphibious light-sport aircraft (LSA) aircraft developed by ICON Aircraft. It has a maximum gross weight of 1,510 lbs and is equipped with a Rotax 912 iS engine rated at 100 hp. HNTB proposes to use the generic GA variable pitch aircraft of equipment 1901 as a substitute, which maps to ANP code GASEPV, airframe 4950 (Piper PA-24 Comanche), engine model TIO-540-J2B2, and BADA code P28A.

AutoGyro GmbH Cavalon (FCM LTP)

The AutoGyro GmbH Cavalon is an autogyro rotorcraft developed by AutoGyro GmbH. It has a maximum gross weight of 992 lbs and is equipped with a Rotax 912ULS engine rated at 100 hp. HNTB proposes to use AEDT equipment 3807 as a substitute, which maps to ANP code R22, airframe 5178 (Robinson R22B), engine model IO-320-D1AD, and BADA code P28A. It represents a light helicopter substitute with takeoff weight and engine thrust close to AutoGyro GmbH Cavalon's characteristics.

3. Summary

We are requesting, for use in the MSP and FCM LTP projects, the concurrence or recommendation of the non-standard AEDT aircraft substitutions. Should you have any additional questions, please do not hesitate to contact me. Thank you in advance for your consideration of this request.

Best regards,

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Attachment 3
2040 Baseline, High Scenario, and Low Scenario AEDT Fleet Mixes

Table 3-1: 2040 LTP Fleet Mixes

Aircraft ID	Aircraft Description	AEDT ANP	Airframe	Engine	2040 Baseline		2040 High		2040 Low	
					Day	Night	Day	Night	Day	Night
221	Airbus A220-100	737700	Airbus A220-100	01P20PW183	423	26	462	29	379	24
223	Airbus A220-300	737700	Airbus A220-300	01P20PW184	45	5	49	5	40	4
319	Airbus A319 series	A319-131	Airbus A319-100 Series	7CM050	5	2	6	3	5	2
320	Airbus A320 series	A320-232	Airbus A320-200 Series	3IA007	2	1	3	1	2	1
321	Airbus A321 series	A321-232	Airbus A321-100 Series	1IA005	18	-	19	-	16	-
32N	Airbus A320NEO Series	A320-271N	Airbus A320-NEO	01P20CM128	98	4	107	5	87	4
32N	Airbus A320NEO Series	A320-272N	Airbus A320-NEO	01P18PW150	2	0	3	0	2	0
32Q	Airbus A321NEO Series	A321-232	Airbus A321-NEO	01P08CM103	2	-	2	-	2	-
339	Airbus A330-900	A330-343	Airbus A330-900N Series (Neo)	02P23RR141	10	1	11	1	9	1
350	Airbus A350	A350-941	Airbus A350-1000 Series	01P21RR125	10	0	11	0	9	0
350	Airbus A350	A350-941	Airbus A350-900 series	01P18RR124	8	2	9	2	7	2
359	Airbus A350-900	A350-941	Airbus A350-900 series	01P18RR124	1	-	1	-	1	-
3N1	Airbus A319NEO Series	A319-131	Airbus A319-NEO	01P20CM127	126	30	138	33	113	27
738	Boeing 737-800	737800	Boeing 737-800 Series	3CM034	66	20	72	21	59	18
739	Boeing 737-900	737800	Boeing 737-900 Series	8CM065	91	12	100	13	82	11
73H	Boeing 737-800	737800	Boeing 737-800 Series	3CM034	19	7	21	8	17	7
73W	Boeing 737-700	737700	Boeing 737-700 Series	3CM030	16	8	18	8	15	7
753	Boeing 757-300	757300	Boeing 757-300 Series	XPW204	30	2	33	2	27	2
781	Boeing 787-10 Dreamliner	7879	Boeing 787-10 Dreamliner	01P17GE211	0	-	0	-	0	-
788	Boeing 787 Dreamliner (800 Model)	7878R	Boeing 787-8 Dreamliner	9GENX3	0	-	0	-	0	-
7M1	Boeing 737 MAX 10	7378MAX	Boeing 737-9	01P20CM136	1	-	1	-	1	-
7M8	Boeing 737 MAX 8	7378MAX	Boeing 737-8	01P20CM136	20	6	22	7	18	6
7M9	Boeing 737 MAX 9	7378MAX	Boeing 737-9	01P20CM136	2	1	2	1	1	1
A319	Airbus A319 series	A319-131	Airbus A319-100 Series	7CM050	0	-	0	-	0	-

Table 3-1: 2040 LTP Fleet Mixes

Aircraft ID	Aircraft Description	AEDT ANP	Airframe	Engine	2040 Baseline		2040 High		2040 Low	
					Day	Night	Day	Night	Day	Night
AT43	Avions de Transport Régional ATR-43	DHC8	ATR 42-300	PW120	2	-	2	-	2	-
B190	Beechcraft 1900D	1900D	Raytheon Beech 1900-C	PT67B	3	1	4	1	4	1
B350	Beechcraft Super King Air 350/300B	DHC6	Raytheon Super King Air 300	P660AG	1	-	1	-	1	-
B748	Boeing 747-800	7478	Boeing 747-8	11GE139	1	0	1	0	1	0
B752	Boeing 757-200	757PW	Boeing 757-200 Series Freighter	4PW072	2	4	2	5	1	4
B752	Boeing 757-200	757RR	Boeing 757-200 Series Freighter	3RR028	2	5	2	5	2	5
B763	Boeing 767-300	767300	Boeing 767-300 Series	1RR011	7	4	7	4	6	3
B77F	Boeing 777 Freighter	777200	Boeing 777 Freighter	01P21GE216	1	-	1	-	1	-
B77F	Boeing 777 Freighter	777300	Boeing 777 Freighter	01P21GE217	1	-	1	-	1	-
BE20	Beechcraft Model 200 (Super) King Air 200	C12	Raytheon Super King Air 200	PT6A41	1	-	1	-	1	-
BE20	Beechcraft Model 200 (Super) King Air 200	DHC6	Raytheon C-12 Huron	PT6A42	1	-	1	-	1	-
BE55	Beechcraft Model E-55	T42	Raytheon Beech 55 Baron	TIO540	1	1	1	1	1	1
BE65	Beechcraft Model 65 Queen Air	BEC58P	Beechcraft Queen Air 65/70/80 (FAS)	TIO540	5	1	5	1	5	0
BE80	Beechcraft Model 80 Queen Air	BEC58P	Beechcraft Queen Air 65/70/80 (FAS)	TIO540	5	-	6	-	5	-
BE99	Beechcraft Airliner Model 99	DHC6	Raytheon Beech 99	PT6A28	6	-	7	-	6	-
C130	Lockheed Martin C-130	C130	Lockheed C-130 Hercules	T56-1	3	-	3	-	3	-
C130	Lockheed Martin C-130	C130E	Lockheed C-130 Hercules	T56-1	3	-	3	-	3	-
C208	Cessna 208 Caravan I	CNA208	Cessna 208 Caravan	PT6A14	1	-	1	-	1	-
C25B	Cessna CitationJet CJ3, 525B	CNA525C	Cessna CitationJet CJ3 (Cessna 525B)	1PW038	1	-	1	-	1	-

Table 3-1: 2040 LTP Fleet Mixes

Aircraft ID	Aircraft Description	AEDT ANP	Airframe	Engine	2040 Baseline		2040 High		2040 Low	
					Day	Night	Day	Night	Day	Night
C560	Cessna 560 Citation V, Ultra & Ultra Encore	CNA560E	Cessna 560 Citation Encore	PW530	1	-	1	-	1	-
C560	Cessna 560 Citation V, Ultra & Ultra Encore	CNA560U	Cessna 560 Citation V	1PW037	1	-	1	-	1	-
C56X	Cessna 560XL Citation Excel	CNA560XL	Cessna 560 Citation Excel	PW530	6	-	6	-	6	-
C680	Cessna 680 Citation Sovereign	CNA680	Cessna 680 Citation Sovereign	03P14PW194	2	-	2	-	2	-
C68A	Cessna Citation Latitude	CNA680	Cessna 680-A Citation Latitude	7PW078	1	-	1	-	1	-
C750	Cessna 750 series/Citation X	CNA750	Cessna 750 Citation X	8AL025	2	1	2	1	2	1
CL30	Bombardier Challenger 300	CL600	Bombardier Challenger 300	6AL006	4	1	4	1	4	1
CL35	Bombardier Challenger 350	CL600	Bombardier Challenger 300	6AL006	1	-	1	-	1	-
CL60	Canadair Bombardier CL600/610 Challenger Twin Jet	CL600	Bombardier Challenger 600	01P05GE189	1	-	1	-	1	-
CL60	Canadair Bombardier CL600/610 Challenger Twin Jet	CL601	Bombardier Challenger 600	1GE034	1	-	1	-	1	-
CNC	Cessna 208 Caravan I	CNA208	Cessna 208 Caravan	PT6A14	1	-	1	-	1	-
CR9	Bombardier CRJ 900 Regional Jet	CRJ9-ER	Bombardier CRJ-900	01P08GE190	45	2	50	3	41	2
CRJ	Bombardier CRJ 200 Regional Jet	CL600	Bombardier (Canadair) CRJ200 ExecLiner	1GE035	23	1	25	1	21	0
CRJ	Bombardier CRJ 200 Regional Jet	CRJ9-ER	Bombardier CRJ-200	1GE035	23	1	25	1	21	0
CRJ2	Bombardier CRJ 200 Regional Jet	CL600	Bombardier (Canadair) CRJ200PF Bulk Freighter	01P05GE189	-	2	-	2	-	1
CRJ7	Bombardier CRJ 700 Regional Jet	CRJ9-ER	Bombardier CRJ-700	01P05GE189	1	0	1	0	1	0

Table 3-1: 2040 LTP Fleet Mixes

Aircraft ID	Aircraft Description	AEDT ANP	Airframe	Engine	2040 Baseline		2040 High		2040 Low	
					Day	Night	Day	Night	Day	Night
CRJ9	Bombardier CRJ 900 Regional Jet	CRJ9-ER	Bombardier CRJ-900	01P08GE190	0	-	0	-	0	-
E170	Embraer ERJ-170	EMB170	Embraer ERJ170	01P08GE198	1	-	1	-	1	-
E545	Embraer Legacy 545	CNA510	Embraer Legacy 450 (EMB-545)	01P14HN014	0	-	0	-	0	-
E55P	Embraer EMB550 Phenom 300	CNA55B	Embraer Phenom 300 (EMB-505)	PW530	2	-	2	-	2	-
E75	Embraer ERJ-175	EMB175	Embraer ERJ175	01P08GE197	13	1	14	1	12	1
E75L	Embraer ERJ-175	EMB175	Embraer ERJ175-LR	01P08GE197	1	-	1	-	1	-
E7W	Embraer ERJ-175	EMB175	Embraer ERJ175	01P08GE197	37	4	40	4	33	4
F2TH	Dassault Falcon 2000	CNA750	Dassault Falcon 2000	03P14PW194	3	-	3	-	3	-
FA50	Dassault Falcon 50	FAL900EX	Dassault Falcon 50	1AS002	1	-	1	-	1	-
G280	Gulfstream G280	CL601	Gulfstream G280	01P11HN012	1	-	1	-	1	-
GLEX	Bombardier BD-700 Global Express	BD-700-1A10	Bombardier Global Express	4BR002	1	-	1	-	1	-
GLF4	Gulfstream IV	GIV	Gulfstream G400	11RR048	3	-	3	-	3	-
GLF5	Gulfstream V	GV	Gulfstream G-5 Gulfstream 5 / G-5SP Gulfstream G500	3BR001	1	1	1	1	1	1
H25B	Hawker 800/800 XP/850 XP Twin Turbojet/Bae 125-800	LEAR35	Hawker HS-125 Series 700	1AS002	2	-	2	-	2	-
HA4T	Hawker Beechcraft 4000 Horizon (Horizon 1000)	CNA750	Raytheon Hawker 4000 Horizon	01P07PW145	1	-	1	-	1	-
K35R	Boeing C-135R Stratotanker	KC135R	Boeing KC-135 Stratotanker	J57P22	1	-	1	-	1	-
LJ40	Learjet 40 Twin Jet	LEAR35	Bombardier Learjet 40	1AS001	1	-	1	-	1	-
LJ55	Learjet 55 Twin Jet	LEAR35	Bombardier Learjet 55	1AS002	1	-	1	-	1	-
LJ60	Learjet 60 Twin Jet	CNA750	Bombardier Learjet 60	6AL022	0	-	0	-	0	-
LJ60	Learjet 60 Twin Jet	LEAR35	Bombardier Learjet 60	TFE731	0	-	0	-	0	-
M20P	Mooney Mark 20 Series	GASEPV	Mooney M20-K	TSIO36	1	1	1	1	1	1

Table 3-1: 2040 LTP Fleet Mixes

Aircraft ID	Aircraft Description	AEDT ANP	Airframe	Engine	2040 Baseline		2040 High		2040 Low	
					Day	Night	Day	Night	Day	Night
MD11	McDonnell Douglas MD-11 (Mixed)	MD11GE	Boeing MD-11 Freighter	1GE031	1	1	1	1	1	1
MD11	McDonnell Douglas MD-11 (Mixed)	MD11PW	Boeing MD-11 Freighter	1PW052	1	1	1	1	1	1
MD90	McDonnell Douglas MD-90	MD9025	Boeing MD-90	1IA002	0	-	0	-	0	-
MD90	McDonnell Douglas MD-90	MD9028	Boeing MD-90	1IA004	0	-	0	-	0	-
PC12	Pilatus PC-12	CNA208	Pilatus PC-12	PT67B	1	-	1	-	1	-
PL2	Pilatus PC-12	CNA208	Pilatus PC-12	PT67B	2	-	2	-	2	-
SF50	Cirrus Vision SF50	CNA510	CIRRUS SF-50 Vision	1PW035	0	-	0	-	0	-
SF50	Cirrus Vision SF50	CNA510	Cirrus Vision SF50 (FAS)	BIZVERYLIGHTJET_F	0	-	0	-	0	-
SW4	Swearingen Merlin IV /Fairchild Merlin IV	DHC6	Fairchild SA-227-AC Metro III	PW125B	4	1	4	1	3	1
Grand Total					1,236	161	1,345	175	1,116	146

Number is shown as 0 when less than 0.5. Number is shown as “-“ when it is 0.
Totals may not sum up due to rounding.

Source: MSP LTP DDFS and HNTB analysis, 2023.

Attachment 4
Track Use

Table 4-1
2018/2040 Average Daily Track Use Percentage by Runway and Operation Type

Runway	AEDT Track	OP Type	Track Use - Percentage (by Op Type)			Track Use - Percentage (by Op Type and Runway)		
			Day	Night	Total	Day	Night	Total
				ARRIVALS				
4	A04A0	A	0.03%	0.24%	0.05%	58.33%	72.00%	64.78%
4	A04A1	A	0.00%	0.01%	0.00%	2.38%	2.67%	2.52%
4	A04A2	A	0.02%	0.08%	0.02%	35.72%	24.00%	30.19%
4	A04A4	A	0.00%	0.00%	0.00%	2.38%	1.33%	1.89%
4	A04A6	A	0.00%	-	0.00%	1.19%	-	0.63%
4 Total			*0.05%*	*0.33%*	*0.08%*	*100.00%*	*100.00%*	*100.00%*
22	A22A0	A	0.02%	-	0.01%	59.57%	-	59.57%
22	A22A1	A	0.00%	-	0.00%	2.13%	-	2.13%
22	A22A2	A	0.01%	-	0.01%	36.17%	-	36.17%
22	A22BL	A	0.00%	-	0.00%	2.13%	-	2.13%
22 Total			*0.03%*	*-*	*0.02%*	*100.00%*	*-*	*100.00%*
12L	A12LA0	A	17.23%	11.39%	16.56%	77.68%	80.17%	77.87%
12L	A12LA1	A	1.44%	0.63%	1.35%	6.48%	4.46%	6.33%
12L	A12LA10N	A	0.01%	-	0.01%	0.03%	-	0.03%
12L	A12LA11N	A	0.01%	0.00%	0.01%	0.03%	0.03%	0.03%
12L	A12LA12N	A	0.00%	0.00%	0.00%	0.02%	0.03%	0.02%
12L	A12LA14N	A	0.00%	-	0.00%	0.00%	-	0.00%
12L	A12LA15N	A	0.00%	-	0.00%	0.01%	-	0.01%
12L	A12LA16N	A	0.01%	-	0.00%	0.02%	-	0.02%
12L	A12LA2	A	0.30%	0.17%	0.29%	1.37%	1.23%	1.36%
12L	A12LA3	A	0.14%	0.06%	0.13%	0.63%	0.40%	0.61%
12L	A12LA4	A	0.01%	0.00%	0.01%	0.03%	0.03%	0.03%
12L	A12LA5	A	0.05%	0.02%	0.05%	0.24%	0.12%	0.24%
12L	A12LA7	A	0.03%	-	0.02%	0.12%	-	0.11%
12L	A12LA9N	A	0.01%	0.01%	0.01%	0.06%	0.06%	0.06%
12L	A12LBL	A	0.00%	-	0.00%	0.02%	-	0.01%
12L	A12LBR	A	0.00%	-	0.00%	0.00%	-	0.00%
12L	A12LCL	A	0.00%	0.03%	0.00%	0.01%	0.18%	0.02%
12L	A12LCLN	A	0.00%	-	0.00%	0.02%	-	0.02%
12L	A12LCR	A	0.00%	0.00%	0.00%	0.00%	0.03%	0.00%
12L	A12LDL	A	0.00%	0.00%	0.00%	0.01%	0.03%	0.01%
12L	A12LDLN	A	0.01%	0.00%	0.01%	0.03%	0.03%	0.03%
12L	A12LDR	A	0.00%	0.00%	0.00%	0.01%	0.03%	0.01%
12L	A12LEL	A	0.02%	0.02%	0.02%	0.08%	0.15%	0.08%
12L	A12LELN	A	0.00%	0.03%	0.00%	0.01%	0.18%	0.02%

Table 4-1
2018/2040 Average Daily Track Use Percentage by Runway and Operation Type

Runway	AEDT Track	OP Type	Track Use - Percentage (by Op Type)			Track Use - Percentage (by Op Type and Runway)		
			Day	Night	Total	Day	Night	Total
12L	A12LER	A	0.00%	-	0.00%	0.02%	-	0.01%
12L	A12LERN	A	0.00%	0.00%	0.00%	0.02%	0.03%	0.02%
12L	A12LFL	A	0.03%	0.03%	0.03%	0.12%	0.18%	0.12%
12L	A12LFLN	A	0.01%	0.00%	0.01%	0.03%	0.03%	0.03%
12L	A12LFR	A	0.00%	0.02%	0.00%	0.01%	0.12%	0.02%
12L	A12LGL	A	0.07%	0.09%	0.07%	0.30%	0.61%	0.32%
12L	A12LGLN	A	0.00%	-	0.00%	0.01%	-	0.01%
12L	A12LGR	A	0.01%	0.00%	0.01%	0.03%	0.03%	0.03%
12L	A12LHL	A	0.12%	0.14%	0.12%	0.55%	0.95%	0.58%
12L	A12LHLN	A	0.00%	-	0.00%	0.00%	-	0.00%
12L	A12LHR	A	0.01%	0.02%	0.01%	0.04%	0.15%	0.05%
12L	A12LIL	A	0.30%	0.21%	0.29%	1.36%	1.44%	1.37%
12L	A12LILN	A	0.00%	-	0.00%	0.00%	-	0.00%
12L	A12LIR	A	0.01%	0.03%	0.01%	0.04%	0.22%	0.05%
12L	A12LJL	A	0.27%	0.19%	0.26%	1.23%	1.32%	1.23%
12L	A12LJR	A	0.02%	0.07%	0.02%	0.08%	0.46%	0.11%
12L	A12LKL	A	1.99%	0.97%	1.87%	8.96%	6.82%	8.80%
12L	A12LKR	A	0.03%	0.05%	0.03%	0.12%	0.34%	0.14%
12L	A12LLLN	A	0.03%	0.01%	0.03%	0.13%	0.09%	0.12%
12L	A12LLRN	A	0.01%	-	0.01%	0.05%	-	0.05%
12L Total			*22.18%*	*14.20%*	*21.27%*	*100.00%*	*100.00%*	*100.00%*
30R	A30RA0	A	13.40%	11.21%	13.15%	61.17%	67.65%	61.74%
30R	A30RA1	A	0.28%	0.26%	0.28%	1.28%	1.55%	1.30%
30R	A30RA10N	A	0.01%	-	0.00%	0.03%	-	0.02%
30R	A30RA11N	A	0.01%	0.00%	0.01%	0.04%	0.03%	0.04%
30R	A30RA2	A	1.13%	0.48%	1.06%	5.15%	2.90%	4.95%
30R	A30RA3	A	0.01%	0.01%	0.01%	0.03%	0.05%	0.03%
30R	A30RA4	A	0.20%	0.08%	0.19%	0.91%	0.50%	0.87%
30R	A30RA5	A	0.00%	0.00%	0.00%	0.01%	0.03%	0.01%
30R	A30RA6	A	0.03%	0.01%	0.02%	0.12%	0.05%	0.11%
30R	A30RA7	A	0.00%	0.00%	0.00%	0.00%	0.03%	0.00%
30R	A30RA8	A	0.01%	-	0.01%	0.04%	-	0.04%
30R	A30RA9N	A	-	0.00%	0.00%	-	0.03%	0.00%
30R	A30RBL	A	0.00%	0.01%	0.00%	0.01%	0.05%	0.01%
30R	A30RBR	A	0.00%	-	0.00%	0.01%	-	0.01%
30R	A30RCL	A	0.00%	0.01%	0.00%	0.01%	0.08%	0.01%
30R	A30RCR	A	0.00%	0.00%	0.00%	0.02%	0.03%	0.02%

Table 4-1
2018/2040 Average Daily Track Use Percentage by Runway and Operation Type

Runway	AEDT Track	OP Type	Track Use - Percentage (by Op Type)			Track Use - Percentage (by Op Type and Runway)		
			Day	Night	Total	Day	Night	Total
30R	A30RCRN	A	0.01%	-	0.00%	0.02%	-	0.02%
30R	A30RDL	A	0.00%	0.01%	0.00%	0.01%	0.08%	0.01%
30R	A30RDR	A	0.00%	-	0.00%	0.01%	-	0.01%
30R	A30RDRN	A	0.01%	-	0.01%	0.05%	-	0.04%
30R	A30REL	A	0.00%	0.00%	0.00%	0.02%	0.03%	0.02%
30R	A30RER	A	0.02%	0.00%	0.01%	0.07%	0.03%	0.07%
30R	A30RERN	A	0.00%	-	0.00%	0.02%	-	0.01%
30R	A30RFL	A	0.00%	0.02%	0.00%	0.02%	0.11%	0.02%
30R	A30RFR	A	0.02%	0.02%	0.02%	0.10%	0.11%	0.10%
30R	A30RFRN	A	0.00%	-	0.00%	0.00%	-	0.00%
30R	A30RGL	A	0.01%	0.04%	0.01%	0.03%	0.26%	0.05%
30R	A30RGR	A	0.04%	0.04%	0.04%	0.20%	0.26%	0.21%
30R	A30RGRN	A	0.00%	-	0.00%	0.01%	-	0.00%
30R	A30RHL	A	0.01%	0.06%	0.02%	0.06%	0.34%	0.09%
30R	A30RHR	A	0.05%	0.07%	0.05%	0.21%	0.40%	0.23%
30R	A30RHRN	A	0.00%	-	0.00%	0.01%	-	0.00%
30R	A30RIL	A	0.03%	0.08%	0.03%	0.13%	0.50%	0.16%
30R	A30RIR	A	0.11%	0.14%	0.11%	0.49%	0.84%	0.52%
30R	A30RIRN	A	-	0.00%	0.00%	-	0.03%	0.00%
30R	A30RJL	A	0.05%	0.21%	0.07%	0.23%	1.24%	0.32%
30R	A30RJR	A	0.23%	0.18%	0.22%	1.03%	1.08%	1.03%
30R	A30RJRN	A	0.00%	-	0.00%	0.02%	-	0.02%
30R	A30RKL	A	5.26%	3.18%	5.02%	24.02%	19.18%	23.59%
30R	A30RKR	A	0.35%	0.16%	0.32%	1.57%	0.95%	1.52%
30R	A30RKRN	A	0.00%	-	0.00%	0.01%	-	0.01%
30R	A30RLR	A	0.00%	-	0.00%	0.00%	-	0.00%
30R	A30RLRN	A	0.00%	-	0.00%	0.02%	-	0.02%
30R	A30ROL	A	0.62%	0.27%	0.58%	2.82%	1.61%	2.71%
30R Total			*21.91%*	*16.57%*	*21.30%*	*100.00%*	*100.00%*	*100.00%*
12R	A12RA0	A	18.66%	21.88%	19.03%	72.89%	79.68%	73.71%
12R	A12RA1	A	0.33%	0.37%	0.33%	1.29%	1.34%	1.30%
12R	A12RA10N	A	0.00%	0.00%	0.00%	0.02%	0.02%	0.02%
12R	A12RA11N	A	0.00%	0.01%	0.00%	0.01%	0.03%	0.01%
12R	A12RA12N	A	0.01%	0.00%	0.01%	0.03%	0.02%	0.03%
12R	A12RA2	A	1.47%	0.73%	1.39%	5.74%	2.67%	5.37%
12R	A12RA3	A	0.03%	0.04%	0.03%	0.11%	0.14%	0.11%
12R	A12RA4	A	0.04%	0.03%	0.04%	0.17%	0.10%	0.16%

Table 4-1
2018/2040 Average Daily Track Use Percentage by Runway and Operation Type

Runway	AEDT Track	OP Type	Track Use - Percentage (by Op Type)			Track Use - Percentage (by Op Type and Runway)		
			Day	Night	Total	Day	Night	Total
12R	A12RA5	A	0.01%	0.01%	0.01%	0.02%	0.05%	0.02%
12R	A12RA6	A	0.02%	-	0.01%	0.06%	-	0.05%
12R	A12RA7	A	0.00%	-	0.00%	0.00%	-	0.00%
12R	A12RA8	A	0.01%	-	0.01%	0.03%	-	0.02%
12R	A12RA9N	A	0.00%	-	0.00%	0.00%	-	0.00%
12R	A12RALN	A	0.00%	-	0.00%	0.00%	-	0.00%
12R	A12RBL	A	0.00%	-	0.00%	0.01%	-	0.01%
12R	A12RBR	A	0.00%	0.02%	0.00%	0.00%	0.08%	0.01%
12R	A12RCL	A	0.00%	0.00%	0.00%	0.01%	0.02%	0.01%
12R	A12RCLN	A	0.00%	-	0.00%	0.02%	-	0.02%
12R	A12RCR	A	0.01%	0.02%	0.01%	0.02%	0.06%	0.02%
12R	A12RDL	A	0.00%	0.01%	0.00%	0.01%	0.05%	0.01%
12R	A12RDLN	A	0.01%	0.00%	0.00%	0.02%	0.02%	0.02%
12R	A12RDR	A	0.00%	0.04%	0.01%	0.01%	0.14%	0.03%
12R	A12RDRN	A	0.00%	0.02%	0.00%	0.01%	0.06%	0.02%
12R	A12REL	A	0.01%	0.03%	0.01%	0.03%	0.10%	0.03%
12R	A12RELN	A	0.01%	-	0.00%	0.02%	-	0.02%
12R	A12RER	A	0.01%	0.03%	0.01%	0.02%	0.11%	0.03%
12R	A12RFL	A	0.01%	0.01%	0.01%	0.05%	0.03%	0.05%
12R	A12RFLN	A	0.00%	0.01%	0.00%	0.01%	0.03%	0.01%
12R	A12RFR	A	0.01%	0.07%	0.02%	0.03%	0.24%	0.06%
12R	A12RFRN	A	0.00%	0.01%	0.00%	0.00%	0.03%	0.01%
12R	A12RGL	A	0.01%	0.03%	0.02%	0.05%	0.13%	0.06%
12R	A12RGLN	A	0.00%	-	0.00%	0.00%	-	0.00%
12R	A12RGR	A	0.02%	0.09%	0.03%	0.08%	0.32%	0.11%
12R	A12RGRN	A	-	0.01%	0.00%	-	0.03%	0.00%
12R	A12RHL	A	0.02%	0.11%	0.03%	0.07%	0.41%	0.11%
12R	A12RHLN	A	-	0.00%	0.00%	-	0.02%	0.00%
12R	A12RHR	A	0.04%	0.12%	0.05%	0.14%	0.45%	0.18%
12R	A12RIL	A	0.03%	0.16%	0.05%	0.12%	0.57%	0.18%
12R	A12RIR	A	0.09%	0.17%	0.10%	0.35%	0.64%	0.39%
12R	A12RJL	A	0.08%	0.24%	0.10%	0.33%	0.86%	0.39%
12R	A12RJR	A	0.19%	0.21%	0.19%	0.74%	0.75%	0.74%
12R	A12RKL	A	4.02%	2.68%	3.86%	15.69%	9.75%	14.97%
12R	A12RKR	A	0.29%	0.24%	0.28%	1.13%	0.87%	1.10%
12R	A12RLLN	A	0.16%	0.06%	0.15%	0.64%	0.21%	0.58%
12R Total			*25.61%*	*27.46%*	*25.82%*	*100.00%*	*100.00%*	*100.00%*

Table 4-1
2018/2040 Average Daily Track Use Percentage by Runway and Operation Type

Runway	AEDT Track	OP Type	Track Use - Percentage (by Op Type)			Track Use - Percentage (by Op Type and Runway)		
			Day	Night	Total	Day	Night	Total
30L	A30LA0	A	17.41%	27.12%	18.52%	70.17%	78.13%	71.38%
30L	A30LA1	A	0.80%	1.07%	0.83%	3.23%	3.08%	3.21%
30L	A30LA10N	A	0.00%	-	0.00%	0.01%	-	0.01%
30L	A30LA11N	A	0.00%	-	0.00%	0.00%	-	0.00%
30L	A30LA12N	A	0.00%	0.00%	0.00%	0.01%	0.01%	0.01%
30L	A30LA2	A	0.25%	0.30%	0.26%	1.02%	0.87%	1.00%
30L	A30LA3	A	0.04%	0.04%	0.04%	0.17%	0.13%	0.16%
30L	A30LA4	A	0.03%	0.04%	0.03%	0.11%	0.11%	0.11%
30L	A30LA5	A	0.01%	0.02%	0.01%	0.05%	0.05%	0.05%
30L	A30LA6	A	0.00%	-	0.00%	0.00%	-	0.00%
30L	A30LA7	A	0.01%	0.03%	0.01%	0.03%	0.08%	0.04%
30L	A30LA8	A	0.00%	-	0.00%	0.01%	-	0.01%
30L	A30LA9N	A	0.00%	-	0.00%	0.01%	-	0.01%
30L	A30LBL	A	0.00%	0.01%	0.00%	0.02%	0.03%	0.02%
30L	A30LBR	A	0.01%	0.02%	0.01%	0.02%	0.05%	0.03%
30L	A30LCL	A	0.00%	0.02%	0.01%	0.02%	0.05%	0.02%
30L	A30LCR	A	0.01%	0.02%	0.01%	0.03%	0.06%	0.03%
30L	A30LDL	A	0.01%	0.04%	0.01%	0.03%	0.11%	0.04%
30L	A30LDLN	A	0.01%	-	0.01%	0.04%	-	0.03%
30L	A30LDR	A	0.01%	0.03%	0.01%	0.03%	0.08%	0.04%
30L	A30LDRN	A	0.00%	0.01%	0.00%	0.01%	0.03%	0.02%
30L	A30LEL	A	0.01%	-	0.01%	0.04%	-	0.04%
30L	A30LELN	A	0.01%	0.08%	0.02%	0.03%	0.24%	0.07%
30L	A30LER	A	0.01%	0.03%	0.01%	0.03%	0.08%	0.04%
30L	A30LERN	A	0.00%	0.01%	0.00%	0.01%	0.04%	0.01%
30L	A30LFL	A	0.02%	0.06%	0.03%	0.09%	0.16%	0.10%
30L	A30LFLN	A	0.00%	-	0.00%	0.01%	-	0.01%
30L	A30LFR	A	0.01%	0.01%	0.01%	0.04%	0.04%	0.04%
30L	A30LFRN	A	0.00%	0.00%	0.00%	0.01%	0.01%	0.01%
30L	A30LGL	A	0.06%	0.16%	0.07%	0.24%	0.45%	0.28%
30L	A30LGR	A	0.01%	0.03%	0.02%	0.05%	0.10%	0.06%
30L	A30LGRN	A	0.00%	-	0.00%	0.01%	-	0.01%
30L	A30LHL	A	0.09%	0.31%	0.11%	0.35%	0.88%	0.43%
30L	A30LHR	A	0.02%	0.05%	0.03%	0.10%	0.15%	0.11%
30L	A30LHRN	A	0.00%	-	0.00%	0.01%	-	0.01%
30L	A30LIL	A	0.20%	0.37%	0.22%	0.80%	1.06%	0.84%
30L	A30LIR	A	0.02%	0.06%	0.02%	0.07%	0.18%	0.09%

Table 4-1
2018/2040 Average Daily Track Use Percentage by Runway and Operation Type

Runway	AEDT Track	OP Type	Track Use - Percentage (by Op Type)			Track Use - Percentage (by Op Type and Runway)		
			Day	Night	Total	Day	Night	Total
30L	A30LJL	A	0.28%	0.45%	0.30%	1.13%	1.30%	1.16%
30L	A30LJR	A	0.03%	0.05%	0.03%	0.12%	0.15%	0.12%
30L	A30LJRN	A	0.01%	-	0.01%	0.03%	-	0.02%
30L	A30LKL	A	5.25%	4.08%	5.11%	21.14%	11.75%	19.71%
30L	A30LKR	A	0.03%	0.08%	0.04%	0.13%	0.23%	0.15%
30L	A30LKRN	A	0.00%	0.01%	0.00%	0.01%	0.03%	0.02%
30L	A30LLLN	A	0.00%	0.01%	0.00%	0.01%	0.03%	0.01%
30L	A30LLRN	A	0.00%	-	0.00%	0.01%	-	0.01%
30L	A30LML	A	0.09%	0.08%	0.09%	0.37%	0.23%	0.35%
30L	A30LMRN	A	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%
30L	A30LNRN	A	0.00%	-	0.00%	0.00%	-	0.00%
30L	A30LOR	A	0.03%	0.02%	0.03%	0.12%	0.05%	0.11%
30L Total			*24.81%*	*34.71%*	*25.94%*	*100.00%*	*100.00%*	*100.00%*
17	A17A0	A	0.00%	0.48%	0.06%	54.55%	81.34%	79.31%
17	A17A1	A	-	0.02%	0.00%	-	2.98%	2.76%
17	A17A2	A	0.00%	0.08%	0.01%	27.27%	13.43%	14.48%
17	A17A5	A	-	0.01%	0.00%	-	1.49%	1.38%
17	A17A7	A	-	0.00%	0.00%	-	0.75%	0.69%
17	A17BR	A	0.00%	-	0.00%	18.18%	-	1.38%
17 Total			*0.01%*	*0.58%*	*0.07%*	*100.00%*	*100.00%*	*100.00%*
35	A35A0	A	3.59%	4.23%	3.66%	66.42%	68.82%	66.72%
35	A35A1	A	0.06%	0.11%	0.07%	1.17%	1.85%	1.26%
35	A35A2	A	1.63%	1.57%	1.63%	30.19%	25.57%	29.61%
35	A35A4	A	0.04%	0.03%	0.04%	0.71%	0.43%	0.68%
35	A35A6	A	-	0.01%	0.00%	-	0.14%	0.02%
35	A35A7	A	0.00%	-	0.00%	0.01%	-	0.01%
35	A35A8	A	0.00%	-	0.00%	0.01%	-	0.01%
35	A35BL	A	0.00%	-	0.00%	0.03%	-	0.03%
35	A35BR	A	0.00%	-	0.00%	0.01%	-	0.01%
35	A35CL	A	0.00%	-	0.00%	0.02%	-	0.02%
35	A35DL	A	0.00%	0.00%	0.00%	0.02%	0.07%	0.03%
35	A35EL	A	0.00%	-	0.00%	0.03%	-	0.03%
35	A35FL	A	0.00%	-	0.00%	0.04%	-	0.04%
35	A35GL	A	0.00%	-	0.00%	0.05%	-	0.05%
35	A35HL	A	0.01%	0.01%	0.01%	0.13%	0.21%	0.14%
35	A35HR	A	-	0.01%	0.00%	-	0.14%	0.02%
35	A35IL	A	0.01%	0.01%	0.01%	0.11%	0.21%	0.13%

Table 4-1
2018/2040 Average Daily Track Use Percentage by Runway and Operation Type

Runway	AEDT Track	OP Type	Track Use - Percentage (by Op Type)			Track Use - Percentage (by Op Type and Runway)		
			Day	Night	Total	Day	Night	Total
35	A35IR	A	0.00%	0.02%	0.00%	0.05%	0.28%	0.08%
35	A35JL	A	0.01%	0.01%	0.01%	0.21%	0.21%	0.21%
35	A35JR	A	0.00%	0.03%	0.01%	0.06%	0.43%	0.11%
35	A35KLN	A	0.04%	0.10%	0.05%	0.70%	1.63%	0.82%
35 Total			*5.41%*	*6.15%*	*5.49%*	*100.00%*	*100.00%*	*100.00%*
12LH	A12LH1	A	0.00%	-	0.00%	100.00%	-	100.00%
12LH Total			*0.00%*	*-*	*0.00%*	*100.00%*	*-*	*100.00%*
22H	A22XA2H	A	0.00%	-	0.00%	50.00%	-	50.00%
22H	A22XBRH	A	0.00%	-	0.00%	50.00%	-	50.00%
22H Total			*0.00%*	*-*	*0.00%*	*100.00%*	*-*	*100.00%*
30LH	A30LA7H	A	0.00%	-	0.00%	50.00%	-	50.00%
30LH	A30LBLH	A	0.00%	-	0.00%	50.00%	-	50.00%
30LH Total			*0.00%*	*-*	*0.00%*	*100.00%*	*-*	*100.00%*
35H	A35H1	A	0.00%	-	0.00%	100.00%	-	100.00%
35H Total			*0.00%*	*-*	*0.00%*	*100.00%*	*-*	*100.00%*
Arrivals Total			***49.63%***	***52.63%***	***49.95%***	***-***	***-***	***-***
DEPARTURES								
4	D04A1	D	0.04%	0.04%	0.04%	8.99%	4.23%	8.02%
4	D04A2	D	0.01%	-	0.01%	2.40%	-	1.91%
4	D04A3	D	0.01%	0.02%	0.01%	1.20%	2.35%	1.43%
4	D04B	D	0.07%	0.12%	0.08%	16.07%	11.74%	15.19%
4	D04C	D	0.03%	0.03%	0.03%	5.52%	2.82%	4.97%
4	D04D	D	0.01%	0.04%	0.02%	3.00%	3.76%	3.15%
4	D04E	D	0.01%	0.05%	0.02%	3.12%	4.70%	3.44%
4	D04F1	D	0.01%	0.06%	0.02%	2.88%	5.63%	3.44%
4	D04F2	D	0.01%	0.01%	0.01%	1.44%	1.41%	1.43%
4	D04F3	D	0.00%	-	0.00%	0.96%	-	0.76%
4	D04G	D	0.01%	0.07%	0.01%	1.56%	7.04%	2.67%
4	D04H1	D	0.01%	0.09%	0.02%	3.00%	8.45%	4.11%
4	D04H2	D	0.01%	0.05%	0.02%	2.76%	4.69%	3.15%
4	D04H3	D	0.01%	0.06%	0.01%	1.92%	5.63%	2.67%
4	D04J1	D	0.01%	0.02%	0.01%	2.88%	1.88%	2.67%
4	D04J2	D	0.03%	0.08%	0.03%	6.00%	7.98%	6.40%
4	D04J3	D	0.05%	0.08%	0.06%	11.51%	7.98%	10.79%
4	D04J4	D	0.05%	0.08%	0.05%	10.79%	7.98%	10.22%
4	D04J5	D	0.03%	0.05%	0.04%	7.31%	5.16%	6.88%

Table 4-1
2018/2040 Average Daily Track Use Percentage by Runway and Operation Type

Runway	AEDT Track	OP Type	Track Use - Percentage (by Op Type)			Track Use - Percentage (by Op Type and Runway)		
			Day	Night	Total	Day	Night	Total
4	D04J6	D	0.03%	0.07%	0.03%	6.71%	6.57%	6.69%
4 Total			*0.46%*	*1.03%*	*0.52%*	*100.00%*	*100.00%*	*100.00%*
22	D22A1	D	0.00%	-	0.00%	10.72%	-	10.35%
22	D22A2	D	0.00%	-	0.00%	5.36%	-	5.17%
22	D22A3	D	0.00%	-	0.00%	5.36%	-	5.17%
22	D22A4	D	0.00%	-	0.00%	1.79%	-	1.72%
22	D22A5	D	0.00%	-	0.00%	8.93%	-	8.62%
22	D22B1	D	0.00%	-	0.00%	1.79%	-	1.72%
22	D22B2	D	0.00%	-	0.00%	1.79%	-	1.72%
22	D22C1	D	0.00%	-	0.00%	1.79%	-	1.72%
22	D22C3	D	0.00%	-	0.00%	1.79%	-	1.72%
22	D22D1	D	0.00%	-	0.00%	1.79%	-	1.72%
22	D22D4	D	0.00%	-	0.00%	3.57%	-	3.45%
22	D22D5	D	0.00%	-	0.00%	1.79%	-	1.72%
22	D22D6	D	0.00%	-	0.00%	3.57%	-	3.45%
22	D22D7	D	0.00%	-	0.00%	14.29%	-	13.79%
22	D22E1	D	0.00%	-	0.00%	1.79%	-	1.72%
22	D22E2	D	0.00%	-	0.00%	1.79%	-	1.72%
22	D22E3	D	0.00%	-	0.00%	1.79%	-	1.72%
22	D22F1	D	0.00%	-	0.00%	8.93%	-	8.62%
22	D22F2	D	0.00%	0.00%	0.00%	5.36%	50.00%	6.90%
22	D22F3	D	0.00%	0.00%	0.00%	16.07%	50.00%	17.24%
22 Total			*0.03%*	*0.01%*	*0.03%*	*100.00%*	*100.00%*	*100.00%*
12L	D12LA1	D	0.09%	0.13%	0.09%	0.60%	0.68%	0.61%
12L	D12LA2	D	0.02%	0.03%	0.02%	0.14%	0.16%	0.15%
12L	D12LB1	D	0.01%	0.01%	0.01%	0.09%	0.05%	0.08%
12L	D12LB2	D	0.01%	0.01%	0.01%	0.10%	0.08%	0.10%
12L	D12LB3	D	0.02%	0.02%	0.02%	0.14%	0.10%	0.13%
12L	D12LB4	D	0.01%	0.00%	0.01%	0.10%	0.03%	0.09%
12L	D12LB5	D	0.07%	0.03%	0.06%	0.46%	0.16%	0.42%
12L	D12LC1	D	0.05%	0.01%	0.04%	0.32%	0.08%	0.29%
12L	D12LC2	D	0.04%	0.03%	0.04%	0.31%	0.18%	0.30%
12L	D12LC3	D	0.01%	0.01%	0.01%	0.09%	0.05%	0.08%
12L	D12LC4	D	0.03%	0.00%	0.02%	0.18%	0.03%	0.16%
12L	D12LD1	D	0.03%	0.03%	0.03%	0.23%	0.18%	0.22%
12L	D12LD2	D	0.03%	0.01%	0.03%	0.19%	0.08%	0.18%
12L	D12LD3	D	0.03%	0.01%	0.03%	0.24%	0.08%	0.22%

Table 4-1
2018/2040 Average Daily Track Use Percentage by Runway and Operation Type

Runway	AEDT Track	OP Type	Track Use - Percentage (by Op Type)			Track Use - Percentage (by Op Type and Runway)		
			Day	Night	Total	Day	Night	Total
12L	D12LD4	D	0.07%	0.03%	0.07%	0.50%	0.16%	0.45%
12L	D12LD5	D	0.08%	0.03%	0.08%	0.58%	0.16%	0.52%
12L	D12LD6	D	0.22%	0.11%	0.21%	1.53%	0.60%	1.41%
12L	D12LD7	D	0.25%	0.20%	0.24%	1.75%	1.09%	1.67%
12L	D12LDL1	D	0.04%	0.02%	0.04%	0.26%	0.13%	0.25%
12L	D12LDL2	D	0.08%	0.08%	0.08%	0.56%	0.42%	0.54%
12L	D12LDL3	D	0.21%	0.29%	0.22%	1.51%	1.56%	1.51%
12L	D12LDL4	D	0.34%	0.29%	0.33%	2.38%	1.56%	2.28%
12L	D12LDL5	D	0.37%	0.34%	0.36%	2.59%	1.82%	2.49%
12L	D12LDL6	D	0.86%	0.67%	0.84%	6.02%	3.62%	5.71%
12L	D12LDL7	D	0.67%	0.50%	0.66%	4.74%	2.68%	4.48%
12L	D12LDL8	D	0.56%	0.45%	0.54%	3.90%	2.42%	3.71%
12L	D12LDL9	D	0.43%	0.48%	0.43%	3.00%	2.55%	2.95%
12L	D12LEC1	D	0.11%	0.13%	0.11%	0.76%	0.68%	0.75%
12L	D12LEC2	D	0.22%	0.21%	0.22%	1.55%	1.15%	1.50%
12L	D12LEC3	D	1.33%	1.14%	1.31%	9.39%	6.09%	8.96%
12L	D12LEC4	D	1.11%	0.72%	1.07%	7.79%	3.88%	7.29%
12L	D12LEC5	D	0.09%	0.07%	0.09%	0.61%	0.39%	0.58%
12L	D12LEC6	D	0.70%	0.52%	0.68%	4.91%	2.81%	4.63%
12L	D12LEC7	D	0.17%	0.19%	0.17%	1.17%	1.02%	1.15%
12L	D12LEL1	D	0.43%	0.52%	0.44%	3.06%	2.81%	3.03%
12L	D12LEL2	D	0.19%	0.28%	0.20%	1.34%	1.48%	1.36%
12L	D12LEL3	D	0.82%	0.92%	0.83%	5.73%	4.92%	5.63%
12L	D12LEL4	D	0.48%	0.35%	0.47%	3.38%	1.90%	3.19%
12L	D12LEL5	D	0.08%	0.08%	0.08%	0.55%	0.44%	0.54%
12L	D12LEL6	D	0.03%	0.03%	0.03%	0.19%	0.18%	0.19%
12L	D12LEL7	D	0.60%	0.66%	0.61%	4.25%	3.54%	4.16%
12L	D12LER1	D	0.66%	0.65%	0.66%	4.62%	3.46%	4.47%
12L	D12LER2	D	0.53%	0.52%	0.53%	3.71%	2.79%	3.59%
12L	D12LER3	D	0.50%	0.59%	0.51%	3.54%	3.18%	3.49%
12L	D12LF1	D	0.30%	1.10%	0.38%	2.08%	5.91%	2.57%
12L	D12LF2	D	0.17%	0.65%	0.22%	1.19%	3.46%	1.48%
12L	D12LF3	D	0.32%	1.68%	0.46%	2.24%	9.04%	3.12%
12L	D12LF4	D	0.41%	2.03%	0.58%	2.90%	10.91%	3.94%
12L	D12LF5	D	0.14%	0.54%	0.18%	0.95%	2.89%	1.20%
12L	D12LF6	D	0.05%	0.21%	0.07%	0.34%	1.15%	0.45%
12L	D12LJ1	D	0.03%	0.29%	0.05%	0.19%	1.54%	0.36%

Table 4-1
2018/2040 Average Daily Track Use Percentage by Runway and Operation Type

Runway	AEDT Track	OP Type	Track Use - Percentage (by Op Type)			Track Use - Percentage (by Op Type and Runway)		
			Day	Night	Total	Day	Night	Total
12L	D12LJ2	D	0.01%	0.00%	0.01%	0.08%	0.03%	0.07%
12L	D12LL1	D	0.04%	0.13%	0.05%	0.27%	0.68%	0.32%
12L	D12LL2	D	0.01%	0.05%	0.02%	0.09%	0.26%	0.11%
12L	D12LL3	D	0.03%	0.02%	0.03%	0.19%	0.13%	0.18%
12L	D12LP	D	0.06%	0.48%	0.10%	0.43%	2.58%	0.71%
12L Total			*14.22%*	*18.63%*	*14.67%*	*100.00%*	*100.00%*	*100.00%*
30R	D30RAA1	D	0.06%	0.12%	0.06%	0.25%	0.66%	0.29%
30R	D30RAA2	D	0.05%	0.26%	0.07%	0.24%	1.39%	0.34%
30R	D30RAA3	D	0.20%	0.61%	0.24%	0.91%	3.30%	1.12%
30R	D30RAA4	D	0.12%	0.46%	0.15%	0.55%	2.46%	0.72%
30R	D30RAA5	D	0.15%	0.40%	0.17%	0.69%	2.15%	0.82%
30R	D30RAB1	D	0.24%	0.61%	0.28%	1.10%	3.30%	1.29%
30R	D30RAB2	D	0.08%	0.39%	0.11%	0.36%	2.10%	0.52%
30R	D30RAB3	D	0.10%	0.25%	0.11%	0.45%	1.34%	0.53%
30R	D30RB1	D	0.11%	0.24%	0.12%	0.50%	1.28%	0.57%
30R	D30RB2	D	0.21%	0.51%	0.24%	0.98%	2.78%	1.14%
30R	D30RD1	D	0.05%	0.11%	0.06%	0.23%	0.58%	0.26%
30R	D30RD2	D	0.06%	0.12%	0.07%	0.28%	0.63%	0.31%
30R	D30RD3	D	0.04%	0.11%	0.05%	0.19%	0.58%	0.23%
30R	D30RD4	D	0.10%	0.16%	0.10%	0.45%	0.84%	0.49%
30R	D30RD5	D	0.80%	0.81%	0.80%	3.70%	4.38%	3.76%
30R	D30RE1	D	1.09%	0.89%	1.07%	5.02%	4.80%	5.00%
30R	D30RE2	D	0.75%	0.61%	0.73%	3.45%	3.30%	3.44%
30R	D30RF1	D	1.06%	0.64%	1.02%	4.90%	3.43%	4.77%
30R	D30RF2	D	0.28%	0.28%	0.28%	1.29%	1.52%	1.31%
30R	D30RF3	D	0.31%	0.27%	0.31%	1.45%	1.47%	1.45%
30R	D30RF4	D	0.88%	0.65%	0.85%	4.06%	3.49%	4.01%
30R	D30RF5	D	0.25%	0.13%	0.24%	1.15%	0.71%	1.11%
30R	D30RF6	D	0.92%	0.51%	0.88%	4.25%	2.78%	4.12%
30R	D30RH1	D	0.32%	0.14%	0.30%	1.46%	0.76%	1.40%
30R	D30RH2	D	0.63%	0.44%	0.61%	2.91%	2.38%	2.86%
30R	D30RH3	D	1.35%	1.29%	1.35%	6.25%	6.94%	6.31%
30R	D30RH4	D	1.66%	1.75%	1.67%	7.66%	9.43%	7.82%
30R	D30RH5	D	0.76%	0.40%	0.72%	3.52%	2.18%	3.40%
30R	D30RH6	D	2.72%	1.56%	2.60%	12.58%	8.44%	12.22%
30R	D30RJ1	D	1.27%	0.71%	1.21%	5.86%	3.85%	5.68%
30R	D30RJ2	D	1.63%	1.13%	1.58%	7.55%	6.08%	7.42%

Table 4-1
2018/2040 Average Daily Track Use Percentage by Runway and Operation Type

Runway	AEDT Track	OP Type	Track Use - Percentage (by Op Type)			Track Use - Percentage (by Op Type and Runway)		
			Day	Night	Total	Day	Night	Total
30R	D30RJ3	D	0.54%	0.34%	0.52%	2.49%	1.86%	2.43%
30R	D30RJ4	D	2.09%	0.98%	1.98%	9.66%	5.32%	9.28%
30R	D30RJ5	D	0.21%	0.21%	0.21%	0.95%	1.13%	0.97%
30R	D30RJ6	D	0.46%	0.34%	0.44%	2.11%	1.83%	2.09%
30R	D30RJ7	D	0.12%	0.10%	0.12%	0.55%	0.55%	0.55%
30R Total			*21.64%*	*18.51%*	*21.32%*	*100.00%*	*100.00%*	*100.00%*
12R	D12RA	D	0.13%	0.38%	0.16%	3.19%	1.52%	2.51%
12R	D12RC1	D	0.02%	0.10%	0.03%	0.59%	0.41%	0.52%
12R	D12RC2	D	0.01%	0.05%	0.01%	0.25%	0.19%	0.23%
12R	D12RC3	D	0.01%	0.07%	0.01%	0.20%	0.29%	0.24%
12R	D12RD1	D	0.02%	0.07%	0.03%	0.51%	0.29%	0.42%
12R	D12RD2	D	0.07%	0.36%	0.10%	1.78%	1.44%	1.64%
12R	D12RE1	D	0.19%	1.10%	0.29%	4.72%	4.42%	4.59%
12R	D12RE2	D	0.26%	1.25%	0.37%	6.43%	5.02%	5.86%
12R	D12RF1	D	0.09%	0.54%	0.14%	2.30%	2.16%	2.25%
12R	D12RF2	D	0.38%	0.94%	0.44%	9.23%	3.76%	7.00%
12R	D12RF3	D	0.21%	3.79%	0.58%	5.14%	15.22%	9.25%
12R	D12RF4	D	0.08%	3.26%	0.41%	2.01%	13.08%	6.52%
12R	D12RG1	D	0.21%	1.26%	0.31%	5.01%	5.04%	5.02%
12R	D12RG2	D	0.08%	1.50%	0.22%	1.90%	6.01%	3.58%
12R	D12RG3	D	0.17%	1.50%	0.31%	4.19%	6.01%	4.94%
12R	D12RG4	D	0.30%	1.01%	0.37%	7.17%	4.05%	5.90%
12R	D12RG5	D	0.17%	0.54%	0.21%	4.21%	2.18%	3.38%
12R	D12RG6	D	0.09%	0.18%	0.10%	2.14%	0.74%	1.57%
12R	D12RG7	D	0.23%	0.53%	0.26%	5.49%	2.12%	4.12%
12R	D12RH1	D	0.06%	0.01%	0.06%	1.47%	0.06%	0.90%
12R	D12RH2	D	0.01%	0.00%	0.01%	0.36%	0.02%	0.22%
12R	D12RH3	D	0.01%	-	0.01%	0.20%	-	0.12%
12R	D12RH4	D	0.00%	0.01%	0.00%	0.09%	0.06%	0.08%
12R	D12RJ1	D	0.02%	0.23%	0.04%	0.37%	0.91%	0.59%
12R	D12RJ2	D	0.12%	0.77%	0.19%	2.96%	3.07%	3.01%
12R	D12RJ3	D	0.06%	0.73%	0.12%	1.35%	2.92%	1.99%
12R	D12RJ4	D	0.20%	1.31%	0.32%	4.97%	5.26%	5.09%
12R	D12RJ5	D	0.18%	0.32%	0.19%	4.26%	1.30%	3.05%
12R	D12RJ6	D	0.04%	0.03%	0.04%	1.06%	0.14%	0.68%
12R	D12RJ7	D	0.00%	-	0.00%	0.05%	-	0.03%
12R	D12RK1	D	0.00%	0.00%	0.00%	0.03%	0.02%	0.02%

Table 4-1
2018/2040 Average Daily Track Use Percentage by Runway and Operation Type

Runway	AEDT Track	OP Type	Track Use - Percentage (by Op Type)			Track Use - Percentage (by Op Type and Runway)		
			Day	Night	Total	Day	Night	Total
12R	D12RK2	D	0.00%	0.01%	0.00%	0.05%	0.04%	0.05%
12R	D12RK3	D	0.00%	0.00%	0.00%	0.03%	0.02%	0.02%
12R	D12RK4	D	0.00%	-	0.00%	0.07%	-	0.04%
12R	D12RL1	D	0.00%	0.00%	0.00%	0.05%	0.02%	0.04%
12R	D12RL2	D	0.00%	-	0.00%	0.05%	-	0.03%
12R	D12RL3	D	0.00%	0.00%	0.00%	0.05%	0.02%	0.04%
12R	D12RL4	D	0.00%	0.00%	0.00%	0.01%	0.02%	0.02%
12R	D12RL5	D	0.00%	0.00%	0.00%	0.03%	0.02%	0.02%
12R	D12RL6	D	0.00%	0.00%	0.00%	0.01%	0.02%	0.02%
12R	D12RM1	D	0.00%	0.01%	0.00%	0.08%	0.04%	0.06%
12R	D12RM2	D	0.00%	-	0.00%	0.08%	-	0.05%
12R	D12RN1	D	0.01%	0.65%	0.08%	0.28%	2.59%	1.22%
12R	D12RN2	D	0.23%	0.73%	0.28%	5.49%	2.92%	4.44%
12R	D12RP1	D	0.04%	0.51%	0.08%	0.86%	2.04%	1.34%
12R	D12RP2	D	0.15%	0.59%	0.20%	3.74%	2.35%	3.17%
12R	D12RP3	D	0.15%	0.38%	0.17%	3.60%	1.54%	2.76%
12R	D12RP4	D	0.06%	0.12%	0.06%	1.39%	0.47%	1.02%
12R	D12RQ	D	0.00%	0.01%	0.00%	0.08%	0.04%	0.06%
12R	D12RR	D	0.02%	0.03%	0.02%	0.38%	0.14%	0.28%
12R Total			*4.12%*	*24.92%*	*6.24%*	*100.00%*	*100.00%*	*100.00%*
30L	D30LAA1	D	0.32%	0.41%	0.33%	1.40%	1.65%	1.42%
30L	D30LAA2	D	0.24%	0.72%	0.29%	1.05%	2.87%	1.25%
30L	D30LAA3	D	0.22%	0.70%	0.27%	0.95%	2.82%	1.16%
30L	D30LAA4	D	0.09%	0.26%	0.11%	0.38%	1.05%	0.45%
30L	D30LAA5	D	0.44%	0.97%	0.50%	1.91%	3.86%	2.12%
30L	D30LAB1	D	0.70%	0.88%	0.72%	3.01%	3.51%	3.06%
30L	D30LAB2	D	3.89%	3.09%	3.81%	16.77%	12.35%	16.29%
30L	D30LAB3	D	6.21%	4.43%	6.03%	26.75%	17.75%	25.77%
30L	D30LAB4	D	4.41%	3.49%	4.32%	19.01%	13.98%	18.46%
30L	D30LAB5	D	0.88%	0.63%	0.85%	3.78%	2.50%	3.64%
30L	D30LB1	D	0.38%	0.19%	0.36%	1.64%	0.78%	1.55%
30L	D30LB2	D	0.40%	0.33%	0.39%	1.70%	1.32%	1.66%
30L	D30LB3	D	0.20%	0.09%	0.19%	0.88%	0.35%	0.82%
30L	D30LC1	D	0.37%	0.20%	0.35%	1.60%	0.80%	1.51%
30L	D30LC2	D	0.34%	0.11%	0.32%	1.48%	0.43%	1.36%
30L	D30LC3	D	0.35%	0.22%	0.34%	1.52%	0.89%	1.45%
30L	D30LC4	D	0.08%	0.04%	0.07%	0.33%	0.16%	0.31%

Table 4-1
2018/2040 Average Daily Track Use Percentage by Runway and Operation Type

Runway	AEDT Track	OP Type	Track Use - Percentage (by Op Type)			Track Use - Percentage (by Op Type and Runway)		
			Day	Night	Total	Day	Night	Total
30L	D30LD1	D	0.11%	0.14%	0.11%	0.46%	0.56%	0.47%
30L	D30LD2	D	0.07%	0.14%	0.08%	0.32%	0.54%	0.34%
30L	D30LE1	D	0.15%	0.36%	0.17%	0.63%	1.44%	0.72%
30L	D30LE2	D	0.41%	0.62%	0.43%	1.78%	2.47%	1.85%
30L	D30LE3	D	0.69%	0.68%	0.69%	2.99%	2.72%	2.96%
30L	D30LE4	D	0.06%	0.10%	0.06%	0.25%	0.41%	0.26%
30L	D30LE5	D	0.29%	0.29%	0.29%	1.24%	1.15%	1.23%
30L	D30LE6	D	0.04%	0.09%	0.05%	0.18%	0.35%	0.20%
30L	D30LF	D	0.08%	0.33%	0.10%	0.33%	1.34%	0.44%
30L	D30LG1	D	0.07%	0.09%	0.08%	0.32%	0.35%	0.32%
30L	D30LG2	D	0.10%	0.29%	0.12%	0.43%	1.15%	0.51%
30L	D30LH1	D	0.11%	0.17%	0.12%	0.48%	0.68%	0.51%
30L	D30LH2	D	0.12%	0.46%	0.16%	0.52%	1.84%	0.66%
30L	D30LH3	D	0.21%	0.51%	0.24%	0.89%	2.04%	1.01%
30L	D30LH4	D	0.31%	1.11%	0.39%	1.34%	4.45%	1.68%
30L	D30LH5	D	0.17%	0.55%	0.21%	0.72%	2.21%	0.88%
30L	D30LJ1	D	0.10%	0.17%	0.11%	0.43%	0.70%	0.46%
30L	D30LJ2	D	0.14%	0.60%	0.19%	0.60%	2.39%	0.80%
30L	D30LJ3	D	0.27%	0.86%	0.33%	1.18%	3.44%	1.43%
30L	D30LJ4	D	0.13%	0.42%	0.16%	0.54%	1.69%	0.67%
30L	D30LJ5	D	0.03%	0.09%	0.03%	0.12%	0.37%	0.15%
30L	D30LJ6	D	0.02%	0.16%	0.04%	0.09%	0.66%	0.15%
30L Total			*23.22%*	*24.98%*	*23.40%*	*100.00%*	*100.00%*	*100.00%*
17	D17A1	D	0.08%	0.01%	0.07%	0.22%	0.08%	0.21%
17	D17A2	D	0.07%	-	0.06%	0.18%	-	0.17%
17	D17B1	D	0.08%	0.03%	0.08%	0.22%	0.25%	0.22%
17	D17B2	D	0.05%	0.03%	0.05%	0.13%	0.25%	0.13%
17	D17B3	D	0.42%	0.07%	0.39%	1.16%	0.62%	1.14%
17	D17B4	D	0.50%	0.10%	0.46%	1.37%	0.83%	1.35%
17	D17B5	D	1.40%	0.14%	1.27%	3.86%	1.20%	3.76%
17	D17B6	D	1.79%	0.18%	1.63%	4.94%	1.57%	4.82%
17	D17B7	D	1.95%	0.18%	1.77%	5.36%	1.57%	5.23%
17	D17C1	D	1.67%	0.17%	1.52%	4.61%	1.49%	4.50%
17	D17C2	D	0.68%	0.11%	0.62%	1.87%	0.91%	1.83%
17	D17C3	D	1.16%	0.11%	1.06%	3.21%	0.91%	3.12%
17	D17C4	D	2.79%	0.45%	2.55%	7.68%	3.80%	7.54%
17	D17C5	D	1.40%	0.18%	1.28%	3.86%	1.53%	3.77%

Table 4-1
2018/2040 Average Daily Track Use Percentage by Runway and Operation Type

Runway	AEDT Track	OP Type	Track Use - Percentage (by Op Type)			Track Use - Percentage (by Op Type and Runway)		
			Day	Night	Total	Day	Night	Total
17	D17D1	D	1.68%	0.25%	1.54%	4.64%	2.15%	4.55%
17	D17D2	D	1.02%	0.20%	0.94%	2.82%	1.74%	2.78%
17	D17D3	D	0.71%	0.10%	0.65%	1.96%	0.87%	1.92%
17	D17D4	D	0.56%	0.72%	0.58%	1.55%	6.12%	1.71%
17	D17D5	D	0.45%	0.18%	0.43%	1.25%	1.53%	1.26%
17	D17E	D	1.86%	2.38%	1.91%	5.13%	20.25%	5.66%
17	D17F1	D	0.69%	0.28%	0.65%	1.90%	2.36%	1.91%
17	D17F2	D	2.44%	1.49%	2.34%	6.73%	12.69%	6.94%
17	D17G1	D	1.72%	0.52%	1.60%	4.74%	4.46%	4.73%
17	D17G2	D	0.39%	0.20%	0.37%	1.07%	1.69%	1.10%
17	D17G3	D	0.45%	0.26%	0.43%	1.24%	2.23%	1.28%
17	D17G4	D	1.61%	0.30%	1.47%	4.43%	2.52%	4.36%
17	D17G5	D	1.40%	0.27%	1.28%	3.85%	2.27%	3.80%
17	D17G6	D	2.59%	0.61%	2.39%	7.14%	5.21%	7.07%
17	D17G7	D	0.48%	0.09%	0.44%	1.32%	0.78%	1.30%
17	D17G8	D	1.15%	0.33%	1.07%	3.17%	2.81%	3.16%
17	D17G9	D	1.15%	0.27%	1.06%	3.15%	2.27%	3.12%
17	D17GL1	D	0.71%	0.24%	0.66%	1.95%	2.07%	1.95%
17	D17GL2	D	0.25%	0.05%	0.23%	0.69%	0.41%	0.68%
17	D17H1	D	0.13%	0.14%	0.13%	0.35%	1.16%	0.38%
17	D17H2	D	0.07%	0.07%	0.07%	0.19%	0.58%	0.21%
17	D17H3	D	0.36%	0.25%	0.35%	1.00%	2.15%	1.04%
17	D17H4	D	0.12%	0.10%	0.12%	0.34%	0.83%	0.36%
17	D17H5	D	0.10%	0.06%	0.10%	0.29%	0.54%	0.29%
17	D17J1	D	0.01%	0.03%	0.01%	0.02%	0.29%	0.03%
17	D17J2	D	0.08%	0.08%	0.08%	0.23%	0.70%	0.25%
17	D17K1	D	0.01%	0.07%	0.02%	0.04%	0.58%	0.06%
17	D17K2	D	0.00%	0.03%	0.01%	0.01%	0.29%	0.02%
17	D17K3	D	0.01%	0.15%	0.03%	0.03%	1.28%	0.07%
17	D17K4	D	0.05%	0.26%	0.07%	0.12%	2.19%	0.20%
17 Total			*36.30%*	*11.74%*	*33.79%*	*100.00%*	*100.00%*	*100.00%*
35	D35A2	D	0.00%	0.00%	0.00%	7.69%	2.63%	3.92%
35	D35A4	D	0.00%	0.00%	0.00%	15.38%	2.63%	5.88%
35	D35B1	D	-	0.00%	0.00%	-	2.63%	1.96%
35	D35B2	D	-	0.00%	0.00%	-	2.63%	1.96%
35	D35B3	D	0.00%	0.01%	0.00%	15.38%	5.26%	7.84%
35	D35D1	D	-	0.00%	0.00%	-	2.63%	1.96%

Table 4-1
2018/2040 Average Daily Track Use Percentage by Runway and Operation Type

Runway	AEDT Track	OP Type	Track Use - Percentage (by Op Type)			Track Use - Percentage (by Op Type and Runway)		
			Day	Night	Total	Day	Night	Total
35	D35E1	D	-	0.01%	0.00%	-	5.26%	3.92%
35	D35E2	D	-	0.02%	0.00%	-	10.53%	7.84%
35	D35E3	D	0.00%	0.00%	0.00%	7.69%	2.63%	3.92%
35	D35E4	D	-	0.00%	0.00%	-	2.63%	1.96%
35	D35F3	D	0.00%	0.02%	0.00%	7.69%	10.53%	9.80%
35	D35F4	D	0.00%	0.09%	0.01%	46.16%	50.00%	49.02%
35 Total			*0.01%*	*0.18%*	*0.03%*	*100.00%*	*100.00%*	*100.00%*
4H	MAC04HF	D	0.00%	-	0.00%	100.00%	-	100.00%
4H Total			*0.00%*	*-*	*0.00%*	*100.00%*	*-*	*100.00%*
12RH	D12RCD3H	D	0.00%	-	0.00%	33.33%	-	33.33%
12RH	DF12RI2H	D	0.00%	-	0.00%	66.67%	-	66.67%
12RH Total			*0.00%*	*-*	*0.00%*	*100.00%*	*-*	*100.00%*
17H	D17IH	D	0.00%	-	0.00%	100.00%	-	100.00%
17H Total			*0.00%*	*-*	*0.00%*	*100.00%*	*-*	*100.00%*
30LH	D30LF1H	D	0.00%	-	0.00%	100.00%	-	100.00%
30LH Total			*0.00%*	*-*	*0.00%*	*100.00%*	*-*	*100.00%*
Departures Total			**50.37%**	**47.37%**	**50.05%**	**-**	**-**	**-**
Grand Total			**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

Number is shown as 0 when less than 0.5. Percentage is shown as 0.0% when less than 0.05%. Number is shown as "-" when it is 0.

Notes: Totals may differ due to rounding.

Source: MACNOMS data, HNTB 2022.

Attachment 5
AEDT 2d vs. AEDT 3e Comparison

Minneapolis St. Paul International Airport (MSP) Long-Term Plan (LTP)
Noise Contour Final Technical Memorandum
AEDT 2d vs. AEDT 3e Comparison

HNTB has been tasked to assist the Metropolitan Airports Commission (MAC) in support of the development of the 2040 Long-Term Plan (LTP) Noise Contours for the Minneapolis-St. Paul International Airport (MSP). The 2040 baseline, high scenario, and low scenario noise contours were modeled with the Federal Aviation Administration's (FAA) Aviation Environmental Design Tool (AEDT), version 3e (AEDT 3e). The 2018 Actual Noise Contour was used as the 2018 noise contour, which was modeled using AEDT version 2d (AEDT 2d). This technical memorandum presents a summary of the major differences between AEDT 2d and AEDT 3e that may introduce changes to the 2018 Actual Noise Contour if it were modeled in AEDT 3e. The scope of this task does not include remodeling the 2018 Actual Noise Contour in AEDT 3e or a discussion of actual resultant changes.

1 Introduction

Since the FAA adopted AEDT as the standard modeling tool for noise, air quality, and fuel analysis for federal actions, HNTB has used AEDT to assist the MAC in modeling noise impacts. The FAA continues to release new versions of AEDT to fix software bugs, expand modeling capability, introduce new aircraft noise parameters, and re-map various components in the fleet database. Since each release incorporates such changes, noise contours modeled with different AEDT versions may be slightly different. As the 2018 Actual Noise Contour was modeled with AEDT 2d and the 2040 LTP noise contours were modeled with AEDT 3e, this technical memorandum discusses major changes from AEDT 2d to AEDT 3e that may introduce changes in modeling results.

2 Weather Parameters

Default weather parameters were applied in both the 2018 and 2040 noise analyses. The default weather parameters in AEDT 3e represent 10-year average values and the default weather parameters in AEDT 2d represent 30-year average values recorded at the same MSP weather station. The weather data in the AEDT Airport Database was obtained from station ID 25160 (MINNEAPOLIS-ST PAUL INTL/WOLD-CHAMBERLIN) from the Integrated Surface Database (ISD) of the National Oceanic and Atmospheric Administration (NOAA). **Table 5-1** shows the weather parameters used in the 2040 noise contours that reflect the most recent 10-year average (2012 through 2021) in AEDT 3e and the 30-year average when the 2018 Actual Noise Contour was modeled in AEDT 2d. It is expected that the weather parameter differences in Table 1 would have minimal impacts on the noise contour results as the parameters are similar. Weather parameters generally do not change noise contours materially unless they vary significantly.

3 Noise Aircraft Types

Multiple representative noise aircraft were updated or added to the fleet database with the latest performance and noise characteristics in AEDT 3e compared to AEDT 2d. Since the release of AEDT 2d on May 29, 2015, four newer versions have been released, including AEDT 3b (September 24, 2019), AEDT 3c (March 6, 2020), AEDT 3d (March 29, 2021), and AEDT 3e (May 9, 2022).

Table 5-1: 2018 and 2040 AEDT Weather Inputs

Variable	2018 AEDT Inputs[1]	2040 AEDT Inputs[2]
Temperature	45.0 degrees F	46.7 degrees F
Dew Point	35.9 degrees F	36.5 degrees F
Pressure	985.4 Millibars	984.5 Millibars
Humidity	67.7 %	67.4 %
Wind Speed	8.4 knots	8.1 knots

[1]: AEDT 2d.
[2]: AEDT 3e.
Source: AEDT default parameters at MSP, HNTB analysis, 2022.

Table 5-2 depicts the new and updated noise aircraft types introduced since AEDT 2d and the number of operations in the 2018 Actual Noise Contour and the 2040 LTP noise contours. It should be noted that the 2018 Actual Noise Contour was not modeled with the following new noise aircraft types, including the G650ER, 737MAX8 (later renamed to 7378MAX), A320-271N, A320-272N, FAL900EX, ATR72-212A, 7673ER, 747400RN, and 7879 as they were not available in AEDT 2d. Operations by these aircraft were modeled by other noise aircraft types as shown in Error! Reference source not found.. The 2018 Actual Noise Contour was modeled with noise aircraft types including 737800, 767300, BEC58P, PA31, and BD-700-1A11, but were updated in subsequent releases.

The number of operations by new or updated noise aircraft types account for approximately 18.4% of the 2018 operations and 26.7% of the projected 2040 baseline operations. Noise aircraft types are one of the most critical components in AEDT as they represent aircraft performance and associated noise levels. It is expected that the new and updated noise aircraft types would introduce the most significant change from AEDT 2d to AEDT 3e. However, their impacts are expected to be relatively minor as the noise aircraft types they replace have similar performance and noise characteristics.

Table 5-2: New and Updated Aircraft Data Since AEDT 2d

Aircraft Name	AEDT 2d ANP Code	AEDT 3e ANP Code	Type of Update	Version	2018 Operations (2d)	2040 Baseline Operations (3e)
Gulfstream G650	GV	G650ER	New	3b	55	-
Boeing 737 Max 8	7378MAX	737MAX8	New		286	10,767
Boeing 737-800	737800	737800	Update		66,540	78,699
Airbus A320neo	A321-232	A320-271N	New		294	37,226
Airbus A320neo	A321-232	A320-272N	New		-	980
Dassault Falcon 900EX	CNA750 or COMJET	FAL900EX	New		858	513
ATR-72	DHC830 or HS748A	ATR72-212A	New	3c	4	-
Boeing 767-300	767300	767300	Update		2,998	3,767
Gulfstream G650	GV	G650ER	Update		55	-
Boeing 767-300ER	767300	7673ER	New	3d	-	-
Boeing 777-300ER	7773ER	7773ER	Update		-	-
Dassault Falcon 900EX	CNA750 or COMJET	FAL900EX	Update		858	513
Boeing 737 Max 8	7378MAX	7378MAX	Update		286	10,767

Aircraft Name	AEDT 2d ANP Code	AEDT 3e ANP Code	Type of Update	Version	2018 Operations (2d)	2040 Baseline Operations (3e)
BEECH 58 Baron	BEC58P	BEC58P	Update	3d	3,671	3,900
Piper PA-31 Navajo	PA31	PA31	Update		27	-
Boeing 747-400 with Reduced Noise PW4062A	747400	747400RN	New	3e	-	-
Boeing 787-9 Dreamliner	7878R	7879	New		145	128
Bombardier BD-700 Global Express	BD-700-1A10	BD-700-1A11	Update		82	-
Total[1]					74,960	135,980

[1]: Excludes duplicate aircraft types that were introduced as new aircraft types and later updated in subsequent releases (including Dassault Falcon 900 Ex and Gulfstream G650).

Source: FAA AEDT Release Notes and HNTB analysis, 2023.

4 Equipment Mapping

AEDT employs equipment codes to represent a combination of air frame, engine type, engine modification, and aircraft performance and noise models (equipment mapping). In each AEDT release, the equipment mapping is updated. Some equipment codes were removed and others re-mapped to other combinations. In AEDT 3e, several equipment codes used in the 2018 Actual Noise Contour (using AEDT 2d) are no longer available in the database, including equipment codes 2342, 2363, 2604, 2641, 2668, 2940, and 3305. These codes were removed in AEDT 3b. However, it is not expected that these changes will significantly change the outputs as they were re-mapped to similar aircraft models.

5 Summary

This technical memorandum documents the differences between AEDT 2d and AEDT 3e and their potential impacts on the difference between 2018 Actual Noise Contour and 2040 LTP noise contours. It is expected that the new and updated noise aircraft types would have the most significant impacts on the noise contours between AEDT 2d and AEDT 3e, however these impacts are anticipated to be minor.

As always, we appreciate the opportunity to provide noise analysis and support to the MAC. Should you have any questions regarding the content of this technical memorandum, please do not hesitate to call me at 703-253-5829 or email yxu@hntb.com.

Best Regards,

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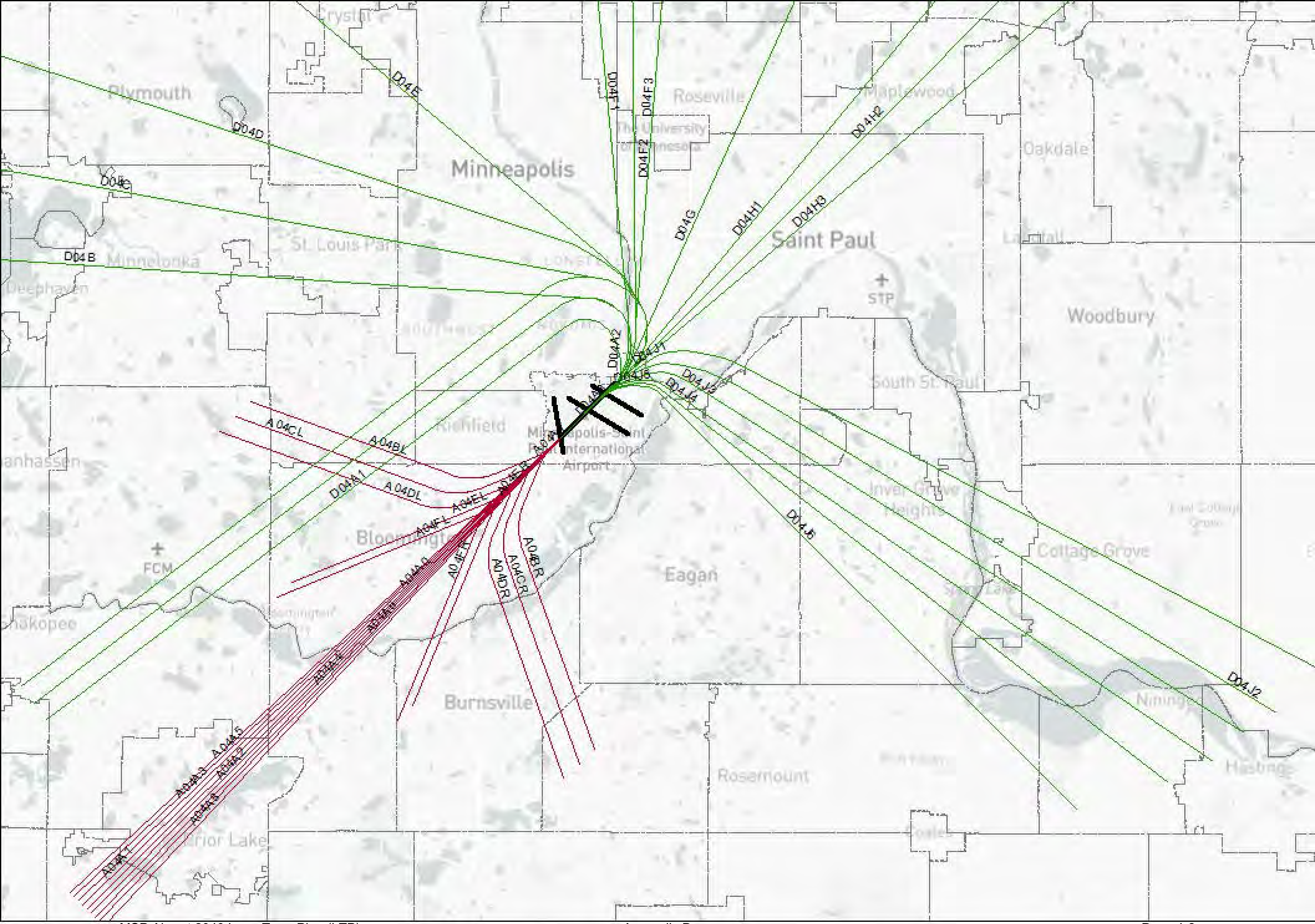
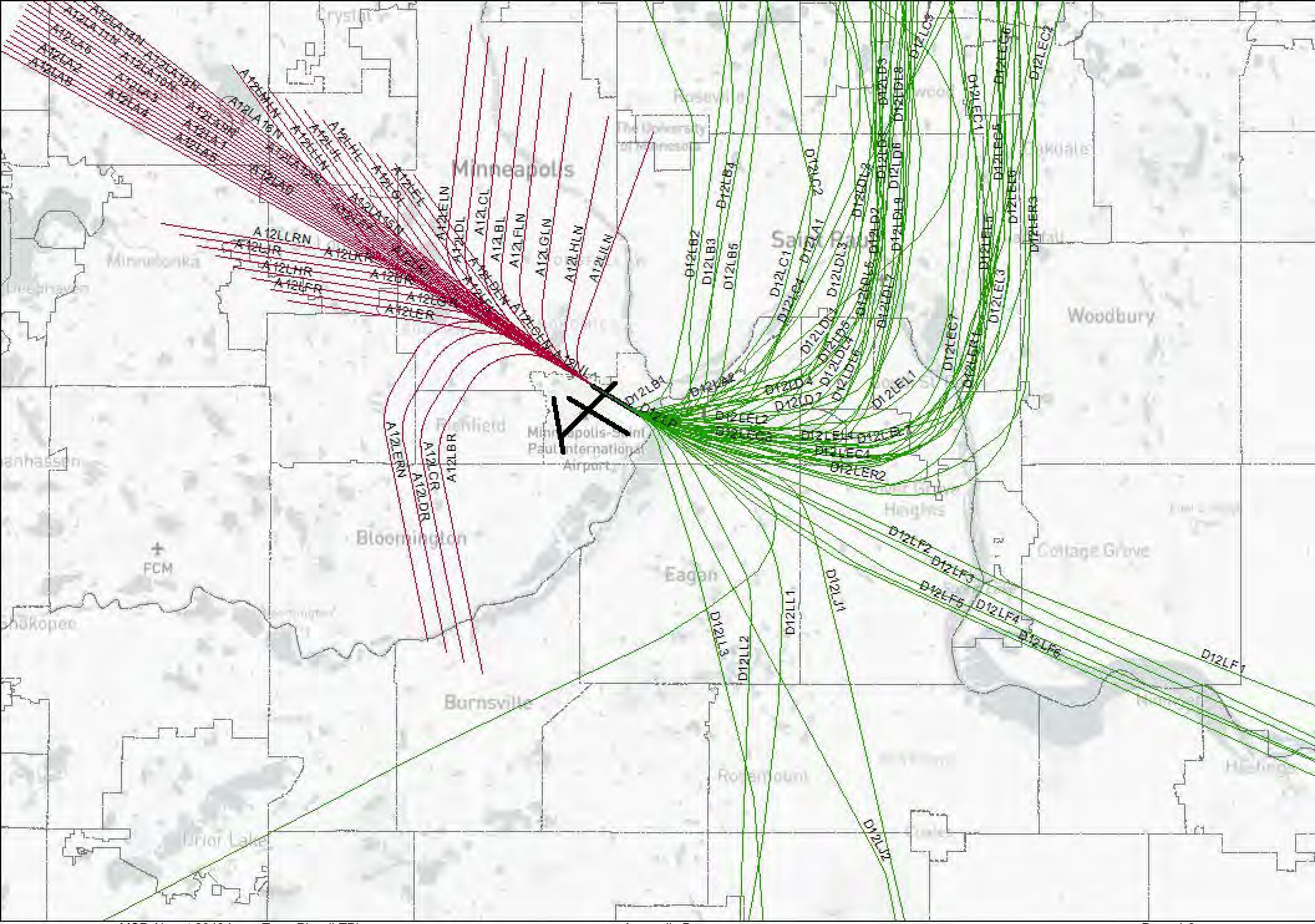
Aviation/Environmental Planner
HNTB Corporation

Cc: Eric Gilles, MAC
Michele Ross, MAC
Dana Nelson, MAC
Kim Hughes, HNTB
Andrew Blaisdell, HNTB
Justin Bychek, HNTB

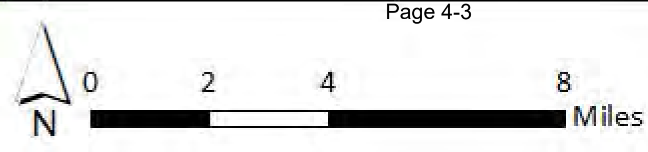
Attachment 6
AEDT Flight Track Figures

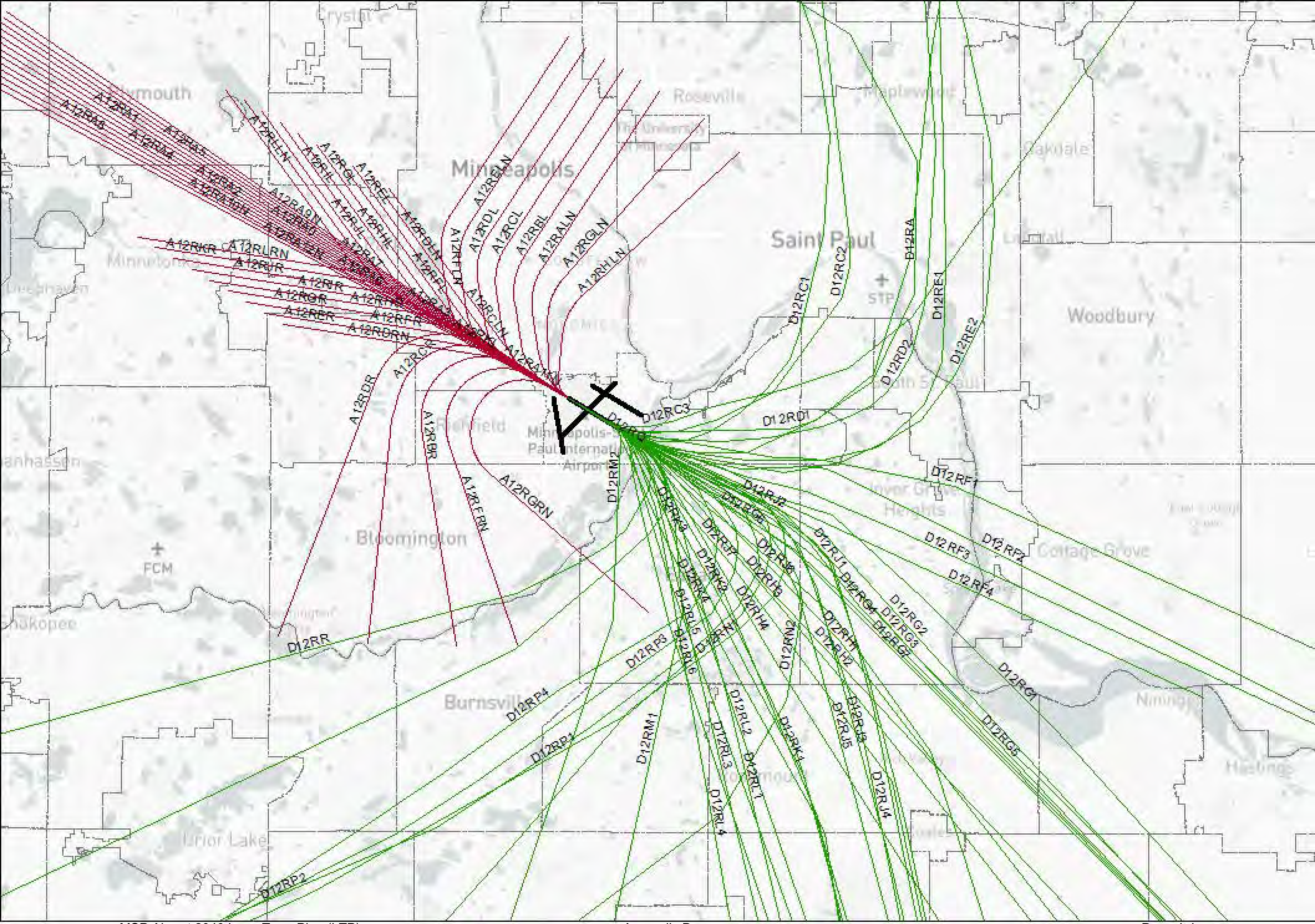


AEDT Model Flight Tracks - Runway 4

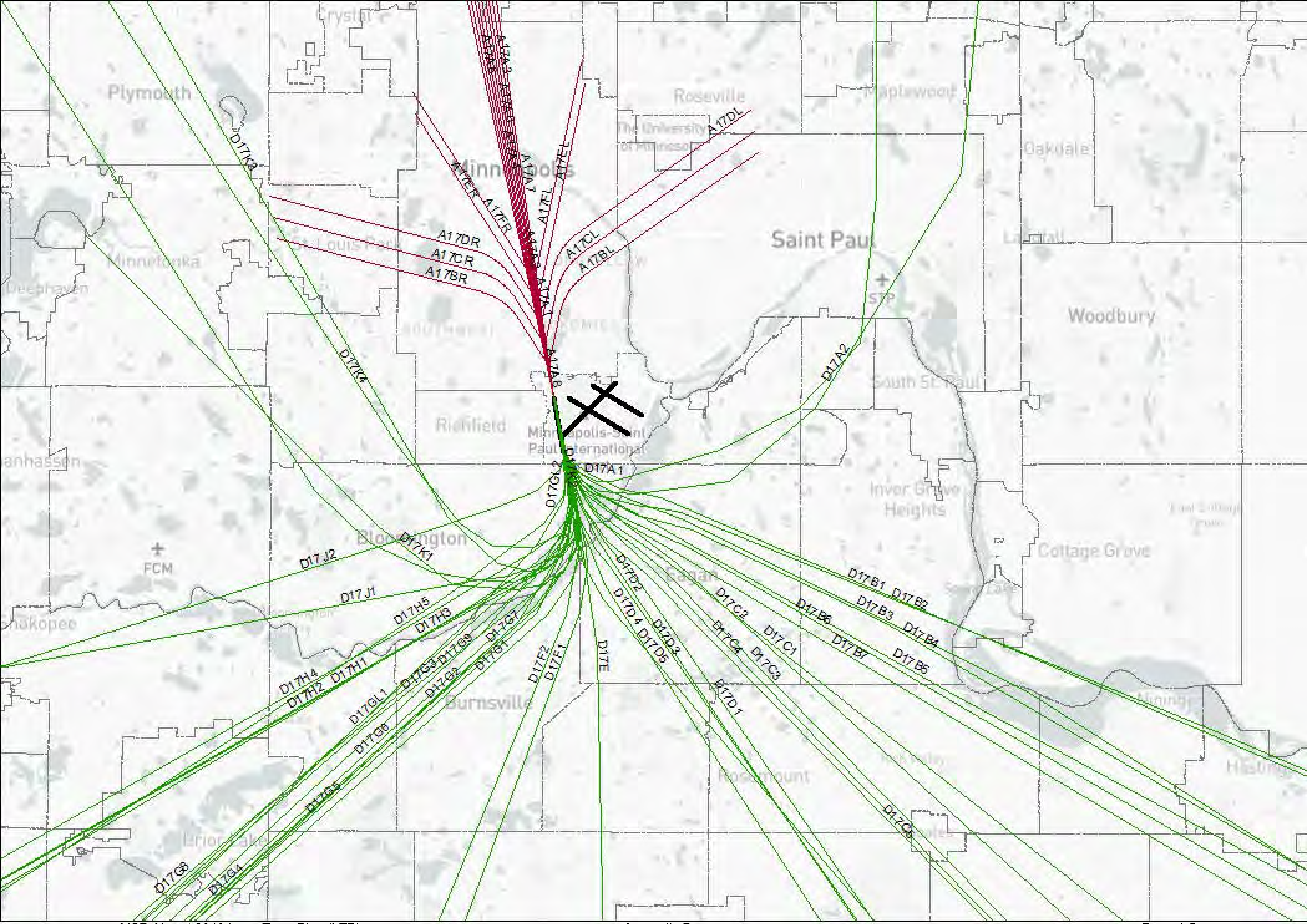


AEDT Model Flight Tracks - Runway 12L



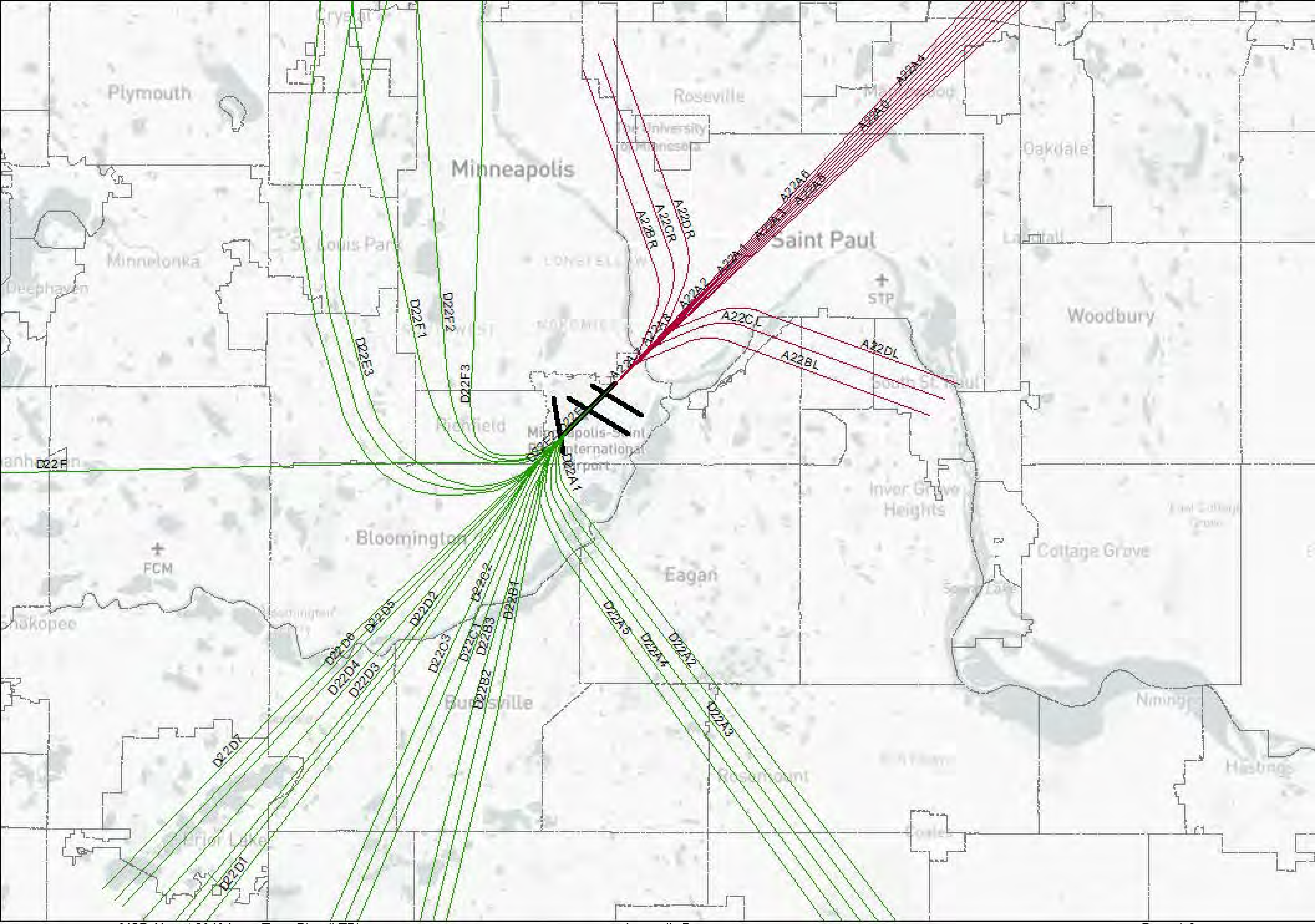


AEDT Model Flight Tracks - Runway 12R

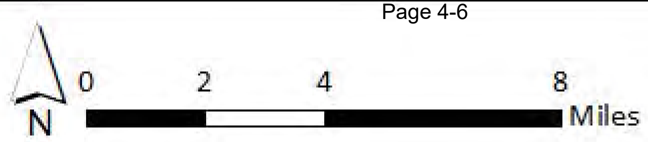


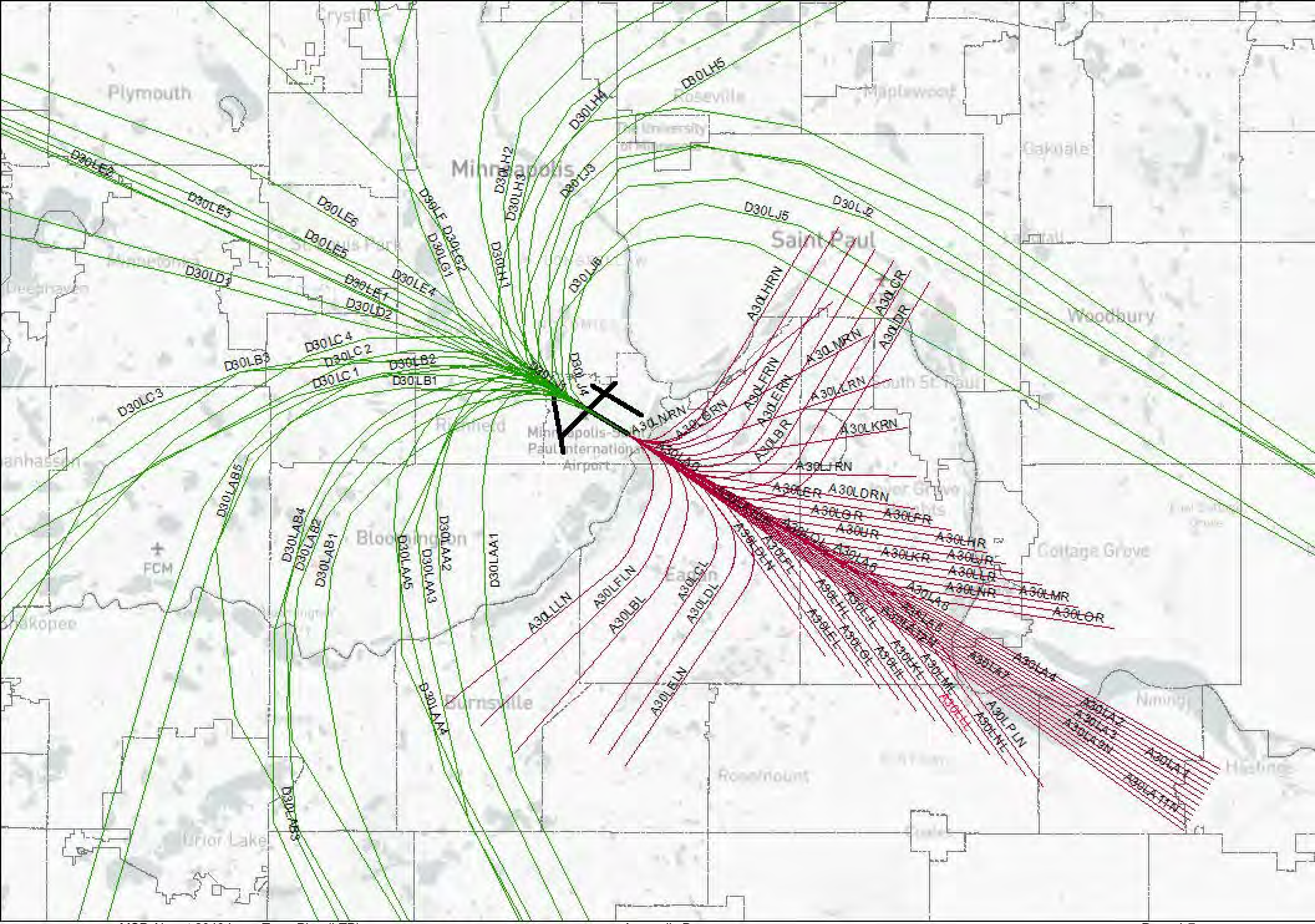
AEDT Model Flight Tracks - Runway 17

N 0 2 4 8 Miles

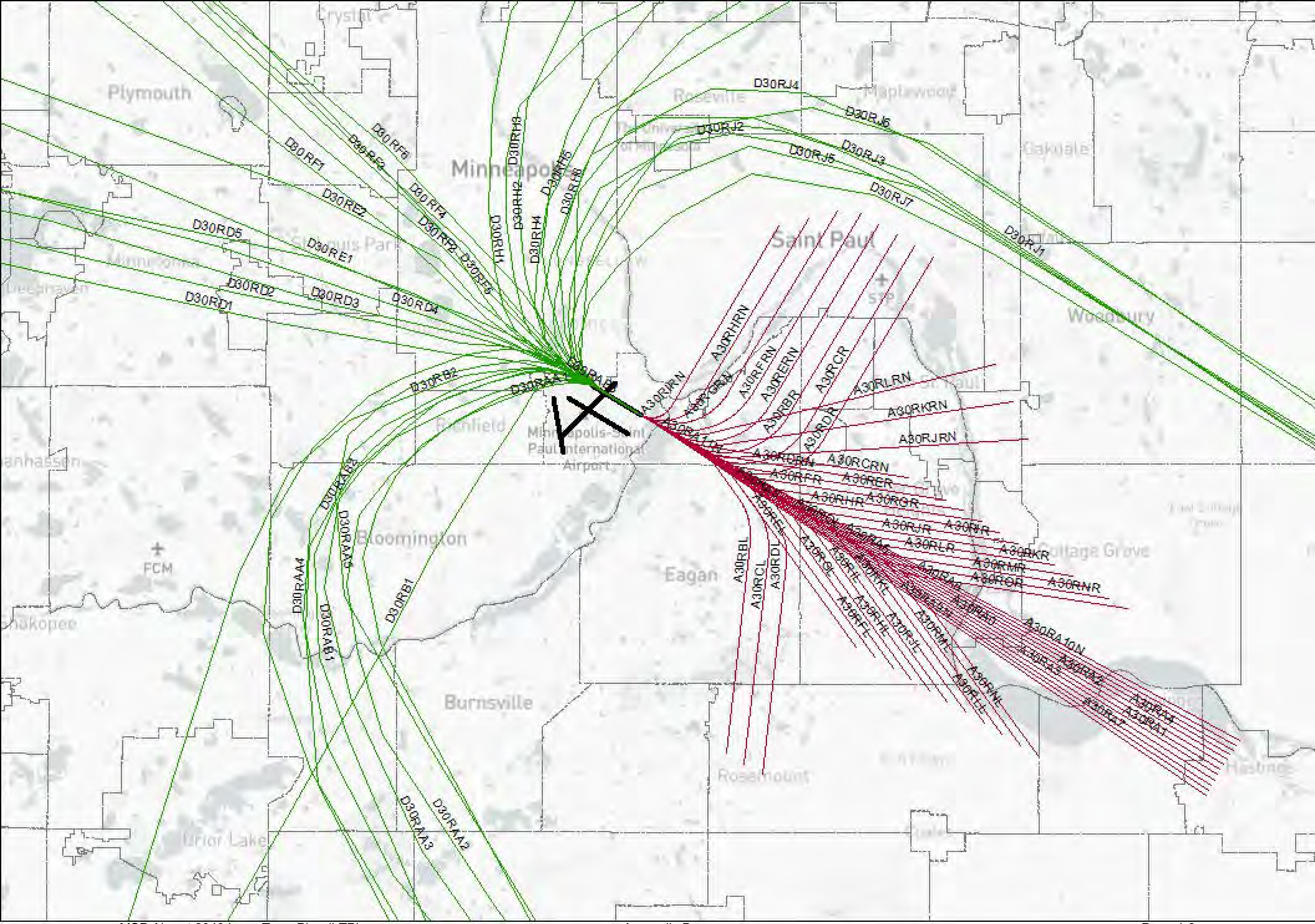


AEDT Model Flight Tracks - Runway 22

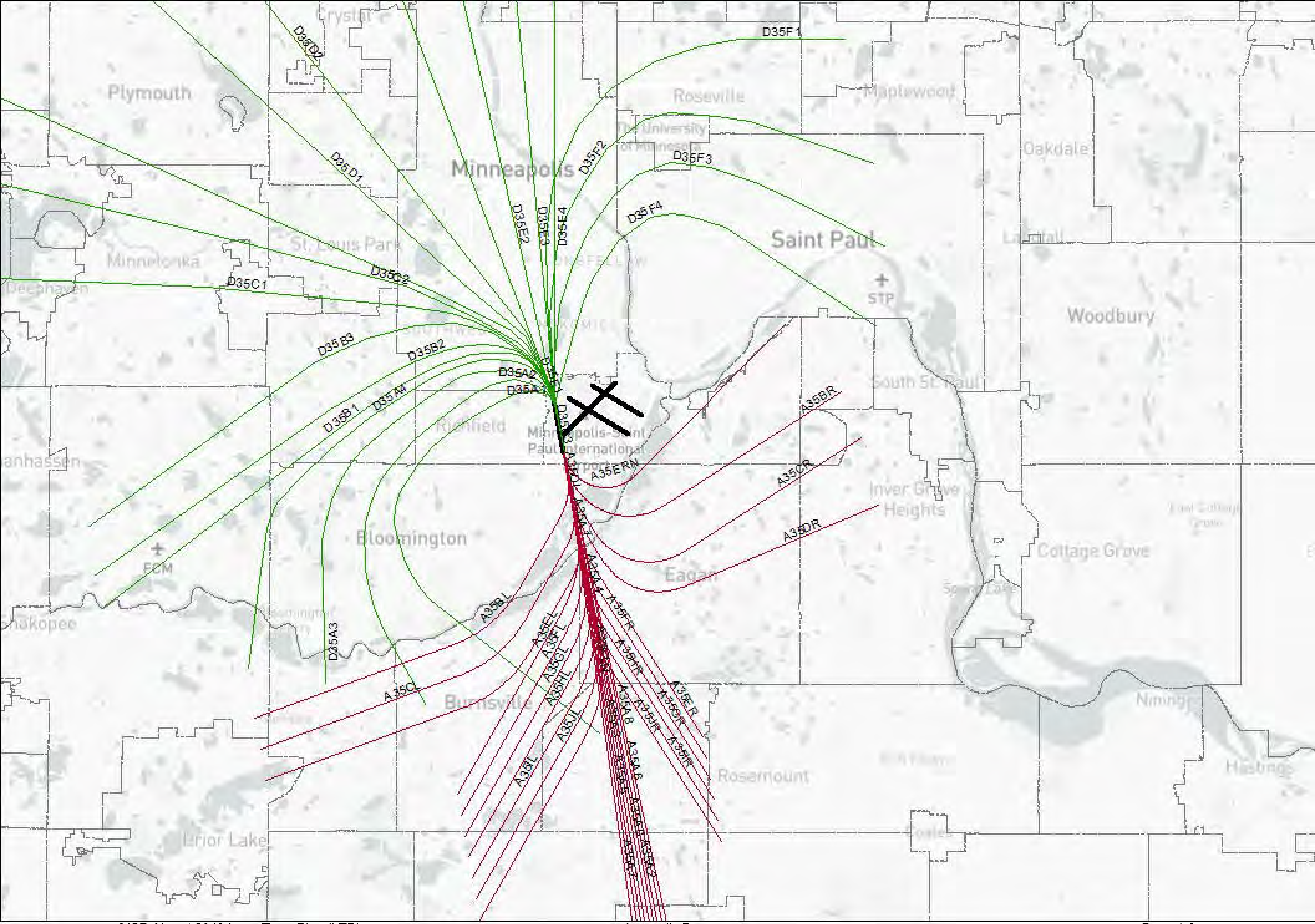




AEDT Model Flight Tracks - Runway 30L



AEDT Model Flight Tracks - Runway 30R



AEDT Model Flight Tracks - Runway 35

Appendix E: MSP 2040 LTP Cost Estimate

Project Title	Landside Masterplan Update		
Location	Saint Paul International Airport		
Submittal Stage	Masterplan - Rough Order of Magnitude Estimate		
Client Name			
Client Project No.		Revision	2
Original Date	7-Apr-2023	Revision Date	25-Apr-2023
Assumed Bid Opening Date		Connico PN	4977.23.03
Project Lead	CJN / CJC	Checked by	IDK

LANDSIDE MASTERPLAN UPDATE

SUMMARY

PROJECT COMPONENTS			TOTAL
NEAR-TERM PROJECTS:			
1-1 - EXISTING T1 FIS FACILITY ENHANCEMENTS		$	4,918,000
1-2 - NEW T2 FIS SOUTH TERMINAL EXPANSION		$	270,322,000
1-3 - TAXIWAY EDGE GEOMETRY		$	1,220,000
1-4 - RUNWAY 12L-30R OUTBOARD TAXIWAY AND TAXIWAY P3 RECONFIGURATION		$	65,665,000
1-5 - GRE RELOCATION AND RON APRON CONSTRUCTION		$	76,512,000
1-6 - USPS SITE REDEVELOPMENT		$	600,353,000
1-7 - ORANGE RAMP NORTH EXPANSION AND OUTRIGGER EXPANSIONS			TBD
MID—TERM PROJECTS:			
2-1 - RECONSTRUCT CONCOURSE A, DEMOLISH CONCOURSE B		$	161,779,000
2-2 - RECONSTRUCT CONCOURSE F		$	297,621,000
2-3 - CENTRAL CARGO APRON EXPANSION		$	29,469,000
2-4 - RUNWAY 30L RON APRON AND DEICE PAD RECONFIGURATION		$	4,457,000
2-5 - WEST CARGO APRON AND FACILITY		$	107,524,000
2-6 - FBO RELOCATION		$	177,000,000
2-7 - RUNWAY 12R-30L TUNNEL RECONSTRUCTION AND TAXIWAY B REALIGNMENT		$	14,150,000
2-8 - RUNWAY 30R DEICE PAD RECONFIGURATION		$	1,689,000
2-9 - TERMINAL 1 TWO-LEVEL ROADWAY RECONSTRUCTION			TBD
2-10 - GREEN/GOLD RAMP REDEVELOPMENT WITH NEW FIS FACILITY			TBD
2-10 PARKING STRUCTURE & ELEVATED ROADWAY	Excluded		
2-10 FIS AND OFFICES & KYWAY TO CONCOURSE C & G		$	740,544,000
2-10 DEMOLITION	Excluded		
LONG—TERM PROJECTS:			
3-1 - NEW T2 NORTH EXPANSION		$	331,536,000

LANDSIDE MASTERPLAN UPDATE

SUMMARY

PROJECT COMPONENTS		TOTAL
3-2 - CONCOURSE G SOUTH EXPANSION	$	256,894,000
3-3 - RECONSTRUCT CONCOURSE E	$	232,323,000
3-4 - T2 CURB FRONTAGE IMPROVEMENTS	$	23,558,000
3-5 - T1-T2 APM TUNNEL CONSTRUCTION	$	317,715,000
3-6 - RUNWAY 4-22 TUNNEL RECONFIGURATION AND DEICE PAD CONSTRUCTION	$	65,607,000
3-7 - NEW SOUTH RON CONSTRUCTION	$	86,331,000
3-8 - RUNWAY 12R END AROUND TAXIWAY CONSTRUCTION	$	68,664,000
3-10A - 34TH AVENUE AND EAST 70TH STREET RECONSTRUCTION		TBD
Opinion of Probable Program Cost	**$**	**3,935,851,000**

The following markups are included in the project costs:		
Estimating Design Evolution		25.0%
General Contractors Markups		
Project Logistics / Phasing & Labor Factor		5.0%
General Requirements & Temporary Construction		5.0%
General Conditions		8.0%
General Contractors Overhead & Profit		5.0%
Insurance		2.0%
Payment & Performance Bonds		1.0%
Sustainability Requirements		0.0%
Escalation		0.0%
Owner's Soft Costs	21.3%	
Construction Manager / Program Management		0.0%
Planning & Preconstruction		0.2%
Architectural / Engineering Design		10.0%
Architectural / Engineering Construction Admin		2.0%
Airport Staff		4.0%
Materials Testing / Inspection / Commissioning		2.5%
Plan Check Services		0.1%
Cost Estimating & Scheduling		0.5%
Miscellaneous Owner Costs (i.e. Legal)		1.0%
Artwork		1.0%
Owner's / Project Construction Contingency		0.0%

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Project Title	Landside Masterplan Update		
Location	Saint Paul International Airport		
Submittal Stage	Masterplan - Rough Order of Magnitude Estimate		
Client Name			
Client Project No.		**Revision**	2
Original Date	7-Apr-2023	**Revision Date**	25-Apr-2023
Assumed Bid Opening Date		**Connico PN**	4977.23.03
Project Lead	CJN / CJC	**Checked by**	IDK

LANDSIDE MASTERPLAN UPDATE

SUMMARY

PROJECT COMPONENTS		TOTAL
NEAR-TERM PROJECTS:		
1-1 - EXISTING T1 FIS FACILITY ENHANCEMENTS	$	4,918,000
1-2 - NEW T2 FIS SOUTH TERMINAL EXPANSION	$	270,322,000
1-6 - USPS SITE REDEVELOPMENT	$	600,353,000
MID—TERM PROJECTS:		
2-1 - RECONSTRUCT CONCOURSE A, DEMOLISH CONCOURSE B	$	161,779,000
2-2 - RECONSTRUCT CONCOURSE F	$	297,621,000
2-9 - TERMINAL 1 TWO-LEVEL ROADWAY RECONSTRUCTION		TBD
2-10 - GREEN/GOLD RAMP REDEVELOPMENT WITH NEW FIS FACILITY	$	740,544,000
LONG—TERM PROJECTS:		
3-1 - NEW T2 NORTH EXPANSION	$	331,536,000
3-2 - CONCOURSE G SOUTH EXPANSION	$	256,894,000
3-3 - RECONSTRUCT CONCOURSE E	$	232,323,000
3-4 - T2 CURB FRONTAGE IMPROVEMENTS	$	23,558,000
3-5 - T1-T2 APM TUNNEL CONSTRUCTION	$	317,715,000
Opinion of Probable Program Cost	**$**	**3,237,563,000**

The following markups are included in the project costs:

Estimating Design Evolution	25.0%
General Contractors Markups	
Project Logistics / Phasing & Labor Factor	5.0%
General Requirements & Temporary Construction	5.0%
General Conditions	8.0%

LANDSIDE MASTERPLAN UPDATE

SUMMARY

PROJECT COMPONENTS			TOTAL
General Contractors Overhead & Profit		5.0%	
Insurance		2.0%	
Payment & Performance Bonds		1.0%	
Sustainability Requirements		0.0%	
Escalation		0.0%	
Owner's Soft Costs	21.3%		
Construction Manager / Program Management		0.0%	
Planning & Preconstruction		0.2%	
Architectural / Engineering Design		10.0%	
Architectural / Engineering Construction Admin		2.0%	
Airport Staff		4.0%	
Materials Testing / Inspection / Commissioning		2.5%	
Plan Check Services		0.1%	
Cost Estimating & Scheduling		0.5%	
Miscellaneous Owner Costs (i.e. Legal)		1.0%	
Artwork		1.0%	
Owner's / Project Construction Contingency		0.0%	

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Project Title	Landside Masterplan Update		
Location	Saint Paul International Airport		
Submittal Stage	Masterplan - Rough Order of Magnitude Estimate		
Client Name			
Client Project No.		Revision	2
Original Date	7-Apr-2023	Revision Date	25-Apr-2023
Assumed Bid Opening Date		Connico PN	4977.23.03
Project Lead	CJN / CJC	Checked by	IDK

1-1 - EXISTING T1 FIS FACILITY ENHANCEMENTS

SUMMARY

	CONSTRUCTION SYSTEM		COST PER SQUARE FOOT	TOTAL
A	**Substructure**		$ 32.93	$ 135,000
	Standard Foundations	$ -		
	Special Foundations	$ 135,000		
	Slab on Grade	$ -		
B	**Shell**		$ -	$ -
	Superstructure	$ -		
	Exterior Closure	$ -		
	Roofing	$ -		
C	**Interiors**		$ 148.17	$ 607,480
	Interior Construction	$ 93,480		
	Stairs	$ 105,000		
	Interior Finishes	$ 409,000		
D	**Services**		$ 377.86	$ 1,549,238
	Conveying	$ 570,000		
	Baggage Handling System	$ -		
	Plumbing	$ 63,550		
	HVAC	$ 346,860		
	Fire Protection	$ 37,925		
	Electrical	$ 386,911		
	Communications	$ 94,874		
	Electronic Safety & Security	$ 49,118		
E	**Equipment & Furnishings**		$ 15.26	$ 62,550
	Equipment	$ 10,250		
	Passenger Boarding Bridges	$ -		
	Furnishings	$ 52,300		
F	**Special Construction & Demolition**		$ 40.00	$ 164,000
	Special Construction	$ -		
	Selective Building Demolition	$ 164,000		
	Hazardous Material Abatement	$ -		
G	**Building Sitework**		$ -	$ -
	Site Mobilization	$ -		
	Site Preparation	$ -		
	Site Improvements	$ -		
	Site Mechanical Utilities	$ -		
	Site Electrical Utilities	$ -		
	Subtotal		***$ 614.21***	***$ 2,518,268***
25.0%	Estimating Design Evolution			$ 629,567

1-1 - EXISTING T1 FIS FACILITY ENHANCEMENTS

SUMMARY

	CONSTRUCTION SYSTEM	COST PER SQUARE FOOT		TOTAL
	Subtotal - Cost of Work	***$ 767.76***	***$***	***3,147,835***
	General Contractors Markups			
5.0%	Project Logistics / Phasing & Labor Factor		$	157,392
5.0%	General Requirements & Temporary Construction		$	165,261
8.0%	General Conditions		$	277,639
5.0%	General Contractors Overhead & Profit		$	187,406
2.0%	Insurance		$	78,711
1.0%	Payment & Performance Bonds		$	40,142
0.0%	Sustainability Requirements		$	-
	Subtotal	***$ 988.87***	***$***	***4,054,387***
0.0%	Escalation		$	-
	Opinion of Probable Construction Cost	***$ 988.87***	***$***	***4,054,387***
21.3%	Owner's Soft Costs		$	863,584
	Opinion of Probable Project Cost	***$ 1,199.51***	***$***	***4,917,971***

The Terminal 1 FIS

Project Title	Landside Masterplan Update		
Location	Saint Paul International Airport		
Submittal Stage	Masterplan - Rough Order of Magnitude Estimate		
Client Name			
Client Project No.		**Revision**	2
Original Date	7-Apr-2023	**Revision Date**	25-Apr-2023
Assumed Bid Opening Date		**Connico PN**	4977.23.03
Project Lead	CJN / CJC	**Checked by**	IDK

1-1 - EXISTING T1 FIS FACILITY ENHANCEMENTS

DETAIL

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
AREA ANALYSIS				
1-1 - Existing T1 FIS Expansion				
Departure Level 02	4,100	sf		
FIS Addition			2,600 sf	
Sterile Corridor			600 sf	
Vertical Circulation			900 sf	
Total Area	**4,100**	**sf**	**4,100 sf**	
A SUBSTRUCTURE				
A10 Foundations				
A1010 Standard Foundations				
A1011 Standard Foundations				Existing
A1030 Special Foundations				
A1031 PBB Foundation				Not Required
A1050 Slab on Grade				
A1051 Elevator Pits - New Pits Allowance	3	ea	$ 45,000.00	$ 135,000
Subtotal - Substructure				***$ 135,000***
B SHELL				
B10 Superstructure				
B1010 Floor Construction				
B1011 Floor Construction				Existing
B1030 Roof Construction				
B1031 Roof Construction				Existing

1-1 - EXISTING T1 FIS FACILITY ENHANCEMENTS

DETAIL

			DESCRIPTION	QUANTITY	UNIT		UNIT COST		TOTAL
	B20		**Exterior Closure**						
		B2010	Exterior Closure						
		B2011	Exterior Closure						Existing
	B30		**Roofing**						
		B3010	Roof Coverings						
		B3011	Roof Coverings						Existing
			Subtotal - Shell					***$***	***-***
C	***INTERIORS***								
	C10		**Interior Construction**						
		C1010	Partitions						
		C1011	Interior Partitions	4,100	sf	$	7.50	$	30,750
		C1012	Rough Carpentry & Blocking	4,100	sf	$	2.50	$	10,250
		C1013	Caulking, Sealants & Firestopping	4,100	sf	$	2.75	$	11,275
		C1014	Misc. Metals, Bracing, Countertop Supports, Equipment Supports, etc.	4,100	sf	$	2.25	$	9,225
		C1030	Interior Doors						
		C1031	Interior Doors - Allowance	4,100	sf	$	2.00	$	8,200
		C1050	Specialties						
		C1051	Fire Extinguishers & Cabinets	4,100	sf	$	0.05	$	205
		C1052	Code Signage	4,100	sf	$	0.25	$	1,025
		C1053	Interior Wayfinding Signage	4,100	sf	$	3.50	$	14,350
		C1054	Miscellaneous Specialties	4,100	sf	$	2.00	$	8,200
	C20		**Stairs**						
		C2010	Stair Construction						
		C2011	Stair - Vertical Core	3	flts	$	35,000.00	$	105,000
	C30		**Interior Finishes**						
		C3010	Interior Finishes						
		C3011	*Departure Level 02*						
		C3012	FIS Addition	2,600	sf	$	75.00	$	195,000
		C3013	Sterile Corridor	600	sf	$	65.00	$	39,000
		C3014	Vertical Circulation	900	sf	$	50.00	$	45,000
		C3015	Relocate Existing Spaces - Allowance	2,600	sf	$	50.00	$	130,000

1-1 - EXISTING T1 FIS FACILITY ENHANCEMENTS

DETAIL

DESCRIPTION			QUANTITY	UNIT		UNIT COST		TOTAL
		Subtotal - Interiors					$	*607,480*
D	**SERVICES**							
D10	**Conveying System**							
D1010	Elevators & Lifts							
	D1011	Hydraulic Passenger Elevator	6	stps	$	95,000.00	$	570,000
D1020	Escalators & Moving Walks							
	D1021	Escalator					Not Required	
	D1022	Moving Walks					Not Required	
D1030	Baggage Handling Equipment							
	D1031	Baggage Handling Equipment Allowance					Not Required	
D20	**Plumbing**							
D2010	Plumbing Systems							
	D2011	Departure Level 02	4,100	sf	$	15.50	$	63,550
D30	**HVAC**							
D3010	HVAC Systems							
	D3011	Departure Level 02	4,100	sf	$	74.00	$	303,400
D3050	Controls and Instrumentation							
	D3051	1-1 - Existing T1 FIS Expansion	4,100	sf	$	8.50	$	34,850
D3060	Systems Testing & Balancing							
	D3061	1-1 - Existing T1 FIS Expansion	4,100	sf	$	2.10	$	8,610
D40	**Fire Protection**							
D4010	Sprinkler Systems							
	D4011	Departure Level 02	4,100	sf	$	9.25	$	37,925
D50	**Electrical**							
D5010	Electrical Systems							
	D5011	Distribution Equipment	4,100	sf	$	3.50	$	14,350
	D5012	Feeders	4,100	sf	$	3.75	$	15,375
	D5013	Grounding and Lightning Protection	4,100	sf	$	2.00	$	8,200
	D5014	*TSA Screening Line*						
	D5015	TDC/CAT Power	2	ea	$	1,908.00	$	3,816
	D5016	WTMD Power	1	ea	$	2,245.00	$	2,245
	D5017	AIT Power	1	ea	$	2,261.00	$	2,261
	D5018	STSO Podium Power	1	ea	$	1,908.00	$	1,908

1-1 - EXISTING T1 FIS FACILITY ENHANCEMENTS

DETAIL

		DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	D5019	AVS/BLS Power	1	ea	$ 2,095.00	$ 2,095
	D5020	ETD @ AIT	1	ea	$ 1,857.00	$ 1,857
	D5021	Front X-Ray Power	1	ea	$ 3,927.00	$ 3,927
	D5022	Rear X-Ray Power	1	ea	$ 3,927.00	$ 3,927
	D5023	Branch Circuit Homeruns	5	ea	$ 1,890.00	$ 9,450
	D5024	*Departure Level 02*				
	D5025	FIS Addition	2,600	sf	$ 49.00	$ 127,400
	D5026	Sterile Corridor	600	sf	$ 49.00	$ 29,400
	D5027	Vertical Circulation	900	sf	$ 37.00	$ 33,300
	D5028	Relocate Existing Spaces - Allowance	2,600	sf	$ 49.00	$ 127,400
D6010	Communications					
	D6011	Telecomm Room Buildout	4,100	sf	$ 4.15	$ 17,015
	D6012	Backbone Cabling	4,100	sf	$ 2.50	$ 10,250
	D6013	Communications	4,100	sf	$ 3.35	$ 13,735
	D6014	EVIDS Cabling and Installation	4,100	sf	$ 1.55	$ 6,355
	D6015	Public Address System	4,100	sf	$ 2.64	$ 10,824
	D6016	DAS	4,100	sf	$ 6.25	$ 25,625
	D6017	Common Use System	4,100	sf	$ 2.70	$ 11,070
D7010	Electronic Safety & Security					
	D7011	Video Surveillance System	4,100	sf	$ 2.90	$ 11,890
	D7012	Security Access Control	4,100	sf	$ 4.08	$ 16,728
	D7013	Fire Alarm	4,100	sf	$ 5.00	$ 20,500
		Subtotal - Services				***$ 1,549,238***

E EQUIPMENT & FURNISHINGS

E10 Equipment

		DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
E1010	Equipment					
	E1011	Concessions Equipment - Not in Scope				Excluded
	E1012	Security Equipment - Not in Scope				Excluded
	E1013	FIS Equipment - Not in Scope				Excluded
	E1014	FIDS, BIDS, MUFIDS	4,100	sf	$ 2.00	$ 8,200
	E1015	Dynamic Signage				Excluded
	E1016	Misc. Equipment Allowance	4,100	sf	$ 0.50	$ 2,050
E1030	Passenger Boarding Bridges					
	E1031	New Passenger Boarding Bridge				Not Required

E20 Furnishings

		DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
E2010	Fixed Furnishings					
	E2011	Misc. Seating	1	alw	$ 40,000.00	$ 40,000
	E2012	Misc. Casework Allowance	4,100	sf	$ 3.00	$ 12,300

1-1 - EXISTING T1 FIS FACILITY ENHANCEMENTS

DETAIL

		DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
		Subtotal - Equipment & Furnishings				***$ 62,550***
F	***SPECIAL CONSTRUCTION & DEMOLITION***					
F10	**Special Construction**					
F1010	Special Construction					
	F1011	Special Construction				Not Required
F20	**Selective Building Demolition**					
F2010	Building Elements Demolition					
	F2011	Demolish Existing Interior Spaces	4,100	sf	$ 35.00	$ 143,500
	F2012	Misc. Demolition	1	alw	$ 20,500.00	$ 20,500
F30	**Hazardous Material Abatement**					
F3010	Hazardous Material Abatement					
	F3011	Hazardous Material Abatement				Excluded
		Subtotal - Special Construction & Demolition				***$ 164,000***
G	***BUILDING SITEWORK***					
G00	**Site Mobilization**					
G0010	Site Mobilization					
	G0011	Site Mobilization				Not Required
G10	**Site Preparation**					
G1010	Site Demolition					
	G1011	Demolish Existing Apron Paving				Not Required
G20	**Site Improvements**					
G2010	Pavement / Roadways etc.					
	G2011	Pavement / Roadways etc.				Not Required
G30	**Site Mechanical Utilities**					
G3010	Site Mechanical Utilities					
	G3011	Site Mechanical Utilities				Not Required
G40	**Site Electrical Utilities**					
G4010	Site Electrical Utilities					
	G4011	Site Electrical Utilities				Not Required

1-1 - EXISTING T1 FIS FACILITY ENHANCEMENTS

DETAIL

	DESCRIPTION	QUANTITY	UNIT	UNIT COST		TOTAL
	Subtotal - Building Sitework				***$***	***-***
	Subtotal			***$ 614.21***	***$***	***2,518,268***
25.0%	Estimating Design Evolution				$	629,567
	Subtotal - Cost of Work			***$ 767.76***	***$***	***3,147,835***
	General Contractors Markups					
5.0%	Project Logistics / Phasing & Labor Factor				$	157,392
5.0%	General Requirements & Temporary Construction				$	165,261
8.0%	General Conditions				$	277,639
5.0%	General Contractors Overhead & Profit				$	187,406
2.0%	Insurance				$	78,711
1.0%	Payment & Performance Bonds				$	40,142
0.0%	Sustainability Requirements				$	-
	Subtotal			***$ 988.87***	***$***	***4,054,387***
0.0%	Escalation				$	-
	Opinion of Probable Construction Cost			***$ 988.87***	***$***	***4,054,387***
21.3%	Owner's Soft Costs				$	863,584
	Opinion of Probable Project Cost			***$ 1,199.51***	***$***	***4,917,971***

Project Title	Landside Masterplan Update		
Location	Saint Paul International Airport		
Submittal Stage	Masterplan - Rough Order of Magnitude Estimate		
Client Name			
Client Project No.		Revision	2
Original Date	7-Apr-2023	Revision Date	25-Apr-2023
Assumed Bid Opening Date		Connico PN	4977.23.03
Project Lead	CJN / CJC	Checked by	IDK

1-2 - NEW T2 FIS SOUTH TERMINAL EXPANSION

SUMMARY

	CONSTRUCTION SYSTEM		COST PER SQUARE FOOT	TOTAL
A	**Substructure**		$ 37.39	$ 8,224,939
	Standard Foundations	$ 3,175,000		
	Special Foundations	$ 3,578,551		
	Slab on Grade	$ 1,471,389		
B	**Shell**		$ 136.95	$ 30,129,248
	Superstructure	$ 19,959,870		
	Exterior Closure	$ 8,230,128		
	Roofing	$ 1,939,250		
C	**Interiors**		$ 80.77	$ 17,769,125
	Interior Construction	$ 3,757,125		
	Stairs	$ 250,000		
	Interior Finishes	$ 13,762,000		
D	**Services**		$ 202.46	$ 44,541,650
	Conveying	$ 650,000		
	Baggage Handling System	$ -		
	Plumbing	$ 3,190,000		
	HVAC	$ 18,612,000		
	Fire Protection	$ 2,035,000		
	Electrical	$ 12,328,250		
	Communications	$ 5,090,800		
	Electronic Safety & Security	$ 2,635,600		
E	**Equipment & Furnishings**		$ 57.40	$ 12,627,500
	Equipment	$ 330,000		
	Passenger Boarding Bridges	$ 10,000,000		
	Furnishings	$ 2,297,500		
F	**Special Construction & Demolition**		$ 0.72	$ 158,000
	Special Construction	$ -		
	Selective Building Demolition	$ 158,000		
	Hazardous Material Abatement	$ -		
G	**Building Sitework**		$ 113.50	$ 24,969,035
	Site Mobilization	$ 4,178,600		
	Site Preparation	$ 1,074,740		
	Site Improvements	$ 19,540,695		
	Site Mechanical Utilities	$ 125,000		
	Site Electrical Utilities	$ 50,000		
	Subtotal		***$ 629.18***	***$ 138,419,497***
25.0%	Estimating Design Evolution			$ 34,604,874

1-2 - NEW T2 FIS SOUTH TERMINAL EXPANSION

SUMMARY

	CONSTRUCTION SYSTEM	COST PER SQUARE FOOT		TOTAL
	Subtotal - Cost of Work	***$ 786.47***	***$***	***173,024,371***
	General Contractors Markups			
5.0%	Project Logistics / Phasing & Labor Factor		$	8,651,219
5.0%	General Requirements & Temporary Construction		$	9,083,779
8.0%	General Conditions		$	15,260,750
5.0%	General Contractors Overhead & Profit		$	10,301,006
2.0%	Insurance		$	4,326,422
1.0%	Payment & Performance Bonds		$	2,206,475
0.0%	Sustainability Requirements		$	-
	Subtotal	***$ 1,012.97***	***$***	***222,854,023***
0.0%	Escalation		$	-
	Opinion of Probable Construction Cost	***$ 1,012.97***	***$***	***222,854,023***
21.3%	Owner's Soft Costs		$	47,467,907
	Opinion of Probable Project Cost	***$ 1,228.74***	***$***	***270,321,930***

Project Title	Landside Masterplan Update		
Location	Saint Paul International Airport		
Submittal Stage	Masterplan - Rough Order of Magnitude Estimate		
Client Name			
Client Project No.		**Revision**	2
Original Date	7-Apr-2023	**Revision Date**	25-Apr-2023
Assumed Bid Opening Date		**Connico PN**	4977.23.03
Project Lead	CJN / CJC	**Checked by**	IDK

1-2 - NEW T2 FIS SOUTH TERMINAL EXPANSION

DETAIL

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
AREA ANALYSIS				
1-2 - New South Conc. H/Expanded T2 FIS				
Apron Level 01	110,000	sf		
Airport Support			48,750 sf	
Airline Support			48,000 sf	
Mechanical			5,000 sf	
Storage			2,500 sf	
Tug Lanes			5,750 sf	
Departure Level 02	110,000	sf		
Concessions (Shell Space)			3,000 sf	
Holdrooms			60,000 sf	
Circulation			41,000 sf	
Restrooms - Public			6,000 sf	
Total Area	**220,000**	**sf**	**220,000 sf**	

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
A SUBSTRUCTURE				
A10 Foundations				
A1010 Standard Foundations				
A1011 Column Foundations, Wall Foundations, Grade Beams, Foundation Wall	110,000	sf	$ 27.50	$ 3,025,000
A1012 Extra for Rock Excavation				Not Required
A1013 Perimeter Drainage	2,400	lf	$ 25.00	$ 60,000
A1014 Dewatering	1	ls	$ 30,000.00	$ 30,000
A1015 Add Allowance for Preparing and Connecting into Existing Foundations	1	alw	$ 60,000.00	$ 60,000
A1030 Special Foundations				
A1031 Pile Foundations (36" Dia Drilled Pier @ 35' Deep)	110,000	sf	$ 30.00	$ 2,868,551
A1032 Jetway Foundations (36"' Dia - 35' Deep Concrete Pile)	10	ea	$ 60,000.00	$ 600,000
A1033 Dewatering	1	ls	$ 110,000.00	$ 110,000

1-2 - NEW T2 FIS SOUTH TERMINAL EXPANSION

DETAIL

		DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
A1050		Slab on Grade				
	A1051	Slab on Grade	110,000	sf	$ 10.00	$ 1,100,000
	A1052	Elevator Pits	5	ea	$ 15,000.00	$ 75,000
	A1053	Misc. Trenches, Pits & Bases	102	cy	$ 750.00	$ 76,389
	A1054	Under-slab Drainage & Insulation	110,000	sf	$ 2.00	$ 220,000
		Subtotal - Substructure				***$ 8,224,939***
B		***SHELL***				
B10		**Superstructure**				
B1010		Floor Construction				
	B1011	Steel Floor Structure	1,265	tns	$ 6,500.00	$ 8,222,500
	B1012	Steel Floor Deck	110,000	sf	$ 7.50	$ 825,000
	B1013	Concrete Fill to Steel Floor Deck	110,000	sf	$ 7.75	$ 852,500
	B1014	Supplemental Framing at Exterior Closure	73	tns	$ 7,000.00	$ 508,620
	B1015	Miscellaneous Steel (5%)	63	tns	$ 7,000.00	$ 442,750
	B1016	Elevated Floor Slab Fireproofing	110,000	sf	$ 7.00	$ 770,000
	B1017	Expansion Joint at Existing Structure	120	lf	$ 150.00	$ 18,000
	B1018	Add Allowance for Misc. Steel Framing at Junction to Existing Floor Structure	1	alw	$ 30,000.00	$ 30,000
B1030		Roof Construction				
	B1031	Steel Roof Structure	990	tns	$ 6,500.00	$ 6,435,000
	B1032	Steel Roof Deck	110,000	sf	$ 6.50	$ 715,000
	B1033	Miscellaneous Steel (5%)	50	tns	$ 7,000.00	$ 346,500
	B1034	Roof Fireproofing	110,000	sf	$ 7.00	$ 770,000
	B1035	Add Allowance for Misc. Steel Framing at Junction to Existing Roof Structure	1	alw	$ 24,000.00	$ 24,000
B20		**Exterior Closure**				
B2010		Exterior Walls				
	B2011	CMU Walls, incl. Back-up System	39,300	sf	$ 40.00	$ 1,572,000
	B2012	Precast Concrete, incl. Back-up System	4,570	sf	$ 45.00	$ 205,650
	B2013	Metal Wall Panel, incl. Back-up System	4,570	sf	$ 65.00	$ 297,050
	B2014	Edge Detail at Roof	2,285	lf	$ 75.00	$ 171,375
	B2015	Caulking & Sealant to Exteriors	86,830	sf	$ 1.75	$ 151,953
	B2016	Abutment Detailing at Existing Building - Patch, Repair, Refinish Exterior Walls Where Disturbed by New Construction	1	alw	$ 30,000.00	$ 30,000
B2030		Exterior Windows				
	B2031	Curtain Wall System	34,280	sf	$ 165.00	$ 5,656,200
B2050		Exterior Doors				

1-2 - NEW T2 FIS SOUTH TERMINAL EXPANSION

DETAIL

		DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	B2051	Exterior Doors - Allowance	1	alw	$ 80,900.00	$ 80,900
	B2052	PBB Exit Doors	10	ea	$ 3,500.00	$ 35,000
	B2052	Exit Doors - Apron Paving Access	10	ea	$ 2,500.00	$ 25,000
	B2053	Extra for Access Control	10	lvs	$ 500.00	$ 5,000
B2070	Exterior Soffits					
	B2071	Exterior Soffits				Not Required
B30	**Roofing**					
B3010	Roof Coverings					
	B3011	SBS Modified Bitumen Roof Assembly	110,000	sf	$ 16.50	$ 1,815,000
	B3012	Parapet Detail	2,285	lf	$ 50.00	$ 114,250
	B3013	Add Allowance for Junction to Existing Roof	1	alw	$ 10,000.00	$ 10,000
B3030	Roof Openings					
	B3031	Skylight				Not Required
	B3032	Roof Hatch				Not Required
		Subtotal - Shell				***$ 30,129,248***
C	***INTERIORS***					
C10	**Interior Construction**					
C1010	Partitions					
	C1011	Interior Partitions	214,250	sf	$ 5.00	$ 1,071,250
	C1012	Rough Carpentry & Blocking	214,250	sf	$ 1.50	$ 321,375
	C1013	Caulking, Sealants & Firestopping	220,000	sf	$ 1.75	$ 385,000
	C1014	Misc. Metals, Bracing, Countertop Supports, Equipment Supports, etc.	220,000	sf	$ 1.25	$ 275,000
C1030	Interior Doors					
	C1031	Interior Doors - Allowance	214,250	sf	$ 2.00	$ 428,500
C1050	Specialties					
	C1051	Fire Extinguishers & Cabinets	220,000	sf	$ 0.05	$ 11,000
	C1052	Code Signage	220,000	sf	$ 0.25	$ 55,000
	C1053	Interior Wayfinding Signage	220,000	sf	$ 3.50	$ 770,000
	C1054	Miscellaneous Specialties	220,000	sf	$ 2.00	$ 440,000
C20	**Stairs**					
C2010	Stair Construction					
	C2011	Stair - Exit - PBB	10	flts	$ 25,000.00	$ 250,000

1-2 - NEW T2 FIS SOUTH TERMINAL EXPANSION

DETAIL

		DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
C30		**Interior Finishes**				
C3010		Interior Finishes				
	C3011	*Apron Level 01*				
	C3012	Airport Support	48,750	sf	$ 45.00	$ 2,193,750
	C3013	Airline Support	48,000	sf	$ 45.00	$ 2,160,000
	C3014	Mechanical	5,000	sf	$ 35.00	$ 175,000
	C3015	Storage	2,500	sf	$ 25.00	$ 62,500
	C3016	Tug Lanes	5,750	sf	$ 10.00	$ 57,500
	C3017	*Departure Level 02*				
	C3018	Concessions (Shell Space)	3,000	sf	$ 25.00	$ 75,000
	C3019	Holdrooms	60,000	sf	$ 75.00	$ 4,500,000
	C3020	Circulation	41,000	sf	$ 85.00	$ 3,485,000
	C3021	Restrooms - Public	6,000	sf	$ 165.00	$ 990,000
	C3022	Allowance for Renovation to Existing Concourse for New Expansion Connection	1,150	sf	$ 55.00	$ 63,250
		Subtotal - Interiors				***$ 17,769,125***
D		***SERVICES***				
D10		**Conveying System**				
D1010		Elevators & Lifts				
	D1011	Hydraulic Passenger Elevator	10	stps	$ 65,000.00	$ 650,000
D1020		Escalators & Moving Walks				
	D1021	Escalator				Not Required
	D1022	Moving Walks				Not Required
D1030		Baggage Handling Equipment				
	D1031	Baggage Handling Equipment Allowance				Excluded
D20		**Plumbing**				
D2010		Plumbing Systems				
	D2011	Apron Level 01	110,000	sf	$ 13.50	$ 1,485,000
	D2012	Departure Level 02	110,000	sf	$ 15.50	$ 1,705,000
D30		**HVAC**				
D3010		HVAC Systems				
	D3011	Apron Level 01	110,000	sf	$ 74.00	$ 8,140,000
	D3012	Departure Level 02	110,000	sf	$ 74.00	$ 8,140,000
D3050		Controls and Instrumentation				
	D3051	1-2 - New South Conc. H/Expanded T2 FIS	220,000	sf	$ 8.50	$ 1,870,000

1-2 - NEW T2 FIS SOUTH TERMINAL EXPANSION

DETAIL

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
D3060	Systems Testing & Balancing				
D3061	1-2 - New South Conc. H/Expanded T2 FIS	220,000	sf	$ 2.10	$ 462,000
D40	**Fire Protection**				
D4010	Sprinkler Systems				
D4011	Apron Level 01	110,000	sf	$ 9.25	$ 1,017,500
D4012	Departure Level 02	110,000	sf	$ 9.25	$ 1,017,500
D50	**Electrical**				
D5010	Electrical Systems				
D5011	Distribution Equipment	220,000	sf	$ 6.00	$ 1,320,000
D5012	Feeders	220,000	sf	$ 8.75	$ 1,925,000
D5013	Grounding and Lightning Protection	220,000	sf	$ 3.00	$ 660,000
D5014	Jetway/GPU/PCA Feeders	10	ea	$ 65,000.00	$ 650,000
D5015	Roof Mounted Apron Light	10	ea	$ 30,000.00	$ 300,000
D5016	*Apron Level 01*				
D5017	Airport Support	48,750	sf	$ 25.00	$ 1,218,750
D5018	Airline Support	48,000	sf	$ 25.00	$ 1,200,000
D5019	Mechanical	5,000	sf	$ 18.00	$ 90,000
D5020	Storage	2,500	sf	$ 18.00	$ 45,000
D5021	Tug Lanes	5,750	sf	$ 10.00	$ 57,500
D5022	*Departure Level 02*				
D5023	Concessions (Shell Space)	3,000	sf	$ 15.00	$ 45,000
D5024	Holdrooms	60,000	sf	$ 49.00	$ 2,940,000
D5025	Circulation	41,000	sf	$ 37.00	$ 1,517,000
D5026	Restrooms - Public	6,000	sf	$ 60.00	$ 360,000
D6010	Communications				
D6011	Telecomm Room Buildout	220,000	sf	$ 4.15	$ 913,000
D6012	Backbone Cabling	220,000	sf	$ 2.50	$ 550,000
D6013	Communications	220,000	sf	$ 3.35	$ 737,000
D6014	EVIDS Cabling and Installation	220,000	sf	$ 1.55	$ 341,000
D6015	Public Address System	220,000	sf	$ 2.64	$ 580,800
D6016	DAS	220,000	sf	$ 6.25	$ 1,375,000
D6017	Common Use System	220,000	sf	$ 2.70	$ 594,000
D7010	Electronic Safety & Security				
D7011	Video Surveillance System	220,000	sf	$ 2.90	$ 638,000
D7012	Security Access Control	220,000	sf	$ 4.08	$ 897,600
D7013	Fire Alarm	220,000	sf	$ 5.00	$ 1,100,000
	Subtotal - Services				***$ 44,541,650***
E	***EQUIPMENT & FURNISHINGS***				
E10	**Equipment**				

1-2 - NEW T2 FIS SOUTH TERMINAL EXPANSION

DETAIL

DESCRIPTION			QUANTITY	UNIT	UNIT COST	TOTAL
	E1010	Equipment				
	E1011	Concessions Equipment - Not in Scope				Excluded
	E1012	Security Equipment - Not in Scope				Excluded
	E1013	FIS Equipment - Not in Scope				Excluded
	E1014	FIDS, BIDS, MUFIDS	110,000	sf	$ 2.00	$ 220,000
	E1015	Dynamic Signage				Excluded
	E1016	Misc. Equipment Allowance	220,000	sf	$ 0.50	$ 110,000
	E1030	Passenger Boarding Bridges				
	E1031	New Passenger Boarding Bridge	10	ea	$1,000,000.00	$ 10,000,000
E20	**Furnishings**					
	E2010	Fixed Furnishings				
	E2011	Gate Podiums & Backscreens	10	ea	$ 35,000.00	$ 350,000
	E2012	Recharge Stations				w/Electrical
	E2013	Holdroom Seating	1,250	ea	$ 1,000.00	$ 1,250,000
	E2014	Holdroom Seating Table	625	ea	$ 700.00	$ 437,500
	E2015	Misc. Seating	1	alw	$ 40,000.00	$ 40,000
	E2016	Kiosks				Excluded
	E2017	Window Shades				Excluded
	E2018	Misc. Casework Allowance	220,000	sf	$ 1.00	$ 220,000
		Subtotal - Equipment & Furnishings				***$ 12,627,500***
F	***SPECIAL CONSTRUCTION & DEMOLITION***					
F10	**Special Construction**					
	F1010	Special Construction				
	F1011	Special Construction				Not Required
F20	**Selective Building Demolition**					
	F2010	Building Elements Demolition				
	F2011	Demolish Exterior Closure at Existing Building	4,200	sf	$ 35.00	$ 147,000
	F2012	Misc. Demolition	1	alw	$ 11,000.00	$ 11,000
F30	**Hazardous Material Abatement**					
	F3010	Hazardous Material Abatement				
	F3011	Hazardous Material Abatement				Excluded
		Subtotal - Special Construction & Demolition				***$ 158,000***
G	***BUILDING SITEWORK***					

1-2 - NEW T2 FIS SOUTH TERMINAL EXPANSION

DETAIL

		DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
G00		**Site Mobilization**				
G0010		Site Mobilization				
	G0011	Mobilization				Incl. In M/UPS
	G0012	Safety and Security (3%)	1	ls	$ 727,300.00	$ 727,300
	G0013	Temporary Construction Items and Erosion Control (6%)	1	ls	$1,372,200.00	$ 1,372,200
	G0014	Drainage and Utility Allowance	1	alw	$2,079,100.00	$ 2,079,100
G10		**Site Preparation**				
G1010		Site Demolition				
	G1011	Demolish Existing Apron Paving	6,510	sy	$ 25.00	$ 162,750
	G1012	Demolish Existing Asphalt Parking Paving	29,250	sy	$ 15.00	$ 438,750
	G1013	Demolish Existing Maintenance Building (Flight Kitchen)	8,800	sf	$ 20.00	$ 176,000
	G1014	Demolish / Remove Existing Concrete Barriers	1,722	lf	$ 20.00	$ 34,440
	G1015	Demolish / Remove Existing Blast Wall	752	lf	$ 150.00	$ 112,800
	G1016	Allowance for Misc. Site Demolition	1	alw	$ 150,000.00	$ 150,000
	G1017	Demolish / Remove Existing QTA				Excluded
G20		**Site Improvements**				
G2010		Pavement / Roadways etc.				
	G2011	*Apron Paving*				
	G2012	Excavation	24,400	cy	$ 18.00	$ 439,200
	G2013	PCC Apron Pavement (17" P-501, 8" Stabilized Base, 16" P-209, Markings, Subgrade Prep.)	48,800	sy	$ 275.00	$ 13,420,000
	G2014	Pavement Markings - Service Road and Striping	21,958	sf	$ 2.50	$ 54,895
	G2015	New Apron Edge Lights (cable, conduit, counterpoise included)				Not Required
	G2016	*Fuel Systems*				
	G2017	New Underground Fuel Vaults	5	ea	$ 250,000.00	$ 1,250,000
	G2018	Fuel Branch Lines: 12" dia Steel Pipe Epoxy Lining, ext Coated, Welded	1,800	lf	$ 656.00	$ 1,180,800
	G2019	Fuel Branch Lines: 8" dia Steel Pipe Epoxy Lining, ext Coated, Welded	250	lf	$ 612.00	$ 153,000
	G2020	Fuel Branch Lines: 6" dia Steel Pipe Epoxy Lining, ext Coated, Welded	150	lf	$ 590.00	$ 88,500
	G2021	Radiographic Testing of Pipe Welds	2,200	lf	$ 19.00	$ 41,800
	G2022	Fuel Valves	10	ea	$ 25,000.00	$ 250,000
	G2023	Branch Line Low & High Point Drain Pit	5	ea	$ 32,500.00	$ 162,500
	G2024	Hydrant Pits and Connectors	10	ea	$ 25,000.00	$ 250,000
G2050		Landscaping				
	G2051	Landscaping Allowance				Excluded

1-2 - NEW T2 FIS SOUTH TERMINAL EXPANSION

DETAIL

		DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	G2060	Miscellaneous Buildings and Structures				
	G2061	Allowance for Relocation of Loading Dock	1	alw	$ 50,000.00	$ 50,000
	G2062	Allowance for Relocation of Maintenance Building	8,800	sf	$ 250.00	$ 2,200,000
G30	**Site Mechanical Utilities**					
	G3010	Site Mechanical Utilities				
	G3011	Site Mechanical Utilities	1	alw	$ 125,000.00	$ 125,000
G40	**Site Electrical Utilities**					
	G4010	Site Electrical Utilities				
	G4011	Site Electrical Utilities	1	alw	$ 25,000.00	$ 25,000
	G4030	Site Lighting				
	G4031	Site Lighting	1	alw	$ 25,000.00	$ 25,000
		Subtotal - Building Sitework				***$ 24,969,035***
		Subtotal			***$ 629.18***	***$ 138,419,497***
25.0%		Estimating Design Evolution				$ 34,604,874
		Subtotal - Cost of Work			***$ 786.47***	***$ 173,024,371***
		General Contractors Markups				
5.0%		Project Logistics / Phasing & Labor Factor				$ 8,651,219
5.0%		General Requirements & Temporary Construction				$ 9,083,779
8.0%		General Conditions				$ 15,260,750
5.0%		General Contractors Overhead & Profit				$ 10,301,006
2.0%		Insurance				$ 4,326,422
1.0%		Payment & Performance Bonds				$ 2,206,475
0.0%		Sustainability Requirements				$ -
		Subtotal			***$ 1,012.97***	***$ 222,854,023***
0.0%		Escalation				$ -
		Opinion of Probable Construction Cost			***$ 1,012.97***	***$ 222,854,023***
21.3%		Owner's Soft Costs				$ 47,467,907

1-2 - NEW T2 FIS SOUTH TERMINAL EXPANSION

DETAIL

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
Opinion of Probable Project Cost			***$ 1,228.74***	***$ 270,321,930***

Project Title	Landside Masterplan Update		
Location	Saint Paul International Airport		
Submittal Stage	Masterplan - Rough Order of Magnitude Estimate		
Client Name			
Client Project No.		Revision	2
Original Date	7-Apr-2023	Revision Date	25-Apr-2023
Assumed Bid Opening Date		Connico PN	4977.23.03
Project Lead	CJN / CJC	Checked by	IDK

1-6 - USPS SITE REDEVELOPMENT

SUMMARY

	CONSTRUCTION SYSTEM		COST PER SQUARE FOOT	TOTAL
A	**Substructure**		$ 7.53	$ 17,373,350
	Standard Foundations	$ 6,645,175		
	Special Foundations	$ 8,128,317		
	Slab on Grade	$ 2,599,858		
B	**Shell**		$ 61.98	$ 142,980,268
	Superstructure	$ 141,524,701		
	Exterior Closure	$ 1,437,593		
	Roofing	$ 17,975		
C	**Interiors**		$ 5.72	$ 13,184,935
	Interior Construction	$ 447,435		
	Stairs	$ 210,000		
	Interior Finishes	$ 12,527,500		
D	**Services**		$ 27.62	$ 63,713,956
	Conveying	$ 3,900,000		
	Baggage Handling System	$ -		
	Plumbing	$ 3,345,150		
	HVAC	$ 363,100		
	Fire Protection	$ 4,037,250		
	Electrical	$ 47,615,946		
	Communications	$ 2,952,960		
	Electronic Safety & Security	$ 1,499,550		
E	**Equipment & Furnishings**		$ 7.71	$ 17,778,550
	Equipment	$ 17,778,550		
	Passenger Boarding Bridges	$ -		
	Furnishings	$ -		
F	**Special Construction & Demolition**		$ 20.18	$ 46,550,000
	Special Construction	$ 46,400,000		
	Selective Building Demolition	$ 150,000		
	Hazardous Material Abatement	$ -		
G	**Building Sitework**		$ 2.53	$ 5,831,833
	Site Mobilization	$ 976,000		
	Site Preparation	$ 4,330,833		
	Site Improvements	$ -		
	Site Mechanical Utilities	$ 150,000		
	Site Electrical Utilities	$ 375,000		
	Subtotal		***$ 133.25***	***$ 307,412,893***
25.0%	Estimating Design Evolution			$ 76,853,223

1-6 - USPS SITE REDEVELOPMENT

SUMMARY

	CONSTRUCTION SYSTEM	COST PER SQUARE FOOT	TOTAL
	Subtotal - Cost of Work	***$ 166.57***	***$ 384,266,116***
	General Contractors Markups		
5.0%	Project Logistics / Phasing & Labor Factor		$ 19,213,306
5.0%	General Requirements & Temporary Construction		$ 20,173,971
8.0%	General Conditions		$ 33,892,271
5.0%	General Contractors Overhead & Profit		$ 22,877,283
2.0%	Insurance		$ 9,608,459
1.0%	Payment & Performance Bonds		$ 4,900,314
0.0%	Sustainability Requirements		$ -
	Subtotal	***$ 214.53***	***$ 494,931,721***
0.0%	Escalation		$ -
	Opinion of Probable Construction Cost	***$ 214.53***	***$ 494,931,721***
21.3%	Owner's Soft Costs		$ 105,420,457
	Opinion of Probable Project Cost	***$ 260.23***	***$ 600,352,177***

Project Title	Landside Masterplan Update			
Location	Saint Paul International Airport			
Submittal Stage	Masterplan - Rough Order of Magnitude Estimate			
Client Name				
Client Project No.		**Revision**	2	
Original Date	7-Apr-2023	**Revision Date**	25-Apr-2023	
Assumed Bid Opening Date		**Connico PN**	4977.23.03	
Project Lead	CJN / CJC	**Checked by**	IDK	

1-6 - USPS SITE REDEVELOPMENT

DETAIL

		DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
		AREA ANALYSIS				
		New Parking Structure	2,307,000	sf		
		Basement Level (Existing)			73,000 sf	
		Level 1			73,000 sf	
		Level 2			73,000 sf	
		Level 3 - At Grade - Rental Car			232,000 sf	
		Level 4 - Rental Car			232,000 sf	
		Level 5 - Rental Car			232,000 sf	
		Level 6 - Public Parking - 1			232,000 sf	
		Level 7 - Public Parking - 2			232,000 sf	
		Level 8 - Public Parking - 3			232,000 sf	
		Level 8 - Public Parking - 4			232,000 sf	
		Level 10 - Public Parking - 5			232,000 sf	
		Level 11 - Public Parking - 6			232,000 sf	
		Total Area	**2,307,000**	**sf**	**2,307,000 sf**	
A	***SUBSTRUCTURE***					
A10	**Foundations**					
A1010		Standard Foundations				
	A1011	Column Foundations, Wall Foundations, Grade Beams, Foundation Wall	232,000	sf	$ 28.00	$ 6,496,000
	A1012	Extra for Rock Excavation				Not Required
	A1013	Perimeter Drainage	1,967	lf	$ 25.00	$ 49,175
	A1014	Dewatering	1	ls	$ 40,000.00	$ 40,000
	A1015	Add Allowance for Preparing and Connecting into Existing Foundations	1	alw	$ 60,000.00	$ 60,000
A1030		Special Foundations				
	A1031	Pile Foundations (36" Dia Drilled Pier @ 35' Deep)	232,000	sf	$ 34.00	$ 7,888,317
	A1032	Dewatering	1	ls	$ 240,000.00	$ 240,000

1-6 - USPS SITE REDEVELOPMENT

DETAIL

		DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
A1050		Slab on Grade				
	A1051	Slab on Grade	159,000	sf	$ 10.00	$ 1,590,000
	A1052	Elevator Pits	4	ea	$ 15,000.00	$ 60,000
	A1053	*Washbays:*				
	A1054	Topping Slab	10,500	sf	$ 3.50	$ 36,750
	A1055	Concrete Islands	2,100	sf	$ 15.00	$ 31,500
	A1056	Extra Over SOG for Sloping Floor Slab to Drainage Trench	10,500	sf	$ 2.50	$ 26,250
	A1057	Trench Drain and Cover Cast into Concrete	700	lf	$ 350.00	$ 245,000
	A1058	Waterproofing SOG and Trench Drain	10,500	sf	$ 6.50	$ 68,250
	A1059	Pipe Bollards	112	ea	$ 950.00	$ 106,400
	A1060	Misc. Trenches, Pits & Bases	157	cy	$ 750.00	$ 117,708
	A1061	Under-slab Drainage & Insulation	159,000	sf	$ 2.00	$ 318,000
		Subtotal - Substructure				***$ 17,373,350***
B		***SHELL***				
B10		**Superstructure**				
B1010		Floor Construction				
	B1011	Concrete Floor Structure	2,307,000	sf	$ 55.00	$ 126,885,000
	B1012	Concrete Shear Walls	175,327	sf	$ 65.00	$ 11,396,233
	B1013	Cable Railing	12,480	lf	$ 215.00	$ 2,683,200
	B1014	Concrete Wall Structure - Perimeter Walls 4' Hi	7,868	sf	$ 65.00	$ 511,420
B1030		Roof Construction				
	B1031	Steel Roof Structure	6	tns	$ 6,500.00	$ 38,025
	B1032	Steel Roof Deck	650	sf	$ 6.50	$ 4,225
	B1033	Miscellaneous Steel (5%)	0.3	tns	$ 7,000.00	$ 2,048
	B1034	Roof Fireproofing	650	sf	$ 7.00	$ 4,550
B20		**Exterior Closure**				
B2010		Exterior Walls				
	B2011	CMU Walls, incl. Back-up System	26,390	sf	$ 40.00	$ 1,055,600
	B2012	Metal Wall Panel, incl. Back-up System	2,639	sf	$ 65.00	$ 171,535
	B2013	Edge Detail at Roof	145	lf	$ 75.00	$ 10,875
	B2014	Caulking & Sealant to Exteriors	26,390	sf	$ 1.75	$ 46,183
B2030		Exterior Windows				
	B2031	Punch Out Windows - Stair Tower	1,040	sf	$ 85.00	$ 88,400
B2050		Exterior Doors				
	B2051	Elevator / Stairs Lobby Doors	26	ea	$ 2,500.00	$ 65,000

1-6 - USPS SITE REDEVELOPMENT

DETAIL

		DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
B2070	Exterior Soffits					
	B2071	Exterior Soffits				Not Required
B30	**Roofing**					
B3010	Roof Coverings					
	B3011	SBS Modified Bitumen Roof Assembly	650	sf	$ 16.50	$ 10,725
	B3012	Parapet Detail	145	lf	$ 50.00	$ 7,250
B3030	Roof Openings					
	B3031	Skylight				Not Required
	B3032	Roof Hatch				Not Required
		Subtotal - Shell				***$ 142,980,268***
C	***INTERIORS***					
C10	**Interior Construction**					
C1010	Partitions					
	C1011	Interior Partitions	18,950	sf	$ 5.00	$ 94,750
	C1012	8" CMU Bash Bay Walls	5,250	sf	$ 30.00	$ 157,500
	C1013	Rough Carpentry & Blocking	18,950	sf	$ 1.50	$ 28,425
	C1014	Caulking, Sealants & Firestopping	18,950	sf	$ 1.75	$ 33,163
	C1015	Misc. Metals, Bracing, Countertop Supports, Equipment Supports, etc.	18,950	sf	$ 1.25	$ 23,688
C1030	Interior Doors					
	C1031	Interior Doors - Allowance				Not Required
C1050	Specialties					
	C1051	Fire Extinguishers & Cabinets	18,950	sf	$ 0.05	$ 948
	C1052	Code Signage	18,950	sf	$ 0.25	$ 4,738
	C1053	Interior Wayfinding Signage	18,950	sf	$ 3.50	$ 66,325
	C1054	Miscellaneous Specialties	18,950	sf	$ 2.00	$ 37,900
C20	**Stairs**					
C2010	Stair Construction					
	C2011	Stair Construction	28	flts	$ 7,500.00	$ 210,000
C30	**Interior Finishes**					
C3010	Interior Finishes					
	C3011	*New Parking Structure*				

1-6 - USPS SITE REDEVELOPMENT

DETAIL

		DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	C3012	Basement Level (Existing) - Dewatering System Upgrade (Waterproofing / Equipment)	73,000	sf	$ 15.00	$ 1,095,000
	C3013	Washbays - Special Waterproofing wall and floor Finishess	10,500	sf	$ 25.00	$ 262,500
	C3014	Level 1	73,000	sf	$ 5.00	$ 365,000
	C3015	Level 2	73,000	sf	$ 5.00	$ 365,000
	C3016	Level 3 - At Grade - Rental Car	232,000	sf	$ 5.00	$ 1,160,000
	C3017	Level 4 - Rental Car	232,000	sf	$ 5.00	$ 1,160,000
	C3018	Level 5 - Rental Car	232,000	sf	$ 5.00	$ 1,160,000
	C3019	Level 6 - Public Parking - 1	232,000	sf	$ 5.00	$ 1,160,000
	C3020	Level 7 - Public Parking - 2	232,000	sf	$ 5.00	$ 1,160,000
	C3021	Level 8 - Public Parking - 3	232,000	sf	$ 5.00	$ 1,160,000
	C3022	Level 8 - Public Parking - 4	232,000	sf	$ 5.00	$ 1,160,000
	C3023	Level 10 - Public Parking - 5	232,000	sf	$ 5.00	$ 1,160,000
	C3024	Level 11 - Public Parking - 6	232,000	sf	$ 5.00	$ 1,160,000
		Subtotal - Interiors				***$ 13,184,935***
D	***SERVICES***					
D10	**Conveying System**					
D1010	Elevators & Lifts					
	D1011	Hydraulic Passenger Elevator	52	stps	$ 75,000.00	$ 3,900,000
D1020	Escalators & Moving Walks					
	D1021	Escalator				Not Required
D20	**Plumbing**					
D2010	Plumbing Systems					
	D2011	New Parking Structure	2,307,000	sf	$ 1.45	$ 3,345,150
D30	**HVAC**					
D3010	HVAC Systems					
	D3011	Rental Car - Heating and Ventilation	6,000	sf	$ 7.00	$ 42,000
	D3012	Stair Cores	8,450	sf	$ 38.00	$ 321,100
D40	**Fire Protection**					
D4010	Sprinkler Systems					
	D4011	New Parking Structure	2,307,000	sf	$ 1.75	$ 4,037,250
D50	**Electrical**					
D5010	Electrical Systems					
	D5011	*EV Charging*				
	D5012	Level 3 Charger	110	ea	$ 39,900.00	$ 4,389,000

1-6 - USPS SITE REDEVELOPMENT

DETAIL

		DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	D5013	Level 2 Charger	130	ea	$ 13,500.00	$ 1,755,000
	D5014	Distribution Equipment	2,307,000	sf	$ 6.00	$ 13,842,000
	D5015	Feeder Conduit & Wire	2,307,000	sf	$ 8.75	$ 20,186,250
	D5016	Wiring Devices	2,307,000	sf	$ 0.15	$ 346,050
	D5017	Equipment Power and Connection	2,307,000	sf	$ 0.30	$ 692,100
	D5018	Lighting	2,307,000	sf	$ 2.00	$ 4,614,000
	D5019	Grounding and Lightning Protection	2,307,000	sf	$ 0.20	$ 461,400
	D5020	*Car Wash Equipment Power Wiring and Connection*				
	D5021	CWUH, Unit Heater	48	ea	$ 2,298.00	$ 110,304
	D5022	RO Pump	12	ea	$ 7,748.00	$ 92,976
	D5023	Reclaim Pump	24	ea	$ 10,938.00	$ 262,512
	D5024	Rinse Pump	12	ea	$ 9,341.00	$ 112,092
	D5025	Vacuum Blower	18	ea	$ 11,237.00	$ 202,266
	D5026	RO Purification Unit	9	ea	$ 14,362.00	$ 129,258
	D5027	Pressure Washer	12	ea	$ 5,769.00	$ 69,228
	D5028	Blower Control Panel	24	ea	$ 5,769.00	$ 138,456
	D5029	Machine Control Panel	24	ea	$ 6,680.00	$ 160,320
	D5030	Maintenance Receptacles at Pumps	51	ea	$ 1,034.00	$ 52,734
D6010	Communications					
	D6011	MDF/IDF Rooms	2,307,000	sf	$ 0.15	$ 346,050
	D6012	Voice/Data Devices	2,307,000	sf	$ 0.23	$ 530,610
	D6013	PA/Code Blue/DAS Systems	2,307,000	sf	$ 0.90	$ 2,076,300
D7010	Electronic Safety & Security					
	D7011	Access Control/CCTV	2,307,000	sf	$ 0.50	$ 1,153,500
	D7012	Fire Alarm	2,307,000	sf	$ 0.15	$ 346,050
		Subtotal - Services				***$ 63,713,956***
E	***EQUIPMENT & FURNISHINGS***					
E10	**Equipment**					
E1010	Equipment					
	E1011	Parking Equipment	1,392,000	sf	$ 0.30	$ 417,600
	E1012	Parking Occupancy Equipment	1,392,000	sf	$ 1.80	$ 2,505,600
	E1046	Signage	2,307,000	sf	$ 0.75	$ 1,730,250
	E1014	Misc. Equipment Allowance	2,307,000	sf	$ 0.50	$ 1,153,500
E1030	Vehicular Equipment					
	E1031	*Vehicle Washing Equipment*				
	E1032	Vehicle Wash Tunnel Equipment	28	ea	$ 117,300.00	$ 3,284,400
	E1033	Fresh Water Piping System, Valves, Connection to Domestic Water System	1	ls	$2,001,000.00	$ 2,001,000
	E1034	RO Water System; Purification Units, Storage Tanks, Piping, etc.	1	ls	$ 845,000.00	$ 845,000
	E1035	Reclaim Water System; Clarifiers, Pumps, Storage Tanks, Piping, etc.	1	ls	$ 664,000.00	$ 664,000

		DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	E1036	Car Wash Control System; Controls and Instrumentation Cabling	1	ls	$ 174,400.00	$ 174,400
	E1037	*Windshield Washing Fluid (WWF)*				
	E1038	Windshield Washing (WWF) AST; 6000 gal, w/ Vents, Gauges and Accessories	4	ea	$ 89,700.00	$ 358,800
	E1039	WWF Pneumatic Pumps, SS Piping, Hose Reels, etc.	4	ls	$ 483,000.00	$ 1,932,000
	E1040	WWF Controls System w/ Interface to E-Stop System	4	ls	$ 138,000.00	$ 552,000
	E1041	*Vacuum*				
	E1042	Vacuum Producers; 25hp w/ Speed Controllers, Separators, Pipe Connections to Outside and Exhaust Air	24	ea	$ 90,000.00	$ 2,160,000
	E1043	Vacuum System				Not Required
	E1044	Compressed Air Equipment				Not Required
	E1045	Fueling Positions				Not Required
E20	**Furnishings**					
E2010	Fixed Furnishings					
	E2011	Fixed Furnishings				Not Required
		Subtotal - Equipment & Furnishings				***$ 17,778,550***
F	***SPECIAL CONSTRUCTION & DEMOLITION***					
F10	**Special Construction**					
F1010	Special Construction					
	F1011	Protection of Existing Industrial Building	83,000	sf	$ 50.00	$ 4,150,000
	F1012	Extend Underground Tunnel - Silver Ramp to New Elvator Core	65,000	sf	$ 650.00	$ 42,250,000
F20	**Selective Building Demolition**					
F2010	Building Elements Demolition					
	F2021	Misc. Demolition	1	alw	$ 150,000.00	$ 150,000
F30	**Hazardous Material Abatement**					
F3010	Hazardous Material Abatement					
	F3011	Hazardous Material Abatement				Excluded
		Subtotal - Special Construction & Demolition				***$ 46,550,000***
G	***BUILDING SITEWORK***					
G00	**Site Mobilization**					
G0010	Site Mobilization					

1-6 - USPS SITE REDEVELOPMENT

DETAIL

		DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	G0011	Mobilization				Incl. In M/UPS
	G0012	Safety and Security (3%)	1	ls	$ 169,900.00	$ 169,900
	G0013	Temporary Construction Items and Erosion Control (6%)	1	ls	$ 320,500.00	$ 320,500
	G0014	Drainage and Utility Allowance	1	alw	$ 485,600.00	$ 485,600
G10	**Site Preparation**					
G1010	Site Demolition					
	G1011	Demolish Existing Concrete Strcuture - Over Existing Industrial Building	83,000	sf	$ 25.00	$ 2,075,000
	G1012	Demolish Existing Customer Service Building	12,000	sf	$ 15.00	$ 180,000
	G1013	Demolish Existing Industrial Building	73,000	sf	$ 20.00	$ 1,460,000
	G1014	Demolish Existing Asphalt Pavement	13,333	sy	$ 25.00	$ 333,333
	G1015	Demolish / Remove Existing Security Gates	2	ea	$ 2,500.00	$ 5,000
	G1016	Provide Security Barrie Around Basement	1,500	lf	$ 85.00	$ 127,500
	G1017	Allowance for Misc. Site Demolition	1	alw	$ 150,000.00	$ 150,000
G20	**Site Improvements**					
G2010	Pavement / Roadways etc.					
	G2011	Pavement / Roadways etc.				W/Civil
G30	**Site Mechanical Utilities**					
G3010	Site Mechanical Utilities					
	G3011	Site Mechanical Utilities	1	alw	$ 150,000.00	$ 150,000
G40	**Site Electrical Utilities**					
G4010	Site Electrical Utilities					
	G4011	Site Electrical Utilities	1	alw	$ 250,000.00	$ 250,000
G4030	Site Lighting					
	G4031	Site Lighting	1	alw	$ 125,000.00	$ 125,000
		Subtotal - Building Sitework				***$ 5,831,833***
		Subtotal			***$ 133.25***	***$ 307,412,893***
25.0%		Estimating Design Evolution				$ 76,853,223
		Subtotal - Cost of Work			***$ 166.57***	***$ 384,266,116***
		General Contractors Markups				
5.0%		Project Logistics / Phasing & Labor Factor				$ 19,213,306
5.0%		General Requirements & Temporary Construction				$ 20,173,971

1-6 - USPS SITE REDEVELOPMENT

DETAIL

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
8.0%	General Conditions				$ 33,892,271
5.0%	General Contractors Overhead & Profit				$ 22,877,283
2.0%	Insurance				$ 9,608,459
1.0%	Payment & Performance Bonds				$ 4,900,314
0.0%	Sustainability Requirements				$ -
	Subtotal			***$ 214.53***	***$ 494,931,721***
0.0%	Escalation				$ -
	Opinion of Probable Construction Cost			***$ 214.53***	***$ 494,931,721***
21.3%	Owner's Soft Costs				$ 105,420,457
	Opinion of Probable Project Cost			***$ 260.23***	***$ 600,352,177***

Project Title	Landside Masterplan Update		
Location	Saint Paul International Airport		
Submittal Stage	Masterplan - Rough Order of Magnitude Estimate		
Client Name			
Client Project No.		Revision	2
Original Date	7-Apr-2023	Revision Date	25-Apr-2023
Assumed Bid Opening Date		Connico PN	4977.23.03
Project Lead	CJN / CJC	Checked by	IDK

2-1 - RECONSTRUCT CONCOURSE A, DEMOLISH CONCOURSE B

SUMMARY

	CONSTRUCTION SYSTEM		COST PER SQUARE FOOT	TOTAL
A	**Substructure**		$ 31.11	$ 4,284,157
	Standard Foundations	$ 1,977,450		
	Special Foundations	$ 1,372,695		
	Slab on Grade	$ 934,013		
B	**Shell**		$ 147.86	$ 20,359,934
	Superstructure	$ 12,479,449		
	Exterior Closure	$ 6,642,460		
	Roofing	$ 1,238,025		
C	**Interiors**		$ 80.59	$ 11,096,660
	Interior Construction	$ 2,321,660		
	Stairs	$ 200,000		
	Interior Finishes	$ 8,575,000		
D	**Services**		$ 200.74	$ 27,642,019
	Conveying	$ 650,000		
	Baggage Handling System	$ -		
	Plumbing	$ 1,688,000		
	HVAC	$ 11,353,320		
	Fire Protection	$ 1,241,350		
	Electrical	$ 7,873,325		
	Communications	$ 3,186,378		
	Electronic Safety & Security	$ 1,649,646		
E	**Equipment & Furnishings**		$ 72.73	$ 10,014,250
	Equipment	$ 206,550		
	Passenger Boarding Bridges	$ 8,000,000		
	Furnishings	$ 1,807,700		
F	**Special Construction & Demolition**		$ 0.94	$ 129,500
	Special Construction	$ -		
	Selective Building Demolition	$ 129,500		
	Hazardous Material Abatement	$ -		
G	**Building Sitework**		$ 67.63	$ 9,312,887
	Site Mobilization	$ 1,558,600		
	Site Preparation	$ 2,872,000		
	Site Improvements	$ 4,707,287		
	Site Mechanical Utilities	$ 125,000		
	Site Electrical Utilities	$ 50,000		
	Subtotal		***$ 601.59***	***$ 82,839,407***
25.0%	Estimating Design Evolution			$ 20,709,852

2-1 - RECONSTRUCT CONCOURSE A, DEMOLISH CONCOURSE B

SUMMARY

	CONSTRUCTION SYSTEM	COST PER SQUARE FOOT	TOTAL
	Subtotal - Cost of Work	***$ 751.99***	***$ 103,549,259***
	General Contractors Markups		
5.0%	Project Logistics / Phasing & Labor Factor		$ 5,177,463
5.0%	General Requirements & Temporary Construction		$ 5,436,336
8.0%	General Conditions		$ 9,133,045
5.0%	General Contractors Overhead & Profit		$ 6,164,805
2.0%	Insurance		$ 2,589,218
1.0%	Payment & Performance Bonds		$ 1,320,501
0.0%	Sustainability Requirements		$ -
	Subtotal	***$ 968.56***	***$ 133,370,628***
0.0%	Escalation		$ -
	Opinion of Probable Construction Cost	***$ 968.56***	***$ 133,370,628***
21.3%	Owner's Soft Costs		$ 28,407,944
	Opinion of Probable Project Cost	***$ 1,174.86***	***$ 161,778,571***

Project Title	Landside Masterplan Update		
Location	Saint Paul International Airport		
Submittal Stage	Masterplan - Rough Order of Magnitude Estimate		
Client Name			
Client Project No.		**Revision**	2
Original Date	7-Apr-2023	**Revision Date**	25-Apr-2023
Assumed Bid Opening Date		**Connico PN**	4977.23.03
Project Lead	CJN / CJC	**Checked by**	IDK

2-1 - RECONSTRUCT CONCOURSE A, DEMOLISH CONCOURSE B

DETAIL

		DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
		AREA ANALYSIS				
		2-1 - Reconstruct Concourse A, Demolish Concourse B				
		Apron Level 01	68,850	sf		
		Airport Support			30,500 sf	
		Airline Support			30,050 sf	
		Mechanical			3,200 sf	
		Storage			1,600 sf	
		Tug Lanes			3,500 sf	
		Departure Level 02	68,850	sf		
		Concessions (Shell Space)			1,800 sf	
		Hold rooms			38,000 sf	
		Circulation			26,000 sf	
		Restrooms - Public			3,050 sf	
		Total Area	**137,700**	**sf**	**137,700 sf**	
A	***SUBSTRUCTURE***					
A10	**Foundations**					
A1010		Standard Foundations				
	A1011	Column Foundations, Wall Foundations, Grade Beams, Foundation Wall	68,850	sf	$ 27.00	$ 1,858,950
	A1012	Extra for Rock Excavation				Not Required
	A1013	Perimeter Drainage	1,940	lf	$ 25.00	$ 48,500
	A1014	Dewatering	1	ls	$ 20,000.00	$ 20,000
	A1015	Add Allowance for Preparing and Connecting into Existing Foundations	1	alw	$ 50,000.00	$ 50,000
A1030		Special Foundations				
	A1031	PBB Foundation	8	ea	$ 60,000.00	$ 480,000
	A1032	Pile Foundations (36" Dia Drilled Pier @ 35' Deep)	68,850	sf	$ 15.00	$ 862,695
	A1033	Dewatering	1	ls	$ 30,000.00	$ 30,000

2-1 - RECONSTRUCT CONCOURSE A, DEMOLISH CONCOURSE B

DETAIL

		DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	A1050	Slab on Grade				
	A1051	Slab on Grade	68,850	sf	$ 10.00	$ 688,500
	A1052	Elevator Pits	4	ea	$ 15,000.00	$ 60,000
	A1053	Misc. Trenches, Pits & Bases	64	cy	$ 750.00	$ 47,813
	A1054	Under-slab Drainage & Insulation	68,850	sf	$ 2.00	$ 137,700
		Subtotal - Substructure				***$ 4,284,157***
B	***SHELL***					
B10	**Superstructure**					
	B1010	Floor Construction				
	B1011	Steel Floor Structure	792	tns	$ 6,500.00	$ 5,146,538
	B1012	Steel Floor Deck	68,850	sf	$ 7.50	$ 516,375
	B1013	Concrete Fill to Steel Floor Deck	68,850	sf	$ 7.75	$ 533,588
	B1014	Supplemental Framing at Exterior Closure	41	tns	$ 7,000.00	$ 289,800
	B1015	Miscellaneous Steel (5%)	40	tns	$ 7,000.00	$ 277,121
	B1016	Elevated Floor Slab Fireproofing	68,850	sf	$ 7.00	$ 481,950
	B1017	Expansion Joint at Existing Structure	100	lf	$ 150.00	$ 15,000
	B1018	Add Allowance for Misc. Steel Framing at Junction to Existing Floor Structure	1	alw	$ 25,000.00	$ 25,000
	B1030	Roof Construction				
	B1031	Steel Roof Structure	620	tns	$ 6,500.00	$ 4,027,725
	B1032	Steel Roof Deck	68,850	sf	$ 6.50	$ 447,525
	B1033	Miscellaneous Steel (5%)	31	tns	$ 7,000.00	$ 216,878
	B1034	Roof Fireproofing	68,850	sf	$ 7.00	$ 481,950
	B1035	Add Allowance for Misc. Steel Framing at Junction to Existing Roof Structure	1	alw	$ 20,000.00	$ 20,000
B20	**Exterior Closure**					
	B2010	Exterior Walls				
	B2011	CMU Walls, incl. Back-up System	31,650	sf	$ 40.00	$ 1,266,000
	B2012	Precast Concrete, incl. Back-up System	3,680	sf	$ 45.00	$ 165,600
	B2013	Metal Wall Panel, incl. Back-up System	3,680	sf	$ 65.00	$ 239,200
	B2014	Edge Detail at Roof	1,840	lf	$ 75.00	$ 138,000
	B2015	Caulking & Sealant to Exteriors	69,920	sf	$ 1.75	$ 122,360
	B2016	Abutment Detailing at Existing Building - Patch, Repair, Refinish Exterior Walls Where Disturbed by New Construction	1	alw	$ 40,000.00	$ 40,000
	B2030	Exterior Windows				
	B2031	Curtain Wall System	27,600	sf	$ 165.00	$ 4,554,000

2-1 - RECONSTRUCT CONCOURSE A, DEMOLISH CONCOURSE B

DETAIL

		DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
B2050		Exterior Doors				
	B2051	Exterior Doors - Allowance	1	alw	$ 65,300.00	$ 65,300
	B2052	PBB Exit Doors	8	ea	$ 3,500.00	$ 28,000
	B2052	Exit Doors - Apron Paving Access	8	ea	$ 2,500.00	$ 20,000
	B2053	Extra for Access Control	8	lvs	$ 500.00	$ 4,000
B2070		Exterior Soffits				
	B2071	Exterior Soffits				Not Required
B30		**Roofing**				
B3010		Roof Coverings				
	B3011	SBS Modified Bitumen Roof Assembly	68,850	sf	$ 16.50	$ 1,136,025
	B3012	Parapet Detail	1,840	lf	$ 50.00	$ 92,000
	B3013	Add Allowance for Junction to Existing Roof	1	alw	$ 10,000.00	$ 10,000
B3030		Roof Openings				
	B3031	Skylight				Not Required
	B3032	Roof Hatch				Not Required
		Subtotal - Shell				***$ 20,359,934***
C		***INTERIORS***				
C10		**Interior Construction**				
C1010		Partitions				
	C1011	Interior Partitions	134,200	sf	$ 5.00	$ 671,000
	C1012	Rough Carpentry & Blocking	134,200	sf	$ 1.50	$ 201,300
	C1013	Caulking, Sealants & Firestopping	134,200	sf	$ 1.75	$ 234,850
	C1014	Misc. Metals, Bracing, Countertop Supports, Equipment Supports, etc.	134,200	sf	$ 1.25	$ 167,750
C1030		Interior Doors				
	C1031	Interior Doors - Allowance	134,200	sf	$ 2.00	$ 268,400
C1050		Specialties				
	C1051	Fire Extinguishers & Cabinets	134,200	sf	$ 0.05	$ 6,710
	C1052	Code Signage	134,200	sf	$ 0.25	$ 33,550
	C1053	Interior Wayfinding Signage	134,200	sf	$ 3.50	$ 469,700
	C1054	Miscellaneous Specialties	134,200	sf	$ 2.00	$ 268,400
C20		**Stairs**				
C2010		Stair Construction				

2-1 - RECONSTRUCT CONCOURSE A, DEMOLISH CONCOURSE B

DETAIL

			DESCRIPTION	QUANTITY	UNIT		UNIT COST		TOTAL
		C2011	Stair - Exit - PBB	8	flts	$	25,000.00	$	200,000
C30	**Interior Finishes**								
	C3010		Interior Finishes						
		C3011	*Apron Level 01*						
		C3012	Airport Support	30,500	sf	$	45.00	$	1,372,500
		C3013	Airline Support	30,050	sf	$	45.00	$	1,352,250
		C3014	Mechanical	3,200	sf	$	35.00	$	112,000
		C3015	Storage	1,600	sf	$	25.00	$	40,000
		C3016	Tug Lanes	3,500	sf	$	10.00	$	35,000
		C3017	*Departure Level 02*						
		C3018	Concessions (Shell Space)	1,800	sf	$	25.00	$	45,000
		C3019	Hold rooms	38,000	sf	$	75.00	$	2,850,000
		C3020	Circulation	26,000	sf	$	85.00	$	2,210,000
		C3021	Restrooms - Public	3,050	sf	$	165.00	$	503,250
		C3022	Allowance for Renovation to Existing Concourse for New Expansion Connection	1,000	sf	$	55.00	$	55,000
			Subtotal - Interiors					***$***	***11,096,660***
D	***SERVICES***								
D10	**Conveying System**								
	D1010		Elevators & Lifts						
		D1011	Hydraulic Passenger Elevator	10	stps	$	65,000.00	$	650,000
	D1020		Escalators & Moving Walks						
		D1021	Escalator					Not Required	
		D1022	Moving Walks					Not Required	
	D1030		Baggage Handling Equipment						
		D1031	Baggage Handling Equipment Allowance					Excluded	
D20	**Plumbing**								
	D2010		Plumbing Systems						
		D2011	Apron Level 01	65,350	sf	$	9.50	$	620,825
		D2012	Departure Level 02	68,850	sf	$	15.50	$	1,067,175
D30	**HVAC**								
	D3010		HVAC Systems						
		D3011	Apron Level 01	65,350	sf	$	74.00	$	4,835,900
		D3012	Departure Level 02	68,850	sf	$	74.00	$	5,094,900
	D3050		Controls and Instrumentation						

2-1 - RECONSTRUCT CONCOURSE A, DEMOLISH CONCOURSE B

DETAIL

		DESCRIPTION	QUANTITY	UNIT		UNIT COST		TOTAL
	D3051	2-1 - Reconstruct Concourse A, Demolish Con	134,200	sf	$	8.50	$	1,140,700
D3060	Systems Testing & Balancing							
	D3061	2-1 - Reconstruct Concourse A, Demolish Con	134,200	sf	$	2.10	$	281,820
D40	**Fire Protection**							
D4010	Sprinkler Systems							
	D4011	Apron Level 01	65,350	sf	$	9.25	$	604,488
	D4012	Departure Level 02	68,850	sf	$	9.25	$	636,863
D50	**Electrical**							
D5010	Electrical Systems							
	D5011	Distribution Equipment	137,700	sf	$	6.00	$	826,200
	D5012	Feeders	137,700	sf	$	8.75	$	1,204,875
	D5013	Grounding and Lightning Protection	137,700	sf	$	3.00	$	413,100
	D5014	Jetway/GPU/PCA Feeders	8	ea	$	65,000.00	$	520,000
	D5015	Roof Mounted Apron Light	8	ea	$	30,000.00	$	240,000
	D5016	*Apron Level 01*						
	D5017	Airport Support	30,500	sf	$	25.00	$	762,500
	D5018	Airline Support	30,050	sf	$	25.00	$	751,250
	D5019	Mechanical	3,200	sf	$	18.00	$	57,600
	D5020	Storage	1,600	sf	$	18.00	$	28,800
	D5021	Tug Lanes	3,500	sf	$	10.00	$	35,000
	D5022	*Departure Level 02*						
	D5023	Concessions (Shell Space)	1,800	sf	$	15.00	$	27,000
	D5024	Hold rooms	38,000	sf	$	49.00	$	1,862,000
	D5025	Circulation	26,000	sf	$	37.00	$	962,000
	D5026	Restrooms - Public	3,050	sf	$	60.00	$	183,000
D6010	Communications							
	D6011	Telecomm Room Buildout	137,700	sf	$	4.15	$	571,455
	D6012	Backbone Cabling	137,700	sf	$	2.50	$	344,250
	D6013	Communications	137,700	sf	$	3.35	$	461,295
	D6014	EVIDS Cabling and Installation	137,700	sf	$	1.55	$	213,435
	D6015	Public Address System	137,700	sf	$	2.64	$	363,528
	D6016	DAS	137,700	sf	$	6.25	$	860,625
	D6017	Common Use System	137,700	sf	$	2.70	$	371,790
D7010	Electronic Safety & Security							
	D7011	Video Surveillance System	137,700	sf	$	2.90	$	399,330
	D7012	Security Access Control	137,700	sf	$	4.08	$	561,816
	D7013	Fire Alarm	137,700	sf	$	5.00	$	688,500
		Subtotal - Services					***$***	***27,642,019***

2-1 - RECONSTRUCT CONCOURSE A, DEMOLISH CONCOURSE B

DETAIL

			DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
E	***EQUIPMENT & FURNISHINGS***						
E10	**Equipment**						
	E1010	Equipment					
		E1011	Concessions Equipment - Not in Scope				Excluded
		E1012	Security Equipment - Not in Scope				Excluded
		E1013	FIS Equipment - Not in Scope				Excluded
		E1014	FIDS, BIDS, MUFIDS	68,850	sf	$ 2.00	$ 137,700
		E1015	Dynamic Signage				Excluded
		E1016	Misc. Equipment Allowance	137,700	sf	$ 0.50	$ 68,850
	E1030	Passenger Boarding Bridges					
		E1031	New Passenger Boarding Bridge	8	ea	$1,000,000.00	$ 8,000,000
E20	**Furnishings**						
	E2010	Fixed Furnishings					
		E2011	Gate Podiums & Backscreens	8	ea	$ 35,000.00	$ 280,000
		E2012	Recharge Stations				w/Electrical
		E2013	Holdroom Seating	1,000	ea	$ 1,000.00	$ 1,000,000
		E2014	Holdroom Seating Table	500	ea	$ 700.00	$ 350,000
		E2015	Misc. Seating	1	alw	$ 40,000.00	$ 40,000
		E2016	Kiosks				Excluded
		E2017	Window Shades				Excluded
		E2018	Misc. Casework Allowance	137,700	sf	$ 1.00	$ 137,700
			Subtotal - Equipment & Furnishings				***$ 10,014,250***
F	***SPECIAL CONSTRUCTION & DEMOLITION***						
F10	**Special Construction**						
	F1010	Special Construction					
		F1011	Special Construction				Not Required
F20	**Selective Building Demolition**						
	F2010	Building Elements Demolition					
		F2011	Demolish Exterior Closure at Existing Building	3,500	sf	$ 35.00	$ 122,500
		F2012	Misc. Demolition	1	alw	$ 7,000.00	$ 7,000
F30	**Hazardous Material Abatement**						
	F3010	Hazardous Material Abatement					
		F3011	Hazardous Material Abatement				Excluded
			Subtotal - Special Construction & Demolition				***$ 129,500***

2-1 - RECONSTRUCT CONCOURSE A, DEMOLISH CONCOURSE B

DETAIL

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
G	***BUILDING SITEWORK***				
G00	**Site Mobilization**				
G0010	Site Mobilization				
G0011	Mobilization				Incl. In M/UPS
G0012	Safety and Security (3%)	1	ls	$ 271,300.00	$ 271,300
G0013	Temporary Construction Items and Erosion Control (6%)	1	ls	$ 511,800.00	$ 511,800
G0014	Drainage and Utility Allowance	1	alw	$ 775,500.00	$ 775,500
G10	**Site Preparation**				
G1010	Site Demolition				
G1011	Demolish Existing Apron Paving	6,580	sy	$ 25.00	$ 164,500
G1012	Demolish Existing Concourse A	65,000	sf	$ 15.00	$ 975,000
G1013	Demolish Existing Concourse B	65,000	sf	$ 15.00	$ 975,000
G1014	Demolish Existing PBB Foundations	19	ea	$ 5,000.00	$ 95,000
G1015	Demolish Existing PBB - Bridge & Equipment	19	ea	$ 25,000.00	$ 475,000
G1016	Demolish / Remove Existing Blast Wall	250	lf	$ 150.00	$ 37,500
G1017	Allowance for Misc. Site Demolition	1	alw	$ 150,000.00	$ 150,000
G1018	Demolish / Remove Existing QTA				Excluded
G20	**Site Improvements**				
G2010	Pavement / Roadways etc.				
G2011	*Apron Paving*				
G2012	Excavation	3,290	cy	$ 18.00	$ 59,220
G2013	PCC Apron Pavement (17" P-501, 8" Stabilized Base, 16" P-209, Markings, Subgrade Prep.) - Infill of Existing Concourse Buildings	6,580	sy	$ 275.00	$ 1,809,500
G2014	Pavement Markings - Service Road and Striping	2,958	sf	$ 2.50	$ 7,394
G2015	New Apron Edge Lights (cable, conduit, counterpoise included)				Not Required
G2016	*Fuel Systems*				
G2017	Sawcut Existing Apron Paving for New Fuel Lines	3,120	lf	$ 8.00	$ 24,960
G2018	Demo Existing Apron Paving	693	sy	$ 35.00	$ 24,267
G2019	PCC Apron Pavement (17" P-501, 8" Stabilized Base, 16" P-209, Markings, Subgrade Prep.) - Infill of Existing Concourse Buildings	693	sy	$ 350.00	$ 242,667
G2020	New Underground Fuel Vaults	4	ea	$ 250,000.00	$ 1,000,000
G2021	Fuel Branch Lines: 12" dia Steel Pipe Epoxy Lining, ext Coated, Welded	1,200	lf	$ 656.00	$ 787,200
G2022	Fuel Branch Lines: 8" dia Steel Pipe Epoxy Lining, ext Coated, Welded	200	lf	$ 612.00	$ 122,400

2-1 - RECONSTRUCT CONCOURSE A, DEMOLISH CONCOURSE B

DETAIL

		DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	G2023	Fuel Branch Lines: 6" dia Steel Pipe Epoxy Lining, ext Coated, Welded	120	lf	$ 590.00	$ 70,800
	G2024	Radiographic Testing of Pipe Welds	1,520	lf	$ 19.00	$ 28,880
	G2025	Fuel Valves	8	ea	$ 25,000.00	$ 200,000
	G2026	Branch Line Low & High Point Drain Pit	4	ea	$ 32,500.00	$ 130,000
	G2027	Hydrant Pits and Connectors	8	ea	$ 25,000.00	$ 200,000
G2050	Landscaping					
	G2051	Landscaping Allowance				Not Required
G2060	Miscellaneous Buildings and Structures					
	G2061	Miscellaneous Buildings and Structures				Not Required
G30	**Site Mechanical Utilities**					
G3010	Site Mechanical Utilities					
	G3011	Site Mechanical Utilities	1	alw	$ 125,000.00	$ 125,000
G40	**Site Electrical Utilities**					
G4010	Site Electrical Utilities					
	G4011	Site Electrical Utilities	1	alw	$ 25,000.00	$ 25,000
G4030	Site Lighting					
	G4031	Site Lighting	1	alw	$ 25,000.00	$ 25,000
		Subtotal - Building Sitework				***$ 9,312,887***
		Subtotal			***$ 601.59***	***$ 82,839,407***
25.0%		Estimating Design Evolution				$ 20,709,852
		Subtotal - Cost of Work			***$ 751.99***	***$ 103,549,259***
		General Contractors Markups				
5.0%		Project Logistics / Phasing & Labor Factor				$ 5,177,463
5.0%		General Requirements & Temporary Construction				$ 5,436,336
8.0%		General Conditions				$ 9,133,045
5.0%		General Contractors Overhead & Profit				$ 6,164,805
2.0%		Insurance				$ 2,589,218
1.0%		Payment & Performance Bonds				$ 1,320,501
0.0%		Sustainability Requirements				$ -
		Subtotal			***$ 968.56***	***$ 133,370,628***

2-1 - RECONSTRUCT CONCOURSE A, DEMOLISH CONCOURSE B

DETAIL

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
0.0%	Escalation				$ -
	Opinion of Probable Construction Cost			***$ 968.56***	***$ 133,370,628***
21.3%	Owner's Soft Costs				$ 28,407,944
	Opinion of Probable Project Cost			***$ 1,174.86***	***$ 161,778,571***

Project Title	Landside Masterplan Update		
Location	Saint Paul International Airport		
Submittal Stage	Masterplan - Rough Order of Magnitude Estimate		
Client Name			
Client Project No.		Revision	2
Original Date	7-Apr-2023	Revision Date	25-Apr-2023
Assumed Bid Opening Date		Connico PN	4977.23.03
Project Lead	CJN / CJC	Checked by	IDK

2-2 - RECONSTRUCT CONCOURSE F

SUMMARY

	CONSTRUCTION SYSTEM		COST PER SQUARE FOOT	TOTAL
A	**Substructure**		$ 22.19	$ 5,546,750
	Standard Foundations	$ 2,037,667		
	Special Foundations	$ 2,089,639		
	Slab on Grade	$ 1,419,444		
B	**Shell**		$ 143.30	$ 35,826,056
	Superstructure	$ 23,219,130		
	Exterior Closure	$ 10,032,593		
	Roofing	$ 2,574,333		
C	**Interiors**		$ 84.25	$ 21,062,950
	Interior Construction	$ 4,264,450		
	Stairs	$ 475,000		
	Interior Finishes	$ 16,323,500		
D	**Services**		$ 194.52	$ 48,629,275
	Conveying	$ 650,000		
	Baggage Handling System	$ -		
	Plumbing	$ 3,241,750		
	HVAC	$ 17,928,900		
	Fire Protection	$ 2,592,625		
	Electrical	$ 15,436,000		
	Communications	$ 5,785,000		
	Electronic Safety & Security	$ 2,995,000		
E	**Equipment & Furnishings**		$ 93.95	$ 23,486,250
	Equipment	$ 325,000		
	Passenger Boarding Bridges	$ 19,000,000		
	Furnishings	$ 4,161,250		
F	**Special Construction & Demolition**		$ 0.64	$ 160,000
	Special Construction	$ -		
	Selective Building Demolition	$ 160,000		
	Hazardous Material Abatement	$ -		
G	**Building Sitework**		$ 70.75	$ 17,686,426
	Site Mobilization	$ 2,959,900		
	Site Preparation	$ 4,935,750		
	Site Improvements	$ 9,615,776		
	Site Mechanical Utilities	$ 125,000		
	Site Electrical Utilities	$ 50,000		
	Subtotal		***$ 609.59***	***$ 152,397,707***
25.0%	Estimating Design Evolution			$ 38,099,427

2-2 - RECONSTRUCT CONCOURSE F

SUMMARY

	CONSTRUCTION SYSTEM	COST PER SQUARE FOOT	TOTAL
	Subtotal - Cost of Work	***$ 761.99***	***$ 190,497,133***
	General Contractors Markups		
5.0%	Project Logistics / Phasing & Labor Factor		$ 9,524,857
5.0%	General Requirements & Temporary Construction		$ 10,001,099
8.0%	General Conditions		$ 16,801,847
5.0%	General Contractors Overhead & Profit		$ 11,341,247
2.0%	Insurance		$ 4,763,324
1.0%	Payment & Performance Bonds		$ 2,429,295
0.0%	Sustainability Requirements		$ -
	Subtotal	***$ 981.44***	***$ 245,358,802***
0.0%	Escalation		$ -
	Opinion of Probable Construction Cost	***$ 981.44***	***$ 245,358,802***
21.3%	Owner's Soft Costs		$ 52,261,425
	Opinion of Probable Project Cost	***$ 1,190.48***	***$ 297,620,227***

Project Title	Landside Masterplan Update		
Location	Saint Paul International Airport		
Submittal Stage	Masterplan - Rough Order of Magnitude Estimate		
Client Name			
Client Project No.		Revision	2
Original Date	7-Apr-2023	Revision Date	25-Apr-2023
Assumed Bid Opening Date		Connico PN	4977.23.03
Project Lead	CJN / CJC	Checked by	IDK

2-2 - RECONSTRUCT CONCOURSE F

DETAIL

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL

AREA ANALYSIS

2-2 - Reconstruct Concourse F			
Apron Level 01	100,000 sf		
Airport Support		44,750 sf	
Airline Support		44,750 sf	
Mechanical		4,000 sf	
Vertical Circulation		1,000 sf	
Storage		2,000 sf	
Tug Lanes		3,500 sf	
Departure Level 02	100,000 sf		
Concessions (Shell Space)		2,500 sf	
Hold rooms		50,000 sf	
Vertical Circulation		1,000 sf	
Circulation		41,500 sf	
Restrooms - Public		5,000 sf	
Secure Corridor Level 03	50,000 sf		
Secure Corridor		49,000 sf	
Vertical Circulation		1,000 sf	
Total Area	**250,000 sf**	**250,000 sf**	

A SUBSTRUCTURE

A10 Foundations

A1010	Standard Foundations				
A1011	Column Foundations, Wall Foundations, Grade Beams, Foundation Wall	100,000	sf	$ 19.00	$ 1,900,000
A1012	Extra for Rock Excavation				Not Required
A1013	Perimeter Drainage	1,907	lf	$ 25.00	$ 47,667
A1014	Dewatering	1	ls	$ 30,000.00	$ 30,000
A1015	Add Allowance for Preparing and Connecting into Existing Foundations	1	alw	$ 60,000.00	$ 60,000
A1030	Special Foundations				
A1031	PBB Foundation	19	ea	$ 60,000.00	$ 1,140,000
A1032	Pile Foundations (36" Dia Drilled Pier @ 35' Deep)	100,000	sf	$ 9.20	$ 919,639

2-2 - RECONSTRUCT CONCOURSE F

DETAIL

		DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	A1033	Dewatering	1	ls	$ 30,000.00	$ 30,000
A1050		Slab on Grade				
	A1051	Slab on Grade	100,000	sf	$ 10.00	$ 1,000,000
	A1052	Elevator Pits	10	ea	$ 15,000.00	$ 150,000
	A1053	Misc. Trenches, Pits & Bases	93	cy	$ 750.00	$ 69,444
	A1054	Under-slab Drainage & Insulation	100,000	sf	$ 2.00	$ 200,000
		Subtotal - Substructure				***$ 5,546,750***
B		***SHELL***				
B10		**Superstructure**				
B1010		Floor Construction				
	B1011	Steel Floor Structure	1,725	tns	$ 6,500.00	$ 11,212,500
	B1012	Steel Floor Deck	150,000	sf	$ 7.50	$ 1,125,000
	B1013	Concrete Fill to Steel Floor Deck	150,000	sf	$ 7.75	$ 1,162,500
	B1014	Supplemental Framing at Exterior Closure	68	tns	$ 7,000.00	$ 478,380
	B1015	Miscellaneous Steel (5%)	86	tns	$ 7,000.00	$ 603,750
	B1016	Elevated Floor Slab Fireproofing	150,000	sf	$ 7.00	$ 1,050,000
	B1017	Expansion Joint at Existing Structure	120	lf	$ 150.00	$ 18,000
	B1018	Add Allowance for Misc. Steel Framing at Junction to Existing Floor Structure	1	alw	$ 30,000.00	$ 30,000
B1030		Roof Construction				
	B1031	Steel Roof Structure	900	tns	$ 6,500.00	$ 5,850,000
	B1032	Steel Roof Deck	100,000	sf	$ 6.50	$ 650,000
	B1033	Miscellaneous Steel (5%)	45	tns	$ 7,000.00	$ 315,000
	B1034	Roof Fireproofing	100,000	sf	$ 7.00	$ 700,000
	B1035	Add Allowance for Misc. Steel Framing at Junction to Existing Roof Structure	1	alw	$ 24,000.00	$ 24,000
B20		**Exterior Closure**				
B2010		Exterior Walls				
	B2011	CMU Walls, incl. Back-up System	31,980	sf	$ 40.00	$ 1,279,200
	B2012	Precast Concrete, incl. Back-up System	6,070	sf	$ 45.00	$ 273,150
	B2013	Metal Wall Panel, incl. Back-up System	6,070	sf	$ 65.00	$ 394,550
	B2014	Edge Detail at Roof	1,787	lf	$ 75.00	$ 134,000
	B2015	Caulking & Sealant to Exteriors	92,910	sf	$ 1.75	$ 162,593
	B2016	Abutment Detailing at Existing Building - Patch, Repair, Refinish Exterior Walls Where Disturbed by New Construction	1	alw	$ 50,000.00	$ 50,000
B2030		Exterior Windows				
	B2031	Curtain Wall System	45,560	sf	$ 165.00	$ 7,517,400

2-2 - RECONSTRUCT CONCOURSE F

DETAIL

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
B2050	Exterior Doors				
B2051	Exterior Doors - Allowance	1	alw	$ 98,200.00	$ 98,200
B2052	PBB Exit Doors	19	ea	$ 3,500.00	$ 66,500
B2052	Exit Doors - Apron Paving Access	19	ea	$ 2,500.00	$ 47,500
B2053	Extra for Access Control	19	lvs	$ 500.00	$ 9,500
B2070	Exterior Soffits				
B2071	Exterior Soffits				Not Required
B30	**Roofing**				
B3010	Roof Coverings				
B3011	SBS Modified Bitumen Roof Assembly	150,000	sf	$ 16.50	$ 2,475,000
B3012	Parapet Detail	1,787	lf	$ 50.00	$ 89,333
B3013	Add Allowance for Junction to Existing Roof	1	alw	$ 10,000.00	$ 10,000
B3030	Roof Openings				
B3031	Skylight				Not Required
B3032	Roof Hatch				Not Required
	Subtotal - Shell				***$ 35,826,056***
C	***INTERIORS***				
C10	**Interior Construction**				
C1010	Partitions				
C1011	Interior Partitions	246,500	sf	$ 5.00	$ 1,232,500
C1012	Rough Carpentry & Blocking	246,500	sf	$ 1.50	$ 369,750
C1013	Caulking, Sealants & Firestopping	246,500	sf	$ 1.75	$ 431,375
C1014	Misc. Metals, Bracing, Countertop Supports, Equipment Supports, etc.	246,500	sf	$ 1.25	$ 308,125
C1030	Interior Doors				
C1031	Interior Doors - Allowance	246,500	sf	$ 2.00	$ 493,000
C1050	Specialties				
C1051	Fire Extinguishers & Cabinets	246,500	sf	$ 0.05	$ 12,325
C1052	Code Signage	246,500	sf	$ 0.25	$ 61,625
C1053	Interior Wayfinding Signage	246,500	sf	$ 3.50	$ 862,750
C1054	Miscellaneous Specialties	246,500	sf	$ 2.00	$ 493,000
C20	**Stairs**				
C2010	Stair Construction				

2-2 - RECONSTRUCT CONCOURSE F

DETAIL

		DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	C2011	Stair - Exit - PBB	19	flts	$ 25,000.00	$ 475,000
C30		**Interior Finishes**				
C3010		Interior Finishes				
	C3011	*Apron Level 01*				
	C3012	Airport Support	44,750	sf	$ 45.00	$ 2,013,750
	C3013	Airline Support	44,750	sf	$ 45.00	$ 2,013,750
	C3014	Mechanical	4,000	sf	$ 35.00	$ 140,000
	C3015	Vertical Circulation	1,000	sf	$ 55.00	$ 55,000
	C3016	Storage	2,000	sf	$ 25.00	$ 50,000
	C3017	Tug Lanes	3,500	sf	$ 10.00	$ 35,000
	C3018	*Departure Level 02*				
	C3019	Concessions (Shell Space)	2,500	sf	$ 25.00	$ 62,500
	C3020	Hold rooms	50,000	sf	$ 75.00	$ 3,750,000
	C3021	Vertical Circulation	1,000	sf	$ 55.00	$ 55,000
	C3022	Circulation	41,500	sf	$ 85.00	$ 3,527,500
	C3023	Restrooms - Public	5,000	sf	$ 165.00	$ 825,000
	C3024	*Secure Corridor Level 03*				
	C3025	Secure Corridor	49,000	sf	$ 75.00	$ 3,675,000
	C3026	Vertical Circulation	1,000	sf	$ 55.00	$ 55,000
	C3027	Allowance for Renovation to Existing Concourse for New Expansion Connection	1,200	sf	$ 55.00	$ 66,000
		Subtotal - Interiors				***$ 21,062,950***
D		***SERVICES***				
D10		**Conveying System**				
D1010		Elevators & Lifts				
	D1011	Hydraulic Passenger Elevator	10	stps	$ 65,000.00	$ 650,000
D1020		Escalators & Moving Walks				
	D1021	Escalator				Not Required
	D1022	Moving Walks				Not Required
D1030		Baggage Handling Equipment				
	D1031	Baggage Handling Equipment Allowance				Excluded
D20		**Plumbing**				
D2010		Plumbing Systems				
	D2011	Apron Level 01	96,500	sf	$ 9.50	$ 916,750
	D2012	Departure Level 02	100,000	sf	$ 15.50	$ 1,550,000
	D2013	Secure Corridor Level 03	50,000	sf	$ 15.50	$ 775,000
D30		**HVAC**				

2-2 - RECONSTRUCT CONCOURSE F

DETAIL

		DESCRIPTION	QUANTITY	UNIT		UNIT COST		TOTAL
D3010		HVAC Systems						
	D3011	Apron Level 01	96,500	sf	$	74.00	$	7,141,000
	D3012	Departure Level 02	100,000	sf	$	74.00	$	7,400,000
	D3013	Secure Corridor Level 03	50,000	sf	$	74.00	$	775,000
D3050		Controls and Instrumentation						
	D3051	2-2 - Reconstruct Concourse F	246,500	sf	$	8.50	$	2,095,250
D3060		Systems Testing & Balancing						
	D3061	2-2 - Reconstruct Concourse F	246,500	sf	$	2.10	$	517,650
D40	**Fire Protection**							
D4010		Sprinkler Systems						
	D4011	Apron Level 01	96,500	sf	$	9.25	$	892,625
	D4012	Departure Level 02	100,000	sf	$	9.25	$	925,000
	D4013	Secure Corridor Level 03	50,000	sf	$	9.25	$	775,000
D50	**Electrical**							
D5010		Electrical Systems						
	D5011	Distribution Equipment	250,000	sf	$	6.00	$	1,500,000
	D5012	Feeders	250,000	sf	$	8.75	$	2,187,500
	D5013	Grounding and Lightning Protection	250,000	sf	$	3.00	$	750,000
	D5014	Jetway/GPU/PCA Feeders	19	ea	$	65,000.00	$	1,235,000
	D5015	Roof Mounted Apron Light	19	ea	$	30,000.00	$	570,000
	D5016	*Departure Level 02*						
	D5017	Airport Support	44,750	sf	$	25.00	$	1,118,750
	D5018	Airline Support	44,750	sf	$	25.00	$	1,118,750
	D5019	Mechanical	4,000	sf	$	18.00	$	72,000
	D5020	Vertical Circulation	1,000	sf	$	37.00	$	37,000
	D5021	Storage	2,000	sf	$	18.00	$	36,000
	D5022	Tug Lanes	3,500	sf	$	10.00	$	35,000
	D5023	*Apron Level 01*						
	D5024	Concessions (Shell Space)	2,500	sf	$	15.00	$	37,500
	D5025	Hold rooms	50,000	sf	$	49.00	$	2,450,000
	D5026	Vertical Circulation	1,000	sf	$	37.00	$	37,000
	D5027	Circulation	41,500	sf	$	37.00	$	1,535,500
	D5028	Restrooms - Public	5,000	sf	$	60.00	$	300,000
	D5029	*Secure Corridor Level 03*						
	D5030	Secure Corridor	49,000	sf	$	49.00	$	2,401,000
	D5031	Vertical Circulation	1,000	sf	$	15.00	$	15,000
D6010		Communications						
	D6011	Telecomm Room Buildout	250,000	sf	$	4.15	$	1,037,500
	D6012	Backbone Cabling	250,000	sf	$	2.50	$	625,000
	D6013	Communications	250,000	sf	$	3.35	$	837,500

2-2 - RECONSTRUCT CONCOURSE F

DETAIL

		DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	D6014	EVIDS Cabling and Installation	250,000	sf	$ 1.55	$ 387,500
	D6015	Public Address System	250,000	sf	$ 2.64	$ 660,000
	D6016	DAS	250,000	sf	$ 6.25	$ 1,562,500
	D6017	Common Use System	250,000	sf	$ 2.70	$ 675,000
D7010	Electronic Safety & Security					
	D7011	Video Surveillance System	250,000	sf	$ 2.90	$ 725,000
	D7012	Security Access Control	250,000	sf	$ 4.08	$ 1,020,000
	D7013	Fire Alarm	250,000	sf	$ 5.00	$ 1,250,000
		Subtotal - Services				***$ 48,629,275***
E	***EQUIPMENT & FURNISHINGS***					
E10	**Equipment**					
E1010	Equipment					
	E1011	Concessions Equipment - Not in Scope				Excluded
	E1012	Security Equipment - Not in Scope				Excluded
	E1013	FIS Equipment - Not in Scope				Excluded
	E1014	FIDS, BIDS, MUFIDS	100,000	sf	$ 2.00	$ 200,000
	E1015	Dynamic Signage				Excluded
	E1016	Misc. Equipment Allowance	250,000	sf	$ 0.50	$ 125,000
E1030	Passenger Boarding Bridges					
	E1031	New Passenger Boarding Bridge	19	ea	$1,000,000.00	$ 19,000,000
E20	**Furnishings**					
E2010	Fixed Furnishings					
	E2011	Gate Podiums & Backscreens	19	ea	$ 35,000.00	$ 665,000
	E2012	Recharge Stations				w/Electrical
	E2013	Holdroom Seating	2,375	ea	$ 1,000.00	$ 2,375,000
	E2014	Holdroom Seating Table	1,188	ea	$ 700.00	$ 831,250
	E2015	Misc. Seating	1	alw	$ 40,000.00	$ 40,000
	E2016	Kiosks				Excluded
	E2017	Window Shades				Excluded
	E2018	Misc. Casework Allowance	250,000	sf	$ 1.00	$ 250,000
		Subtotal - Equipment & Furnishings				***$ 23,486,250***
F	***SPECIAL CONSTRUCTION & DEMOLITION***					
F10	**Special Construction**					
F1010	Special Construction					
	F1011	Special Construction				Not Required
F20	**Selective Building Demolition**					

2-2 - RECONSTRUCT CONCOURSE F

DETAIL

		DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	F2010	Building Elements Demolition				
	F2011	Demolish Exterior Closure at Existing Building	4,200	sf	$ 35.00	$ 147,000
	F2012	Misc. Demolition	1	alw	$ 13,000.00	$ 13,000
F30	**Hazardous Material Abatement**					
	F3010	Hazardous Material Abatement				
	F3011	Hazardous Material Abatement				Excluded
		Subtotal - Special Construction & Demolition				***$ 160,000***
G	***BUILDING SITEWORK***					
G00	**Site Mobilization**					
	G0010	Site Mobilization				
	G0011	Mobilization				Incl. In M/UPS
	G0012	Safety and Security (3%)	1	ls	$ 515,200.00	$ 515,200
	G0013	Temporary Construction Items and Erosion Control (6%)	1	ls	$ 972,000.00	$ 972,000
	G0014	Drainage and Utility Allowance	1	alw	$1,472,700.00	$ 1,472,700
G10	**Site Preparation**					
	G1010	Site Demolition				
	G1011	Demolish Existing Apron Paving	12,230	sy	$ 25.00	$ 305,750
	G1012	Demolish Existing Concourse F (2 and Partial 3 Story)	240,000	sf	$ 15.00	$ 3,600,000
	G1013	Demolish Existing PBB Foundations	16	ea	$ 5,000.00	$ 80,000
	G1014	Demolish Existing PBB - Bridge & Equipment	16	ea	$ 50,000.00	$ 800,000
	G1015	Allowance for Misc. Site Demolition	1	alw	$ 150,000.00	$ 150,000
	G1016	Demolish / Remove Existing QTA				Excluded
G20	**Site Improvements**					
	G2010	Pavement / Roadways etc.				
	G2011	*Apron Paving*				
	G2012	Excavation	4,930	cy	$ 18.00	$ 88,740
	G2013	PCC Apron Pavement (17" P-501, 8" Stabilized Base, 16" P-209, Markings, Subgrade Prep.) - Infill of Existing Concourse Buildings	9,860	sy	$ 275.00	$ 2,711,500
	G2014	Pavement Markings - Service Road and Striping	4,434	sf	$ 2.50	$ 11,086
	G2015	New Apron Edge Lights (cable, conduit, counterpoise included)				Not Required
	G2016	*Fuel Systems*				
	G2017	Sawcut Existing Apron Paving for New Fuel Lines	5,930	lf	$ 8.00	$ 47,440

2-2 - RECONSTRUCT CONCOURSE F

DETAIL

		DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	G2018	Demo Existing Apron Paving	1,318	sy	$ 35.00	$ 46,122
	G2019	PCC Apron Pavement (17" P-501, 8" Stabilized Base, 16" P-209, Markings, Subgrade Prep.) - Infill of Existing Concourse Buildings	1,318	sy	$ 350.00	$ 461,222
	G2020	New Underground Fuel Vaults	10	ea	$ 250,000.00	$ 2,500,000
	G2021	Fuel Branch Lines: 12" dia Steel Pipe Epoxy Lining, ext Coated, Welded	2,965	lf	$ 656.00	$ 1,945,040
	G2022	Fuel Branch Lines: 8" dia Steel Pipe Epoxy Lining, ext Coated, Welded	475	lf	$ 612.00	$ 290,700
	G2023	Fuel Branch Lines: 6" dia Steel Pipe Epoxy Lining, ext Coated, Welded	285	lf	$ 590.00	$ 168,150
	G2024	Radiographic Testing of Pipe Welds	3,725	lf	$ 19.00	$ 70,775
	G2025	Fuel Valves	19	ea	$ 25,000.00	$ 475,000
	G2026	Branch Line Low & High Point Drain Pit	10	ea	$ 32,500.00	$ 325,000
	G2027	Hydrant Pits and Connectors	19	ea	$ 25,000.00	$ 475,000
G2050	Landscaping					
	G2051	Landscaping Allowance				Not Required
G2060	Miscellaneous Buildings and Structures					
	G2061	Miscellaneous Buildings and Structures				Not Required
G30	**Site Mechanical Utilities**					
G3010	Site Mechanical Utilities					
	G3011	Site Mechanical Utilities	1	alw	$ 125,000.00	$ 125,000
G40	**Site Electrical Utilities**					
G4010	Site Electrical Utilities					
	G4011	Site Electrical Utilities	1	alw	$ 25,000.00	$ 25,000
G4030	Site Lighting					
	G4031	Site Lighting	1	alw	$ 25,000.00	$ 25,000
		Subtotal - Building Sitework				***$ 17,686,426***
		Subtotal			***$ 609.59***	***$ 152,397,707***
25.0%		Estimating Design Evolution				$ 38,099,427
		Subtotal - Cost of Work			***$ 761.99***	***$ 190,497,133***
		General Contractors Markups				

2-2 - RECONSTRUCT CONCOURSE F

DETAIL

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
5.0%	Project Logistics / Phasing & Labor Factor				$ 9,524,857
5.0%	General Requirements & Temporary Construction				$ 10,001,099
8.0%	General Conditions				$ 16,801,847
5.0%	General Contractors Overhead & Profit				$ 11,341,247
2.0%	Insurance				$ 4,763,324
1.0%	Payment & Performance Bonds				$ 2,429,295
0.0%	Sustainability Requirements				$ -
	Subtotal			***$ 981.44***	***$ 245,358,802***
0.0%	Escalation				$ -
	Opinion of Probable Construction Cost			***$ 981.44***	***$ 245,358,802***
21.3%	Owner's Soft Costs				$ 52,261,425
	Opinion of Probable Project Cost			***$ 1,190.48***	***$ 297,620,227***

Project Title	Landside Masterplan Update		
Location	Saint Paul International Airport		
Submittal Stage	Masterplan - Rough Order of Magnitude Estimate		
Client Name			
Client Project No.		Revision	2
Original Date	7-Apr-2023	Revision Date	25-Apr-2023
Assumed Bid Opening Date		Connico PN	4977.23.03
Project Lead	CJN / CJC	Checked by	IDK

2-10 FIS AND OFFICES & KYWAY TO CONCOURSE C & G

SUMMARY

	CONSTRUCTION SYSTEM			COST PER SQUARE FOOT	TOTAL
A	**Substructure**			$ 9.01	$ 7,297,750
	Standard Foundations	$	3,746,500		
	Special Foundations	$	1,747,500		
	Slab on Grade	$	1,803,750		
B	**Shell**			$ 134.91	$ 109,280,710
	Superstructure	$	78,587,070		
	Exterior Closure	$	28,363,140		
	Roofing	$	2,330,500		
C	**Interiors**			$ 73.80	$ 59,778,000
	Interior Construction	$	14,013,000		
	Stairs	$	1,050,000		
	Interior Finishes	$	44,715,000		
D	**Services**			$ 212.15	$ 171,839,700
	Conveying	$	9,480,000		
	Baggage Handling System	$	-		
	Plumbing	$	11,745,000		
	HVAC	$	68,526,000		
	Fire Protection	$	7,492,500		
	Electrical	$	48,336,000		
	Communications	$	16,556,400		
	Electronic Safety & Security	$	9,703,800		
E	**Equipment & Furnishings**			$ 3.25	$ 2,632,500
	Equipment	$	1,822,500		
	Passenger Boarding Bridges	$	-		
	Furnishings	$	810,000		
F	**Special Construction & Demolition**			$ 35.02	$ 28,370,000
	Special Construction	$	28,370,000		
	Selective Building Demolition	$	-		
	Hazardous Material Abatement	$	-		
G	**Building Sitework**			$ -	$ -
	Subtotal			***$ 468.15***	***$ 379,198,660***
25.0%	Estimating Design Evolution				$ 94,799,665
	Subtotal - Cost of Work			***$ 585.18***	***$ 473,998,325***
	General Contractors Markups				
5.0%	Project Logistics / Phasing & Labor Factor				$ 23,699,916

2-10 FIS AND OFFICES & KYWAY TO CONCOURSE C & G

SUMMARY

	CONSTRUCTION SYSTEM	COST PER SQUARE FOOT		TOTAL
5.0%	General Requirements & Temporary Construction		$	24,884,912
8.0%	General Conditions		$	41,806,652
5.0%	General Contractors Overhead & Profit		$	28,219,490
2.0%	Insurance		$	11,852,186
1.0%	Payment & Performance Bonds		$	6,044,615
0.0%	Sustainability Requirements		$	-
	Subtotal	***$ 753.71***	***$***	***610,506,097***
0.0%	Escalation		$	-
	Opinion of Probable Construction Cost	***$ 753.71***	***$***	***610,506,097***
21.3%	Owner's Soft Costs		$	130,037,799
	Opinion of Probable Project Cost	***$ 914.25***	***$***	***740,543,895***

Project Title	Landside Masterplan Update		
Location	Saint Paul International Airport		
Submittal Stage	Masterplan - Rough Order of Magnitude Estimate		
Client Name			
Client Project No.		Revision	2
Original Date	7-Apr-2023	Revision Date	25-Apr-2023
Assumed Bid Opening Date		Connico PN	4977.23.03
Project Lead	CJN / CJC	Checked by	IDK

2-10 FIS AND OFFICES & KYWAY TO CONCOURSE C & G

DETAIL

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
AREA ANALYSIS				
FIS And Offices & Kyway To Concourse C & G				
Level 01 - Baggage Claim	135,000	sf		
Airport Support			33,750 sf	
Airline Support			33,750 sf	
Bagged Claim Area			61,500 sf	
Restrooms - Public			6,000 sf	
Level 02 - Ticketing	135,000	sf		
Ticketing Area			67,500 sf	
Circulation			61,500 sf	
Restrooms - Public			6,000 sf	
Level 03 - FIS	135,000	sf		
Offices / Board Rooms / Corridors / Rest Rooms / Storage / Kitchen Etc.			135,000 sf	
Level 04 - Offices	135,000	sf		
Offices / Board Rooms / Corridors / Rest Rooms / Storage / Kitchen Etc.			135,000 sf	
Level 05 - Offices	135,000	sf		
Offices / Board Rooms / Corridors / Rest Rooms / Storage / Kitchen Etc.			135,000 sf	
Level 06 - Offices	135,000	sf		
Offices / Board Rooms / Corridors / Rest Rooms / Storage / Kitchen Etc.			135,000 sf	
Total Area	**810,000**	**sf**	**810,000 sf**	

A SUBSTRUCTURE

A10 Foundations

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
A1010 Standard Foundations				
A1011 Column Foundations, Wall Foundations, Grade Beams, Foundation Wall	135,000	sf	$ 26.00	$ 3,510,000
A1012 Extra for Rock Excavation				Not Required
A1013 Perimeter Drainage	1,860	lf	$ 25.00	$ 46,500
A1014 Dewatering	1	ls	$ 40,000.00	$ 40,000

2-10 FIS AND OFFICES & KYWAY TO CONCOURSE C & G

DETAIL

			DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
		A1015	Add Allowance for Preparing and Connecting into Existing Foundations	1	alw	$ 150,000.00	$ 150,000
	A1030		Special Foundations				
		A1031	Pile Foundations (36" Dia Drilled Pier @ 35' Deep)	135,000	sf	$ 12.50	$ 1,687,500
		A1032	Dewatering	1	ls	$ 60,000.00	$ 60,000
	A1050		Slab on Grade				
		A1051	Slab on Grade	135,000	sf	$ 10.00	$ 1,350,000
		A1052	Elevator Pits	6	ea	$ 15,000.00	$ 90,000
		A1053	Misc. Trenches, Pits & Bases	125	cy	$ 750.00	$ 93,750
		A1054	Under-slab Drainage & Insulation	135,000	sf	$ 2.00	$ 270,000
			Subtotal - Substructure				***$ 7,297,750***
B	***SHELL***						
B10	**Superstructure**						
	B1010		Floor Construction				
		B1011	Steel Floor Structure	7,290	tns	$ 6,500.00	$ 47,385,000
		B1012	Steel Floor Deck	810,000	sf	$ 7.50	$ 6,075,000
		B1013	Concrete Fill to Steel Floor Deck	810,000	sf	$ 7.75	$ 6,277,500
		B1014	Supplemental Framing at Exterior Closure	193	tns	$ 7,000.00	$ 1,347,570
		B1015	Miscellaneous Steel (5%)	365	tns	$ 7,000.00	$ 2,551,500
		B1016	Elevated Floor Slab Fireproofing	810,000	sf	$ 7.00	$ 5,670,000
		B1017	Expansion Joint at Existing Structure	100	lf	$ 150.00	$ 15,000
		B1018	Add Allowance for Misc. Steel Framing at Junction to Existing Floor Structure	1	alw	$ 25,000.00	$ 25,000
	B1030		Roof Construction				
		B1031	Steel Roof Structure	1,080	tns	$ 6,500.00	$ 7,020,000
		B1032	Steel Roof Deck	135,000	sf	$ 6.50	$ 877,500
		B1033	Miscellaneous Steel (5%)	54	tns	$ 7,000.00	$ 378,000
		B1034	Roof Fireproofing	135,000	sf	$ 7.00	$ 945,000
		B1035	Add Allowance for Misc. Steel Framing at Junction to Existing Roof Structure	1	alw	$ 20,000.00	$ 20,000
B20	**Exterior Closure**						
	B2010		Exterior Walls				
		B2011	CMU Walls, incl. Back-up System	25,670	sf	$ 40.00	$ 1,026,800
		B2012	Precast Concrete, incl. Back-up System	64,170	sf	$ 45.00	$ 2,887,650
		B2013	Metal Wall Panel, incl. Back-up System	38,500	sf	$ 65.00	$ 2,502,500
		B2014	Edge Detail at Roof	0	lf	$ 75.00	$ -

2-10 FIS AND OFFICES & KYWAY TO CONCOURSE C & G

DETAIL

			DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
		B2015	Caulking & Sealant to Exteriors	256,680	sf	$ 1.75	$ 449,190
		B2016	Abutment Detailing at Existing Building - Patch, Repair, Refinish Exterior Walls Where Disturbed by New Construction	1	alw	$ 40,000.00	$ 40,000
	B2030		Exterior Windows				
		B2031	Curtain Wall System	128,340	sf	$ 165.00	$ 21,176,100
	B2050		Exterior Doors				
		B2051	Exterior Doors - Allowance	1	alw	$ 280,900.00	$ 280,900
	B2070		Exterior Soffits				
		B2071	Exterior Soffits				Not Required
B30	Roofing						
	B3010		Roof Coverings				
		B3011	SBS Modified Bitumen Roof Assembly	135,000	sf	$ 16.50	$ 2,227,500
		B3012	Parapet Detail	1,860	lf	$ 50.00	$ 93,000
		B3013	Add Allowance for Junction to Existing Roof	1	alw	$ 10,000.00	$ 10,000
	B3030		Roof Openings				
		B3031	Skylight				Not Required
		B3032	Roof Hatch				Not Required
			Subtotal - Shell				***$ 109,280,710***
C	***INTERIORS***						
C10	**Interior Construction**						
	C1010		Partitions				
		C1011	Interior Partitions	810,000	sf	$ 5.00	$ 4,050,000
		C1012	Rough Carpentry & Blocking	810,000	sf	$ 1.50	$ 1,215,000
		C1013	Caulking, Sealants & Firestopping	810,000	sf	$ 1.75	$ 1,417,500
		C1014	Misc. Metals, Bracing, Countertop Supports, Equipment Supports, etc.	810,000	sf	$ 1.25	$ 1,012,500
	C1030		Interior Doors				
		C1031	Interior Doors - Allowance	810,000	sf	$ 2.00	$ 1,620,000
	C1050		Specialties				
		C1051	Fire Extinguishers & Cabinets	810,000	sf	$ 0.05	$ 40,500
		C1052	Code Signage	810,000	sf	$ 0.25	$ 202,500

2-10 FIS AND OFFICES & KYWAY TO CONCOURSE C & G

DETAIL

DESCRIPTION			QUANTITY	UNIT	UNIT COST	TOTAL
	C1053	Interior Wayfinding Signage	810,000	sf	$ 3.50	$ 2,835,000
	C1054	Miscellaneous Specialties	810,000	sf	$ 2.00	$ 1,620,000
C20	**Stairs**					
C2010	Stair Construction					
	C2011	Stair - Six Stair Shafts	42	flts	$ 25,000.00	$ 1,050,000
C30	**Interior Finishes**					
C3010	Interior Finishes					
	C3011	*Level 01 - Baggage Claim*				
	C3012	Airport Support	33,750	sf	$ 35.00	$ 1,181,250
	C3013	Airline Support	33,750	sf	$ 35.00	$ 1,181,250
	C3014	Bagged Claim Area	61,500	sf	$ 55.00	$ 3,382,500
	C3015	Restrooms - Public	6,000	sf	$ 135.00	$ 810,000
	C3016	*Level 02 - Ticketing*				
	C3017	Ticketing Area	67,500	sf	$ 75.00	$ 5,062,500
	C3018	Circulation	61,500	sf	$ 75.00	$ 4,612,500
	C3019	Restrooms - Public	6,000	sf	$ 135.00	$ 810,000
	C3020	*Level 03 - FIS*				
	C3021	Offices / Board Rooms / Corridors / Rest Rooms / Storage / Kitchen Etc.	135,000	sf	$ 55.00	$ 7,425,000
	C3022	*Level 04 - Offices*				
	C3023	Offices / Board Rooms / Corridors / Rest Rooms / Storage / Kitchen Etc.	135,000	sf	$ 50.00	$ 6,750,000
	C3024	*Level 05 - Offices*				
	C3025	Offices / Board Rooms / Corridors / Rest Rooms / Storage / Kitchen Etc.	135,000	sf	$ 50.00	$ 6,750,000
	C3026	*Level 06 - Offices*				
	C3027	Offices / Board Rooms / Corridors / Rest Rooms / Storage / Kitchen Etc.	135,000	sf	$ 50.00	$ 6,750,000
		Subtotal - Interiors				***$ 59,778,000***
D	***SERVICES***					
D10	**Conveying System**					
D1010	Elevators & Lifts					
	D1011	Hydraulic Passenger Elevator	42	stps	$ 65,000.00	$ 2,730,000
D1020	Escalators & Moving Walks					
	D1021	Escalator				Not Required
	D1022	Moving Walks				Not Required
D1030	Baggage Handling Equipment					
	D1031	Baggage Handling Equipment Allowance	135,000	sf	$ 50.00	$ 6,750,000

2-10 FIS AND OFFICES & KYWAY TO CONCOURSE C & G

DETAIL

DESCRIPTION			QUANTITY	UNIT		UNIT COST		TOTAL
D20 Plumbing								
D2010	Plumbing Systems							
	D2011	Level 01 - Baggage Claim	135,000	sf	$	9.50	$	1,282,500
	D2012	Level 02 - Ticketing	135,000	sf	$	15.50	$	2,092,500
	D2013	Level 03 - FIS	135,000	sf	$	15.50	$	2,092,500
	D2014	Level 04 - Offices	135,000	sf	$	15.50	$	2,092,500
	D2015	Level 05 - Offices	135,000	sf	$	15.50	$	2,092,500
	D2016	Level 06 - Offices	135,000	sf	$	15.50	$	2,092,500
D30 HVAC								
D3010	HVAC Systems							
	D3011	Level 01 - Baggage Claim	135,000	sf	$	74.00	$	9,990,000
	D3012	Level 02 - Ticketing	135,000	sf	$	74.00	$	9,990,000
	D3013	Level 03 - FIS	135,000	sf	$	74.00	$	9,990,000
	D3014	Level 04 - Offices	135,000	sf	$	74.00	$	9,990,000
	D3015	Level 05 - Offices	135,000	sf	$	74.00	$	9,990,000
	D3016	Level 06 - Offices	135,000	sf	$	74.00	$	9,990,000
D3050	Controls and Instrumentation							
	D3051	FIS And Offices & Kyway To Concourse C & G	810,000	sf	$	8.50	$	6,885,000
D3060	Systems Testing & Balancing							
	D3061	FIS And Offices & Kyway To Concourse C & G	810,000	sf	$	2.10	$	1,701,000
D40 Fire Protection								
D4010	Sprinkler Systems							
	D4011	Level 01 - Baggage Claim	135,000	sf	$	9.25	$	1,248,750
	D4012	Level 02 - Ticketing	135,000	sf	$	9.25	$	1,248,750
	D4013	Level 03 - FIS	135,000	sf	$	9.25	$	1,248,750
	D4014	Level 04 - Offices	135,000	sf	$	9.25	$	1,248,750
	D4015	Level 05 - Offices	135,000	sf	$	9.25	$	1,248,750
	D4016	Level 06 - Offices	135,000	sf	$	9.25	$	1,248,750
D50 Electrical								
D5010	Electrical Systems							
	D5011	Distribution Equipment	810,000	sf	$	6.00	$	4,860,000
	D5012	Feeders	810,000	sf	$	8.75	$	7,087,500
	D5013	Grounding and Lightning Protection	810,000	sf	$	3.00	$	2,430,000
	D5014	*Level 01 - Baggage Claim*						
	D5015	Airport Support	33,750	sf	$	25.00	$	843,750
	D5016	Airline Support	33,750	sf	$	25.00	$	843,750
	D5017	Bagged Claim Area	61,500	sf	$	37.00	$	2,275,500
	D5018	Restrooms - Public	6,000	sf	$	60.00	$	360,000
	D5019	*Level 02 - Ticketing*						
	D5020	Ticketing Area	67,500	sf	$	40.00	$	2,700,000

2-10 FIS AND OFFICES & KYWAY TO CONCOURSE C & G

DETAIL

			DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
		D5021	Circulation	61,500	sf	$ 37.00	$ 2,275,500
		D5022	Restrooms - Public	6,000	sf	$ 60.00	$ 360,000
		D5023	*Level 03 - FIS*				
		D5024	Offices / Board Rooms / Corridors / Rest Rooms / Storage / Kitchen Etc.	135,000	sf	$ 45.00	$ 6,075,000
		D5025	*Level 04 - Offices*				
		D5026	Offices / Board Rooms / Corridors / Rest Rooms / Storage / Kitchen Etc.	135,000	sf	$ 45.00	$ 6,075,000
		D5027	*Level 05 - Offices*				
		D5028	Offices / Board Rooms / Corridors / Rest Rooms / Storage / Kitchen Etc.	135,000	sf	$ 45.00	$ 6,075,000
		D5029	*Level 06 - Offices*				
		D5030	Offices / Board Rooms / Corridors / Rest Rooms / Storage / Kitchen Etc.	135,000	sf	$ 45.00	$ 6,075,000
	D6010	Communications					
		D6011	Telecom Room Buildout	810,000	sf	$ 4.15	$ 3,361,500
		D6012	Backbone Cabling	810,000	sf	$ 2.50	$ 2,025,000
		D6013	Communications	810,000	sf	$ 3.35	$ 2,713,500
		D6014	EVIDS Cabling and Installation	810,000	sf	$ 1.55	$ 1,255,500
		D6015	Public Address System	810,000	sf	$ 2.64	$ 2,138,400
		D6016	DAS	810,000	sf	$ 6.25	$ 5,062,500
	D7010	Electronic Safety & Security					
		D7011	Video Surveillance System	810,000	sf	$ 2.90	$ 2,349,000
		D7012	Security Access Control	810,000	sf	$ 4.08	$ 3,304,800
		D7013	Fire Alarm	810,000	sf	$ 5.00	$ 4,050,000
			Subtotal - Services				***$ 171,839,700***
E	***EQUIPMENT & FURNISHINGS***						
E10	**Equipment**						
	E1010	Equipment					
		E1011	Concessions Equipment - Not in Scope				Excluded
		E1012	Security Equipment - Not in Scope				Excluded
		E1013	FIS Equipment - Not in Scope				Excluded
		E1014	Signage	810,000	sf	$ 1.50	$ 1,215,000
		E1015	Misc. Equipment Allowance	810,000	sf	$ 0.75	$ 607,500
E20	**Furnishings**						
	E2010	Fixed Furnishings					
		E2011	Misc. Casework Allowance	810,000	sf	$ 1.00	$ 810,000
			Subtotal - Equipment & Furnishings				***$ 2,632,500***

2-10 FIS AND OFFICES & KYWAY TO CONCOURSE C & G

DETAIL

		DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
F		***SPECIAL CONSTRUCTION & DEMOLITION***				
F10		**Special Construction**				
F1010		Special Construction				
	F1011	Construct Skyway From G Concourse to New FIS	7,000	sf	$ 725.00	$ 5,075,000
	F1012	Construct Skyway From C Concourse to New FIS	11,000	sf	$ 725.00	$ 7,975,000
	F1013	Sterile Corridor - Concourse C	440	lf	$ 6,500.00	$ 2,860,000
	F1014	Sterile Corridor - Concourse G	440	lf	$ 6,500.00	$ 2,860,000
	F1015	Vertical Circulation South of Concourse G (Two Stories)	6,000	sf	$ 800.00	$ 4,800,000
	F1016	Vertical Circulation North of Concourse C (Two Stories)	6,000	sf	$ 800.00	$ 4,800,000
F20		**Selective Building Demolition**				
F2010		Building Elements Demolition				
	F2011	Building Elements Demolition				Not Required
F30		**Hazardous Material Abatement**				
F3010		Hazardous Material Abatement				
	F3011	Hazardous Material Abatement				Excluded
		Subtotal - Special Construction & Demolition				***$ 28,370,000***
G		***BUILDING SITEWORK***				Excluded
		Subtotal - Building Sitework				***$ -***
		Subtotal			***$ 468.15***	***$ 379,198,660***
25.0%		Estimating Design Evolution				$ 94,799,665
		Subtotal - Cost of Work			***$ 585.18***	***$ 473,998,325***
		General Contractors Markups				
5.0%		Project Logistics / Phasing & Labor Factor				$ 23,699,916
5.0%		General Requirements & Temporary Construction				$ 24,884,912
8.0%		General Conditions				$ 41,806,652
5.0%		General Contractors Overhead & Profit				$ 28,219,490
2.0%		Insurance				$ 11,852,186
1.0%		Payment & Performance Bonds				$ 6,044,615
0.0%		Sustainability Requirements				$ -

2-10 FIS AND OFFICES & KYWAY TO CONCOURSE C & G

DETAIL

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	Subtotal			***$ 753.71***	***$ 610,506,097***
0.0%	Escalation				$ -
	Opinion of Probable Construction Cost			***$ 753.71***	***$ 610,506,097***
21.3%	Owner's Soft Costs				$ 130,037,799
	Opinion of Probable Project Cost			***$ 914.25***	***$ 740,543,895***

Project Title	Landside Masterplan Update		
Location	Saint Paul International Airport		
Submittal Stage	Masterplan - Rough Order of Magnitude Estimate		
Client Name			
Client Project No.		Revision	2
Original Date	7-Apr-2023	Revision Date	25-Apr-2023
Assumed Bid Opening Date		Connico PN	4977.23.03
Project Lead	CJN / CJC	Checked by	IDK

3-1 - NEW T2 NORTH EXPANSION

SUMMARY

	CONSTRUCTION SYSTEM		COST PER SQUARE FOOT	TOTAL
A	**Substructure**		$ 24.86	$ 6,797,388
	Standard Foundations	$ 2,906,500		
	Special Foundations	$ 2,012,207		
	Slab on Grade	$ 1,878,681		
B	**Shell**		$ 135.46	$ 37,034,933
	Superstructure	$ 24,589,048		
	Exterior Closure	$ 10,040,835		
	Roofing	$ 2,405,050		
C	**Interiors**		$ 80.44	$ 21,991,890
	Interior Construction	$ 4,658,890		
	Stairs	$ 225,000		
	Interior Finishes	$ 17,108,000		
D	**Services**		$ 197.00	$ 53,858,913
	Conveying	$ 650,000		
	Baggage Handling System	$ -		
	Plumbing	$ 3,378,550		
	HVAC	$ 22,782,780		
	Fire Protection	$ 2,491,025		
	Electrical	$ 14,954,750		
	Communications	$ 6,326,476		
	Electronic Safety & Security	$ 3,275,332		
E	**Equipment & Furnishings**		$ 42.27	$ 11,557,250
	Equipment	$ 410,100		
	Passenger Boarding Bridges	$ 9,000,000		
	Furnishings	$ 2,147,150		
F	**Special Construction & Demolition**		$ 33.05	$ 9,036,250
	Special Construction	$ 8,887,500		
	Selective Building Demolition	$ 148,750		
	Hazardous Material Abatement	$ -		
G	**Building Sitework**		$ 107.85	$ 29,487,528
	Site Mobilization	$ 4,934,700		
	Site Preparation	$ 6,192,850		
	Site Improvements	$ 18,184,978		
	Site Mechanical Utilities	$ 125,000		
	Site Electrical Utilities	$ 50,000		
	Subtotal		***$ 620.94***	***$ 169,764,151***
25.0%	Estimating Design Evolution			$ 42,441,038

3-1 - NEW T2 NORTH EXPANSION

SUMMARY

	CONSTRUCTION SYSTEM		COST PER SQUARE FOOT		TOTAL
	Subtotal - Cost of Work	***$***	***776.17***	***$***	***212,205,189***
	General Contractors Markups				
5.0%	Project Logistics / Phasing & Labor Factor			$	10,610,259
5.0%	General Requirements & Temporary Construction			$	11,140,772
8.0%	General Conditions			$	18,716,498
5.0%	General Contractors Overhead & Profit			$	12,633,636
2.0%	Insurance			$	5,306,127
1.0%	Payment & Performance Bonds			$	2,706,125
0.0%	Sustainability Requirements			$	-
	Subtotal	***$***	***999.70***	***$***	***273,318,607***
0.0%	Escalation			$	-
	Opinion of Probable Construction Cost	***$***	***999.70***	***$***	***273,318,607***
21.3%	Owner's Soft Costs			$	58,216,863
	Opinion of Probable Project Cost	***$***	***1,212.64***	***$***	***331,535,470***

Project Title	Landside Masterplan Update				
Location	Saint Paul International Airport				
Submittal Stage	Masterplan - Rough Order of Magnitude Estimate				
Client Name					
Client Project No.		**Revision**	2		
Original Date	7-Apr-2023	**Revision Date**	25-Apr-2023		
Assumed Bid Opening Date		**Connico PN**	4977.23.03		
Project Lead	CJN / CJC	**Checked by**	IDK		

3-1 - NEW T2 NORTH EXPANSION

DETAIL

		DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
		AREA ANALYSIS				
3-1 - New T2 North Expansion						
	Apron Level 01		136,700	sf		
		Airport Support			62,000 sf	
		Airline Support			61,000 sf	
		Mechanical			5,500 sf	
		Vertical Circulation			1,400 sf	
		Storage			2,700 sf	
		Tug Lanes			4,100 sf	
	Departure Level 02		136,700	sf		
		Concessions (Shell Space)			2,400 sf	
		Hold rooms			68,000 sf	
		Vertical Circulation			1,500 sf	
		Circulation			60,000 sf	
		Restrooms - Public			4,800 sf	
		Total Area	**273,400**	**sf**	**273,400 sf**	

			QUANTITY	UNIT	UNIT COST	TOTAL
A	***SUBSTRUCTURE***					
A10	**Foundations**					
A1010	Standard Foundations					
	A1011	Column Foundations, Wall Foundations, Grade Beams, Foundation Wall	136,700	sf	$ 20.00	$ 2,734,000
	A1012	Extra for Rock Excavation				Not Required
	A1013	Perimeter Drainage	2,900	lf	$ 25.00	$ 72,500
	A1014	Dewatering	1	ls	$ 40,000.00	$ 40,000
	A1015	Add Allowance for Preparing and Connecting into Existing Foundations	1	alw	$ 60,000.00	$ 60,000
A1030	Special Foundations					
	A1031	PBB Foundation	9	ea	$ 60,000.00	$ 540,000
	A1032	Pile Foundations (36" Dia Drilled Pier @ 35' Deep)	136,700	sf	$ 10.40	$ 1,422,207
	A1033	Dewatering	1	ls	$ 50,000.00	$ 50,000

3-1 - NEW T2 NORTH EXPANSION

DETAIL

		DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	A1050	Slab on Grade				
	A1051	Slab on Grade	136,700	sf	$ 10.50	$ 1,435,350
	A1052	Elevator Pits	5	ea	$ 15,000.00	$ 75,000
	A1053	Misc. Trenches, Pits & Bases	127	cy	$ 750.00	$ 94,931
	A1054	Under-slab Drainage & Insulation	136,700	sf	$ 2.00	$ 273,400
		Subtotal - Substructure				***$ 6,797,388***
B	***SHELL***					
B10	**Superstructure**					
	B1010	Floor Construction				
	B1011	Steel Floor Structure	1,572	tns	$ 6,500.00	$ 10,218,325
	B1012	Steel Floor Deck	136,700	sf	$ 7.50	$ 1,025,250
	B1013	Concrete Fill to Steel Floor Deck	136,700	sf	$ 7.75	$ 1,059,425
	B1014	Supplemental Framing at Exterior Closure	63	tns	$ 7,000.00	$ 439,425
	B1015	Miscellaneous Steel (5%)	79	tns	$ 7,000.00	$ 550,218
	B1016	Elevated Floor Slab Fireproofing	136,700	sf	$ 7.00	$ 956,900
	B1017	Expansion Joint at Existing Structure	110	lf	$ 150.00	$ 16,500
	B1018	Add Allowance for Misc. Steel Framing at Junction to Existing Floor Structure	1	alw	$ 28,000.00	$ 28,000
	B1030	Roof Construction				
	B1031	Steel Roof Structure	1,230	tns	$ 6,500.00	$ 7,996,950
	B1032	Steel Roof Deck	136,700	sf	$ 6.50	$ 888,550
	B1033	Miscellaneous Steel (5%)	62	tns	$ 7,000.00	$ 430,605
	B1034	Roof Fireproofing	136,700	sf	$ 7.00	$ 956,900
	B1035	Add Allowance for Misc. Steel Framing at Junction to Existing Roof Structure	1	alw	$ 22,000.00	$ 22,000
B20	**Exterior Closure**					
	B2010	Exterior Walls				
	B2011	CMU Walls, incl. Back-up System	47,990	sf	$ 40.00	$ 1,919,600
	B2012	Precast Concrete, incl. Back-up System	5,580	sf	$ 45.00	$ 251,100
	B2013	Metal Wall Panel, incl. Back-up System	5,580	sf	$ 65.00	$ 362,700
	B2014	Edge Detail at Roof	2,790	lf	$ 75.00	$ 209,250
	B2015	Caulking & Sealant to Exteriors	106,020	sf	$ 1.75	$ 185,535
	B2016	Abutment Detailing at Existing Building - Patch, Repair, Refinish Exterior Walls Where Disturbed by New Construction	1	alw	$ 50,000.00	$ 50,000
	B2030	Exterior Windows				
	B2031	Curtain Wall System	41,850	sf	$ 165.00	$ 6,905,250

3-1 - NEW T2 NORTH EXPANSION

DETAIL

		DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
B2050	Exterior Doors					
	B2051	Exterior Doors - Allowance	1	alw	$ 98,900.00	$ 98,900
	B2052	PBB Exit Doors	9	ea	$ 3,500.00	$ 31,500
	B2052	Exit Doors - Apron Paving Access	9	ea	$ 2,500.00	$ 22,500
	B2053	Extra for Access Control	9	lvs	$ 500.00	$ 4,500
B2070	Exterior Soffits					
	B2071	Exterior Soffits				Not Required
B30	**Roofing**					
B3010	Roof Coverings					
	B3011	SBS Modified Bitumen Roof Assembly	136,700	sf	$ 16.50	$ 2,255,550
	B3012	Parapet Detail	2,790	lf	$ 50.00	$ 139,500
	B3013	Add Allowance for Junction to Existing Roof	1	alw	$ 10,000.00	$ 10,000
B3030	Roof Openings					
	B3031	Skylight				Not Required
	B3032	Roof Hatch				Not Required
		Subtotal - Shell				***$ 37,034,933***
C	***INTERIORS***					
C10	**Interior Construction**					
C1010	Partitions					
	C1011	Interior Partitions	269,300	sf	$ 5.00	$ 1,346,500
	C1012	Rough Carpentry & Blocking	269,300	sf	$ 1.50	$ 403,950
	C1013	Caulking, Sealants & Firestopping	269,300	sf	$ 1.75	$ 471,275
	C1014	Misc. Metals, Bracing, Countertop Supports, Equipment Supports, etc.	269,300	sf	$ 1.25	$ 336,625
C1030	Interior Doors					
	C1031	Interior Doors - Allowance	269,300	sf	$ 2.00	$ 538,600
C1050	Specialties					
	C1051	Fire Extinguishers & Cabinets	269,300	sf	$ 0.05	$ 13,465
	C1052	Code Signage	269,300	sf	$ 0.25	$ 67,325
	C1053	Interior Wayfinding Signage	269,300	sf	$ 3.50	$ 942,550
	C1054	Miscellaneous Specialties	269,300	sf	$ 2.00	$ 538,600
C20	**Stairs**					
C2010	Stair Construction					

3-1 - NEW T2 NORTH EXPANSION

DETAIL

		DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	C2011	Stair - Exit - PBB	9	flts	$ 25,000.00	$ 225,000
C30		**Interior Finishes**				
C3010		Interior Finishes				
	C3011	*Apron Level 01*				
	C3012	Airport Support	62,000	sf	$ 45.00	$ 2,790,000
	C3013	Airline Support	61,000	sf	$ 45.00	$ 2,745,000
	C3014	Mechanical	5,500	sf	$ 35.00	$ 192,500
	C3015	Vertical Circulation	1,400	sf	$ 55.00	$ 77,000
	C3016	Storage	2,700	sf	$ 25.00	$ 67,500
	C3017	Tug Lanes	4,100	sf	$ 10.00	$ 41,000
	C3018	*Departure Level 02*				
	C3019	Concessions (Shell Space)	2,400	sf	$ 25.00	$ 60,000
	C3020	Hold rooms	68,000	sf	$ 75.00	$ 5,100,000
	C3021	Vertical Circulation	1,500	sf	$ 55.00	$ 82,500
	C3022	Circulation	60,000	sf	$ 85.00	$ 5,100,000
	C3023	Restrooms - Public	4,800	sf	$ 165.00	$ 792,000
	C3024	Allowance for Renovation to Existing Concourse for New Expansion Connection	1,100	sf	$ 55.00	$ 60,500
		Subtotal - Interiors				***$ 21,991,890***
D		***SERVICES***				
D10		**Conveying System**				
D1010		Elevators & Lifts				
	D1011	Hydraulic Passenger Elevator	10	stps	$ 65,000.00	$ 650,000
D1020		Escalators & Moving Walks				
	D1021	Escalator				Not Required
	D1022	Moving Walks				Not Required
D1030		Baggage Handling Equipment				
	D1031	Baggage Handling Equipment Allowance				Excluded
D20		**Plumbing**				
D2010		Plumbing Systems				
	D2011	Apron Level 01	132,600	sf	$ 9.50	$ 1,259,700
	D2012	Departure Level 02	136,700	sf	$ 15.50	$ 2,118,850
D30		**HVAC**				
D3010		HVAC Systems				
	D3011	Apron Level 01	132,600	sf	$ 74.00	$ 9,812,400
	D3012	Departure Level 02	136,700	sf	$ 74.00	$ 10,115,800

3-1 - NEW T2 NORTH EXPANSION

DETAIL

		DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	D3050	Controls and Instrumentation				
		D3051 3-1 - New T2 North Expansion	269,300	sf	$ 8.50	$ 2,289,050
	D3060	Systems Testing & Balancing				
		D3061 3-1 - New T2 North Expansion	269,300	sf	$ 2.10	$ 565,530
D40	**Fire Protection**					
	D4010	Sprinkler Systems				
		D4011 Apron Level 01	132,600	sf	$ 9.25	$ 1,226,550
		D4012 Departure Level 02	136,700	sf	$ 9.25	$ 1,264,475
D50	**Electrical**					
	D5010	Electrical Systems				
		D5011 Distribution Equipment	273,400	sf	$ 6.00	$ 1,640,400
		D5012 Feeders	273,400	sf	$ 8.75	$ 2,392,250
		D5013 Grounding and Lightning Protection	273,400	sf	$ 3.00	$ 820,200
		D5014 Jetway/GPU/PCA Feeders	9	ea	$ 65,000.00	$ 585,000
		D5015 Roof Mounted Apron Light	9	ea	$ 30,000.00	$ 270,000
		D5016 *Departure Level 02*				
		D5017 Airport Support	62,000	sf	$ 25.00	$ 1,550,000
		D5018 Airline Support	61,000	sf	$ 25.00	$ 1,525,000
		D5019 Mechanical	5,500	sf	$ 18.00	$ 99,000
		D5020 Vertical Circulation	1,400	sf	$ 37.00	$ 51,800
		D5021 Storage	2,700	sf	$ 18.00	$ 48,600
		D5022 Tug Lanes	4,100	sf	$ 10.00	$ 41,000
		D5023 *Departure Level 02*				
		D5024 Concessions (Shell Space)	2,400	sf	$ 15.00	$ 36,000
		D5025 Hold rooms	68,000	sf	$ 49.00	$ 3,332,000
		D5026 Vertical Circulation	1,500	sf	$ 37.00	$ 55,500
		D5027 Circulation	60,000	sf	$ 37.00	$ 2,220,000
		D5028 Restrooms - Public	4,800	sf	$ 60.00	$ 288,000
	D6010	Communications				
		D6011 Telecomm Room Buildout	273,400	sf	$ 4.15	$ 1,134,610
		D6012 Backbone Cabling	273,400	sf	$ 2.50	$ 683,500
		D6013 Communications	273,400	sf	$ 3.35	$ 915,890
		D6014 EVIDS Cabling and Installation	273,400	sf	$ 1.55	$ 423,770
		D6015 Public Address System	273,400	sf	$ 2.64	$ 721,776
		D6016 DAS	273,400	sf	$ 6.25	$ 1,708,750
		D6017 Common Use System	273,400	sf	$ 2.70	$ 738,180
	D7010	Electronic Safety & Security				
		D7011 Video Surveillance System	273,400	sf	$ 2.90	$ 792,860
		D7012 Security Access Control	273,400	sf	$ 4.08	$ 1,115,472
		D7013 Fire Alarm	273,400	sf	$ 5.00	$ 1,367,000

3-1 - NEW T2 NORTH EXPANSION

DETAIL

		DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
		Subtotal - Services				***$ 53,858,913***
E	***EQUIPMENT & FURNISHINGS***					
E10	**Equipment**					
E1010	Equipment					
	E1011	Concessions Equipment - Not in Scope				Excluded
	E1012	Security Equipment - Not in Scope				Excluded
	E1013	FIS Equipment - Not in Scope				Excluded
	E1014	FIDS, BIDS, MUFIDS	136,700	sf	$ 2.00	$ 273,400
	E1015	Dynamic Signage				Excluded
	E1016	Misc. Equipment Allowance	273,400	sf	$ 0.50	$ 136,700
E1030	Passenger Boarding Bridges					
	E1031	New Passenger Boarding Bridge	9	ea	$1,000,000.00	$ 9,000,000
E20	**Furnishings**					
E2010	Fixed Furnishings					
	E2011	Gate Podiums & Backscreens	9	ea	$ 35,000.00	$ 315,000
	E2012	Recharge Stations				w/Electrical
	E2013	Holdroom Seating	1,125	ea	$ 1,000.00	$ 1,125,000
	E2014	Holdroom Seating Table	563	ea	$ 700.00	$ 393,750
	E2015	Misc. Seating	1	alw	$ 40,000.00	$ 40,000
	E2016	Kiosks				Excluded
	E2017	Window Shades				Excluded
	E2018	Misc. Casework Allowance	273,400	sf	$ 1.00	$ 273,400
		Subtotal - Equipment & Furnishings				***$ 11,557,250***
F	***SPECIAL CONSTRUCTION & DEMOLITION***					
F10	**Special Construction**					
F1010	Special Construction					
	F1011	Elevated Bridge Structure (Enclosed & Airconditioned)	19,750	sf	$ 450.00	$ 8,887,500
F20	**Selective Building Demolition**					
F2010	Building Elements Demolition					
	F2011	Demolish Exterior Closure at Existing Building	3,850	sf	$ 35.00	$ 134,750
	F2012	Misc. Demolition	1	alw	$ 14,000.00	$ 14,000
F30	**Hazardous Material Abatement**					

3-1 - NEW T2 NORTH EXPANSION

DETAIL

		DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	F3010	Hazardous Material Abatement				
	F3011	Hazardous Material Abatement				Excluded
		Subtotal - Special Construction & Demolition				***$ 9,036,250***
G		***BUILDING SITEWORK***				
G00		**Site Mobilization**				
	G0010	Site Mobilization				
	G0011	Mobilization				Incl. In M/UPS
	G0012	Safety and Security (3%)	1	ls	$ 858,900.00	$ 858,900
	G0013	Temporary Construction Items and Erosion Control (6%)	1	ls	$1,620,500.00	$ 1,620,500
	G0014	Drainage and Utility Allowance	1	alw	$2,455,300.00	$ 2,455,300
G10		**Site Preparation**				
	G1010	Site Demolition				
	G1011	Demolish Existing Apron Paving	40,890	sy	$ 40.00	$ 1,635,600
	G1012	Demolish Existing Asphalt Paving	27,070	sy	$ 25.00	$ 676,750
	G1013	Demolish Existing FBO Campus	248,700	sf	$ 15.00	$ 3,730,500
	G1014	Allowance for Misc. Site Demolition	1	alw	$ 150,000.00	$ 150,000
	G1015	Demolish / Remove Existing QTA				Excluded
G20		**Site Improvements**				
	G2010	Pavement / Roadways etc.				
	G2011	*Apron Paving*				
	G2012	Excavation	22,500	cy	$ 18.00	$ 405,000
	G2013	PCC Apron Pavement (17" P-501, 8" Stabilized Base, 16" P-209, Markings, Subgrade Prep.) - Infill of Existing Concourse Buildings	45,000	sy	$ 275.00	$ 12,375,000
	G2014	Pavement Markings - Service Road and Striping	20,250	sf	$ 2.50	$ 50,625
	G2015	New Apron Edge Lights (cable, conduit, counterpoise included)				Not Required
	G2016	*Surface Parking*				
	G2017	Grading	5,560	sy	$ 18.00	$ 100,080
	G2018	Asphalt on Grade Parking and Roads	11,120	sy	$ 115.00	$ 1,278,800
	G2019	Pavement Markings - Service Road and Striping	5,000	sf	$ 1.25	$ 6,250
	G2020	New Apron Edge Lights (cable, conduit, counterpoise included)				Not Required
	G2021	*Fuel Systems*				
	G2022	Sawcut Existing Apron Paving for New Fuel Lines	1,760	lf	$ 8.00	$ 14,080
	G2023	Demo Existing Apron Paving	391	sy	$ 35.00	$ 13,689

3-1 - NEW T2 NORTH EXPANSION

DETAIL

		DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	G2024	PCC Apron Pavement (17" P-501, 8" Stabilized Base, 16" P-209, Markings, Subgrade Prep.) - Infill of Existing Concourse Buildings	391	sy	$ 350.00	$ 136,889
	G2025	New Underground Fuel Vaults	5	ea	$ 250,000.00	$ 1,250,000
	G2026	Fuel Branch Lines: 12" dia Steel Pipe Epoxy Lining, ext Coated, Welded	2,545	lf	$ 656.00	$ 1,669,520
	G2027	Fuel Branch Lines: 8" dia Steel Pipe Epoxy Lining, ext Coated, Welded	225	lf	$ 612.00	$ 137,700
	G2028	Fuel Branch Lines: 6" dia Steel Pipe Epoxy Lining, ext Coated, Welded	135	lf	$ 590.00	$ 79,650
	G2029	Radiographic Testing of Pipe Welds	2,905	lf	$ 19.00	$ 55,195
	G2030	Fuel Valves	9	ea	$ 25,000.00	$ 225,000
	G2031	Branch Line Low & High Point Drain Pit	5	ea	$ 32,500.00	$ 162,500
	G2032	Hydrant Pits and Connectors	9	ea	$ 25,000.00	$ 225,000
G2050	Landscaping					
	G2051	Landscaping Allowance				Not Required
G2060	Miscellaneous Buildings and Structures					
	G2061	Miscellaneous Buildings and Structures				Not Required
G30	**Site Mechanical Utilities**					
G3010	Site Mechanical Utilities					
	G3011	Site Mechanical Utilities	1	alw	$ 125,000.00	$ 125,000
G40	**Site Electrical Utilities**					
G4010	Site Electrical Utilities					
	G4011	Site Electrical Utilities	1	alw	$ 25,000.00	$ 25,000
G4030	Site Lighting					
	G4031	Site Lighting	1	alw	$ 25,000.00	$ 25,000
		Subtotal - Building Sitework				***$ 29,487,528***
		Subtotal			***$ 620.94***	***$ 169,764,151***
25.0%		Estimating Design Evolution				$ 42,441,038
		Subtotal - Cost of Work			***$ 776.17***	***$ 212,205,189***
		General Contractors Markups				
5.0%		Project Logistics / Phasing & Labor Factor				$ 10,610,259

3-1 - NEW T2 NORTH EXPANSION

DETAIL

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
5.0%	General Requirements & Temporary Construction				$ 11,140,772
8.0%	General Conditions				$ 18,716,498
5.0%	General Contractors Overhead & Profit				$ 12,633,636
2.0%	Insurance				$ 5,306,127
1.0%	Payment & Performance Bonds				$ 2,706,125
0.0%	Sustainability Requirements				$ -
	Subtotal			***$ 999.70***	***$ 273,318,607***
0.0%	Escalation				$ -
	Opinion of Probable Construction Cost			***$ 999.70***	***$ 273,318,607***
21.3%	Owner's Soft Costs				$ 58,216,863
	Opinion of Probable Project Cost			***$ 1,212.64***	***$ 331,535,470***

Project Title	Landside Masterplan Update		
Location	Saint Paul International Airport		
Submittal Stage	Masterplan - Rough Order of Magnitude Estimate		
Client Name			
Client Project No.		Revision	2
Original Date	7-Apr-2023	Revision Date	25-Apr-2023
Assumed Bid Opening Date		Connico PN	4977.23.03
Project Lead	CJN / CJC	Checked by	IDK

3-2 - CONCOURSE G SOUTH EXPANSION

SUMMARY

	CONSTRUCTION SYSTEM			COST PER SQUARE FOOT		TOTAL
A	**Substructure**			$ 25.23	$	5,268,549
	Standard Foundations	$	2,337,600			
	Special Foundations	$	1,545,649			
	Slab on Grade	$	1,385,300			
B	**Shell**			$ 135.02	$	28,192,115
	Superstructure	$	18,789,605			
	Exterior Closure	$	7,565,010			
	Roofing	$	1,837,500			
C	**Interiors**			$ 80.66	$	16,841,690
	Interior Construction	$	3,603,690			
	Stairs	$	175,000			
	Interior Finishes	$	13,063,000			
D	**Services**			$ 198.50	$	41,447,136
	Conveying	$	520,000			
	Baggage Handling System	$	-			
	Plumbing	$	2,610,000			
	HVAC	$	17,664,480			
	Fire Protection	$	1,931,400			
	Electrical	$	11,388,200			
	Communications	$	4,831,632			
	Electronic Safety & Security	$	2,501,424			
E	**Equipment & Furnishings**			$ 43.05	$	8,988,250
	Equipment	$	313,200			
	Passenger Boarding Bridges	$	7,000,000			
	Furnishings	$	1,675,050			
F	**Special Construction & Demolition**			$ 67.94	$	14,185,750
	Special Construction	$	14,040,000			
	Selective Building Demolition	$	145,750			
	Hazardous Material Abatement	$	-			
G	**Building Sitework**			$ 79.60	$	16,620,153
	Site Mobilization	$	2,781,400			
	Site Preparation	$	1,250,000			
	Site Improvements	$	12,413,753			
	Site Mechanical Utilities	$	125,000			
	Site Electrical Utilities	$	50,000			
	Subtotal			***$ 630.00***	***$***	***131,543,643***
25.0%	Estimating Design Evolution				$	32,885,911

3-2 - CONCOURSE G SOUTH EXPANSION

SUMMARY

	CONSTRUCTION SYSTEM	COST PER SQUARE FOOT	TOTAL
	Subtotal - Cost of Work	***$ 787.50***	***$ 164,429,553***
	General Contractors Markups		
5.0%	Project Logistics / Phasing & Labor Factor		$ 8,221,478
5.0%	General Requirements & Temporary Construction		$ 8,632,552
8.0%	General Conditions		$ 14,502,687
5.0%	General Contractors Overhead & Profit		$ 9,789,313
2.0%	Insurance		$ 4,111,512
1.0%	Payment & Performance Bonds		$ 2,096,871
0.0%	Sustainability Requirements		$ -
	Subtotal	***$ 1,014.29***	***$ 211,783,965***
0.0%	Escalation		$ -
	Opinion of Probable Construction Cost	***$ 1,014.29***	***$ 211,783,965***
21.3%	Owner's Soft Costs		$ 45,109,985
	Opinion of Probable Project Cost	***$ 1,230.34***	***$ 256,893,950***

Project Title	Landside Masterplan Update		
Location	Saint Paul International Airport		
Submittal Stage	Masterplan - Rough Order of Magnitude Estimate		
Client Name			
Client Project No.		Revision	2
Original Date	7-Apr-2023	Revision Date	25-Apr-2023
Assumed Bid Opening Date		Connico PN	4977.23.03
Project Lead	CJN / CJC	Checked by	IDK

3-2 - CONCOURSE G SOUTH EXPANSION

DETAIL

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	AREA ANALYSIS				
	3-2 - Concourse G South Expansion				
	Apron Level 01	104,400	sf		
	Airport Support			48,000 sf	
	Airline Support			48,000 sf	
	Mechanical			6,000 sf	
	Vertical Circulation			500 sf	
	Storage			1,000 sf	
	Tug Lanes			900 sf	
	Departure Level 02	104,400	sf		
	Concessions (Shell Space)			3,000 sf	
	Hold rooms			50,000 sf	
	Vertical Circulation			500 sf	
	Circulation			48,000 sf	
	Restrooms - Public			2,900 sf	
	Total Area	**208,800**	**sf**	**208,800 sf**	
A	***SUBSTRUCTURE***				
A10	**Foundations**				
A1010	Standard Foundations				
A1011	Column Foundations, Wall Foundations, Grade Beams, Foundation Wall	104,400	sf	$ 21.00	$ 2,192,400
A1012	Extra for Rock Excavation				Not Required
A1013	Perimeter Drainage	2,208	lf	$ 25.00	$ 55,200
A1014	Dewatering	1	ls	$ 30,000.00	$ 30,000
A1015	Add Allowance for Preparing and Connecting into Existing Foundations	1	alw	$ 60,000.00	$ 60,000
A1030	Special Foundations				
A1031	PBB Foundation	7	ea	$ 60,000.00	$ 420,000
A1032	Pile Foundations (36" Dia Drilled Pier @ 35' Deep)	104,400	sf	$ 10.40	$ 1,085,649
A1033	Dewatering	1	ls	$ 40,000.00	$ 40,000

3-2 - CONCOURSE G SOUTH EXPANSION

DETAIL

		DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
A1050	Slab on Grade					
	A1051	Slab on Grade	104,400	sf	$ 10.00	$ 1,044,000
	A1052	Elevator Pits	4	ea	$ 15,000.00	$ 60,000
	A1053	Misc. Trenches, Pits & Bases	97	cy	$ 750.00	$ 72,500
	A1054	Under-slab Drainage & Insulation	104,400	sf	$ 2.00	$ 208,800
		Subtotal - Substructure				***$ 5,268,549***
B	***SHELL***					
B10	**Superstructure**					
B1010	Floor Construction					
	B1011	Steel Floor Structure	1,201	tns	$ 6,500.00	$ 7,803,900
	B1012	Steel Floor Deck	104,400	sf	$ 7.50	$ 783,000
	B1013	Concrete Fill to Steel Floor Deck	104,400	sf	$ 7.75	$ 809,100
	B1014	Supplemental Framing at Exterior Closure	47	tns	$ 7,000.00	$ 330,435
	B1015	Miscellaneous Steel (5%)	60	tns	$ 7,000.00	$ 420,210
	B1016	Elevated Floor Slab Fireproofing	104,400	sf	$ 7.00	$ 730,800
	B1017	Expansion Joint at Existing Structure	110	lf	$ 150.00	$ 16,500
	B1018	Add Allowance for Misc. Steel Framing at Junction to Existing Floor Structure	1	alw	$ 28,000.00	$ 28,000
B1030	Roof Construction					
	B1031	Steel Roof Structure	940	tns	$ 6,500.00	$ 6,107,400
	B1032	Steel Roof Deck	104,400	sf	$ 6.50	$ 678,600
	B1033	Miscellaneous Steel (5%)	47	tns	$ 7,000.00	$ 328,860
	B1034	Roof Fireproofing	104,400	sf	$ 7.00	$ 730,800
	B1035	Add Allowance for Misc. Steel Framing at Junction to Existing Roof Structure	1	alw	$ 22,000.00	$ 22,000
B20	**Exterior Closure**					
B2010	Exterior Walls					
	B2011	CMU Walls, incl. Back-up System	36,090	sf	$ 40.00	$ 1,443,600
	B2012	Precast Concrete, incl. Back-up System	4,200	sf	$ 45.00	$ 189,000
	B2013	Metal Wall Panel, incl. Back-up System	4,200	sf	$ 65.00	$ 273,000
	B2014	Edge Detail at Roof	2,098	lf	$ 75.00	$ 157,350
	B2015	Caulking & Sealant to Exteriors	79,720	sf	$ 1.75	$ 139,510
	B2016	Abutment Detailing at Existing Building - Patch, Repair, Refinish Exterior Walls Where Disturbed by New Construction	1	alw	$ 50,000.00	$ 50,000
B2030	Exterior Windows					
	B2031	Curtain Wall System	31,470	sf	$ 165.00	$ 5,192,550

3-2 - CONCOURSE G SOUTH EXPANSION

DETAIL

		DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
B2050		Exterior Doors				
	B2051	Exterior Doors - Allowance	1	alw	$ 74,500.00	$ 74,500
	B2052	PBB Exit Doors	7	ea	$ 3,500.00	$ 24,500
	B2052	Exit Doors - Apron Paving Access	7	ea	$ 2,500.00	$ 17,500
	B2053	Extra for Access Control	7	lvs	$ 500.00	$ 3,500
B2070		Exterior Soffits				
	B2071	Exterior Soffits				Not Required
B30		**Roofing**				
B3010		Roof Coverings				
	B3011	SBS Modified Bitumen Roof Assembly	104,400	sf	$ 16.50	$ 1,722,600
	B3012	Parapet Detail	2,098	lf	$ 50.00	$ 104,900
	B3013	Add Allowance for Junction to Existing Roof	1	alw	$ 10,000.00	$ 10,000
B3030		Roof Openings				
	B3031	Skylight				Not Required
	B3032	Roof Hatch				Not Required
		Subtotal - Shell				***$ 28,192,115***
C		***INTERIORS***				
C10		**Interior Construction**				
C1010		Partitions				
	C1011	Interior Partitions	207,900	sf	$ 5.00	$ 1,039,500
	C1012	Rough Carpentry & Blocking	207,900	sf	$ 1.50	$ 311,850
	C1013	Caulking, Sealants & Firestopping	207,900	sf	$ 1.75	$ 363,825
	C1014	Misc. Metals, Bracing, Countertop Supports, Equipment Supports, etc.	207,900	sf	$ 1.25	$ 259,875
C1030		Interior Doors				
	C1031	Interior Doors - Allowance	208,800	sf	$ 2.00	$ 417,600
C1050		Specialties				
	C1051	Fire Extinguishers & Cabinets	208,800	sf	$ 0.05	$ 10,440
	C1052	Code Signage	208,800	sf	$ 0.25	$ 52,200
	C1053	Interior Wayfinding Signage	208,800	sf	$ 3.50	$ 730,800
	C1054	Miscellaneous Specialties	208,800	sf	$ 2.00	$ 417,600
C20		**Stairs**				

3-2 - CONCOURSE G SOUTH EXPANSION

DETAIL

		DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	C2010	Stair Construction				
		C2011 Stair - Exit - PBB	7	flts	$ 25,000.00	$ 175,000
C30	**Interior Finishes**					
	C3010	Interior Finishes				
		C3011 *Apron Level 01*				
		C3012 Airport Support	48,000	sf	$ 45.00	$ 2,160,000
		C3013 Airline Support	48,000	sf	$ 45.00	$ 2,160,000
		C3014 Mechanical	6,000	sf	$ 35.00	$ 210,000
		C3015 Vertical Circulation	500	sf	$ 55.00	$ 27,500
		C3016 Storage	1,000	sf	$ 25.00	$ 25,000
		C3017 Tug Lanes	900	sf	$ 10.00	$ 9,000
		C3018 *Departure Level 02*				
		C3019 Concessions (Shell Space)	3,000	sf	$ 25.00	$ 75,000
		C3020 Hold rooms	50,000	sf	$ 75.00	$ 3,750,000
		C3021 Vertical Circulation	500	sf	$ 55.00	$ 27,500
		C3022 Circulation	48,000	sf	$ 85.00	$ 4,080,000
		C3023 Restrooms - Public	2,900	sf	$ 165.00	$ 478,500
		C3024 Allowance for Renovation to Existing Concourse for New Expansion Connection	1,100	sf	$ 55.00	$ 60,500
		Subtotal - Interiors				***$ 16,841,690***
D	***SERVICES***					
D10	**Conveying System**					
	D1010	Elevators & Lifts				
		D1011 Hydraulic Passenger Elevator	8	stps	$ 65,000.00	$ 520,000
	D1020	Escalators & Moving Walks				
		D1021 Escalator				Not Required
		D1022 Moving Walks				Not Required
	D1030	Baggage Handling Equipment				
		D1031 Baggage Handling Equipment Allowance				Excluded
D20	**Plumbing**					
	D2010	Plumbing Systems				
		D2011 Apron Level 01	104,400	sf	$ 9.50	$ 991,800
		D2012 Departure Level 02	104,400	sf	$ 15.50	$ 1,618,200
D30	**HVAC**					
	D3010	HVAC Systems				
		D3011 Apron Level 01	104,400	sf	$ 74.00	$ 7,725,600

3-2 - CONCOURSE G SOUTH EXPANSION

DETAIL

DESCRIPTION			QUANTITY	UNIT	UNIT COST	TOTAL
		D3012 Departure Level 02	104,400	sf	$ 74.00	$ 7,725,600
	D3050	Controls and Instrumentation				
		D3051 3-2 - Concourse G South Expansion	208,800	sf	$ 8.50	$ 1,774,800
	D3060	Systems Testing & Balancing				
		D3061 3-2 - Concourse G South Expansion	208,800	sf	$ 2.10	$ 438,480
D40	**Fire Protection**					
	D4010	Sprinkler Systems				
		D4011 Apron Level 01	104,400	sf	$ 9.25	$ 965,700
		D4012 Departure Level 02	104,400	sf	$ 9.25	$ 965,700
D50	**Electrical**					
	D5010	Electrical Systems				
		D5011 Distribution Equipment	208,800	sf	$ 6.00	$ 1,252,800
		D5012 Feeders	208,800	sf	$ 8.75	$ 1,827,000
		D5013 Grounding and Lightning Protection	208,800	sf	$ 3.00	$ 626,400
		D5014 Jetway/GPU/PCA Feeders	7	ea	$ 65,000.00	$ 455,000
		D5015 Roof Mounted Apron Light	7	ea	$ 30,000.00	$ 210,000
		D5016 *Departure Level 02*				
		D5017 Airport Support	48,000	sf	$ 25.00	$ 1,200,000
		D5018 Airline Support	48,000	sf	$ 25.00	$ 1,200,000
		D5019 Mechanical	6,000	sf	$ 18.00	$ 108,000
		D5020 Vertical Circulation	500	sf	$ 37.00	$ 18,500
		D5021 Storage	1,000	sf	$ 18.00	$ 18,000
		D5022 Tug Lanes	900	sf	$ 10.00	$ 9,000
		D5023 *Departure Level 02*				
		D5024 Concessions (Shell Space)	3,000	sf	$ 15.00	$ 45,000
		D5025 Hold rooms	50,000	sf	$ 49.00	$ 2,450,000
		D5026 Vertical Circulation	500	sf	$ 37.00	$ 18,500
		D5027 Circulation	48,000	sf	$ 37.00	$ 1,776,000
		D5028 Restrooms - Public	2,900	sf	$ 60.00	$ 174,000
	D6010	Communications				
		D6011 Telecomm Room Buildout	208,800	sf	$ 4.15	$ 866,520
		D6012 Backbone Cabling	208,800	sf	$ 2.50	$ 522,000
		D6013 Communications	208,800	sf	$ 3.35	$ 699,480
		D6014 EVIDS Cabling and Installation	208,800	sf	$ 1.55	$ 323,640
		D6015 Public Address System	208,800	sf	$ 2.64	$ 551,232
		D6016 DAS	208,800	sf	$ 6.25	$ 1,305,000
		D6017 Common Use System	208,800	sf	$ 2.70	$ 563,760
	D7010	Electronic Safety & Security				
		D7011 Video Surveillance System	208,800	sf	$ 2.90	$ 605,520

3-2 - CONCOURSE G SOUTH EXPANSION

DETAIL

		DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	D7012	Security Access Control	208,800	sf	$ 4.08	$ 851,904
	D7013	Fire Alarm	208,800	sf	$ 5.00	$ 1,044,000
		Subtotal - Services				***$ 41,447,136***
E		***EQUIPMENT & FURNISHINGS***				
E10		**Equipment**				
E1010		Equipment				
	E1011	Concessions Equipment - Not in Scope				Excluded
	E1012	Security Equipment - Not in Scope				Excluded
	E1013	FIS Equipment - Not in Scope				Excluded
	E1014	FIDS, BIDS, MUFIDS	104,400	sf	$ 2.00	$ 208,800
	E1015	Dynamic Signage				Excluded
	E1016	Misc. Equipment Allowance	208,800	sf	$ 0.50	$ 104,400
E1030		Passenger Boarding Bridges				
	E1031	New Passenger Boarding Bridge	7	ea	$1,000,000.00	$ 7,000,000
E20		**Furnishings**				
E2010		Fixed Furnishings				
	E2011	Gate Podiums & Backscreens	7	ea	$ 35,000.00	$ 245,000
	E2012	Recharge Stations				w/Electrical
	E2013	Holdroom Seating	875	ea	$ 1,000.00	$ 875,000
	E2014	Holdroom Seating Table	438	ea	$ 700.00	$ 306,250
	E2015	Misc. Seating	1	alw	$ 40,000.00	$ 40,000
	E2016	Kiosks				Excluded
	E2017	Window Shades				Excluded
	E2018	Misc. Casework Allowance	208,800	sf	$ 1.00	$ 208,800
		Subtotal - Equipment & Furnishings				***$ 8,988,250***
F		***SPECIAL CONSTRUCTION & DEMOLITION***				
F10		**Special Construction**				
F1010		Special Construction				
	F1011	Connector - Elevated Bridge Structure (Enclosed & Airconditioned)	31,200	sf	$ 450.00	$ 14,040,000
F20		**Selective Building Demolition**				
F2010		Building Elements Demolition				
	F2011	Demolish Exterior Closure at Existing Building	3,850	sf	$ 35.00	$ 134,750
	F2012	Misc. Demolition	1	alw	$ 11,000.00	$ 11,000

3-2 - CONCOURSE G SOUTH EXPANSION

DETAIL

		DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
F30		**Hazardous Material Abatement**				
F3010		Hazardous Material Abatement				
	F3011	Hazardous Material Abatement				Excluded
		Subtotal - Special Construction & Demolition				***$ 14,185,750***
G		***BUILDING SITEWORK***				
G00		**Site Mobilization**				
G0010		Site Mobilization				
	G0011	Mobilization				Incl. In M/UPS
	G0012	Safety and Security (3%)	1	ls	$ 484,100.00	$ 484,100
	G0013	Temporary Construction Items and Erosion Control (6%)	1	ls	$ 913,400.00	$ 913,400
	G0014	Drainage and Utility Allowance	1	alw	$1,383,900.00	$ 1,383,900
G10		**Site Preparation**				
G1010		Site Demolition				
	G1011	Demolish Existing Apron Paving - Building Footprint	11,600	sy	$ 25.00	$ 290,000
	G1011	Demolish Existing Apron Paving - New Pavement	17,800	sy	$ 25.00	$ 445,000
	G1012	Demolish Existing Concourse End	10,000	sf	$ 20.00	$ 200,000
	G1013	Demolish Existing PBB Foundations	3	ea	$ 5,000.00	$ 15,000
	G1014	Demolish Existing PBB - Bridge & Equipment	3	ea	$ 50,000.00	$ 150,000
	G1015	Allowance for Misc. Site Demolition	1	alw	$ 150,000.00	$ 150,000
G20		**Site Improvements**				
G2010		Pavement / Roadways etc.				
	G2011	*Apron Paving*				
	G2012	Excavation	5,800	cy	$ 18.00	$ 104,400
	G2013	PCC Apron Pavement (17" P-501, 8" Stabilized Base, 16" P-209, Markings, Subgrade Prep.) - Infill of Existing Concourse Buildings	11,600	sy	$ 275.00	$ 3,190,000
	G2013	PCC Apron Pavement (17" P-501, 8" Stabilized Base, 16" P-209, Markings, Subgrade Prep.)	17,800	sy	$ 275.00	$ 4,895,000
	G2014	Pavement Markings - Service Road and Striping	13,229	sf	$ 2.50	$ 33,073
	G2015	New Apron Edge Lights (cable, conduit, counterpoise included)				Not Required
	G2016	*Surface Parking*				
	G2017	Grading	5,560	sy	$ 18.00	$ 100,080
	G2018	Asphalt on Grade Parking and Roads	11,120	sy	$ 115.00	$ 1,278,800

3-2 - CONCOURSE G SOUTH EXPANSION

DETAIL

		DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	G2019	Pavement Markings - Service Road and Striping	5,000	sf	$ 1.25	$ 6,250
	G2020	New Apron Edge Lights (cable, conduit, counterpoise included)				Not Required
	G2021	*Fuel Systems*				
	G2022	Sawcut Existing Apron Paving for New Fuel Lines	2,672	lf	$ 8.00	$ 21,376
	G2023	Demo Existing Apron Paving	594	sy	$ 35.00	$ 20,782
	G2024	PCC Apron Pavement (17" P-501, 8" Stabilized Base, 16" P-209, Markings, Subgrade Prep.) - Infill of Existing Concourse Buildings	594	sy	$ 350.00	$ 207,822
	G2025	New Underground Fuel Vaults	4	ea	$ 250,000.00	$ 1,000,000
	G2026	Fuel Branch Lines: 12" dia Steel Pipe Epoxy Lining, ext Coated, Welded	1,336	lf	$ 656.00	$ 876,416
	G2027	Fuel Branch Lines: 8" dia Steel Pipe Epoxy Lining, ext Coated, Welded	175	lf	$ 612.00	$ 107,100
	G2028	Fuel Branch Lines: 6" dia Steel Pipe Epoxy Lining, ext Coated, Welded	105	lf	$ 590.00	$ 61,950
	G2029	Radiographic Testing of Pipe Welds	1,616	lf	$ 19.00	$ 30,704
	G2030	Fuel Valves	7	ea	$ 25,000.00	$ 175,000
	G2031	Branch Line Low & High Point Drain Pit	4	ea	$ 32,500.00	$ 130,000
	G2032	Hydrant Pits and Connectors	7	ea	$ 25,000.00	$ 175,000
G2050	Landscaping					
	G2051	Landscaping Allowance				Not Required
G2060	Miscellaneous Buildings and Structures					
	G2061	Miscellaneous Buildings and Structures				Not Required
G30	**Site Mechanical Utilities**					
G3010	Site Mechanical Utilities					
	G3011	Site Mechanical Utilities	1	alw	$ 125,000.00	$ 125,000
G40	**Site Electrical Utilities**					
G4010	Site Electrical Utilities					
	G4011	Site Electrical Utilities	1	alw	$ 25,000.00	$ 25,000
G4030	Site Lighting					
	G4031	Site Lighting	1	alw	$ 25,000.00	$ 25,000
		Subtotal - Building Sitework				***$ 16,620,153***
		Subtotal			***$ 630.00***	***$ 131,543,643***

3-2 - CONCOURSE G SOUTH EXPANSION

DETAIL

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
25.0%	Estimating Design Evolution				$ 32,885,911
	Subtotal - Cost of Work			***$ 787.50***	***$ 164,429,553***
	General Contractors Markups				
5.0%	Project Logistics / Phasing & Labor Factor				$ 8,221,478
5.0%	General Requirements & Temporary Construction				$ 8,632,552
8.0%	General Conditions				$ 14,502,687
5.0%	General Contractors Overhead & Profit				$ 9,789,313
2.0%	Insurance				$ 4,111,512
1.0%	Payment & Performance Bonds				$ 2,096,871
0.0%	Sustainability Requirements				$ -
	Subtotal			***$ 1,014.29***	***$ 211,783,965***
0.0%	Escalation				$ -
	Opinion of Probable Construction Cost			***$ 1,014.29***	***$ 211,783,965***
21.3%	Owner's Soft Costs				$ 45,109,985
	Opinion of Probable Project Cost			***$ 1,230.34***	***$ 256,893,950***

Project Title	Landside Masterplan Update		
Location	Saint Paul International Airport		
Submittal Stage	Masterplan - Rough Order of Magnitude Estimate		
Client Name			
Client Project No.		Revision	2
Original Date	7-Apr-2023	Revision Date	25-Apr-2023
Assumed Bid Opening Date		Connico PN	4977.23.03
Project Lead	CJN / CJC	Checked by	IDK

3-3 - RECONSTRUCT CONCOURSE E

SUMMARY

	CONSTRUCTION SYSTEM			COST PER SQUARE FOOT	TOTAL
A	**Substructure**			$ 28.28	$ 5,232,201
	Standard Foundations	$	1,985,750		
	Special Foundations	$	1,937,215		
	Slab on Grade	$	1,309,236		
B	**Shell**			$ 132.57	$ 24,524,525
	Superstructure	$	16,635,603		
	Exterior Closure	$	6,266,923		
	Roofing	$	1,622,000		
C	**Interiors**			$ 82.05	$ 15,178,680
	Interior Construction	$	3,184,930		
	Stairs	$	425,000		
	Interior Finishes	$	11,568,750		
D	**Services**			$ 200.38	$ 37,069,900
	Conveying	$	1,170,000		
	Baggage Handling System	$	-		
	Plumbing	$	2,312,500		
	HVAC	$	15,651,000		
	Fire Protection	$	1,711,250		
	Electrical	$	9,727,950		
	Communications	$	4,280,900		
	Electronic Safety & Security	$	2,216,300		
E	**Equipment & Furnishings**			$ 113.33	$ 20,966,250
	Equipment	$	277,500		
	Passenger Boarding Bridges	$	17,000,000		
	Furnishings	$	3,688,750		
F	**Special Construction & Demolition**			$ 3.02	$ 557,855
	Special Construction	$	406,980		
	Selective Building Demolition	$	150,875		
	Hazardous Material Abatement	$	-		
G	**Building Sitework**			$ 83.42	$ 15,432,462
	Site Mobilization	$	2,582,600		
	Site Preparation	$	3,745,500		
	Site Improvements	$	8,929,362		
	Site Mechanical Utilities	$	125,000		
	Site Electrical Utilities	$	50,000		
	Subtotal			***$ 643.04***	***$ 118,961,874***
25.0%	Estimating Design Evolution				$ 29,740,468

3-3 - RECONSTRUCT CONCOURSE E

SUMMARY

	CONSTRUCTION SYSTEM	COST PER SQUARE FOOT	TOTAL
	Subtotal - Cost of Work	***$ 803.80***	***$ 148,702,342***
	General Contractors Markups		
5.0%	Project Logistics / Phasing & Labor Factor		$ 7,435,117
5.0%	General Requirements & Temporary Construction		$ 7,806,873
8.0%	General Conditions		$ 13,115,547
5.0%	General Contractors Overhead & Profit		$ 8,852,994
2.0%	Insurance		$ 3,718,257
1.0%	Payment & Performance Bonds		$ 1,896,311
0.0%	Sustainability Requirements		$ -
	Subtotal	***$ 1,035.28***	***$ 191,527,442***
0.0%	Escalation		$ -
	Opinion of Probable Construction Cost	***$ 1,035.28***	***$ 191,527,442***
21.3%	Owner's Soft Costs		$ 40,795,345
	Opinion of Probable Project Cost	***$ 1,255.80***	***$ 232,322,787***

Project Title	Landside Masterplan Update		
Location	Saint Paul International Airport		
Submittal Stage	Masterplan - Rough Order of Magnitude Estimate		
Client Name			
Client Project No.		**Revision**	2
Original Date	7-Apr-2023	**Revision Date**	25-Apr-2023
Assumed Bid Opening Date		**Connico PN**	4977.23.03
Project Lead	CJN / CJC	**Checked by**	IDK

3-3 - RECONSTRUCT CONCOURSE E

DETAIL

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
AREA ANALYSIS				
3-3 - Reconstruct Concourse E				
Apron Level 01	92,500	sf		
Airport Support			43,000 sf	
Airline Support			42,100 sf	
Mechanical			5,000 sf	
Vertical Circulation			500 sf	
Storage			1,000 sf	
Tug Lanes			900 sf	
Departure Level 02	92,500	sf		
Concessions (Shell Space)			3,000 sf	
Hold rooms			46,000 sf	
Vertical Circulation			500 sf	
Circulation			40,100 sf	
Restrooms - Public			2,900 sf	
Total Area	**185,000**	**sf**	**185,000 sf**	

A	***SUBSTRUCTURE***					
A10	**Foundations**					
A1010	Standard Foundations					
A1011	Column Foundations, Wall Foundations, Grade Beams, Foundation Wall	92,500	sf	$ 20.00	$ 1,850,000	
A1012	Extra for Rock Excavation				Not Required	
A1013	Perimeter Drainage	1,830	lf	$ 25.00	$ 45,750	
A1014	Dewatering	1	ls	$ 30,000.00	$ 30,000	
A1015	Add Allowance for Preparing and Connecting into Existing Foundations	1	alw	$ 60,000.00	$ 60,000	
A1030	Special Foundations					
A1031	PBB Foundation	17	ea	$ 60,000.00	$ 1,020,000	
A1032	Pile Foundations (36" Dia Drilled Pier @ 35' Deep)	92,500	sf	$ 9.59	$ 887,215	
A1033	Dewatering	1	ls	$ 30,000.00	$ 30,000	

3-3 - RECONSTRUCT CONCOURSE E

DETAIL

		DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
A1050	Slab on Grade					
	A1051	Slab on Grade	92,500	sf	$ 10.00	$ 925,000
	A1052	Elevator Pits	9	ea	$ 15,000.00	$ 135,000
	A1053	Misc. Trenches, Pits & Bases	86	cy	$ 750.00	$ 64,236
	A1054	Under-slab Drainage & Insulation	92,500	sf	$ 2.00	$ 185,000
		Subtotal - Substructure				***$ 5,232,201***
B	***SHELL***					
B10	**Superstructure**					
B1010	Floor Construction					
	B1011	Steel Floor Structure	1,064	tns	$ 6,500.00	$ 6,914,375
	B1012	Steel Floor Deck	92,500	sf	$ 7.50	$ 693,750
	B1013	Concrete Fill to Steel Floor Deck	92,500	sf	$ 7.75	$ 716,875
	B1014	Supplemental Framing at Exterior Closure	39	tns	$ 7,000.00	$ 270,165
	B1015	Miscellaneous Steel (5%)	53	tns	$ 7,000.00	$ 372,313
	B1016	Elevated Floor Slab Fireproofing	92,500	sf	$ 7.00	$ 647,500
	B1017	Expansion Joint at Existing Structure	115	lf	$ 150.00	$ 17,250
	B1018	Add Allowance for Misc. Steel Framing at Junction to Existing Floor Structure	1	alw	$ 29,000.00	$ 29,000
B1030	Roof Construction					
	B1031	Steel Roof Structure	833	tns	$ 6,500.00	$ 5,411,250
	B1032	Steel Roof Deck	92,500	sf	$ 6.50	$ 601,250
	B1033	Miscellaneous Steel (5%)	42	tns	$ 7,000.00	$ 291,375
	B1034	Roof Fireproofing	92,500	sf	$ 7.00	$ 647,500
	B1035	Add Allowance for Misc. Steel Framing at Junction to Existing Roof Structure	1	alw	$ 23,000.00	$ 23,000
B20	**Exterior Closure**					
B2010	Exterior Walls					
	B2011	CMU Walls, incl. Back-up System	29,500	sf	$ 40.00	$ 1,180,000
	B2012	Precast Concrete, incl. Back-up System	3,430	sf	$ 45.00	$ 154,350
	B2013	Metal Wall Panel, incl. Back-up System	3,430	sf	$ 65.00	$ 222,950
	B2014	Edge Detail at Roof	1,715	lf	$ 75.00	$ 128,625
	B2015	Caulking & Sealant to Exteriors	65,170	sf	$ 1.75	$ 114,048
	B2016	Abutment Detailing at Existing Building - Patch, Repair, Refinish Exterior Walls Where Disturbed by New Construction	1	alw	$ 50,000.00	$ 50,000
B2030	Exterior Windows					
	B2031	Curtain Wall System	25,730	sf	$ 165.00	$ 4,245,450
B2050	Exterior Doors					

3-3 - RECONSTRUCT CONCOURSE E

DETAIL

		DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	B2051	Exterior Doors - Allowance	1	alw	$ 61,000.00	$ 61,000
	B2052	PBB Exit Doors	17	ea	$ 3,500.00	$ 59,500
	B2052	Exit Doors - Apron Paving Access	17	ea	$ 2,500.00	$ 42,500
	B2053	Extra for Access Control	17	lvs	$ 500.00	$ 8,500
B2070		Exterior Soffits				
	B2071	Exterior Soffits				Not Required
B30		**Roofing**				
B3010		Roof Coverings				
	B3011	SBS Modified Bitumen Roof Assembly	92,500	sf	$ 16.50	$ 1,526,250
	B3012	Parapet Detail	1,715	lf	$ 50.00	$ 85,750
	B3013	Add Allowance for Junction to Existing Roof	1	alw	$ 10,000.00	$ 10,000
B3030		Roof Openings				
	B3031	Skylight				Not Required
	B3032	Roof Hatch				Not Required
		Subtotal - Shell				***$ 24,524,525***
C		***INTERIORS***				
C10		**Interior Construction**				
C1010		Partitions				
	C1011	Interior Partitions	184,100	sf	$ 5.00	$ 920,500
	C1012	Rough Carpentry & Blocking	184,100	sf	$ 1.50	$ 276,150
	C1013	Caulking, Sealants & Firestopping	184,100	sf	$ 1.75	$ 322,175
	C1014	Misc. Metals, Bracing, Countertop Supports, Equipment Supports, etc.	184,100	sf	$ 1.25	$ 230,125
C1030		Interior Doors				
	C1031	Interior Doors - Allowance	184,100	sf	$ 2.00	$ 368,200
C1050		Specialties				
	C1051	Fire Extinguishers & Cabinets	184,100	sf	$ 0.05	$ 9,205
	C1052	Code Signage	184,100	sf	$ 0.25	$ 46,025
	C1053	Interior Wayfinding Signage	184,100	sf	$ 3.50	$ 644,350
	C1054	Miscellaneous Specialties	184,100	sf	$ 2.00	$ 368,200
C20		**Stairs**				
C2010		Stair Construction				
	C2011	Stair - Exit - PBB	17	flts	$ 25,000.00	$ 425,000

3-3 - RECONSTRUCT CONCOURSE E

DETAIL

		DESCRIPTION	QUANTITY	UNIT		UNIT COST		TOTAL
C30		**Interior Finishes**						
C3010		Interior Finishes						
	C3011	*Apron Level 01*						
	C3012	Airport Support	43,000	sf	$	45.00	$	1,935,000
	C3013	Airline Support	42,100	sf	$	45.00	$	1,894,500
	C3014	Mechanical	5,000	sf	$	35.00	$	175,000
	C3015	Vertical Circulation	500	sf	$	55.00	$	27,500
	C3016	Storage	1,000	sf	$	25.00	$	25,000
	C3017	Tug Lanes	900	sf	$	10.00	$	9,000
	C3018	*Departure Level 02*						
	C3019	Concessions (Shell Space)	3,000	sf	$	25.00	$	75,000
	C3020	Hold rooms	46,000	sf	$	75.00	$	3,450,000
	C3021	Vertical Circulation	500	sf	$	55.00	$	27,500
	C3022	Circulation	40,100	sf	$	85.00	$	3,408,500
	C3023	Restrooms - Public	2,900	sf	$	165.00	$	478,500
	C3024	Allowance for Renovation to Existing Concourse for New Expansion Connection	1,150	sf	$	55.00	$	63,250
		Subtotal - Interiors					***$***	***15,178,680***
D		***SERVICES***						
D10		**Conveying System**						
D1010		Elevators & Lifts						
	D1011	Hydraulic Passenger Elevator	18	stps	$	65,000.00	$	1,170,000
D1020		Escalators & Moving Walks						
	D1021	Escalator					Not Required	
	D1022	Moving Walks					Not Required	
D1030		Baggage Handling Equipment						
	D1031	Baggage Handling Equipment Allowance					Excluded	
D20		**Plumbing**						
D2010		Plumbing Systems						
	D2011	Apron Level 01	92,500	sf	$	9.50	$	878,750
	D2012	Departure Level 02	92,500	sf	$	15.50	$	1,433,750
D30		**HVAC**						
D3010		HVAC Systems						
	D3011	Apron Level 01	92,500	sf	$	74.00	$	6,845,000
	D3012	Departure Level 02	92,500	sf	$	74.00	$	6,845,000
D3050		Controls and Instrumentation						

3-3 - RECONSTRUCT CONCOURSE E

DETAIL

		DESCRIPTION	QUANTITY	UNIT	UNIT COST		TOTAL	
		D3051 3-3 - Reconstruct Concourse E	185,000	sf	$	8.50	$	1,572,500
	D3060	Systems Testing & Balancing						
		D3061 3-3 - Reconstruct Concourse E	185,000	sf	$	2.10	$	388,500
D40	**Fire Protection**							
	D4010	Sprinkler Systems						
		D4011 Apron Level 01	92,500	sf	$	9.25	$	855,625
		D4012 Departure Level 02	92,500	sf	$	9.25	$	855,625
D50	**Electrical**							
	D5010	Electrical Systems						
		D5011 Distribution Equipment	185,000	sf	$	3.50	$	647,500
		D5012 Feeders	185,000	sf	$	3.75	$	693,750
		D5013 Grounding and Lightning Protection	185,000	sf	$	2.00	$	370,000
		D5014 Jetway/GPU/PCA Feeders	17	ea	$	65,000.00	$	1,105,000
		D5015 Roof Mounted Apron Light	17	ea	$	30,000.00	$	510,000
		D5016 *Departure Level 02*						
		D5017 Airport Support	43,000	sf	$	25.00	$	1,075,000
		D5018 Airline Support	42,100	sf	$	25.00	$	1,052,500
		D5019 Mechanical	5,000	sf	$	50.00	$	250,000
		D5020 Vertical Circulation	500	sf	$	25.00	$	12,500
		D5021 Storage	1,000	sf	$	25.00	$	25,000
		D5022 Tug Lanes	900	sf	$	25.00	$	22,500
		D5023 *Departure Level 02*						
		D5024 Concessions (Shell Space)	3,000	sf	$	15.00	$	45,000
		D5025 Hold rooms	46,000	sf	$	49.00	$	2,254,000
		D5026 Vertical Circulation	500	sf	$	15.00	$	7,500
		D5027 Circulation	40,100	sf	$	37.00	$	1,483,700
		D5028 Restrooms - Public	2,900	sf	$	60.00	$	174,000
	D6010	Communications						
		D6011 Telecomm Room Buildout	185,000	sf	$	4.15	$	767,750
		D6012 Backbone Cabling	185,000	sf	$	2.50	$	462,500
		D6013 Communications	185,000	sf	$	3.35	$	619,750
		D6014 EVIDS Cabling and Installation	185,000	sf	$	1.55	$	286,750
		D6015 Public Address System	185,000	sf	$	2.64	$	488,400
		D6016 DAS	185,000	sf	$	6.25	$	1,156,250
		D6017 Common Use System	185,000	sf	$	2.70	$	499,500
	D7010	Electronic Safety & Security						
		D7011 Video Surveillance System	185,000	sf	$	2.90	$	536,500
		D7012 Security Access Control	185,000	sf	$	4.08	$	754,800
		D7013 Fire Alarm	185,000	sf	$	5.00	$	925,000

3-3 - RECONSTRUCT CONCOURSE E

DETAIL

		DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
		Subtotal - Services				***$ 37,069,900***
E		***EQUIPMENT & FURNISHINGS***				
E10		**Equipment**				
E1010		Equipment				
	E1011	Concessions Equipment - Not in Scope				Excluded
	E1012	Security Equipment - Not in Scope				Excluded
	E1013	FIS Equipment - Not in Scope				Excluded
	E1014	FIDS, BIDS, MUFIDS	92,500	sf	$ 2.00	$ 185,000
	E1015	Dynamic Signage				Excluded
	E1016	Misc. Equipment Allowance	185,000	sf	$ 0.50	$ 92,500
E1030		Passenger Boarding Bridges				
	E1031	New Passenger Boarding Bridge	17	ea	$1,000,000.00	$ 17,000,000
E20		**Furnishings**				
E2010		Fixed Furnishings				
	E2011	Gate Podiums & Backscreens	17	ea	$ 35,000.00	$ 595,000
	E2012	Recharge Stations				w/Electrical
	E2013	Holdroom Seating	2,125	ea	$ 1,000.00	$ 2,125,000
	E2014	Holdroom Seating Table	1,063	ea	$ 700.00	$ 743,750
	E2015	Misc. Seating	1	alw	$ 40,000.00	$ 40,000
	E2016	Kiosks				Excluded
	E2017	Window Shades				Excluded
	E2018	Misc. Casework Allowance	185,000	sf	$ 1.00	$ 185,000
		Subtotal - Equipment & Furnishings				***$ 20,966,250***
F		***SPECIAL CONSTRUCTION & DEMOLITION***				
F10		**Special Construction**				
F1010		Special Construction				
	F1011	Allowance For New Exterior Closure - Concourse E Bump Out	4,788	sf	$ 85.00	$ 406,980
F20		**Selective Building Demolition**				
F2020		Building Elements Demolition				
	F2021	Demolish Exterior Closure at Existing Building	4,025	sf	$ 35.00	$ 140,875
	F2022	Misc. Demolition	1	alw	$ 10,000.00	$ 10,000
F30		**Hazardous Material Abatement**				
F3010		Hazardous Material Abatement				
	F3011	Hazardous Material Abatement				Excluded

3-3 - RECONSTRUCT CONCOURSE E

DETAIL

		DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
		Subtotal - Special Construction & Demolition				***$ 557,855***
G		***BUILDING SITEWORK***				
G00		**Site Mobilization**				
	G0010	Site Mobilization				
	G0011	Mobilization				Incl. In M/UPS
	G0012	Safety and Security (3%)	1	ls	$ 449,500.00	$ 449,500
	G0013	Temporary Construction Items and Erosion Control (6%)	1	ls	$ 848,100.00	$ 848,100
	G0014	Drainage and Utility Allowance	1	alw	$1,285,000.00	$ 1,285,000
G10		**Site Preparation**				
	G1010	Site Demolition				
	G1011	Demolish Existing Apron Paving	10,280	sy	$ 25.00	$ 257,000
	G1012	Demolish Existing Concourse E	109,175	sf	$ 20.00	$ 2,183,500
	G1013	Demolish Existing PBB Foundations	21	ea	$ 5,000.00	$ 105,000
	G1014	Demolish Existing PBB - Bridge & Equipment	21	ea	$ 50,000.00	$ 1,050,000
	G1015	Allowance for Misc. Site Demolition	1	alw	$ 150,000.00	$ 150,000
G20		**Site Improvements**				
	G2010	Pavement / Roadways etc.				
	G2011	*Apron Paving*				
	G2012	Excavation	6,070	cy	$ 18.00	$ 109,260
	G2013	PCC Apron Pavement (17" P-501, 8" Stabilized Base, 16" P-209, Markings, Subgrade Prep.) - Infill of Existing Concourse Buildings	12,140	sy	$ 250.00	$ 3,035,000
	G2014	Pavement Markings - Service Road and Striping	5,459	sf	$ 2.50	$ 13,647
	G2015	New Apron Edge Lights (cable, conduit, counterpoise included)				Not Required
	G2016	*Surface Parking*				
	G2017	Grading	5,560	sy	$ 18.00	$ 100,080
	G2018	Asphalt on Grade Parking and Roads	11,120	sy	$ 115.00	$ 1,278,800
	G2019	Pavement Markings - Service Road and Striping	5,000	sf	$ 1.25	$ 6,250
	G2020	New Apron Edge Lights (cable, conduit, counterpoise included)				Not Required
	G2021	*Fuel Systems*				
	G2022	Sawcut Existing Apron Paving for New Fuel Lines	4,600	lf	$ 8.00	$ 36,800
	G2023	Demo Existing Apron Paving	1,022	sy	$ 35.00	$ 35,778

3-3 - RECONSTRUCT CONCOURSE E

DETAIL

		DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	G2024	PCC Apron Pavement (17" P-501, 8" Stabilized Base, 16" P-209, Markings, Subgrade Prep.) - Infill of Existing Concourse Buildings	1,022	sy	$ 350.00	$ 357,778
	G2025	New Underground Fuel Vaults	4	ea	$ 250,000.00	$ 1,000,000
	G2026	Fuel Branch Lines: 12" dia Steel Pipe Epoxy Lining, ext Coated, Welded	2,300	lf	$ 656.00	$ 1,508,800
	G2027	Fuel Branch Lines: 8" dia Steel Pipe Epoxy Lining, ext Coated, Welded	425	lf	$ 612.00	$ 260,100
	G2028	Fuel Branch Lines: 6" dia Steel Pipe Epoxy Lining, ext Coated, Welded	255	lf	$ 590.00	$ 150,450
	G2029	Radiographic Testing of Pipe Welds	2,980	lf	$ 19.00	$ 56,620
	G2030	Fuel Valves	17	ea	$ 25,000.00	$ 425,000
	G2031	Branch Line Low & High Point Drain Pit	4	ea	$ 32,500.00	$ 130,000
	G2032	Hydrant Pits and Connectors	17	ea	$ 25,000.00	$ 425,000
G2050	Landscaping					
	G2051	Landscaping Allowance				Not Required
G2060	Miscellaneous Buildings and Structures					
	G2061	Miscellaneous Buildings and Structures				Not Required
G30	**Site Mechanical Utilities**					
G3010	Site Mechanical Utilities					
	G3011	Site Mechanical Utilities	1	alw	$ 125,000.00	$ 125,000
G40	**Site Electrical Utilities**					
G4010	Site Electrical Utilities					
	G4011	Site Electrical Utilities	1	alw	$ 25,000.00	$ 25,000
G4030	Site Lighting					
	G4031	Site Lighting	1	alw	$ 25,000.00	$ 25,000
		Subtotal - Building Sitework				***$ 15,432,462***
		Subtotal			***$ 643.04***	***$ 118,961,874***
25.0%		Estimating Design Evolution				$ 29,740,468
		Subtotal - Cost of Work			***$ 803.80***	***$ 148,702,342***
		General Contractors Markups				
5.0%		Project Logistics / Phasing & Labor Factor				$ 7,435,117

3-3 - RECONSTRUCT CONCOURSE E

DETAIL

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
5.0%	General Requirements & Temporary Construction				$ 7,806,873
8.0%	General Conditions				$ 13,115,547
5.0%	General Contractors Overhead & Profit				$ 8,852,994
2.0%	Insurance				$ 3,718,257
1.0%	Payment & Performance Bonds				$ 1,896,311
0.0%	Sustainability Requirements				$ -
	Subtotal			***$ 1,035.28***	***$ 191,527,442***
0.0%	Escalation				$ -
	Opinion of Probable Construction Cost			***$ 1,035.28***	***$ 191,527,442***
21.3%	Owner's Soft Costs				$ 40,795,345
	Opinion of Probable Project Cost			***$ 1,255.80***	***$ 232,322,787***

Project Title	Landside Masterplan Update		
Location	Saint Paul International Airport		
Submittal Stage	Masterplan - Rough Order of Magnitude Estimate		
Client Name			
Client Project No.		Revision	2
Original Date	7-Apr-2023	Revision Date	25-Apr-2023
Assumed Bid Opening Date		Connico PN	4977.23.03
Project Lead	CJN / CJC	Checked by	IDK

3-4 - T2 CURB FRONTAGE IMPROVEMENTS

SUMMARY

	CONSTRUCTION SYSTEM			COST PER SQUARE FOOT	TOTAL
A	**Substructure**			$ 27.14	$ 380,000
	Standard Foundations	$	180,000		
	Slab on Grade	$	200,000		
B	**Shell**			$ 303.73	$ 4,252,200
	Superstructure	$	1,132,200		
	Exterior Closure	$	3,120,000		
	Roofing	$	-		
C	**Interiors**			$ 93.73	$ 1,312,200
	Interior Construction	$	242,200		
	Stairs	$	100,000		
	Interior Finishes	$	970,000		
D	**Services**			$ 431.72	$ 6,044,080
	Conveying	$	4,120,000		
	Baggage Handling System	$	-		
	Plumbing	$	205,000		
	HVAC	$	618,400		
	Fire Protection	$	129,500		
	Electrical	$	479,500		
	Communications	$	323,960		
	Electronic Safety & Security	$	167,720		
E	**Equipment & Furnishings**			$ 3.50	$ 49,000
	Equipment	$	35,000		
	Passenger Boarding Bridges	$	-		
	Furnishings	$	14,000		
F	**Special Construction & Demolition**			$ 1.79	$ 25,000
	Special Construction	$	-		
	Selective Building Demolition	$	25,000		
	Hazardous Material Abatement	$	-		
G	**Building Sitework**			$ -	$ -
	Site Mobilization				
	Site Preparation				
	Site Improvements				
	Site Mechanical Utilities				
	Site Electrical Utilities				
	Subtotal			***$ 861.61***	***$ 12,062,480***
25.0%	Estimating Design Evolution				$ 3,015,620

3-4 - T2 CURB FRONTAGE IMPROVEMENTS

SUMMARY

	CONSTRUCTION SYSTEM	COST PER SQUARE FOOT		TOTAL
	Subtotal - Cost of Work	***$ 1,077.01***	***$***	***15,078,100***
	General Contractors Markups			
5.0%	Project Logistics / Phasing & Labor Factor		$	753,905
5.0%	General Requirements & Temporary Construction		$	791,600
8.0%	General Conditions		$	1,329,888
5.0%	General Contractors Overhead & Profit		$	897,675
2.0%	Insurance		$	377,023
1.0%	Payment & Performance Bonds		$	192,282
0.0%	Sustainability Requirements		$	-
	Subtotal	***$ 1,387.18***	***$***	***19,420,474***
0.0%	Escalation		$	-
	Opinion of Probable Construction Cost	***$ 1,387.18***	***$***	***19,420,474***
21.3%	Owner's Soft Costs		$	4,136,561
	Opinion of Probable Project Cost	***$ 1,682.65***	***$***	***23,557,035***

Project Title	Landside Masterplan Update		
Location	Saint Paul International Airport		
Submittal Stage	Masterplan - Rough Order of Magnitude Estimate		
Client Name			
Client Project No.		Revision	2
Original Date	7-Apr-2023	Revision Date	25-Apr-2023
Assumed Bid Opening Date		Connico PN	4977.23.03
Project Lead	CJN / CJC	Checked by	IDK

3-4 - T2 CURB FRONTAGE IMPROVEMENTS

DETAIL

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
AREA ANALYSIS				
3-4 - T2 Curb Frontage Improvements				
Apron Level 01	2,000	sf		
Vertical Circulation			2,000 sf	
Departure Level 02	12,000	sf		
Vertical Circulation			2,000 sf	
Curb Access - Infill			10,000 sf	
Total Area	**14,000**	**sf**	**14,000 sf**	

A SUBSTRUCTURE				
A10 Foundations				
A1010 Standard Foundations				
A1015 Allowance for Foundations Inside Terminal for Level 2 Curb Access Infill	1	alw	$ 180,000.00	$ 180,000
A1050 Slab on Grade				
A1051 New Elevator Pits - Existing Terminal	4	ea	$ 50,000.00	$ 200,000
Subtotal - Substructure				***$ 380,000***
B SHELL				
B10 Superstructure				
B1010 Floor Construction				
B1011 Steel Floor Structure	108	tns	$ 7,500.00	$ 810,000
B1012 Steel Floor Deck	12,000	sf	$ 8.00	$ 96,000
B1013 Concrete Fill to Steel Floor Deck	12,000	sf	$ 8.25	$ 99,000
B1014 Miscellaneous Steel (5%)	5	tns	$ 8,000.00	$ 43,200
B1015 Elevated Floor Slab Fireproofing	12,000	sf	$ 7.00	$ 84,000
B20 Exterior Closure				

3-4 - T2 CURB FRONTAGE IMPROVEMENTS

DETAIL

		DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
B2010	Exterior Walls					
	B2011	Allowance for Exterior Skin Adjustment for New Curb Access	20,000	sf	$ 150.00	$ 3,000,000
B2030	Exterior Windows					
	B2031	Curtain Wall System				Incl. Above
B2050	Exterior Doors					
	B2051	New Entrance Access Doors	4	ea	$ 30,000.00	$ 120,000
B2070	Exterior Soffits					
	B2071	Exterior Soffits				Not Required
B30	**Roofing**					
B3010	Roof Coverings					
	B3011	Roof Coverings				Not Required
		Subtotal - Shell				***$ 4,252,200***
C	***INTERIORS***					
C10	**Interior Construction**					
C1010	Partitions					
	C1011	Interior Partitions	14,000	sf	$ 5.00	$ 70,000
	C1012	Rough Carpentry & Blocking	14,000	sf	$ 1.50	$ 21,000
	C1013	Caulking, Sealants & Firestopping	14,000	sf	$ 1.75	$ 24,500
	C1014	Misc. Metals, Bracing, Countertop Supports, Equipment Supports, etc.	14,000	sf	$ 1.25	$ 17,500
C1030	Interior Doors					
	C1031	Interior Doors - Allowance	14,000	sf	$ 2.00	$ 28,000
C1050	Specialties					
	C1051	Fire Extinguishers & Cabinets	14,000	sf	$ 0.05	$ 700
	C1052	Code Signage	14,000	sf	$ 0.25	$ 3,500
	C1053	Interior Wayfinding Signage	14,000	sf	$ 3.50	$ 49,000
	C1054	Miscellaneous Specialties	14,000	sf	$ 2.00	$ 28,000
C20	**Stairs**					
C2010	Stair Construction					
	C2011	Stair - Curb Assess Level	4	flts	$ 25,000.00	$ 100,000

3-4 - T2 CURB FRONTAGE IMPROVEMENTS

DETAIL

		DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
C30		**Interior Finishes**				
	C3010	Interior Finishes				
	C3011	*Apron Level 01*				
	C3012	Vertical Circulation	2,000	sf	$ 55.00	$ 110,000
	C3013	*Departure Level 02*				
	C3014	Vertical Circulation	2,000	sf	$ 55.00	$ 110,000
	C3015	Curb Access - Infill	10,000	sf	$ 75.00	$ 750,000
		Subtotal - Interiors				***$ 1,312,200***
D		***SERVICES***				
D10		**Conveying System**				
	D1010	Elevators & Lifts				
	D1011	Hydraulic Passenger Elevator	8	stps	$ 65,000.00	$ 520,000
	D1020	Escalators & Moving Walks				
	D1021	Escalator	8	ea	$ 450,000.00	$ 3,600,000
	D1022	Moving Walks				Not Required
	D1030	Baggage Handling Equipment				
	D1031	Baggage Handling Equipment Allowance				Excluded
D20		**Plumbing**				
	D2010	Plumbing Systems				
	D2011	Apron Level 01	2,000	sf	$ 9.50	$ 19,000
	D2012	Departure Level 02	12,000	sf	$ 15.50	$ 186,000
D30		**HVAC**				
	D3010	HVAC Systems				
	D3011	Apron Level 01	2,000	sf	$ 25.00	$ 50,000
	D3012	Departure Level 02	12,000	sf	$ 35.00	$ 420,000
	D3050	Controls and Instrumentation				
	D3051	3-4 - T2 Curb Frontage Improvements	14,000	sf	$ 8.50	$ 119,000
	D3060	Systems Testing & Balancing				
	D3061	3-4 - T2 Curb Frontage Improvements	14,000	sf	$ 2.10	$ 29,400
D40		**Fire Protection**				
	D4010	Sprinkler Systems				

3-4 - T2 CURB FRONTAGE IMPROVEMENTS

DETAIL

		DESCRIPTION	QUANTITY	UNIT		UNIT COST		TOTAL
	D4011	Apron Level 01	2,000	sf	$	9.25	$	18,500
	D4012	Departure Level 02	12,000	sf	$	9.25	$	111,000
D50	**Electrical**							
D5010	Electrical Systems							
	D5011	Distribution Equipment	14,000	sf	$	3.50	$	49,000
	D5012	Feeders	14,000	sf	$	3.75	$	52,500
	D5013	Grounding and Lightning Protection	14,000	sf	$	2.00	$	28,000
	D5014	*Apron Level 01*						
	D5015	Vertical Circulation	2,000	sf	$	25.00	$	50,000
	D5016	*Departure Level 02*						
	D5017	Vertical Circulation	2,000	sf	$	25.00	$	50,000
	D5018	Curb Access - Infill	10,000	sf	$	25.00	$	250,000
D6010	Communications							
	D6011	Telecomm Room Buildout	14,000	sf	$	4.15	$	58,100
	D6012	Backbone Cabling	14,000	sf	$	2.50	$	35,000
	D6013	Communications	14,000	sf	$	3.35	$	46,900
	D6014	EVIDS Cabling and Installation	14,000	sf	$	1.55	$	21,700
	D6015	Public Address System	14,000	sf	$	2.64	$	36,960
	D6016	DAS	14,000	sf	$	6.25	$	87,500
	D6017	Common Use System	14,000	sf	$	2.70	$	37,800
D7010	Electronic Safety & Security							
	D7011	Video Surveillance System	14,000	sf	$	2.90	$	40,600
	D7012	Security Access Control	14,000	sf	$	4.08	$	57,120
	D7013	Fire Alarm	14,000	sf	$	5.00	$	70,000
		Subtotal - Services					***$***	***6,044,080***
E	***EQUIPMENT & FURNISHINGS***							
E10	**Equipment**							
E1010	Equipment							
	E1011	Signage	14,000	sf	$	2.00	$	28,000
	E1012	Misc. Equipment Allowance	14,000	sf	$	0.50	$	7,000
E20	**Furnishings**							
E2010	Fixed Furnishings							
	E2011	Misc. Casework Allowance	14,000	sf	$	1.00	$	14,000
		Subtotal - Equipment & Furnishings					***$***	***49,000***
F	***SPECIAL CONSTRUCTION & DEMOLITION***							
F10	**Special Construction**							

3-4 - T2 CURB FRONTAGE IMPROVEMENTS

DETAIL

		DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
F1010		Special Construction				
	F1011	Special Construction				Not Required
F20		**Selective Building Demolition**				
F2020		Building Elements Demolition				
	F2021	Demolish Exterior Closure at Existing Building	1	alw	$ 25,000.00	$ 25,000
F30		**Hazardous Material Abatement**				
F3010		Hazardous Material Abatement				
	F3011	Hazardous Material Abatement				Excluded
		Subtotal - Special Construction & Demolition				***$ 25,000***
G		***BUILDING SITEWORK***				W/Civil
		Subtotal - Building Sitework				***$ -***
		Subtotal			***$ 861.61***	***$ 12,062,480***
25.0%		Estimating Design Evolution				$ 3,015,620
		Subtotal - Cost of Work			***$ 1,077.01***	***$ 15,078,100***
		General Contractors Markups				
5.0%		Project Logistics / Phasing & Labor Factor				$ 753,905
5.0%		General Requirements & Temporary Construction				$ 791,600
8.0%		General Conditions				$ 1,329,888
5.0%		General Contractors Overhead & Profit				$ 897,675
2.0%		Insurance				$ 377,023
1.0%		Payment & Performance Bonds				$ 192,282
0.0%		Sustainability Requirements				$ -
		Subtotal			***$ 1,387.18***	***$ 19,420,474***
0.0%		Escalation				$ -
		Opinion of Probable Construction Cost			***$ 1,387.18***	***$ 19,420,474***
21.3%		Owner's Soft Costs				$ 4,136,561

3-4 - T2 CURB FRONTAGE IMPROVEMENTS

DETAIL

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
Opinion of Probable Project Cost			***$ 1,682.65***	***$ 23,557,035***

Project Title	Landside Masterplan Update		
Location	Saint Paul International Airport		
Submittal Stage	Masterplan - Rough Order of Magnitude Estimate		
Client Name			
Client Project No.		Revision	2
Original Date	7-Apr-2023	Revision Date	25-Apr-2023
Assumed Bid Opening Date		Connico PN	4977.23.03
Project Lead	CJN / CJC	Checked by	IDK

3-5 - T1-T2 APM TUNNEL CONSTRUCTION

SUMMARY

	CONSTRUCTION SYSTEM				TOTAL
A	**Substructure**			$	376,028
	Standard Foundations	$	235,250		
	Special Foundations	$	-		
	Slab on Grade	$	140,778		
B	**Shell**			$	1,927,968
	Superstructure	$	1,173,240		
	Exterior Closure	$	669,478		
	Roofing	$	85,250		
C	**Interiors**			$	1,151,350
	Interior Construction	$	207,600		
	Stairs	$	150,000		
	Interior Finishes	$	793,750		
D	**Services**			$	4,476,240
	Conveying	$	2,190,000		
	Baggage Handling System	$	-		
	Plumbing	$	114,000		
	HVAC	$	1,015,200		
	Fire Protection	$	111,000		
	Electrical	$	657,000		
	Communications	$	245,280		
	Electronic Safety & Security	$	143,760		
E	**Equipment & Furnishings**			$	42,000
	Equipment	$	30,000		
	Passenger Boarding Bridges	$	-		
	Furnishings	$	12,000		
F	**Special Construction & Demolition**			$	31,625
	Special Construction	$	-		
	Selective Building Demolition	$	31,625		
	Hazardous Material Abatement	$	-		
G	**Building Sitework**			$	154,681,645
	Site Mobilization	$	19,752,400		
	Site Improvements	$	134,754,245		
	Site Mechanical Utilities	$	50,000		
	Site Electrical Utilities	$	125,000		
	Subtotal			***$***	***162,686,855***
25.0%	Estimating Design Evolution			$	40,671,714

3-5 - T1-T2 APM TUNNEL CONSTRUCTION

SUMMARY

	CONSTRUCTION SYSTEM		TOTAL
	Subtotal - Cost of Work	***$***	***203,358,569***
	General Contractors Markups		
5.0%	Project Logistics / Phasing & Labor Factor	$	10,167,928
5.0%	General Requirements & Temporary Construction	$	10,676,325
8.0%	General Conditions	$	17,936,226
5.0%	General Contractors Overhead & Profit	$	12,106,952
2.0%	Insurance	$	5,084,920
1.0%	Payment & Performance Bonds	$	2,593,309
0.0%	Sustainability Requirements	$	-
	Subtotal	***$***	***261,924,230***
0.0%	Escalation	$	-
	Opinion of Probable Construction Cost	***$***	***261,924,230***
21.3%	Owner's Soft Costs	$	55,789,861
	Opinion of Probable Project Cost	***$***	***317,714,091***

Project Title	Landside Masterplan Update		
Location	Saint Paul International Airport		
Submittal Stage	Masterplan - Rough Order of Magnitude Estimate		
Client Name			
Client Project No.		Revision	2
Original Date	7-Apr-2023	Revision Date	25-Apr-2023
Assumed Bid Opening Date		Connico PN	4977.23.03
Project Lead	CJN / CJC	Checked by	IDK

3-5 - T1-T2 APM TUNNEL CONSTRUCTION

DETAIL

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL

AREA ANALYSIS

APM Tunnel and Term 1 & 2 Vertical Circulation			
Tunnel Level	4,000 sf		
Term 1 - Vertical Circulation		2,000 sf	
Term 2 - Vertical Circulation		2,000 sf	
Apron Level	4,000 sf		
Term 1 - Vertical Circulation		2,000 sf	
Term 2 - Vertical Circulation		2,000 sf	
Concourse Level	4,000 sf		
Term 1 - Vertical Circulation		2,000 sf	
Term 2 - Vertical Circulation		2,000 sf	
Total Area	**12,000 sf**	**12,000 sf**	

A SUBSTRUCTURE

A10 Foundations

Code	Description	Quantity	Unit	Unit Cost	Total
A1010	Standard Foundations				
A1011	Column Foundations, Wall Foundations, Grade Beams, Foundation Wall	4,000	sf	$ 50.00	$ 200,000
A1012	Extra for Rock Excavation				Not Required
A1013	Perimeter Drainage	210	lf	$ 25.00	$ 5,250
A1014	Dewatering	1	ls	$ 10,000.00	$ 10,000
A1015	Add Allowance for Preparing and Connecting into Existing Foundations	1	alw	$ 20,000.00	$ 20,000
A1030	Special Foundations				
A1031	Special Foundations				Not Required
A1050	Slab on Grade				
A1051	Slab on Grade	4,000	sf	$ 10.00	$ 40,000

3-5 - T1-T2 APM TUNNEL CONSTRUCTION

DETAIL

		DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	A1052	Elevator & Escalator Pits	6	ea	$ 15,000.00	$ 90,000
	A1053	Misc. Trenches, Pits & Bases	4	cy	$ 750.00	$ 2,778
	A1054	Under-slab Drainage & Insulation	4,000	sf	$ 2.00	$ 8,000
		Subtotal - Substructure				***$ 376,028***
B		***SHELL***				
B10		**Superstructure**				
B1010		Floor Construction				
	B1011	Steel Floor Structure	92	tns	$ 6,500.00	$ 598,000
	B1012	Steel Floor Deck	8,000	sf	$ 7.50	$ 60,000
	B1013	Concrete Fill to Steel Floor Deck	8,000	sf	$ 7.75	$ 62,000
	B1014	Supplemental Framing at Exterior Closure	4	tns	$ 7,000.00	$ 29,190
	B1015	Miscellaneous Steel (5%)	5	tns	$ 7,000.00	$ 32,200
	B1016	Elevated Floor Slab Fireproofing	8,000	sf	$ 7.00	$ 56,000
	B1017	Expansion Joint at Existing Structure	75	lf	$ 150.00	$ 11,250
	B1018	Add Allowance for Misc. Steel Framing at Junction to Existing Floor Structure	1	alw	$ 19,000.00	$ 19,000
B1030		Roof Construction				
	B1031	Steel Roof Structure	36	tns	$ 6,500.00	$ 234,000
	B1032	Steel Roof Deck	4,000	sf	$ 6.50	$ 26,000
	B1033	Miscellaneous Steel (5%)	2	tns	$ 7,000.00	$ 12,600
	B1034	Roof Fireproofing	4,000	sf	$ 7.00	$ 28,000
	B1035	Add Allowance for Misc. Steel Framing at Junction to Existing Roof Structure	1	alw	$ 5,000.00	$ 5,000
B20		**Exterior Closure**				
B2010		Exterior Walls				
	B2011	CMU Walls, incl. Back-up System	3,180	sf	$ 40.00	$ 127,200
	B2012	Precast Concrete, incl. Back-up System	370	sf	$ 45.00	$ 16,650
	B2013	Metal Wall Panel, incl. Back-up System	370	sf	$ 65.00	$ 24,050
	B2014	Edge Detail at Roof	185	lf	$ 75.00	$ 13,875
	B2015	Caulking & Sealant to Exteriors	7,030	sf	$ 1.75	$ 12,303
	B2016	Abutment Detailing at Existing Building - Patch, Repair, Refinish Exterior Walls Where Disturbed by New Construction	1	alw	$ 10,000.00	$ 10,000
B2030		Exterior Windows				
	B2031	Curtain Wall System	2,780	sf	$ 165.00	$ 458,700
B2050		Exterior Doors				
	B2051	Exterior Doors - Allowance	1	alw	$ 6,700.00	$ 6,700

3-5 - T1-T2 APM TUNNEL CONSTRUCTION

DETAIL

DESCRIPTION			QUANTITY	UNIT	UNIT COST	TOTAL
B2070	Exterior Soffits					
	B2071	Exterior Soffits				Not Required
B30	**Roofing**					
B3010	Roof Coverings					
	B3011	SBS Modified Bitumen Roof Assembly	4,000	sf	$ 16.50	$ 66,000
	B3012	Parapet Detail	185	lf	$ 50.00	$ 9,250
	B3013	Add Allowance for Junction to Existing Roof	1	alw	$ 10,000.00	$ 10,000
B3030	Roof Openings					
	B3031	Skylight				Not Required
	B3032	Roof Hatch				Not Required
		Subtotal - Shell				***$ 1,927,968***
C	***INTERIORS***					
C10	**Interior Construction**					
C1010	Partitions					
	C1011	Interior Partitions	12,000	sf	$ 5.00	$ 60,000
	C1012	Rough Carpentry & Blocking	12,000	sf	$ 1.50	$ 18,000
	C1013	Caulking, Sealants & Firestopping	12,000	sf	$ 1.75	$ 21,000
	C1014	Misc. Metals, Bracing, Countertop Supports, Equipment Supports, etc.	12,000	sf	$ 1.25	$ 15,000
C1030	Interior Doors					
	C1031	Interior Doors - Allowance	12,000	sf	$ 2.00	$ 24,000
C1050	Specialties					
	C1051	Fire Extinguishers & Cabinets	12,000	sf	$ 0.05	$ 600
	C1052	Code Signage	12,000	sf	$ 0.25	$ 3,000
	C1053	Interior Wayfinding Signage	12,000	sf	$ 3.50	$ 42,000
	C1054	Miscellaneous Specialties	12,000	sf	$ 2.00	$ 24,000
C20	**Stairs**					
C2010	Stair Construction					
	C2011	Stair - Vertical Circulation	6	flts	$ 25,000.00	$ 150,000
C30	**Interior Finishes**					
C3010	Interior Finishes					
	C3011	*Tunnel Level*				
	C3012	Term 1 - Vertical Circulation	2,000	sf	$ 65.00	$ 130,000

3-5 - T1-T2 APM TUNNEL CONSTRUCTION

DETAIL

		DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	C3013	Term 2 - Vertical Circulation	2,000	sf	$ 65.00	$ 130,000
	C3014	*Apron Level*				
	C3015	Term 1 - Vertical Circulation	2,000	sf	$ 65.00	$ 130,000
	C3016	Term 2 - Vertical Circulation	2,000	sf	$ 65.00	$ 130,000
	C3017	*Concourse Level*				
	C3018	Term 1 - Vertical Circulation	2,000	sf	$ 65.00	$ 130,000
	C3019	Term 2 - Vertical Circulation	2,000	sf	$ 65.00	$ 130,000
	C3020	Allowance for Renovation to Existing Concourse for New Expansion Connection	250	sf	$ 55.00	$ 13,750
		Subtotal - Interiors				***$ 1,151,350***
D	***SERVICES***					
D10	**Conveying System**					
D1010	Elevators & Lifts					
	D1011	Hydraulic Passenger Elevator	6	stps	$ 65,000.00	$ 390,000
D1020	Escalators & Moving Walks					
	D1021	Escalator	4	ea	$ 450,000.00	$ 1,800,000
	D1022	Moving Walks				Not Required
D1030	Baggage Handling Equipment					
	D1031	Baggage Handling Equipment Allowance				Excluded
D20	**Plumbing**					
D2010	Plumbing Systems					
	D2011	Vertical Circulation	12,000	sf	$ 9.50	$ 114,000
D30	**HVAC**					
D3010	HVAC Systems					
	D3011	Vertical Circulation	12,000	sf	$ 74.00	$ 888,000
D3050	Controls and Instrumentation					
	D3051	Vertical Circulation	12,000	sf	$ 8.50	$ 102,000
D3060	Systems Testing & Balancing					
	D3061	Vertical Circulation	12,000	sf	$ 2.10	$ 25,200
D40	**Fire Protection**					
D4010	Sprinkler Systems					
	D4011	Vertical Circulation	12,000	sf	$ 9.25	$ 111,000

3-5 - T1-T2 APM TUNNEL CONSTRUCTION

DETAIL

		DESCRIPTION	QUANTITY	UNIT	UNIT COST		TOTAL
D50		**Electrical**					
D5010		Electrical Systems					
	D5011	Distribution Equipment	12,000	sf	$	6.00	$ 72,000
	D5012	Feeders	12,000	sf	$	8.75	$ 105,000
	D5013	Grounding and Lightning Protection	12,000	sf	$	3.00	$ 36,000
	D5014	*Concourse Level*					
	D5015	Term 1 - Vertical Circulation	2,000	sf	$	37.00	$ 74,000
	D5016	Term 2 - Vertical Circulation	2,000	sf	$	37.00	$ 74,000
	D5017	*Apron Level*					
	D5018	Term 1 - Vertical Circulation	2,000	sf	$	37.00	$ 74,000
	D5019	Term 2 - Vertical Circulation	2,000	sf	$	37.00	$ 74,000
	D5020	*Concourse Level*					
	D5021	Term 1 - Vertical Circulation	2,000	sf	$	37.00	$ 74,000
	D5022	Term 2 - Vertical Circulation	2,000	sf	$	37.00	$ 74,000
D6010		Communications					
	D6011	Telecomm Room Buildout	12,000	sf	$	4.15	$ 49,800
	D6012	Backbone Cabling	12,000	sf	$	2.50	$ 30,000
	D6013	Communications	12,000	sf	$	3.35	$ 40,200
	D6014	EVIDS Cabling and Installation	12,000	sf	$	1.55	$ 18,600
	D6015	Public Address System	12,000	sf	$	2.64	$ 31,680
	D6016	DAS	12,000	sf	$	6.25	$ 75,000
D7010		Electronic Safety & Security					
	D7011	Video Surveillance System	12,000	sf	$	2.90	$ 34,800
	D7012	Security Access Control	12,000	sf	$	4.08	$ 48,960
	D7013	Fire Alarm	12,000	sf	$	5.00	$ 60,000
		Subtotal - Services					***$ 4,476,240***
E		***EQUIPMENT & FURNISHINGS***					
E10		**Equipment**					
E1010		Equipment					
	E1011	FIDS, BIDS, MUFIDS	12,000	sf	$	2.00	$ 24,000
	E1012	Dynamic Signage					Excluded
	E1013	Misc. Equipment Allowance	12,000	sf	$	0.50	$ 6,000
E1030		Passenger Boarding Bridges					
	E1031	New Passenger Boarding Bridge					Not Required
E20		**Furnishings**					
E2010		Fixed Furnishings					
	E2011	Misc. Casework Allowance	12,000	sf	$	1.00	$ 12,000

3-5 - T1-T2 APM TUNNEL CONSTRUCTION

DETAIL

		DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
		Subtotal - Equipment & Furnishings				***$ 42,000***
F		***SPECIAL CONSTRUCTION & DEMOLITION***				
F10		**Special Construction**				
F1010		Special Construction				
	F1011	Special Construction				Not Required
F20		**Selective Building Demolition**				
F2020		Building Elements Demolition				
	F2021	Demolish Exterior Closure at Existing Building	875	sf	$ 35.00	$ 30,625
	F2022	Misc. Demolition	1	alw	$ 1,000.00	$ 1,000
F30		**Hazardous Material Abatement**				
F3010		Hazardous Material Abatement				
	F3011	Hazardous Material Abatement				Excluded
		Subtotal - Special Construction & Demolition				***$ 31,625***
G		***BUILDING SITEWORK***				
G00		**Site Mobilization**				
G0010		Site Mobilization				
	G0011	Mobilization				Incl. In M/UPS
	G0012	Safety and Security (3%)	1	ls	$ 4,505,300.00	$ 4,505,300
	G0013	Temporary Construction Items and Erosion Control (6%)	1	ls	$ 8,500,600.00	$ 8,500,600
	G0014	Drainage and Utility Allowance	1	alw	$ 6,746,500.00	$ 6,746,500
G20		**Site Improvements**				
G2010		APM Tunnel				
	G2011	*Demolition*				
	G2012	Demo Existing Apron Paving	27,328	sy	$ 25.00	$ 683,200
	G2013	Excavation and Disposal of Surplus - On Site	688,882	cy	$ 18.50	$ 12,744,317
	G2014	Allowance for Rock Excavation	1	alw	$ 637,215.85	$ 637,216
	G2015	Backfill Sides of Tunnel	276,160	cy	$ 12.50	$ 3,451,997
	G2016	Apron Paving - Trench Fill-in	27,328	sy	$ 300.00	$ 8,198,400
	G2017	*Special Foundations*				
	G2018	Auger Cast Piles 18" Dia; avg 55' depth	32,047	lf	$ 165.00	$ 5,287,755
	G2019	Allowance for Rock Excavation	1	alw	$ 100,000.00	$ 100,000
	G2020	*Tunnel Bottom Slab*				
	G2021	Granular Subbase to U/S of Tunnel Floor	5,503	cy	$ 35.00	$ 192,604
	G2022	24" Thick Concrete in Tunnel Floor - 4.000PSI	22,012	cy	$ 185.00	$ 4,072,193

3-5 - T1-T2 APM TUNNEL CONSTRUCTION

DETAIL

		DESCRIPTION	QUANTITY	UNIT		UNIT COST		TOTAL
	G2023	Reinforcing to Tunnel Floor - #10 @ 10" OC EW T&B	3,068	tn	$	2,600.00	$	7,977,260
	G2024	Floor Waterproofing	297,160	sf	$	8.00	$	2,377,280
	G2025	Finish Surface Cure & Seal	297,160	sf	$	3.00	$	891,480
	G2026	Trench Drain - Water Drain	13,110	lf	$	250.00	$	3,277,500
	G2027	Dewatering	1	ls	$	100,000.00	$	100,000
	G2028	*Basement Walls*						
	G2029	Formwork for Concrete Wall	943,920	sf	$	18.00	$	16,990,560
	G2030	24" Thick Concrete in Walls - 4,000PSI	40,204	cy	$	185.00	$	7,437,740
	G2031	Elastomeric Waterproof Poly Guard & Meadows Blindside Waterproofing	235,980	sf	$	8.50	$	2,005,830
	G2032	Reinforcing to Concrete Wall - #10 @ 10" OC EW T&B	4,873	ton	$	2,600.00	$	12,669,766
	G2033	Rub; Point & patch concrete walls	943,920	sf	$	3.00	$	2,831,760
	G2034	Water Stop - 3/8" x 6" PVC Waterstop	17,480	lf	$	9.62	$	168,203
	G2035	*Tunnel Roof Slab*						
	G2036	Formwork to Underside of Slab Including Propping	297,160	sf	$	18.00	$	5,348,880
	G2037	24" Thick Concrete to Elevated Slab - 4,000PSI	37,123	cy	$	185.00	$	6,867,748
	G2038	Reinforcing to Concrete Roof - #10 @ 10" OC EW T&B	3,068	ton	$	2,600.00	$	7,977,260
	G2039	Power Float Finish to Concrete Slabs	297,160	sf	$	2.10	$	624,036
	G2040	Elastomeric Waterproof Poly Guard & Meadows Blindside Waterproofing	297,160	sf	$	8.50	$	2,525,860
	G2041	Electrical, HVAC and Interiors	297,160	sf	$	65.00	$	19,315,400
G2050	Landscaping							
	G2051	Landscaping Allowance						Not Required
G2060	Miscellaneous Buildings and Structures							
	G2061	Miscellaneous Buildings and Structures						Not Required
G30	**Site Mechanical Utilities**							
G3010	Site Mechanical Utilities							
	G3011	Site Mechanical Utilities	1	alw	$	50,000.00	$	50,000
G40	**Site Electrical Utilities**							
G4010	Site Electrical Utilities							
	G4011	Site Electrical Utilities	1	alw	$	125,000.00	$	125,000
G4030	Site Lighting							
	G4031	Site Lighting						Not Required
		Subtotal - Building Sitework					***$***	***154,681,645***

3-5 - T1-T2 APM TUNNEL CONSTRUCTION

DETAIL

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	Subtotal				***$ 162,686,855***
25.0%	Estimating Design Evolution				$ 40,671,714
	Subtotal - Cost of Work				***$ 203,358,569***
	General Contractors Markups				
5.0%	Project Logistics / Phasing & Labor Factor				$ 10,167,928
5.0%	General Requirements & Temporary Construction				$ 10,676,325
8.0%	General Conditions				$ 17,936,226
5.0%	General Contractors Overhead & Profit				$ 12,106,952
2.0%	Insurance				$ 5,084,920
1.0%	Payment & Performance Bonds				$ 2,593,309
0.0%	Sustainability Requirements				$ -
	Subtotal				***$ 261,924,230***
0.0%	Escalation				$ -
	Opinion of Probable Construction Cost				***$ 261,924,230***
21.3%	Owner's Soft Costs				$ 55,789,861
	Opinion of Probable Project Cost				***$ 317,714,091***

MSP 2040 LONG-TERM PLAN

LANDSIDE ELEMENTS

PROJECTS	SUB-TOTAL CONSTRUCTION	ESTIMATED DESIGN EVOLUTION (25%) [2]	GENERAL CONSTRCTORS MARKUPS (28.8%) [3]	TOTAL CONSTRUCTION COST	ESCALATION (0%)	OWNER'S SOFT COSTS (21.3%) [4]	TOTAL
NEAR-TERM PROJECTS:							
1-6: USPS REDEVELOPMENT	$317,812,893	$79,453,223	$114,412,641	$511,678,758	$0	$108,987,575	**$620,666,333**
SITE DEMOLITION AND MULTI-USE DEVELOPMENT [1]	*$307,412,893*						
RED RAMP LEVEL 1 REDEVELOPMENT	*$10,400,000*						
1-7 - ORANGE RAMP NORTH EXPANSION AND OUTRIGGER EXPANSIONS	$192,200,000	$48,050,000	$69,192,000	$309,442,000	$0	$65,911,146	**$375,353,146**
MID-TERM PROJECTS:							
2-9 - TERMINAL 1 2-LEVEL ROADWAY RECONSTRUCTION	$136,194,500	$34,048,625	$49,030,020	$219,273,145	$0	$46,705,180	**$265,978,325**
2-10 - GREEN/GOLD RAMPS REDEVELOPMENT	$659,783,660	$164,945,915	$237,522,118	$1,062,251,693	$0	$226,259,611	**$1,288,511,303**
GREEN/GOLD RAMPS DEMOLITION	*$41,900,500*						
PARKING AND ROADWAY DEVELOPMENT	*$238,684,500*						
FIS BUILDING AND SKYWAYS DEVELOPMENT [1]	*$379,198,660*						
2-11 - 34TH AVENUE PARKING DEVELOPMENT	$202,800,000	$50,700,000	$73,008,000	$326,508,000	$0	$69,546,204	**$396,054,204**
2-12 - TH 5 INTERCHANGE RECONSTRUCTION	$39,295,750	$9,823,938	$14,146,470	$63,266,158	$0	$13,475,692	**$76,741,849**
LONG—TERM PROJECTS:							
3-4 - T2 CURBFRONTAGE IMPROVEMENTS	$68,627,980	$17,156,995	$24,706,073	$110,491,048	$0	$23,534,593	**$134,025,641**
TERMINAL BUILDING IMPROVEMENTS [1]	*$12,062,480*						
ROADWAY-ENABLING DEMOLITION	*$13,234,000*						
2-LEVEL ROADWAY CONSTRUCTION	*$43,331,500*						
3-9 - ORANGE AND PURPLE RAMPS VERTICAL EXPANSION	$224,304,000	$56,076,000	$80,749,440	$361,129,440	$0	$76,920,571	**$438,050,011**
3-10 34TH AVENUE AND EAST 70TH STREET RECONSTRUCTION	$14,898,000	$3,724,500	$5,363,280	$23,985,780	$0	$5,108,971	**$29,094,751**

NOTES:

[1] *Estimate component prepared by Connico.*
[2] *Design evolution percentage (25%) provided by Connico. Calculated as percent of sub-total for construction.*
[3] *General contractor markup percentage provided by Connico. Contractor's markups are accumulative resulting in a total of approximately 28.8% of the sub-total of construction plus design evolution.*
[4] *Owner's soft costs percentage (21.3%) provided by Connico. Calculated as percent of total construction cost.*

Appendix F: Stakeholder Engagement Program Documentation

MSP 2040 Long Term Comprehensive Plan: Stakeholder Engagement Program

This document outlines objectives, approach and communication efforts for engaging stakeholders during the MSP 2040 Long Term Comprehensive Plan.

Objectives

Broadly, the Stakeholder Engagement Program is intended to benefit both the MAC and the MAC's stakeholders. It will set a framework for an inclusive process so that interested stakeholders can be informed and involved throughout the planning process. Additionally, Stakeholder Engagement will be designed to help MAC achieve the following objectives:

- **Fulfill the MAC's legislative purpose to:**
  - Promote air navigation and transportation, international, national, state, and local, in and through the State of Minnesota.
  - Promote the efficient, safe and economical handling of air commerce and to assure the inclusion of the State in national and international programs of air transportation. To those ends, develop the full potentialities of the metropolitan area as an aviation center.
  - Assure minimum environmental impact from air navigation and transportation for residents of the metropolitan area, promote the overall goals of the State's environmental policies and minimize the public's exposure to noise and safety hazards around airports.
- **Conduct planning for future airport facilities in a responsible and transparent manner that includes specific engagement processes designed to build trust and establish a shared understanding of airport, traveler, and community needs**
  - Actively listen to stakeholder ideas and topics of interest
  - Strengthen MAC's relationship with its stakeholder groups
  - Establish a system to reach a wide variety of stakeholders
  - Communicate the services and benefits the MAC's system of airports delivers to the region
- **Support and document a thorough and effective public involvement process**

Approach

Stakeholder Advisory Panel

MAC staff will convene a Stakeholder Advisory Panel (Panel) consisting of key stakeholders. The objectives of the Panel are to present information about the planning process to major stakeholder groups and to ensure that those tasked with making planning decisions hear and consider public concerns and aspirations related to the process.

Specifically, the Panel is an advisory board representing major stakeholder groups that have an interest in the planning process. The Panel serves several important functions, including:

- Representing a broad range of stakeholder groups;

- Receiving information about the planning process; and
- Communicating public concerns and aspirations as the voice of key stakeholders.

It is important to note that the Panel serves only in an advisory capacity. While the Panel may offer opinions, advice, and guidance, the MAC is solely responsible for all planning decisions.

The MAC will work with key stakeholder groups to identify specific members to serve on the Panel and then extend an invitation to participate. Key stakeholder groups include:

- Local community leaders and city planners
- MSP airport travelers
- MSP airlines
- Federal Aviation Administration
- Transportation Security Administration
- Regional business representatives

Project Milestones

In order to create an inclusive and transparent process, and ensure a regular rhythm of public involvement, the planning process will be divided into four distinct phases, or "milestones." These milestones will culminate in a public event. Four public events will be held to share information about each phase and receive input. Input received during each milestone's public event will help inform the remaining phases of the planning process.

The Stakeholder Engagement Plan will involve four project milestones:

1) LTCP Introduction, Planning Goals & Objectives
2) MSP Aviation Activity Forecasts, Existing Conditions
3) Facility Requirements (Gap Analysis), Alternative Design Concepts
4) Environmental and Land Use Planning Evaluation, Review Draft LTCP and Public Comment Period

Survey Input

At the start of the planning effort, the MAC will be using an online polling software to reach an audience wider than typical public meeting audiences. Responses allow for purposeful information, offering greater value for what the planning team should consider as it begins the initiative.

MAC's objectives for using this platform during the MSP Long-Term Plan are:

1. To achieve balanced and broad participation across a range of stakeholders and members of the public.
2. To receive purposeful information offering greater value for ongoing planning considerations well beyond complaint-based feedback.
3. To increase transparency and structured communication.
4. To assess the value this platform would bring for future initiatives, strategies and policies.

Communication

Project Website

The MAC will create and maintain a project website to share information with the general public. The project website will include:

- Public event information
- Public project documents (such as technical reports, newsletters, presentations, fact sheets, etc.)
- Frequently asked questions
- How to contact the project team
- How to sign up for E-News subscription service (see below)
- Project timeline

Project Newsletters

A detailed project newsletter will be created and distributed through a GovDelivery subscription service. Individuals can sign up for the subscription on the project website. Once signed-up, they will receive regular project updates and public meeting events. Newsletters will also be posted on the project website.

Public Notifications

Public notifications will be provided in the St. Paul Pioneer Press and Star Tribune in advance of the public comment period. Notifications will include information about the last public event logistics as well as where the public can view and comment on the draft plan. This will be in addition to sending public event notifications through the project website and project newsletters.

Updates at the MSP Noise Oversight Committee and MAC Committee/Commission Meetings

MAC staff will update the MSP Noise Oversight Committee (NOC) and the MAC Planning, Development, and Environment (PD&E) Committee at key milestones in the process. The public may attend these meetings. Public input at these meetings will follow the established protocols governing public comments during the meeting. Meeting minutes and video recordings will be made available on https://metroairports.org/.

Additional Public Presentations

If requested, MAC staff will provide presentations to local councils, boards, and committees at any point throughout the planning process. MAC will also provide updates to stakeholder groups, such as the MSP Airport and Airline Affairs Committee, MSP Airport Foundation, Terminal 2 Users Group, and the MSP Traveler Advisory Committee.

Comments Received

MAC staff will provide many opportunities for public comments and ideas throughout the planning process. Each comment may not receive a direct response; rather, comments will be addressed in one or more of the following ways:

- Comments may be addressed as part of the Frequently Asked Questions offered on the project website or part of a meeting recap document
- Comments may be answered verbally as part of a question and answer session
- Comments received during the LTCP Public Comment Period will be evaluated to determine any changes to the final document
- General responses will be developed to address questions and concerns that are consistent among the comments received

Comments received from stakeholders is one of the factors that the MAC considers in the planning process. Conformance to design standards, operational safety and feasibility, federal and state regulations, and project cost are also critical factors to consider.

Metropolitan Airports Commission

MSP Airport Long-Term Plan

Stakeholder Advisory Panel Report

Metropolitan Airports Commission

Providing exceptional airport experiences so Minnesota thrives.

MSP Airport Long-Term Plan

Stakeholder Advisory Panel Report

Table of Contents

One of the goals of the MSP Airport Long-Term Plan ("Plan") is to conduct the planning process in a manner that includes meaningful stakeholder engagement. To that end, this report summarizes the engagement activities of the Stakeholder Advisory Panel.

Stakeholder Advisory Panel Report

The Role of the Stakeholder Advisory Panel

The Metropolitan Airports Commission convened a Stakeholder Advisory Panel ("Panel") consisting of key stakeholders. The objectives of the Panel are to present information about the planning process to major stakeholder groups and to ensure that those tasked with making planning decisions hear and consider public concerns and aspirations related to the process.

Specifically, the Panel is an advisory body representing major stakeholder groups that have an interest in the planning process. The Panel serves several important functions including:

- Representing a broad range of stakeholder groups;
- Receiving information about the planning process; and
- Communicating public concerns and aspirations as the voice of key stakeholders.

It is important to note that the Panel serves only in an advisory capacity. While the Panel may offer opinions, advice, and guidance, the MAC is solely responsible for all planning decisions.

The stakeholder Advisory Panel is made up of the following key stakeholder groups:

Airport Tenants:

- MSP Airport and Airline Affairs Committee
- Airline Managers Council
- Cargo Operator
- T2 Users Group
- Airport Business/Tenant

Passengers:

- MSP Airport Foundation
- Business Travel Advisor
- Travelers with Disabilities Advisory Committee

Public Partners:

- FAA Airport District Office
- FAA
- TSA
- CBP
- MnDOT Aeronautics
- Metropolitan Council

Local Communities:

- Bloomington
- Eagan
- Mendota Heights
- Minneapolis
- Richfield
- St. Paul
- At-Large Community

Regional Businesses

- Greater MSP/Regional Air Service Partnership
- Regional Business Development
- Regional Economic Development
- Mall of America

Tourism Associations

- Meet Minneapolis
- Visit St. Paul
- Bloomington Convention and Visitor's Bureau
- Explore Minnesota

Stakeholder Advisory Panel Report

Stakeholder Advisory Panel Meeting #1 Recap

The Stakeholder Advisory Panel met for the kick-off meeting on Monday, June 10, 2019. The meeting began with a narrated tour of the MSP Airport. The tour included a behind-the-scenes look at the runways, taxiways, terminals, hangars, and other support buildings. The attendees also heard about previous planning efforts at the airport, including the Dual Track Planning Process, construction of Runway 17/35 and the MSP 2010 Plan.

Following the tour, the panel members convened at the Crowne Plaza Aire Hotel in Bloomington. The meeting began with welcome remarks from the MAC Executive Director/CEO, Brian Ryks. Introductions were made by the Panel members and key staff members and MAC Commissioners in attendance.

MAC staff then presented the MSP Airport Long-Term Plan process and timeline as well as the Stakeholder Engagement Program. The Stakeholder Engagement Program will ensure the planning process incorporates meaningful stakeholder engagement, which is one of the foundational goals of the Long-Term Plan.

A Panel discussion was held for the remainder of the meeting, focused on key issues for consideration as we look forward 20 years at the Airport. The Panel brought up a wide range of questions and topics, highlighting the complex and impactful nature of running and planning the future of a major international airport.

For purposes of summarizing the discussion, the feedback from the Panel was divided into five themes:

- Curbside, Roadways, Public Transit
- Passenger Amenities and Services
- Airport Safety and Security
- Air Cargo Activities
- General Comments/Questions

Panel insights are documented and categorized into these themes below, followed by response to the insights and questions raised. The feedback from the first Panel meeting is being used in numerous ways, including informing the Plan and helping to identify opportunities to share additional information during the planning process.

The meeting agenda, presentation and minutes from the June 10, 2019 Panel meeting are available under Documents and Links on the project website (https://www.mspairport.com/long-term-plan).

Curbside, Roadways, Public Transit

- Are we running into challenges getting people in/out or to/from the airport?
- Curbside congestion and safety should be considered in the Plan.
- Self-driving cars are a threat to airport revenue.
- Park-and-Fly capacity is diminishing. How will the airport account for this?
- Can the airport replicate the convenience of Park-and-Fly car to door service?
- Can we identify alternate curb pickup locations?
- Public transit safety should be considered.
- Alternative transportation to and from the airport.
- Neighboring communities should work together to identify infrastructure opportunities.
- Average commute time is good and we need to maintain that.

With more travelers beginning and ending their travel at MSP Airport than in the past, the curbside, roadways and public transit areas are becoming more and more congested. Curbside congestion and safety will be a consideration in the Plan. This may include identifying alternative curb pickup locations, finding opportunities to increase curbfront footage, or offering new and unique ways for the public to arrive at and leave the airport.

Opening in 2020, the Silver parking ramp will offer 5,000 additional parking spots at Terminal 1-Lindbergh.This will help offset diminishing Park-and-Fly capacity. Additionally, the MAC currently offers a convenient parking service at Terminal 1-Lindbergh similar to the convenience offered by local Park-and-Fly car to door services, at the lowest rate. The Quick Ride Ramp located off Highway 5 at the Post Road exit, has a free 24/7 shuttle that will pick you up at your vehicle and drive you to the terminal and back upon your arrival.

The MAC is working toward a parking reservation system which will guarantee a parking spot to anyone who pre-books and may offer drivers additional services while they are parked at the airport.

Passenger Amenities and Services

- The Plan should consider travelers and employees with disabilities. Can the airport offer services similar to airports in Europe? Are travelers with disabilities accounted for in disaster and emergency plans?
- Common use facilities at T2 could be improved. Kiosks, bag printers, etc.
- Concessions at T2 can be improved, similar to T1.
- How can passenger amenities be upgraded to meet the needs of changing passenger demographics? Should health and pharmacy services be included to serve an aging population?
- Simple amenities for breast-feeding mothers. Ice on the other side of security.
- What is the experience like for people without Clear, Pre-Check, Delta Sky Club, etc?
- What does the aging demographic need to feel satisfied with MSP? What space considerations are needed for ambulatory passengers?
- Terminal navigation for non-English speakers
- Is there an opportunity for short-term hotel/lodging?

The planning team will consider how facility and infrastructure planning can and should promote operational efficiency and flexibility throughout the entire MSP campus while considering changing passenger demographics, trends, and behaviors. This is especially important considering the changing passenger demographics, travelers and employees with disabilities and special service needs, and the aging population.

The MAC Emergency Preparedness program continues to make significant progress towards including passengers with a Disability, Functional and Access Need (DFAN) in all phases of planning for, responding to, recovering from, mitigating and preventing a disaster at MSP. Members of the DFAN Community were included in all aspects of the 2018 Crash Ex Triennial Exercise hosted by the MAC. Incorporating lessons learned from that exercise will be the foundation for planning for Crash Ex 2021.

Introducing short-term lodging at the airport has been brought up by both the Panel and through the online Polco survey. These amenities require space either within the terminal or within close proximity to the airport. The Plan, in conjunction with the ongoing MSP Land Assessment, will seek to identify practical development concepts for available airport parcels.

Airport Safety and Security

- What can be done to balance security and Customs and Boarder Protection (CBP) resources between the terminals?
- What's the future of security technology?
- Gate hold rooms will be more congested due to aircraft up gauging. Federal Inspection Services (FIS) facility upgrades will be needed shortly. Could FIS be consolidated to one location?
- TSA technology should be able to detect medical implants.

Security issues related to air travel have changed and will continue to change as new security procedures and technology are incorporated to improve airport security. Events that may affect traveler confidence in airport security or air travel security cannot be predicted.

Maintaining a high level of airport safety is critical to the travelers and employees at the airport. The security and customs resources are carefully allocated between the terminals. Doing so requires these agencies to carefully review staffing in advance, and daily, based on passenger data provided to the MAC by the airlines. Passenger volumes at Terminal 1-Lindbergh are much greater and consistent than the volume at Terminal 2-Humphrey. Terminal 2 volume sees significant ebbs and flows with periods of significant downtime. Transportation Security Administration (TSA) leadership monitors passenger wait times constantly and reports hourly to ensure the frontline staff is effectively distributed to where the demand is greatest.

The Plan will use the latest available TSA and CBP guidance when planning for security screening and FIS facilities.

Neither of the existing FIS facilities in Terminal 1 or Terminal 2 is large enough to accommodate all international arrival operations from both terminals. Attempting to consolidate into one location (terminal) would have numerous major impacts to airline tenants in both terminals.

Air Cargo Activities

- How do cargo hub airport constraints impact MSP?
- How does future drone deliveries impact cargo operations?
- Demand and projected demand for air cargo should be better understood.

The MAC will be conducting an air cargo study in 2020. The study will help to address these questions. The study will include a baseline of existing MSP air cargo activity, provide an overview of the air cargo industry in the United States, and identify opportunities and strategies for enhancing air cargo activity at MSP. The study is estimated to be completed by the end of

2020. The Long-Term Plan will include a section describing this study since it was identified as an opportunity from the Panel.

General Comments/Questions

- How do current workforce challenges impact MSP now and into the future?
- How does the airport impact the region and how does the airport impact the individual traveler?
- What technology disruptors could impact this plan?
- How do aviation technology changes impact the communities? How would RNAV departure procedures change the livability of the cities?
- Should outstate Minnesota airports relieve MSP?
- Great air service is critical to local business.
- Are we looking at other domestic and international airports? Do airlines provide information about trends they are noticing?

The planning team added three questions to the Frequently Asked Questions about the project to address the general questions above.

Workforce challenges are important to consider on a continuous basis. The MAC hosts job fairs where job seekers can visit with a multitude of airport employers looking for workers. While obtaining and retaining strong workers at the MSP Airport is important, it falls outside the purpose and role of a long-range facility planning document.

Stakeholder Advisory Panel Meeting #2 Recap

The Stakeholder Advisory Panel met for the second time on Tuesday, August 27, 2019 at the Intercontinental MSP Airport Hotel. The meeting began with welcome remarks from Naomi Pesky, MAC Vice President of Strategy and Stakeholder Engagement. Introductions were made by the Panel members. Panel members were asked to state, in five words or less, what they hope to learn or take away from their participation on the Panel. Below are a few examples provided by the Panel members:

- Find opportunities to enhance visitor's experience
- Cost-conscious and efficient airport
- Maintain focus on passenger needs
- Support Minnesota's economic growth
- Better appreciation of the complexities of airport operations
- Better learn about the future of the airport
- Continue to build partnerships to make MSP the best international airport
- Understand how the airport will fit into the regional transportation system
- Airport and community thriving together
- Continue to provide superior customer service and develop responsibly
- Understand customer insights to continue providing excellent customer service
- Continue to promote an accessible airport

MAC staff then presented the MSP Airport Long-Term Plan update covering the following topics:

- Aviation Activity Forecasts, which identify a likely range of demand levels in a manner that will facilitate a meaningful evaluation of facility performance.
- Airfield Capacity Study, which uses state of the art simulation tools to predict how the MSP airfield and close-in airspace will perform under forecasted aircraft activity levels.

A recap of the first Panel meeting was delivered, summarizing the five themes and how they would be used to inform the Plan. Next, a presentation on traveler survey results was presented along with a Panel discussion about passenger insights derived from the survey. Finally, the Panel was encouraged to attend the first Experience MSP public event on October 2, 2019. This is the first in a series of four events where the public will receive updates on the Plan and be given the opportunity to ask questions and provide feedback.

The meeting agenda, presentation and minutes from the August 27, 2019 Panel meeting are available under Documents and Links on the project website (https://www.mspairport.com/long-term-plan).

Stakeholder Advisory Panel Meeting #3 Recap

The Stakeholder Advisory Panel met for the third time on Thursday, January 30, 2020, at the Crown Plaza, Bloomington. The meeting began with welcome remarks from Bridget Rief, MAC Vice President of Planning and Development. Introductions were made by the Panel members. Panel members were asked to give a brief description of what they'd like to learn through their panel participation.

MAC staff then provided a recap of the first Experience MSP public event held on October 2, 2019, and the second public survey results meant to gain a greater understanding of traveler and community attitudes and perceptions about the airport.

The Panel then heard a presentation on MSP's Airport Service Quality (ASQ) survey rankings. This topic was included in the meeting due to the Panel's interests in the insights gathered through the passenger survey results shared at their previous meeting. The ASQ survey is the leading passenger satisfaction benchmarking program in the world. The Panel discussed ways to enhance accessibility to the airport accommodating all modes of travel as well as issues with curb length, vehicle traffic congestion and parking ramps.

The Panel then reviewed the aviation activity forecasts and capacity study. The forecasts use Planning Activity Levels (PALs), or triggers in demand, that may lead to implementation of certain facility needs. They are not tied to specific years or periods of time. The Panel discussed airline schedules and passenger demand and how the airport accommodates the demand.

The meeting agenda, presentation and minutes from the January 30, 2020 Panel meeting are available under Documents and Links on the project website (https://www.mspairport.com/long-term-plan).

Stakeholder Advisory Panel Meeting #4 Recap

The Stakeholder Advisory Panel met for the fourth time on Friday, December 10, 2021. The meeting was held virtually via Microsoft Teams. The meeting began with welcome remarks from Dana Nelson, MAC Director of Stakeholder Engagement. The MAC Chief Operating Officer, Roy Fuhrmann, then gave a presentation about the COVID-19 pandemic and its effects on the industry. He began by presenting the 2020 MSP Passenger Activity levels.

Mr. Fuhrmann provided an update in the following areas:

- Federal relief grant programs and how MAC has also provided relief to key partners during the pandemic to position MSP for a strong recovery.
- Passenger recovery at MSP and across the country.
- Accredited health and safety measures in the Travel Confidently MSP program, including robust cleaning, social distancing, hand sanitizing, shields, face coverings and more touchless services.
- Two major projects that were completed at MSP in 2020 that have vastly improved the passenger experience at Terminal 1: rebuilding the inbound roadway and completion of the Silver Ramp.

Members of the panel commended MAC staff for their hard work in trying to keep rates stabilized and continued partnerships. Members also asked questions regarding passenger traffic at MSP and airport capacity.

The Panel then reviewed the Stakeholder Engagement Program developed for the MSP Long-Term Plan, the purpose of the Stakeholder Advisory Panel and an overview of the planning process. The Panel was reminded that the baseline inventory and aviation forecasts were completed prior to a pause in the timeline due to COVID-19. Aviation forecasts were updated with actual 2020 numbers and a post-pandemic recovery period.

A presentation of the updated Aviation Activity Forecasts was presented. The Panel inquired about lasting impacts to business travel due to more virtual meetings and international travel resumption for both leisure and business travel.

The Panel offered insights to known or anticipated adjustments to long-term airport facilities in light of the pandemic. Comments and ideas included:

- Changing consumer behavior impacting food and beverage concessions.
- Exploring ways to diversify revenue streams beyond parking, since technology is moving fast (electronic vehicles, autonomous vehicles, etc.)
- Ensuring everything online is still accessible for people with disabilities or low-vision and blind customers.
- Federal Inspection Services and long-term planning and incorporating the CDC earlier on in the process.
- Understanding the needs of the international air cargo in support of supply chain needs for key sectors, specifically the med-tech industry.
- Consideration for wayfinding, concessions and non-passenger security, given the airport also serves as a transit hub for non-passengers.

The meeting agenda, presentation and minutes from the December 10, 2021 Panel meeting are available under Documents and Links on the project website (https://www.mspairport.com/long-term-plan).

Stakeholder Advisory Panel Meeting #5 Recap

The Stakeholder Advisory Panel met for the fifth time on Thursday, August 4, 2022. This was the first hybrid meeting of the Panel. Attendees were able to join virtually via Zoom or in-person at the Bloomington Convention and Visitor's Bureau offices at the Mall of America. Eighteen people joined in-person and 25 people joined virtually for a total of 43 attendees.

The purpose of this meeting was to:

- Review the MSP Long-Term Plan goals, process and engagement program,
- Share progress to-date on the plan, including terminal, airside and landside facility requirements,
- Present a set of preliminary concepts ("alternatives") intended to fulfill projected requirements, and
- Invite input from the Panel members.

MAC staff reviewed the planning goals, process and engagement program. The Panel then discussed the following opportunities for terminal, airside and landside facility requirements:

Terminal

- Gating requirements and passenger connectivity
- Federal Inspection Services (FIS) for international travelers

Airside

- Maintain airfield efficiency
- Long-term Remain Overnight (RON) aircraft parking needs
- Airfield design standards
- Cargo operations

Landside

- Curbside and in-bound roadway congestion
- Long-term vehicle parking needs (private, rental, ride-share, etc.)
- Address airfield design standards

The Panel then discussed three high-level preliminary concepts aimed to fulfill these requirements.

- Alternative 1A consisted of a single FIS at Terminal 1 and maximized preferential gating
- Alternative 2A consisted of a single FIS at Terminal 2 and an emphasis on common-use gating
- Alternative 3A consisted of two FIS facilities (Terminals 1 and 2), maximizing preferential gating, which is how the airport operates today.

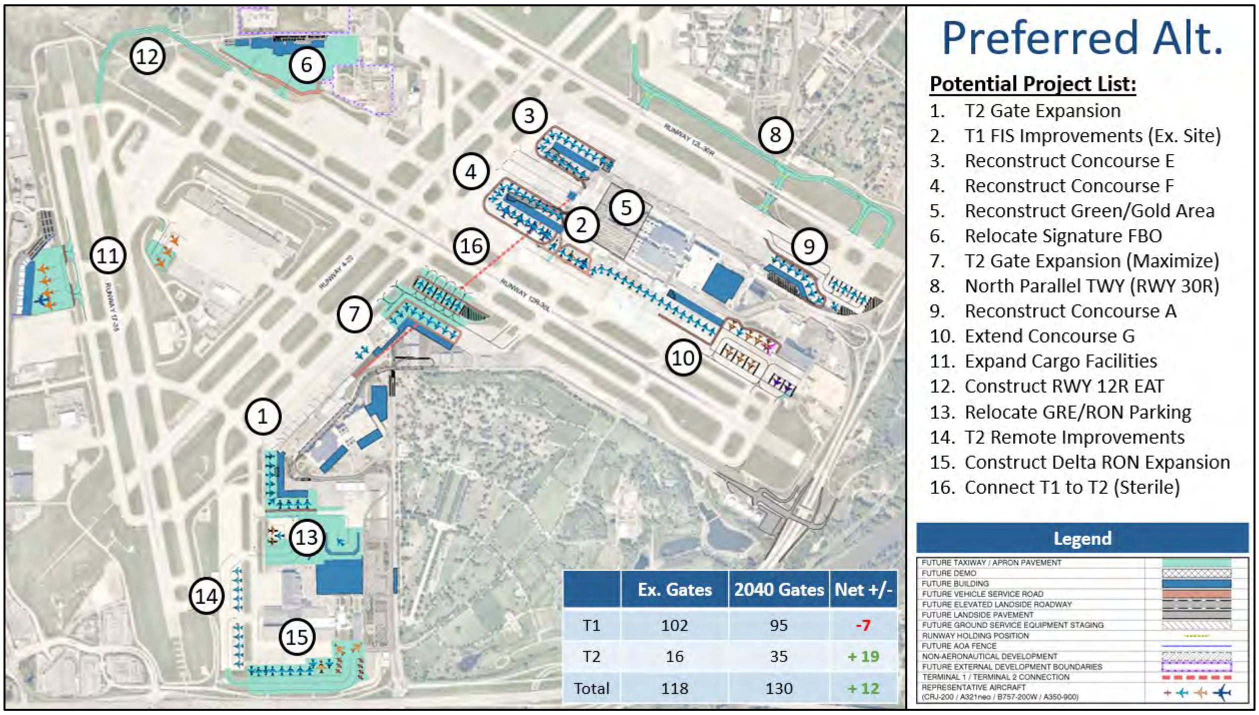
The meeting agenda, presentation and minutes from the August 4, 2022 Panel meeting are available under Documents and Links on the project website (https://www.mspairport.com/long-term-plan).

Stakeholder Advisory Panel Meeting #6 Recap

The Stakeholder Advisory Panel met for the sixth and final time on Thursday, April 13, 2023. Attendees were able to join virtually via Microsoft Teams or in-person at the Crowne Plaza Aire in Bloomington. Seventeen people joined in-person and thirty people joined virtually for a total of 47 attendees.

The meeting began with welcome remarks from the MAC Executive Director/CEO, Brian Ryks.

MAC staff then presented the MSP Airport Long-Term Plan process update, beginning with the purpose and goals of the plan. The Preferred Alternative was then presented in three categories: terminals, airside and landside. A list of potential project, shown in the depiction below, was presented to the Panel.



Panel members asked questions covering a wide variety of topics, including:

- Timing for the potential projects
- Air Cargo and e-commerce demand
- Curbside congestion
- Connecting Terminal 1 and Terminal 2
- Walking distance and accessibility
- Number of gates at each terminal
- Sustainable aviation fuel

MAC staff then presented aircraft noise analysis contained in the Long-Term Plan. The noise analysis includes a comparison of the 2040 forecast with a 2018 base year. Questions arose about the following:

- Reaction from the MSP Noise Oversight Committee and general public
- Contour shape and reasons for larger impact on Runway 12R/30L
- National Guard operations

An open discussion was facilitated with the Panel. Members asked questions and offered insights in the following topic areas: Comments and ideas included:

- Remain Overnight Aircraft Parking
- Terminal 2 gate expansion

- TNC (Uber and Lift) at Terminal 2
- Projected vehicle parking demand

MAC staff shared appreciation for the Panel member's participation in the planning process. This meeting was the last planned Panel meeting. The Panel was released from their role and adjourned. The meeting agenda, presentation and minutes from the April 13, 2023, meeting are available under Documents and Links on the project website (https://www.mspairport.com/long-term-plan).

MSP Airport Long-Term Comprehensive Plan – A 20-Year Look Ahead
June 10, 2019
Crowne Plaza
3 Appletree Square
Bloomington, MN 55425

STAKEHOLDER ADVISORY PANEL MEETING #1

Meeting Objective: Introduce the MSP Airport Long-Term Plan team, process and timeline. Begin discussions on Panel perspectives on key issues facing MSP over the next 20 years and what recommendations you have to address these issues to remain successful.

Agenda:

4:00 – 5:30 PM MSP Airfield Tour (starting and ending at the Crowne Plaza)

Tour the airfield, airport facilities and get acquainted with airport operations

6:00 Reception

Network with light snacks and soft drinks

6:30 Welcome Remarks

Provided by Brian Ryks, MAC Executive Director/CEO

6:40 Panel Introductions

Share Panel member names and representation

6:50 Key staff and Stakeholder Engagement Program Introduction

Introduce staff, engagement program, purpose of the panel and housekeeping items – Dana Nelson, MAC Director of Stakeholder Engagement

7:00 MSP Airport Long-Term Plan Introduction

Introduce planning process, timeline, goals/objectives and existing conditions – Neil Ralston, MAC Airport Planner

7:20 Panel Discussion

What do you see are the key issues we should be considering in our plan as we look to the next 20 years?

- Thought starters: new technology; new transportation modes; aging demographics; air service development; community; infrastructure.

7:50 Public Comment

8:00 Close

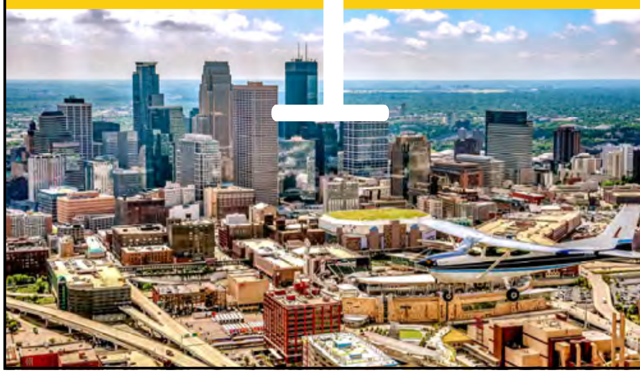
Reach out to Dana Nelson at dana.nelson@mspmac.org or 612-725-6330 if you have any questions or requests.

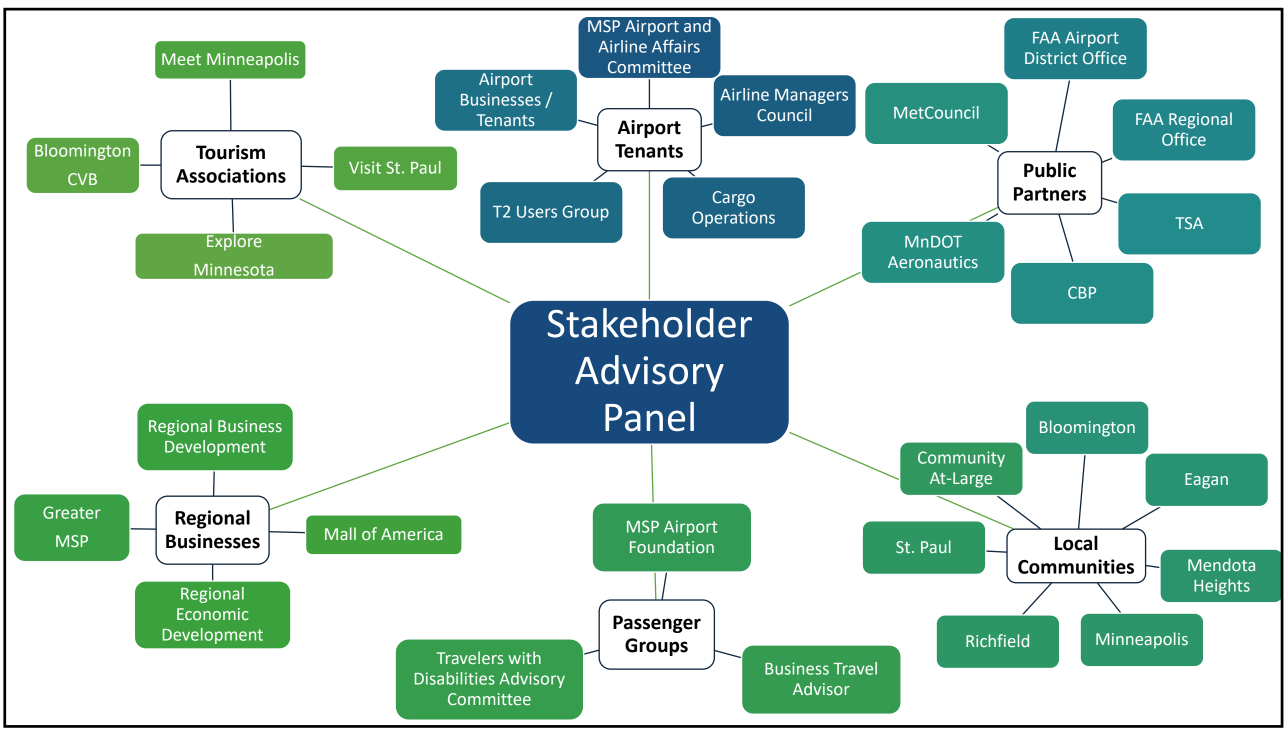

MSP Airport
Long Term Plan
Stakeholder Advisory Panel
Minneapolis • Saint Paul
msp
MAC
Meeting #1
June 10, 2019


Meeting Overview
• Panel Introductions
• Key Staff Introductions
• Stakeholder Engagement Program
• MSP Airport Long-Term Plan Introduction
• Panel Discussion
• Public Comment
Parking

1

Panel Introductions





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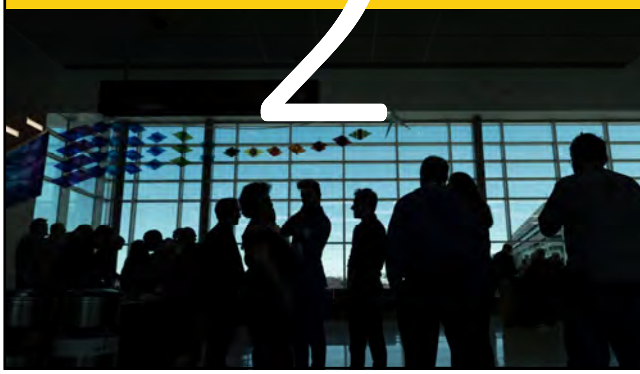


Key Staff Introductions

3

Stakeholder Engagement Program

Stakeholder Engagement Program Objectives

Fulfill the MAC's legislative purpose to:

- Promote air navigation and transportation in and through the State of Minnesota.
- Promote the efficient, safe and economical handling of air commerce and to assure the inclusion of the State in national and international programs of air transportation. To those ends, develop the full potentialities of the metropolitan area as an aviation center.
- Assure minimum environmental impact from air navigation and transportation, promote the overall goas of the State's environmental policies and minimize exposure to noise and safety hazards.

Conduct responsible and transparent planning for future airport facilities with engagement designed to build trust and establish a shared understanding of airport, traveler, and community needs

- Actively listen to stakeholder ideas and topics of interest
- Strengthen MAC's relationship with stakeholder groups
- Establish a system to reach a wide variety of stakeholders
- Communicate the services and benefits the MAC's system of airports delivers to the region

Support and document a thorough and effective public involvement process

Stakeholder Engagement Program Approach

- Stakeholder Advisory Panel
- Project Milestone Events
- Project Website
- E-News Monthly Project Updates
- Online Public Polling
- Project Newsletters
- Print Notifications for Public Events
- Updates at NOC and MAC's PD&E Committee
- Additional Public Presentations Upon Request

Stakeholder Engagement Program Approach

- Stakeholder Advisory Panel
  - An advisory board representing major stakeholder groups that have an interest in the planning process.
  - The Panel serves several important functions, including:
  - Representing a broad range of stakeholder groups;
  - Receiving information about the planning process; and
  - Communicating public concerns and aspirations as the voice of key stakeholders.

Project Website

- Overview
- Community and Stakeholder Engagement
- Progress and Schedule
- Documents and Links
- Frequently Asked Questions
- Contact Us
- Sign up to receive updates about the project.

  Visit: http://mspairport.com/long-term-plan

4

MSP Airport Long-Term Plan Introduction

Long-Term Plan Overview

- The Plan is:
  - A forward-looking planning tool that studies facility and infrastructure needs based on projected 20-year passenger demand and aircraft operations.
  - It will focus on evaluating when facility improvements are needed to accommodate projected demand in a manner that is safe, efficient, orderly and cost-effective and that maintains and enhances customer service.
- The Plan does not:
  - Authorize construction or improvements to facilities, nor does it serve as a basis for determining eligibility for noise mitigation programs.
  - Rather it helps the MAC better understand and plan for future facility needs.

Long-Term Plan Goals

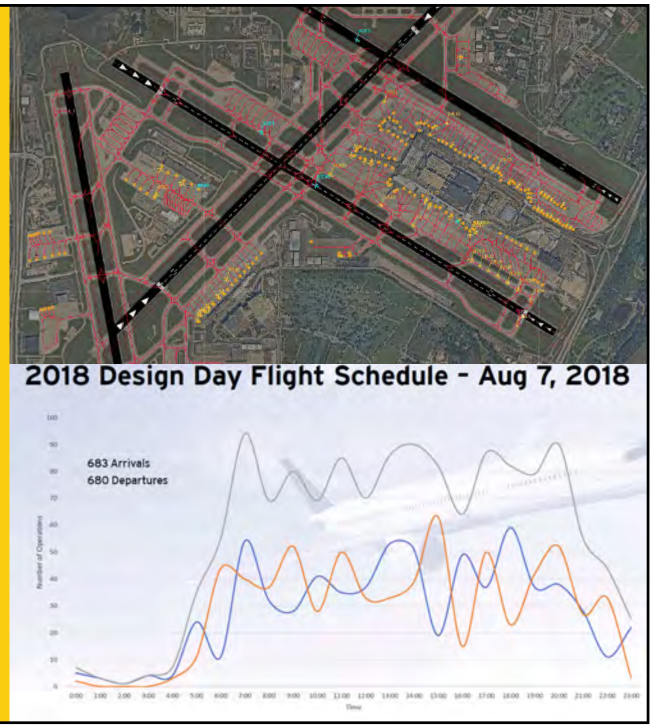
- Plan for future facilities that will meet projected passenger activity levels in a manner that maintains and enhances customer service, while facilitating a seamless experience.
- Produce a development plan that positions the MAC to
  - meet future demand levels,
  - enhance financial strength,
  - leverage environmental stewardship, and
  - infuse sustainable thinking.
- Conduct the planning process in a manner that includes meaningful stakeholder engagement processes.

Planning Process

Baseline Existing Facilities	• Inventory and document existing facilities and aviation activity levels to establish baseline conditions
Forecasts	• Forecast MSP aviation activity levels (passengers, cargo, and aircraft operations) for the milestone years between 2020 and 2040
Facility Requirements (Gap Analysis)	• Determine any facility deficiency gaps between the baseline condition and desired future conditions based on forecasted activity levels
Development Concepts	• Develop and evaluate alternative means to remedy facility deficiencies identified through the process
Proposed Development	• Determine a proposed development program, funding plan, and implementation strategy to present to the community and the MAC board
Environmental Considerations	• Prepare an overview of environmental factors that should be taken into consideration when implementing the plan

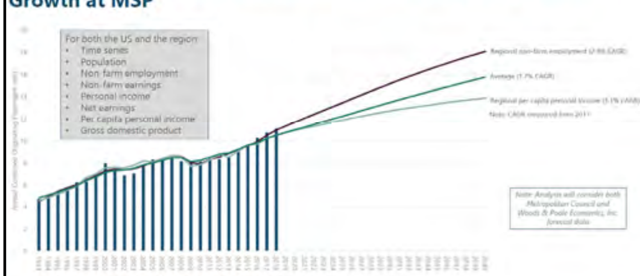
Airfield Capacity Study

- Objective is to use state-of-the-art simulation tools to predict how the MSP airfield and close-in airspace will perform under forecasted activity levels.
- The Airfield Capacity Study will be completed in three phases:
  - Phase 1: Simulation model for baseline (2018) conditions
  - Phases 2/3: Simulation model for future forecast (2030 and 2040) conditions



Aviation Activity Forecasts

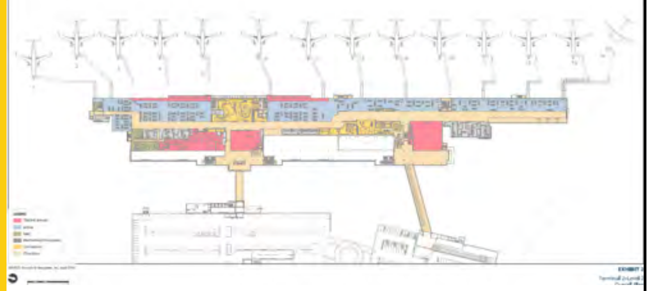
Combined O&D Socioeconomic Drivers Present a Range of Growth at MSP

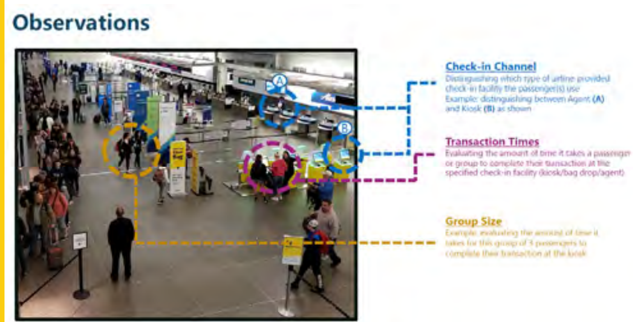


- Objective is to develop aviation activity forecasts for MSP that identify a likely range of demand levels for aviation services in a manner that will facilitate a meaningful evaluation of facility performance.
- Aviation activity forecast milestone years
  - 2020, 2025, 2030, 2035, 2040
- Forecast Elements
  - Passengers: Originations and Total Enplanements
  - Air Cargo Tonnage
  - Aircraft Operations
- Forecast Scenarios – Base Case, High, and Low
- Annual projections and Design Day Flight Schedules

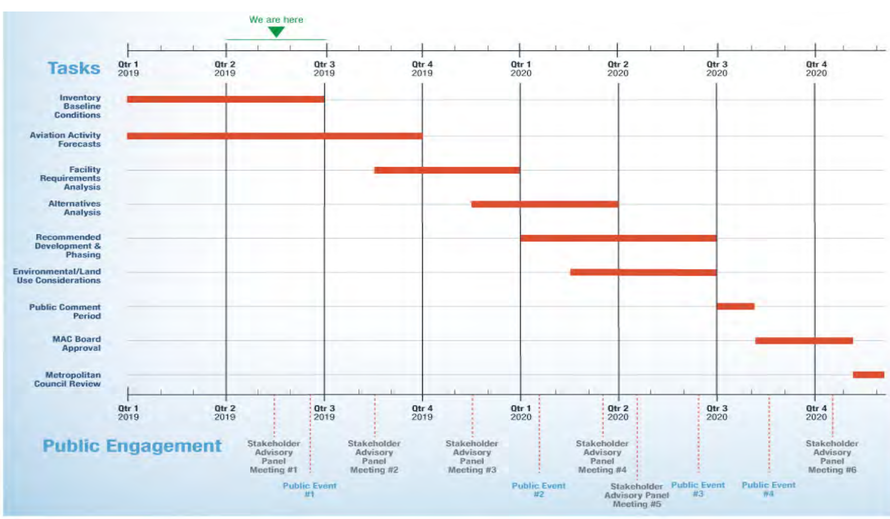
Baseline Conditions Data Collection

- Updated Terminal Floor Plans
- Survey/observations to measure passenger attributes and trends
  - Passenger intercept surveys
  - Check-in counter observations
  - Domestic bag claim observations
  - Vehicle traffic volumes
  - Curbside observations
- Planning Parameters and Level of Service Standards





MSP Airport Long-Term Plan Timeline



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Panel Discussion

What do you see are the key issues we should be considering in our plan as we look to the next 20 years?

Panel Discussion

- Are we running into challenges getting people in/out or to/from the airport?
- Plan should consider travelers and employees with disabilities. Can the airport offer services similar to airports in Europe? Are travelers with disabilities accounted for in disaster and emergency plans?
- How do current workforce challenges impact MSP now and into the future?
- How does the airport impact the region and how does the airport impact the individual traveler?
- Is there an opportunity for short-term hotel / lodging?
- Park-and-Fly capacity is diminishing. How will the airport account for this?
- Can the airport replicate the convenience of Park-and-Fly car to door service?
- Self-driving cars are a threat to airport revenue.
- What technology disruptors could impact this plan?
- How do aviation technology changes impact the communities? How would RNAV departure procedures change the livability of the cities?
- Curbside congestion and safety should be considered in the plan.
- What’s the future of security technology?
- What can be done to balance security and CBP resources between the terminals?

Panel Discussion

- Common use facilities at T2 could be improved. Kiosks, bag printers, etc.
- Concessions at T2 can be improved, similar to T1.
- How can passenger amenities be upgraded to meet the needs of changing passenger demographics? Should health and pharmacy services be included to serve an aging population?
- Gate hold rooms will be more congested due to aircraft up gauging. FIS upgrades will be needed shortly. Could FIS be consolidated to one location?
- International service is great, how do we continue that?
- Should outstate Minnesota airports relieve MSP?
- How do cargo hub airport constraints impact MSP?
- How does future drone deliveries impact cargo operations?
- Great air service is critical to local business. Average commute time is good and we need to maintain that. Demand and projected demand for air cargo should be better understood.
- TSA technology should be able to detect medical implants.
- Are we looking at other domestic and international airports? Do airlines provide information about trends they are noticing?

Panel Discussion

- Public transit safety should be considered
- What is the experience like for people without Clear, Pre-Check, Delta Sky Club
- What does the aging demographic need to feel satisfied with MSP? What space considerations are needed for ambulatory passengers?
- Terminal navigation for non-English speakers
- Neighboring communities should work together to identify infrastructure opportunities.
- Alternative transportation to and from the airport
- Simple amenities for breast-feeding mothers. Ice on the other side of security.
- Can we identify alternate curb pickup locations?

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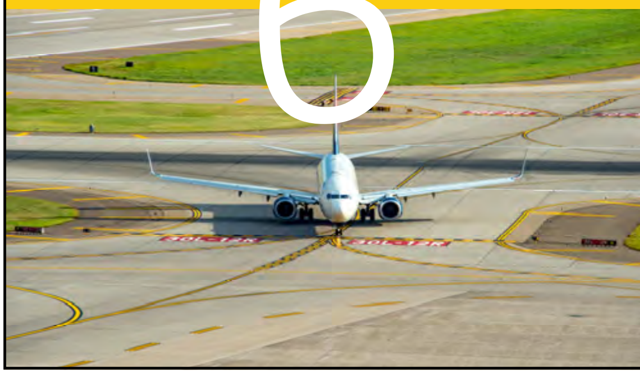
Public Comment



MSP Airport Long-Term Comprehensive Plan – A 20-Year Look Ahead
Stakeholder Advisory Panel
MEETING MINUTES
Monday, June 10th, 2019

Stakeholder Advisory Panel Meeting #1
Crowne Plaza, Bloomington

Panel Members:	Kathleen Barrett, Airline Managers Council/Sun Country Airlines; Dave Borgert, Regional Economic Development; Bill Deef, Meet Minneapolis; Pam Dmytrenko, City of Richfield; Mark Ellingson, Regional Economic Development/Microbiologics, Inc; Bill Goins, Cargo Operator; Susan Heegaard, City of St. Paul; Eric Johnson, City of Bloomington; Rylan Juran, MnDOT Aeronautics; Kathleen Koetz, Customs and Border Protection; Jan Kroells, Bloomington Convention and Visitors Bureau; Cheng Lor, Airport Business/Aero Service Group; Terry Mattson, Visit Saint Paul; Dianne Miller, City of Eagan; Gina Mitchell, FAA Airport District Office; Hank Moody, MSP Airport and Airline Affairs Committee/Delta Air Lines; Dan O'Leary, Community At-Large; Andrew Palmberg, Travelers with Disabilities Advisory Committee; Linea Palmisano, City of Minneapolis; Shari Paul, Business Travel Advisor/Medtronic; Elizabeth Petschel, City of Mendota Heights; Vicki Stute, Minnesota Chamber of Commerce; Amanda Taylor, Greater MSP; Cliff Van Leuven, Transportation Security Administration; Jana Webster, MSP Airport Foundation
MAC Staff:	Brian Ryks, Executive Director/CEO; Roy Fuhrmann, COO; Bridget Rief, VP of Planning, Development and Environment; Mitch Kilian, Associate VP of Governmental Affairs; Neil Ralston, Airport Planner; Dana Nelson, Director of Stakeholder Engagement; Brad Juffer, Manager of Community Relations; Melissa Scovronski, Manager of Corporate Communications and Creative Services; Jennifer Lewis, Community Relations Specialist
Others:	Randy Schubring, MAC Commissioner; Loren Olson, City of Minneapolis Alternate; Jessica Wyatt, HNTB; Greg Albjerg, HNTB; Todd Streeter, Community Collaboration; Dave Wondra, Wondra Group

1. Welcome Remarks

Brian Ryks, MAC Executive Director/CEO, thanked everyone for their attendance and stated the goal of ensuring MSP has a strong plan in place to fulfill forecast and demand for safe, abundant, affordable air service for the region. The stakeholder panel consists of tourism associations, regional businesses, passenger groups, local communities, federal partners, and airport tenants. The variety of members represents the range of considerations needed for a long-term plan. This plan does not determine mitigation eligibility or budget dollars for infrastructure but will provide a well-considered approach for improvements if and when demand warrants it.

2. Panel Introductions

The Stakeholder Advisory Panel consists of 29 members from tourism associations, airport tenants, public partnerships, regional businesses, passenger groups, local communities. Each member introduced themselves and the organization they represent as stakeholders.

3. Key Staff and Stakeholder Engagement Program Introduction

MAC Staff introduced themselves.

Dana Nelson, Director of Stakeholder Engagement, introduced the Stakeholder Engagement Program objectives. **Nelson** reviewed the MAC's legislative purpose, and explained the goal to conduct responsible and transparent planning for future airport facilities. **Nelson** reviewed the Stakeholder Engagement approach and introduced the project website to assist with planning and transparency at http://mspairport.com/long-term-plan.

4. MSP Airport Long-Term Plan Introduction

Neil Ralston, Airport Planner, introduced the MSP Long-Term Plan as a tool to study facility and infrastructure needs based on a 20-year passenger demand and aircraft operations. **Ralston** reviewed the goals of the planning process as well as the steps to be taken. **Ralston** gave an overview of the three phases of the Airfield Capacity Study. He then transitioned into the forecasts for aviation activity; the objective as well as elements and scenarios that will lead to projections and five-year forecast milestones. **Ralston** then addressed the baseline condition of data and utilizing surveys and observations to pinpoint gaps.

The team presented the MSP Airport Long-Term Plan Timeline. The timeline began in Quarter 1 of 2019 and is projected to end with submittal to MetCouncil in the 4th Quarter of year 2020. The present meeting takes place in the 2nd Quarter of 2019.

In response to a question, **Ralston** confirmed that this is the start of the MSP 2040 plan.

5. Panel Discussion

Dana Nelson, Director of Stakeholder Engagement, introduced the panel discussion process and opened the conversation by asking the Panel what they thought were key issues to be addressed as we look ahead to the next 20 years at MSP.

For purposes of documenting the discussion, comments during the open conversation were divided into five topic areas: Curbside, Roadways and Public Transit; Passenger Amenities and Services; Airport Safety and Security; Air Cargo Activities; General Comments/Questions. Specific comments are provided below:

Curbside, Roadways, Public Transit

- Are we running into challenges getting people in/out or to/from the airport?
- Curbside congestion and safety should be considered in the plan.
- Self-driving cars are a threat to airport revenue.

- Park-and-Fly capacity is diminishing. How will the airport account for this?
- Can the airport replicate the convenience of Park-and-Fly car to door service?
- Can we identify alternate curb pickup locations?
- Public transit safety should be considered.
- Alternative transportation to and from the airport.
- Neighboring communities should work together to identify infrastructure opportunities.
- Average commute time is good, and we need to maintain that.

Passenger Amenities and Services

- Plan should consider travelers and employees with disabilities. Can the airport offer services similar to airports in Europe? Are travelers with disabilities accounted for in disaster and emergency plans?
- Common use facilities at T2 could be improved. Kiosks, bag printers, etc.
- Concessions at T2 can be improved, similar to T1.
- How can passenger amenities be upgraded to meet the needs of changing passenger demographics? Should health and pharmacy services be included to serve an aging population?
- Simple amenities for breast-feeding mothers. Ice on the other side of security.
- What is the experience like for people without Clear, Pre-Check, Delta Sky Club, etc?
- What does the aging demographic need to feel satisfied with MSP? What space considerations are needed for ambulatory passengers?
- Terminal navigation for non-English speakers.
- Is there an opportunity for short-term hotel/lodging?

Airport Safety and Security

- What's the future of security technology?
- What can be done to balance security and CBP resources between the terminals?
- Gate hold rooms will be more congested due to aircraft up gauging. FIS upgrades will be needed shortly. Could FIS be consolidated to one location?
- International service is great, how do we continue that?
- TSA technology should be able to detect medical implants.

Air Cargo Activities

- How do cargo hub airport constraints impact MSP?
- How does future drone deliveries impact cargo operations?
- Demand and projected demand for air cargo should be better understood.

General Comments/Questions

- How do current workforce challenges impact MSP now and into the future?
- How does the airport impact the region and how does the airport impact the individual traveler?
- What technology disruptors could impact this plan?
- How do aviation technology changes impact the communities? How would RNAV departure procedures change the livability of the cities?

- Should outstate Minnesota airports relieve MSP?
- Great air service is critical to local business.

Are we looking at other domestic and international airports? Do airlines provide information about trends they are noticing?

6. Public Comment period

No public comment

Respectfully Submitted,

Amie Kolesar, Recording Secretary

MSP Airport Long-Term Comprehensive Plan – A 20-Year Look Ahead
August 27, 2019
InterContinental MSP Airport
Altitude Room
5005 Glumack Dr, Minneapolis 558450

STAKEHOLDER ADVISORY PANEL MEETING #2

Meeting Objectives: Present a Long-Term Plan update, including baseline and activity forecasts; Review and respond to insights from the first panel meeting; Present traveler survey results.

Agenda:

4:30 Welcome

Naomi Pesky, MAC Vice President of Strategy and Stakeholder Engagement

4:40 Introductions

Share name and representation. In five words or less, what do you hope to learn or get out of your participation on the Panel?

5:00 Planning update and baseline/forecast passenger and operations activity levels

Provide a planning update and present current and forecast number of passengers and flights – Neil Ralston, MAC Airport Planner

5:25 Recap Panel meeting #1

Recap and respond to insights and questions raised during the first meeting – Dana Nelson, MAC Director of Stakeholder Engagement

5:35 Present traveler survey results

Discuss results from passenger survey – Dana Nelson, MAC Director of Stakeholder Engagement

5:50 Public Comment

6:00 Close

Reach out to Dana Nelson at dana.nelson@mspmac.org or 612-725-6330 if you have any questions or requests.

Meeting Agenda

- Welcome
- Introductions
- Planning Update
- Recap Panel Meeting #1
- Survey Results
- First Public Event – Oct 2, 2019
- Public Comment

Questions or Comments about the MSP Long-Term Plan?

- Contact us via email at MSPAirportLongTermPlan@mspmac.org
- Visit the project website at www.mspairport.com/long-term-plan
- Receive regular updates by signing up for our e-newsletter

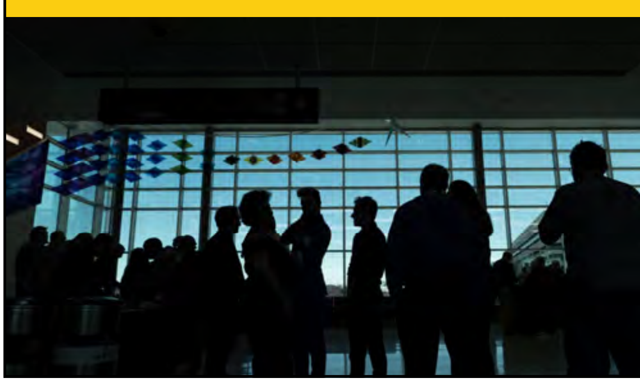
Questions or Comments about the MSP Long-Term Plan?

- The Plan may not incorporate all input provided by the public
- The Project Team will listen to concerns, input and aspirations shared by the public and, when possible, make changes
- Things to balance include:
  - Maintaining a high level of service
  - Achieving the established goals of the Plan
  - Conforming to design standards
  - Safety
  - Operational feasibility
  - Federal and state policies
  - Project costs

Introductions

- Name
- Representation
- In 5 words or less, what do you hope to learn or get out of your participation on the Panel?

Planning Update



Aviation Activity Forecasts

Objective is to develop aviation activity forecasts for MSP that identify a likely range of demand levels for aviation services in a manner that will facilitate a meaningful evaluation of facility performance.

The forecasts should:

- Be constructed with a level of detail that informs the development of facilities necessary to meet future demand levels, provide high levels of customer service, and maximize economic benefit
- Provide a reasonable range of possible forecast activity outcomes, considering the inherent uncertainty in the forecasting process that enables facility planning promoting operational efficiency and flexibility
- Engage stakeholders to provide insights and input into forecast development, and to review and comment on forecast results

We are seeking to predict activity levels that will occur naturally over time as our metropolitan area and state continues to grow and prosper

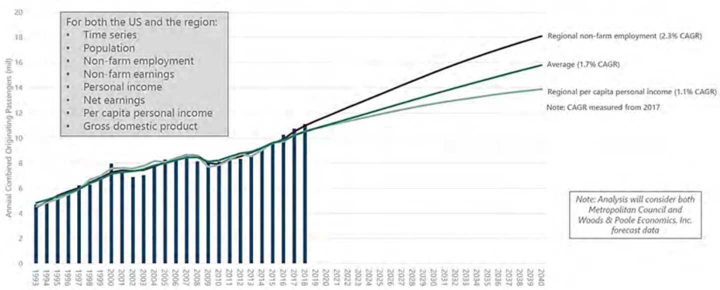
Forecast Elements

- **Data Collection**
  Complete
- **Market Assessment and Factors Affecting Aviation Demand**
  Complete
- **Baseline Aviation Activity Forecast Development**
  Complete
- **Alternative Demand Scenarios**
  Complete
- **Peaking Metrics and Design Day Flight Schedules (Baseline and Scenario)**
  Currently in Progress
- **Documentation**
  Currently in Progress/Ongoing

Forecast Elements (2018-2040)

- Passengers: Originations and Total Enplanements
- Air Cargo Activity
- Total Aircraft Operations
- Unconstrained in nature
- Forecast Scenarios – Baseline, High, and Low
- Annual projections and Design Day Flight Schedules

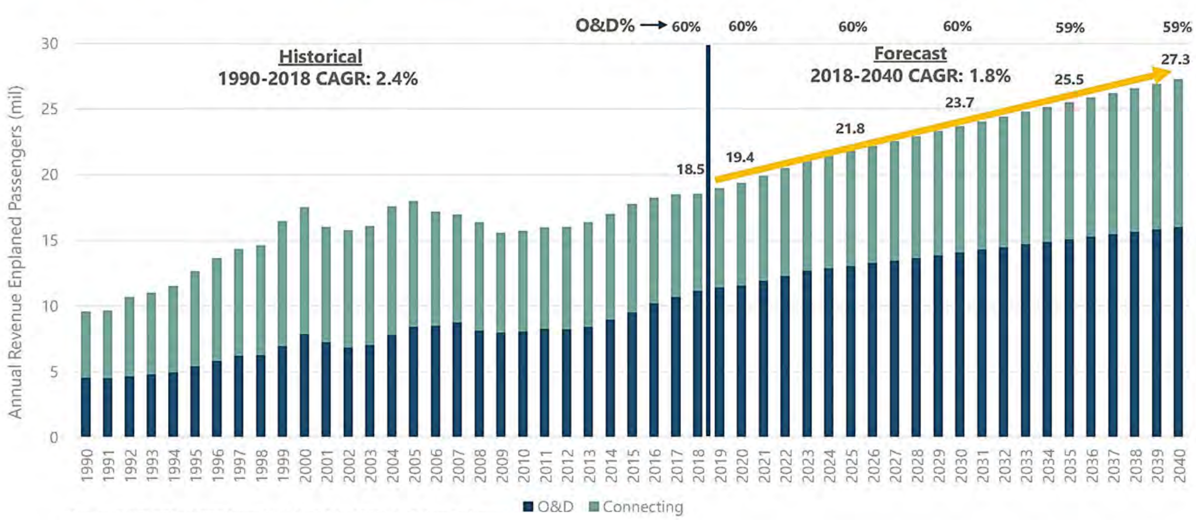
Combined O&D Socioeconomic Drivers Present a Range of Growth at MSP



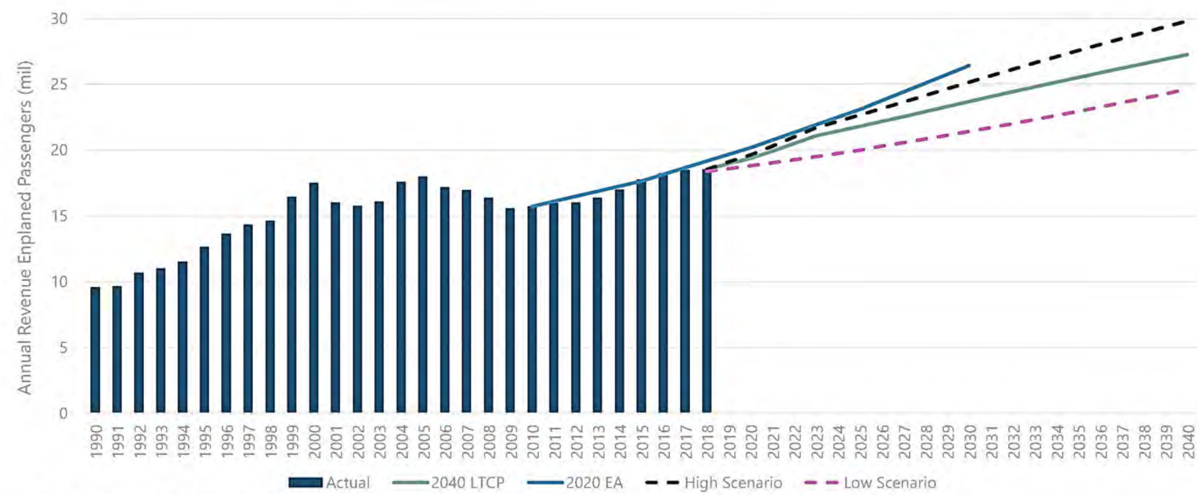
Passenger Forecast Process

- Identified predictive relationships between local/US socioeconomics and historical passenger demand
- Developed consensus forecast (a blend of socioeconomic variable relationships) to project O&D demand
- A similar approach was used for potential connecting demand (non-MSP centric passengers)

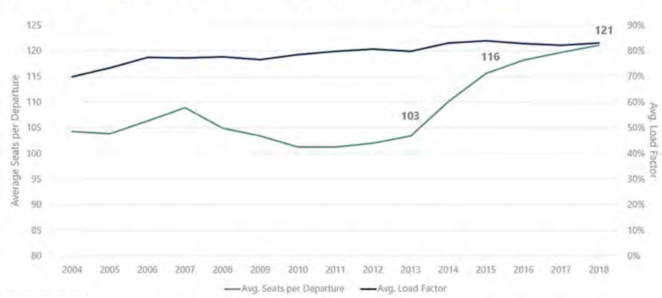
Enplaned Passenger Forecast – O&D vs. Connecting



Enplaned Passengers – Forecast Comparison



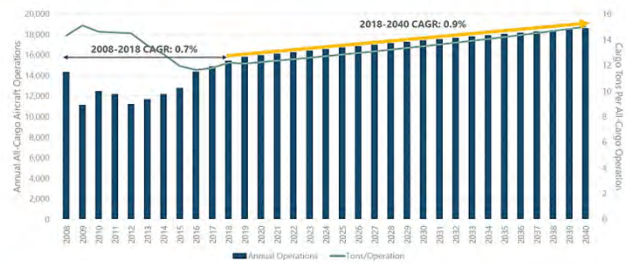
Historical Passenger Growth Has Been Accommodated Primarily Through Larger Aircraft and Higher Load Factors



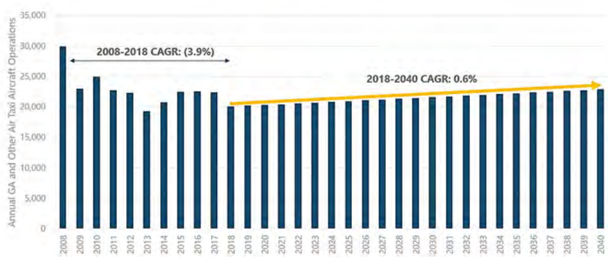
Aircraft Operations Forecast Process

- Passenger growth was accommodated in a combination of ways
  - New flights
  - Larger aircraft
  - Increased load factors

All-Cargo Aircraft Operations



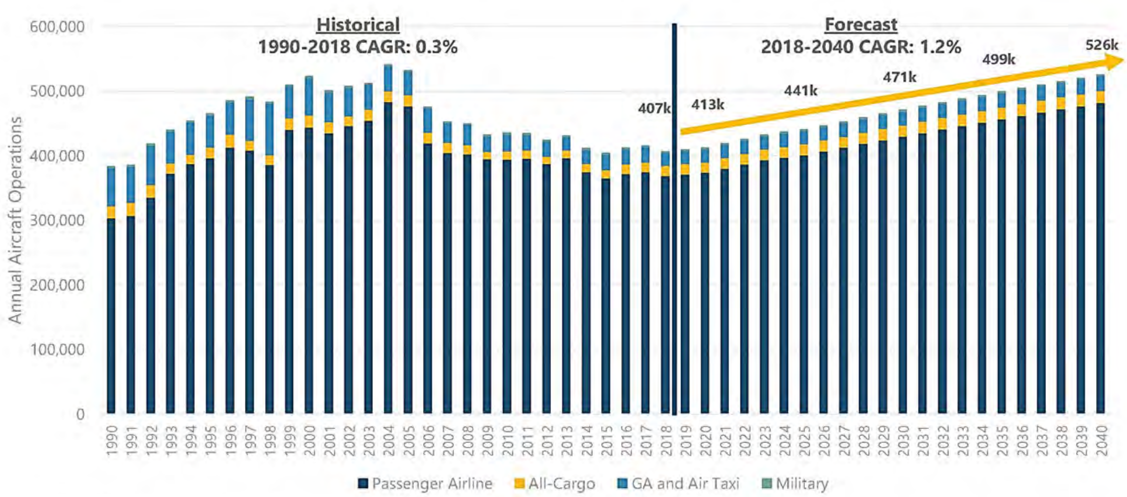
General Aviation and Air Taxi Aircraft Operations



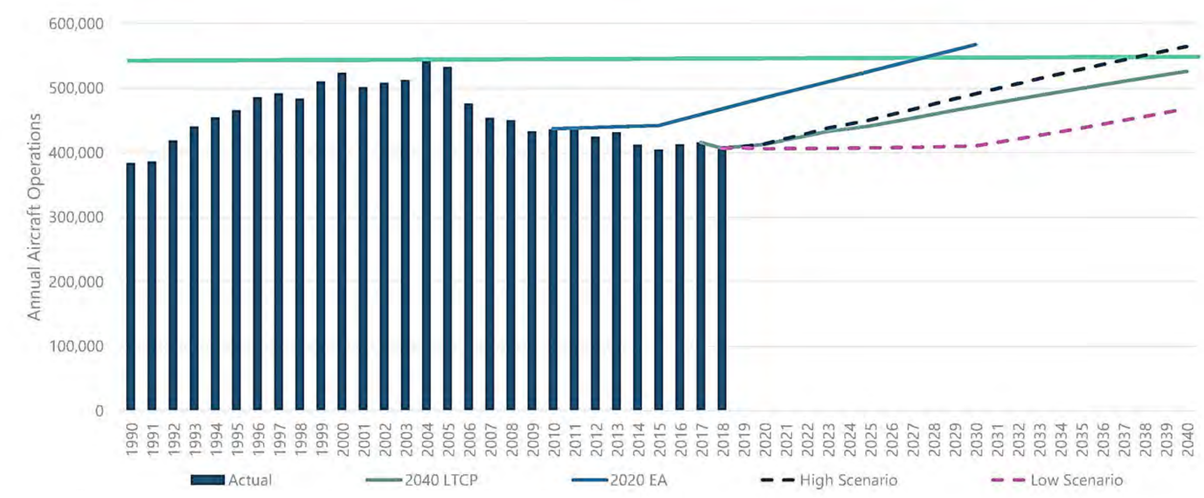
Aircraft Operations Forecast Process

- Cargo tonnage volumes were forecast for all-cargo and passenger airlines, separately.
  - Future tonnage per operation was estimated based on the cargo fleet mix, and was applied to projections of all-cargo aircraft volumes.
- MSP General Aviation and Military activities

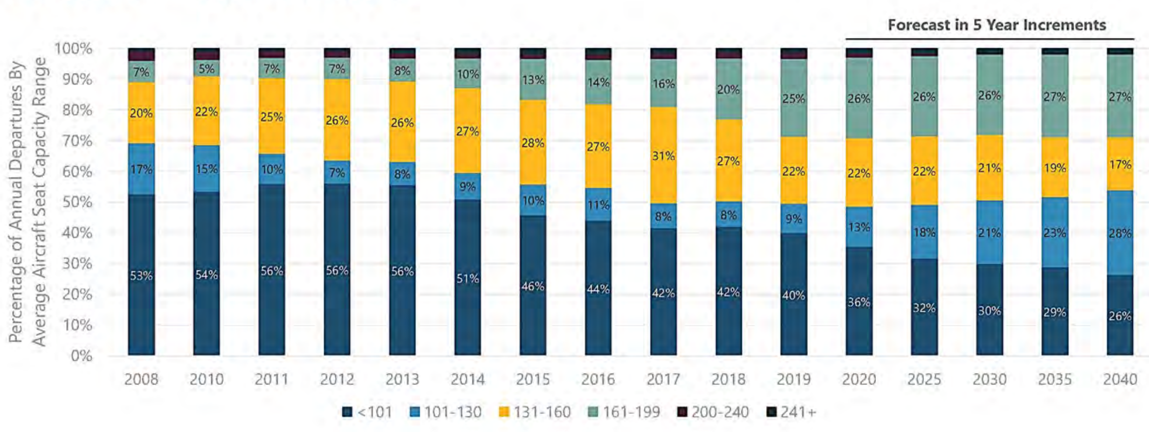
Forecast of Total Operations



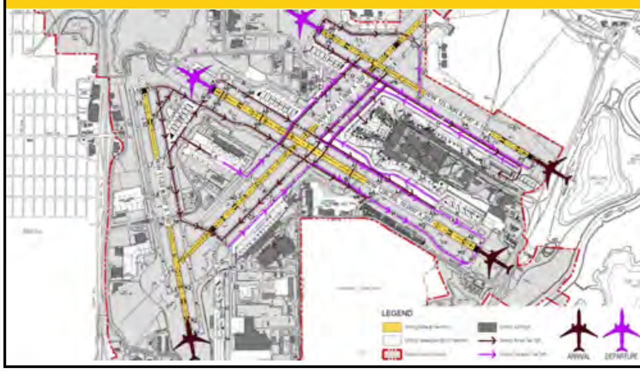
Aircraft Operations – Forecast Comparison



Annual Percentage of Operations by Aircraft Seat Capacity at MSP – All Airlines



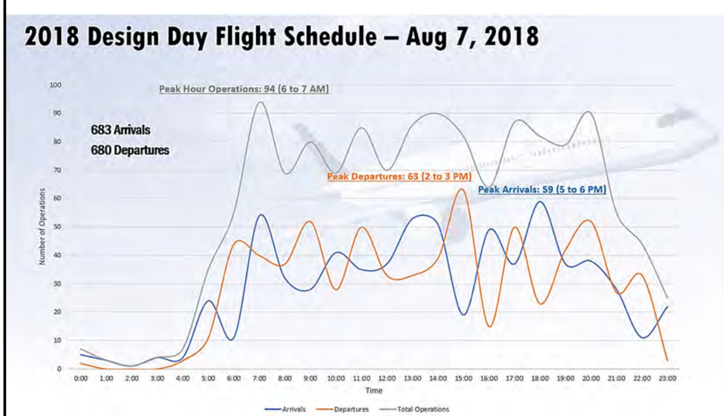
Airfield Capacity Study



Objective is to use state-of-the-art simulation tools to predict how the MSP airfield and close-in airspace will perform under forecasted aircraft activity levels.

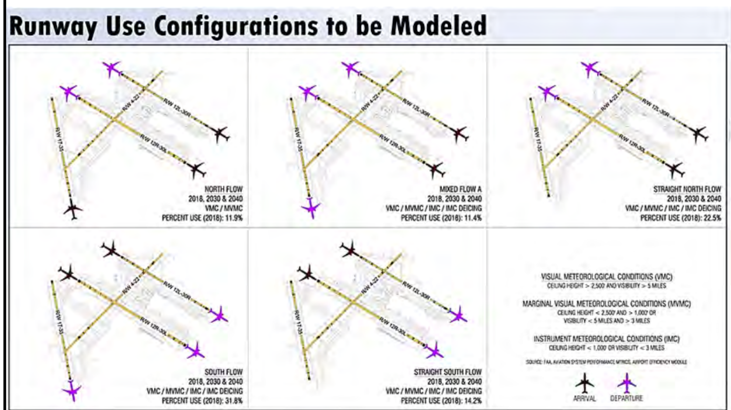
The capacity study should:

- Develop a well-calibrated baseline simulation that takes into account the present-state airfield and close-in airspace, and represents how actual air traffic at MSP is managed in various runway use configurations and weather conditions.
- Predict how much of the existing airfield's capacity is needed to accommodate existing and forecast future demand levels, and estimate associated levels of delay.
- Develop a flexible simulation model that can be used to test how alternative scenarios affect airfield capacity.
- Promote a better understanding of the relationship between airfield capacity and aircraft delay.
- Provide summary results in a manner that facilitates effective dialogue across stakeholder groups.



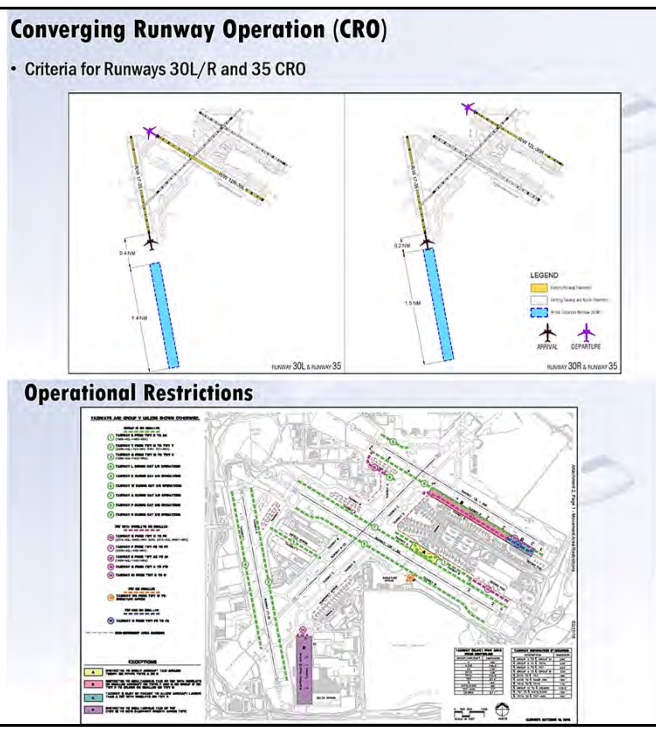
Model Inputs

- Peak Month, Average Day Flight Schedule
  - August 7, 2018
  - 683 arrivals, 59 in peak hour
  - 680 departures, 63 in peak hour
  - 1,363 combined operations, 94 in peak hour



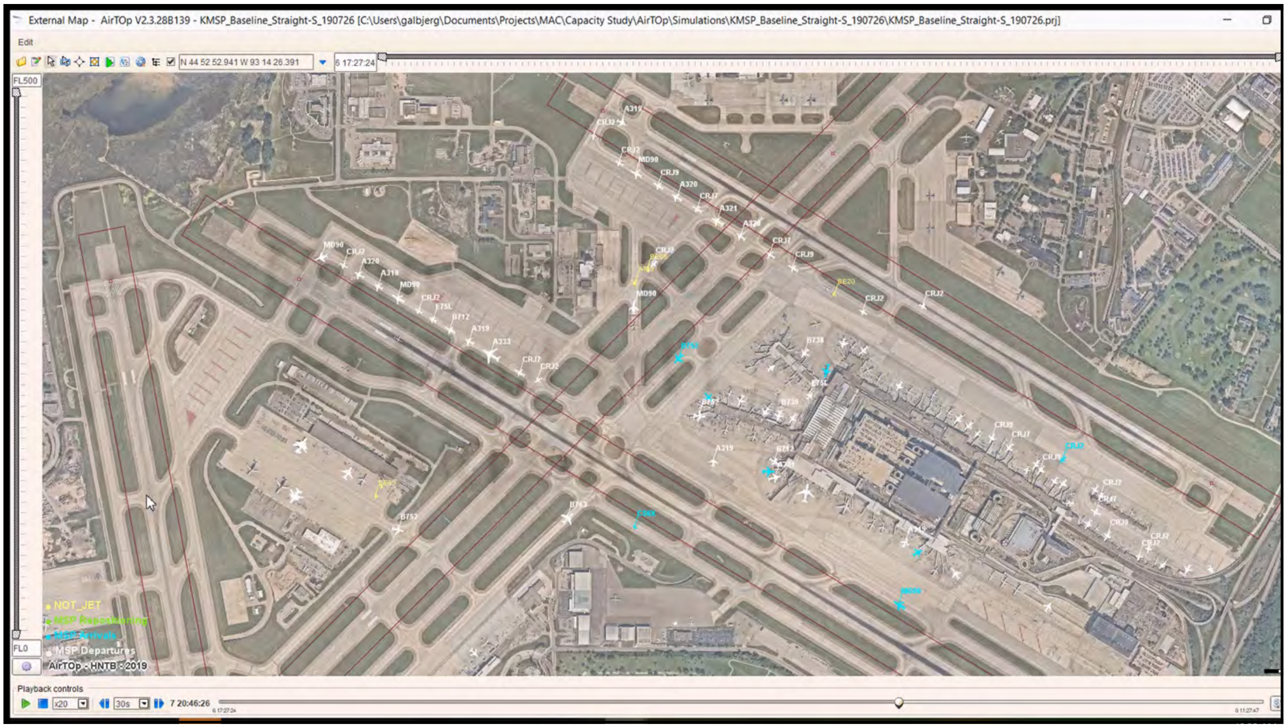
Model Inputs

- Runway Use Configurations
  - Modeling the most commonly-used runway configurations representing 92% of total operations
  - Modeling operations in three weather conditions (visual, marginal visual, instrument)

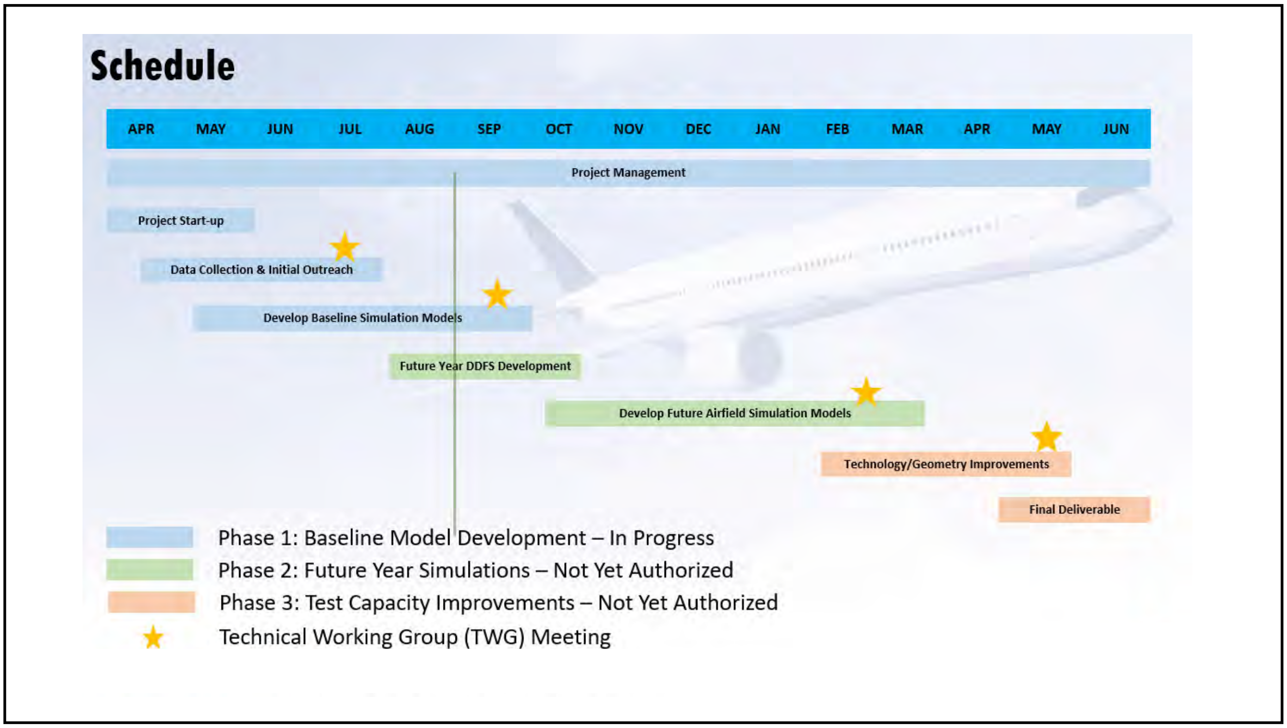


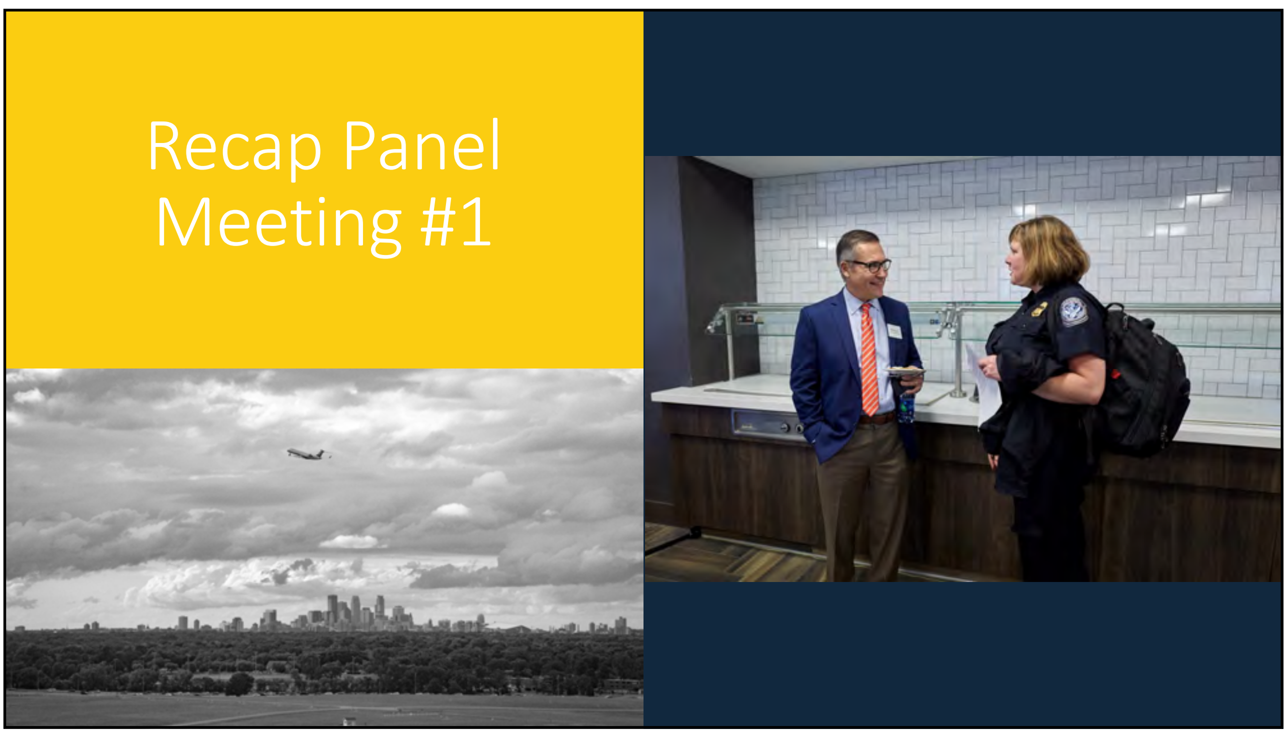
Model Inputs

- Converging Runway Operations (CRO)
- Airfield Operational Restrictions



	North VMC	Mixed A VMC	Straight N VMC	South VMC	Straight S VMC
Arrival Delay (Minutes)					
Taxi Delay					
Runway Crossing Delay					
Inbound Flow Delay					
Average Arrival Delay (Exclude Inbound	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Average Arrival Delay (Include Inbound F	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Undelayed Taxi Time					
Total Arrival Travel Time	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Departure Delay (Minutes)					
Gate Delay					
Runway Crossing Delay					
Taxi Delay					
Runway Queue Delay					
Outbound Flow Delay					
Average Departure Delay (Exclude Outbo	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Average Departure Delay (Include Outbou	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Undelayed Taxi Time					
Total Departure Travel Time	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Average Delay Excluding Flow Delays					
Average Total Delay Per Operation (Minute	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
ADPM Annualization Adjustment Factor					
Annual Percent in Flow					
Representative ADPM Delay (Minutes)	0.0	0.0	0.0	0.0	0.0
Representative Annual Delay (Minutes)	0.0	0.0	0.0	0.0	0.0
Average Delay Including Flow Delays					
Average Total Delay Per Operation (Minutes)	0.0	0.0	0.0	0.0	0.0
ADPM Annualization Adjustment Factor					
Annual Percent in Flow					
Representative ADPM Delay (Minutes)	0.0	0.0	0.0	0.0	0.0
Representative Annual Delay (Minutes)	0.0	0.0	0.0	0.0	0.0
Average ADPM Delay (Minutes / Operation) Excluding Flow Delay	**0.0**				
Average ADPM Delay (Minutes / Operation) Including Flow Delay	**0.0**				
Average Annual Delay (Minutes / Operation) Excluding Flow Delay	**0.0**				
Average Annual Delay (Minutes / Operation) Including Flow Delay	**0.0**				


Schedule
APR MAY JUN JUL AUG SEP OCT NOV DEC JAN FEB MAR APR MAY JUN
Project Management
Project Start-up
Data Collection & Initial Outreach
Develop Baseline Simulation Models
Future Year DDFS Development
Develop Future Airfield Simulation Models
Technology/Geometry Improvements
Final Deliverable
Phase 1: Baseline Model Development – In Progress
Phase 2: Future Year Simulations – Not Yet Authorized
Phase 3: Test Capacity Improvements – Not Yet Authorized
Technical Working Group (TWG) Meeting


Recap Panel Meeting #1

Stakeholder Advisory Panel

- Represents a broad range of stakeholder groups;
- Receives information about the planning process; and
- Communicates public concerns and aspirations as the voice of key stakeholders.

June 10 Kick-Off Meeting

- MSP Airport Tour
- Welcome from Executive Director/CEO, Brian Ryks
- Introductions
- MSP Long-Term Plan process and timeline
- Stakeholder Engagement Program Overview
- Panel Discussion

Panel Insights

- Curbside, Roadways, Public Transit
- Passenger Amenities and Services
- Airport Safety and Security
- Air Cargo Activities
- General Comments/Questions

Traveler Survey Results

- Gather general information about travel habits
- Find out what we're doing well
- Find improvement areas
- Discover innovative opportunities

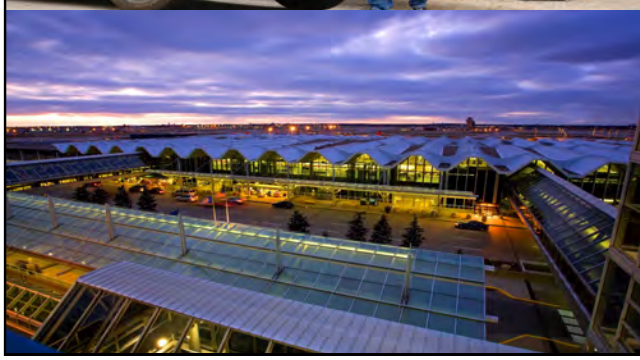
Polco Survey #1 Results

- Open for 3 weeks beginning July 22, 2019
- Distributed through:
  - MSP Facebook and Twitter post
  - MAC News newsletters
  - MSP News newsletter
  - Airport WiFi Landing Page
  - Long-Term Plan project website
- 269 people participated

What do you appreciate most about MSP?

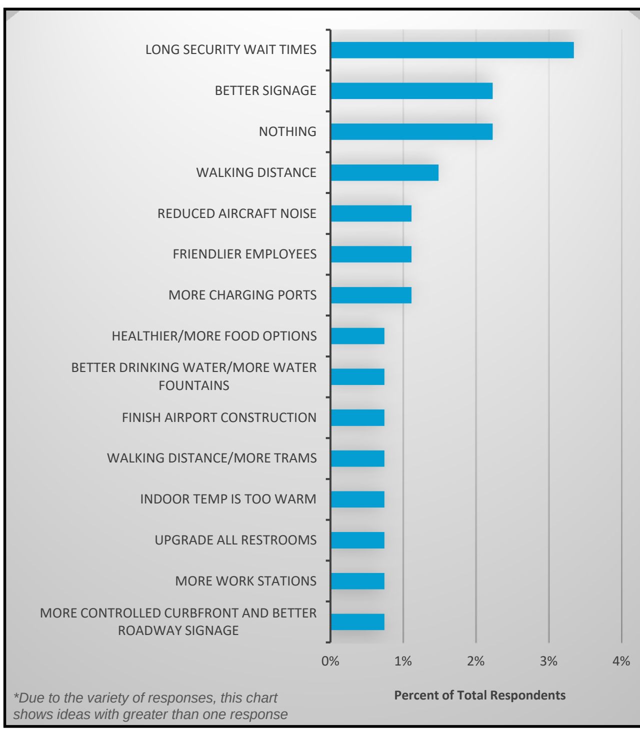
(Select 3)

1. **50%** Variety of flight options, destinations and airplanes
2. **48%** Restaurants and shops
3. **25%** Restrooms
4. **22%** Curbside access (how you get picked-up, dropped-off, park, take public transit, etc.)
5. **17%** Ticketing/Check-in
6. **16%** Environmental Sustainability



What areas of MSP airport could be improved upon?
(Select 3)

1. **28%** Curbside access (how you get picked-up, dropped-off, park, take public transit, etc.)
2. **25%** Baggage claim
3. **23%** Other
4. **22%** Experience at your gate
5. **20%** Ticketing/Check-in
6. **16%** Safety and security



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3. **23%** Other
4. **22%** Experience at your gate
5. **20%** Ticketing/Check-in
6. **16%** Safety and security

What is missing at MSP Airport that other airports have?

Responses were free-form text and spanned across 84 different areas. Here are the top response areas:

1. **9%** Nothing
2. **4%** Healthier/more food options
3. **4%** Sleeping area/Yotel
4. **3%** More efficient curbfront/inbound roadway
5. **3%** Trams/moving walks to reduce walking distances
6. **3%** Shorter security wait times

Experience MSP

Please Join Us!

The public is invited to 'Experience MSP' through tastes, interactive booths and knowledgeable resources in a welcoming setting.

The MAC's first Experience MSP event is the first in a four-part series where the public will receive updates on the Long-Term Plan and be given a platform to ask questions and provide feedback.

Wednesday, October 2, 2019 from 4-8 p.m.
Mall of America Executive Center

Public Comment

- Each speaker will have one opportunity to speak and is allotted three (3) minutes.
- If you would like to speak, stand up and state your name and address. If you are affiliated with any organization, please state your affiliation.
- Tonight's comments will not be responded to by MAC staff nor members of the Panel. Rather, they will be recorded as part of the meeting minutes.
- If you are asking a question, the planning staff will respond to those questions and include them in a document published on the Long-Term Plan project website.

MSP Airport Long-Term Comprehensive Plan – A 20-Year Look Ahead
Stakeholder Advisory Panel
MEETING MINUTES
Tuesday, August 27th, 2019

Stakeholder Advisory Panel Meeting #2
Intercontinental Hotel, MSP Airport

Panel Members: Kathleen Barrett, Airline Managers Council/Sun Country Airlines; Dave Borgert, Regional Economic Development; Bill Deef, Meet Minneapolis; Pam Dmytrenko, City of Richfield; Mark Ellingson, Regional Economic Development/Microbiologics, Inc; Bill Goins, Cargo Operator; Susan Heegaard, City of St. Paul; Eric Johnson, City of Bloomington; Rylan Juran, MnDOT Aeronautics; Kathleen Koetz, Customs and Border Protection; Jan Kroells, Bloomington Convention and Visitors Bureau; Cheng Lor, Airport Business/Aero Service Group; Terry Mattson, Visit Saint Paul; Dianne Miller, City of Eagan; Gina Mitchell, FAA Airport District Office; Hank Moody, MSP Airport and Airline Affairs Committee/Delta Air Lines; Dan O'Leary, Community At-Large; Andrew Palmberg, Travelers with Disabilities Advisory Committee; Linea Palmisano, City of Minneapolis; Shari Paul, Business Travel Advisor/Medtronic; Elizabeth Petschel, City of Mendota Heights; Vicki Stute, Minnesota Chamber of Commerce; Amanda Taylor, Greater MSP; Cliff Van Leuven, Transportation Security Administration; Jana Webster, MSP Airport Foundation

MAC Staff: Brian Ryks, Executive Director/CEO; Roy Fuhrmann, COO; Bridget Rief, VP of Planning, Development and Environment; Mitch Kilian, Associate VP of Governmental Affairs; Neil Ralston, Airport Planner; Dana Nelson, Director of Stakeholder Engagement; Brad Juffer, Manager of Community Relations; Melissa Scovronski, Manager of Corporate Communications and Creative Services; Brian Peters, Michele Ross, Assistant Manager of Community Relations; Jennifer Lewis, Community Relations Specialist

Others: Randy Schubring, MAC Commissioner; Loren Olson, City of Minneapolis; Jessica Wyatt, HNTB; Greg Albjerg, HNTB; Todd Streeter, Community Collaboration; Dave Wondra, Wondra Group

1. **Welcome Remarks**

   Naomi Pesky, MAC VP of Strategy and Stakeholder Engagement, welcomed everyone to the meeting and gave a background of the MAC's reorganization and creation of the Strategy and Stakeholder Engagement division. **Pesky** gave an overview of the Long-Term Plan and what results will come from stakeholder engagement and public feedback.

2. Panel Introductions

The Stakeholder Advisory Panel consists of 29 members from tourism associations, airport tenants, public partnerships, regional businesses, passenger groups, local communities. Each member introduced themselves, mentioned the organization they represent as stakeholders, and gave a brief synopsis of what they'd like to learn through their panel participation. Afterwards, **Dana Nelson** asked all MAC staff to introduce themselves as well as any other members of the public.

3. Planning update and baseline/forecast passenger and operations activity levels

Neil Ralston, Airport Planner, introduced the activity forecasting phase, which is being done in partnership with MAC's airport consultant, Ricondo and Associates. **Ralston** started with the objective to develop aviation forecasts for MSP that identify a likely range of demand levels for aviation services. Included in this, the forecasts should have a high level of detail, provide a reasonable range of possibilities, and engage stakeholders to provide insight and input in development.

At the time of this meeting, four steps in the forecast process are complete and two steps are in process. This plan uses 2018 as the baseline year and the information includes passenger originations and total enplanements, air cargo activity, total operations, forecast scenarios and alternative scenarios. This will lead to annual projections and design day flight schedules. Ralston followed up this information

Ralston moved on to an update on the airfield capacity study, which is being conducted with MAC's airport consultant, HNTB. He reviewed the objective: to use state of the art simulation tools to predict how the MSP airfield and close-in airspace will perform under forecasted aircraft levels. This study should develop a baseline and then predict how much existing capacity is needed to accommodate current and forecasted demands. It will also help to develop a flexible simulation model to be used to test how alternative scenarios affect capacity.

Ralston presented historical flight data, runway configurations, operational considerations and the capacity study schedule. At the time of this presentation, the team was on Phase 1 of a 3-phase process, final deliverable is scheduled to be complete in June 2020.

4. Recap Panel meeting #1

Dana Nelson, Director of Stakeholder Engagement, began by reminding the group of the goals of the panel: to have a broad representation of stakeholders who will take information from planning resources, share with their communities and constituents, and return to the panel with feedback and to directly communicate community concerns. **Nelson** reviewed the order and process of the first meeting which took place on June 10th, 2019. The meeting was mostly an open discussion and there were a number of insights from panel members.

For purposes of documenting the discussion, comments during the open conversation were divided into five topic areas: Curbside, Roadways and Public Transit; Passenger Amenities and Services; Airport Safety and Security; Air Cargo Activities; General Comments/Questions. **Nelson** said that the insights as well as the actions MAC is taking to either incorporate them into the Plan, develop new Frequently Asked Questions, or otherwise address the themes is provided in a 9-page Panel Report that was included in the meeting materials and posted on the Long-Term Plan website.

5. Present traveler survey results

Dana Nelson, Director of Stakeholder Engagement, presented a recent survey that was conducted to collect insights from the traveling public through an online polling platform, Polco. The purpose of the survey was to gather general information about travel habits, find out what is going well at MSP, find improvement areas and uncover innovative opportunities.

Nelson said the survey was open for three weeks and distributed through multiple channels. A total of 269 people participated. She then presented a summary of the survey results, noting that the majority of respondents appreciate the variety of flight operations, destinations and airplanes as well as airport restaurants and shops. The majority of respondents feel that curbside access and baggage claim are the biggest areas of improvement. There was a wide variety of responses for the things MSP airport is missing that other airports have. Nine percent replied nothing. Other responses included healthier/more food options, sleeping area, more efficient curb front/inbound roadway, trams/moving walks to reduce walking distances, and shorter security wait times.

The Panel asked questions and discussed the survey results. Specific interest from the Panel included better understanding of the difference between Terminal 1 – Lindbergh and Terminal 2 – Humphrey respondents, how passengers and employees are traveling to the airport, in-terminal wayfinding/signage, identifying the difference in the MSP airport experience between the business traveler, leisure traveler, and employees.

Nelson closed with announcing the Experience MSP public event at the Mall of America. The purpose of the event is to bring MSP Airport to the public, inform the public about the Long-Term Plan, and collect feedback about the Plan. The event will include a number of booths focused on different avenues of the airport and the public is welcome to attend and ask questions, get more information, and try some food from vendors at the airport.

6. Public Comment period

No public comment

Respectfully Submitted,

Amie Kolesar, Recording Secretary

MSP Airport Long-Term Comprehensive Plan – A 20-Year Look Ahead
January 30, 2019 4:30 p.m.
Crowne Plaza
3 Appletree Square
Bloomington, MN 55425

STAKEHOLDER ADVISORY PANEL MEETING #3

Meeting Objective: Recap the first public event and review the survey results from the second Polco survey. Receive a presentation on the Air Service Quality surveys conducted at airports across the world. Hear an update on the Airfield Capacity Study and Facility Requirements.

Agenda:

4:30 Welcome

Bridget Rief, MAC Vice President of Planning and Development

4:40 Introductions

5:00 Recap the first Experience MSP public event

Dana Nelson, MAC Director of Stakeholder Engagement

5:10 Public survey results

Discuss results from the most recent public survey – Dana Nelson, MAC Director of Stakeholder Engagement

5:20 MSP's Airport Service Quality (ASQ) Survey Rankings*

With the level of interest in passenger surveys expressed at the last Panel meeting, MAC will present ASQ survey results and rankings for MSP compared to historic trends and benchmark airports – Steve Gentry, MAC Customer Research Analyst

5:50 MSP Airport Long-Term Plan Update

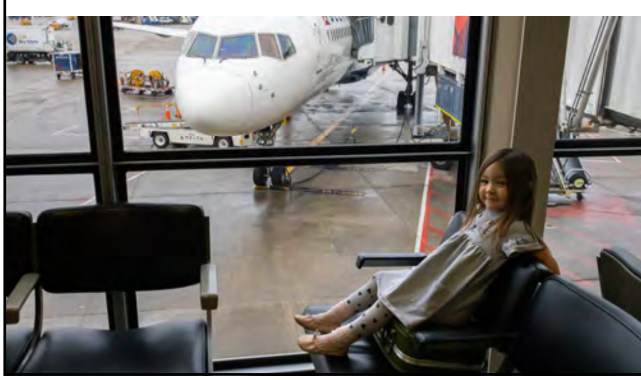
Airfield Capacity Study and Facility Requirements Update – Neil Ralston, MAC Airport Planner

6:20 Public Comment

6:30 Close

*ASQ is provided through Airports Council International and is the world's leading airport passenger service and benchmarking program. It measures passengers' satisfaction whilst they are traveling through an airport.

Meeting Agenda



- Welcome
- Introductions
- Recap Experience MSP Public Event
- Public Survey Results
- MSP's ASQ Survey Rankings
- MSP Airport Long-Term Plan Update
- Public Comment

2

EXPERIENCE msp

Exhibits

- MSP Airport Foundation
- Northwest Airlines History Center
- MSP Airport Winter Operations
- History of MSP Airport
- Community Relations
- Taste of MSP
- Kid's Zone
- MAC
- MnDOT

3

EXPERIENCE msp

During this event, attendees:

- Learned about the MSP Long-Term Plan
- Discussed future airport usage projections
- Completed a short survey
- Spoke with MAC staff and exhibitors
- Enjoyed Kid Zone activities and Taste of MSP hosted by an airport restaurant

4

EXPERIENCE msp

- 60 attendees
- What we heard:
  - Questions about future planning at MAC's reliever airports
  - The projected number of domestic/international flights, cargo flights and how the airfield is big enough to handle future projections
  - Questions about airport security/safety
  - Changes to security screening for passengers?

5

Experience MSP

The public is invited to the next Experience MSP event

April 9, 2020

Crowne Plaza Aire in Bloomington

Show up any time between 4 and 8 PM for MSP tastes, interactive booths and knowledgeable resources in a welcoming setting.

Presentation on the MSP Long-Term Plan will begin at 6:00 PM.

This event is the second in a four-part series where the public will receive updates on the Long-Term Plan and be given a platform to ask questions and provide feedback.

Please join us!

6

Public Survey Results

- Gain a greater understanding of traveler and community attitudes, perceptions and airport issues
- Encourage people to sign up to the LTP distribution list
- Understand preferred news sources for advertising future Experience MSP events
- Find examples of preferred airports and what makes them stand out to the general public
- Generate ideas and suggestions for airport improvements

7

Polco Survey #2 Results

- 9 Questions
- Open for 4 weeks beginning September 24, 2019
- Distributed through:
  - MSP newsletter to over 700 individuals subscribed to the MSP Long-Term Plan topic
  - MAC News newsletters
  - Postcard mailing to over 8,000 residents
  - Experience MSP public event
  - Emailed to the MAC Commission, Stakeholder Advisory Panel, and MSP Noise Oversight Committee
- 456 people participated

8

What is your favorite airport and why?

MSP Airport	**46%**
Other Airports	**54%**
95 other airports listed, including:	
Detroit	3.7%
Denver	3.3%
DFW	2.0%
Las Vegas	2.0%
Amsterdam	1.8%
Phoenix	1.8%
Chicago O'Hare	1.5%
Singapore	1.3%
Atlanta	1.0%

Of the following, what could be improved?

Curbside access	**38%**
Ticketing/Check-in	**30%**
Experience at your gate	**29%**
Safety and security	**27%**
Variety of flight options	**26%**
Baggage claim	**25%**

AIRPORT SERVICE QUALITY (ASQ)

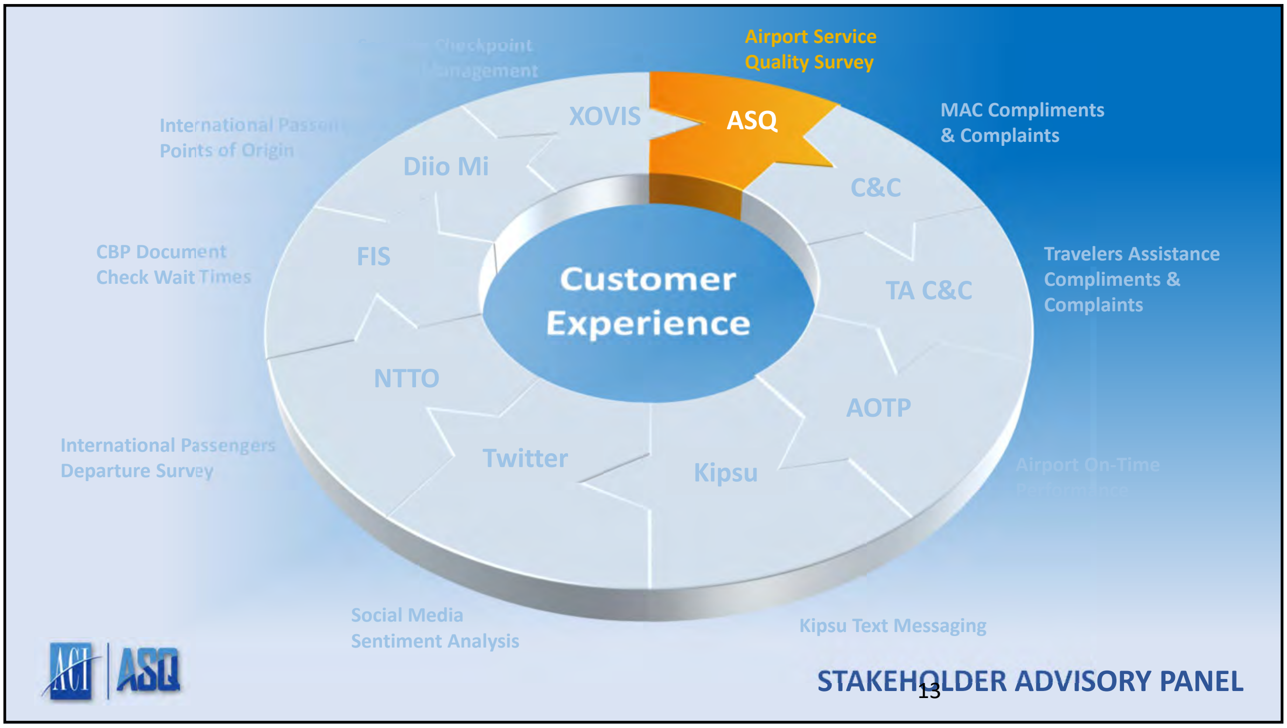
Steve Gentry
Customer Research Analyst
CUSTOMER DATA AND ANALYTICS
METROPOLITAN AIRPORTS COMMISSION

STAKEHOLDER ADVISORY PANEL

11

STAKEHOLDER ADVISORY PANEL

12



- **Airport Service Quality (ASQ) is the world's leading airport customer satisfaction benchmark survey. The program is owned and managed by Airports Council International.**
- **346 airports in more than 50 countries use ASQ to survey their passengers each month.**
- **Participating airports receive results from all other participating airports allowing it to identify best practice and measure its own performance.**

STAKEHOLDER ADVISORY PANEL

14

Best Airport in North America

25-40 million passengers

STAKEHOLDER ADVISORY PANEL

15

Internal Performance Metrics

MSP most current year compared to previous year.

2018 compared to 2017

HOW MSP USES ASQ DATA

External Performance Metrics

MSP current performance compared to our panel of airports.

STAKEHOLDER ADVISORY PANEL

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2018 MSP ASQ AIRPORT PANEL

STAKEHOLDER ADVISORY PANEL

17

What does ASQ measure?

Essentially the customer journey from arriving at the airport to their departure gate

STAKEHOLDER ADVISORY PANEL

18

ACCESS

- Ground transportation to / from the airport
- Parking facilities
- Parking facilities value for money
- Availability of baggage carts / trolleys

AIRLINE CHECK-IN

- Waiting time in check-in queue / line
- Efficiency of check-in staff
- Courtesy, helpfulness of check-in staff

SECURITY

- Courtesy and helpfulness of Security staff
- Thoroughness of Security inspection
- Waiting time at Security inspection
- Feeling of being safe and secure

FINDING YOUR WAY

- Ease of finding your way through airport
- Flight information screens
- Walking distance inside the terminal
- Ease of making connections with other flights

FOOD & BEVERAGE / SHOPPING

- Restaurant / Eating facilities
- Restaurant facilities value for money
- Shopping facilities
- Shopping facilities value for money

AIRPORT STAFF

- Courtesy, helpfulness of airport staff

AIRPORT SERVICES

- Availability of bank / ATM facilities / money changers
- Internet access / Wi-fi
- Business / Executive lounges

AIRPORT FACILITIES

- Availability of washrooms / toilets
- Cleanliness of washrooms / toilets
- Cleanliness of airport terminal
- Comfort of waiting / gate areas

OVERALL SATISFACTION

- Ambience of the airport
- Overall satisfaction with the airport

STAKEHOLDER ADVISORY PANEL

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ACCESS

- Ground transportation to / from the airport
- Parking facilities
- Parking facilities value for money
- Availability of baggage carts / trolleys

AIRLINE CHECK-IN

- Waiting time in check-in queue / line
- Efficiency of check-in staff
- Courtesy, helpfulness of check-in staff

SECURITY

- Courtesy and helpfulness of Security staff
- Thoroughness of Security inspection
- Waiting time at Security inspection
- Feeling of being safe and secure

FINDING YOUR WAY

- Ease of finding your way through airport
- Flight information screens
- Walking distance inside the terminal
- Ease of making connections with other flights

FOOD & BEVERAGE / SHOPPING

- Restaurant / Eating facilities
- Restaurant facilities value for money
- Shopping facilities
- Shopping facilities value for money

AIRPORT STAFF

- Courtesy, helpfulness of airport staff

AIRPORT SERVICES

- Availability of bank / ATM facilities / money changers
- Internet access / Wi-fi
- Business / Executive lounges

AIRPORT FACILITIES

- Availability of washrooms / toilets
- Cleanliness of washrooms / toilets
- Cleanliness of airport terminal
- Comfort of waiting / gate areas

OVERALL SATISFACTION

- Ambience of the airport
- Overall satisfaction with the airport

STAKEHOLDER ADVISORY PANEL

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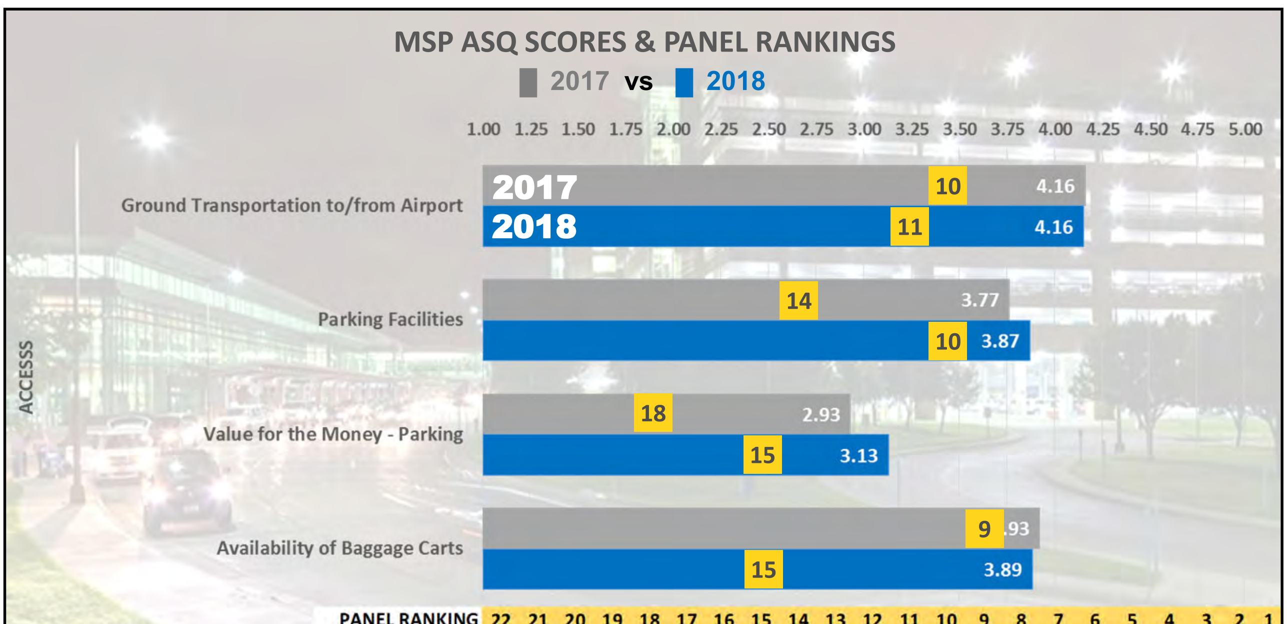
STAKEHOLDER ADVISORY PANEL

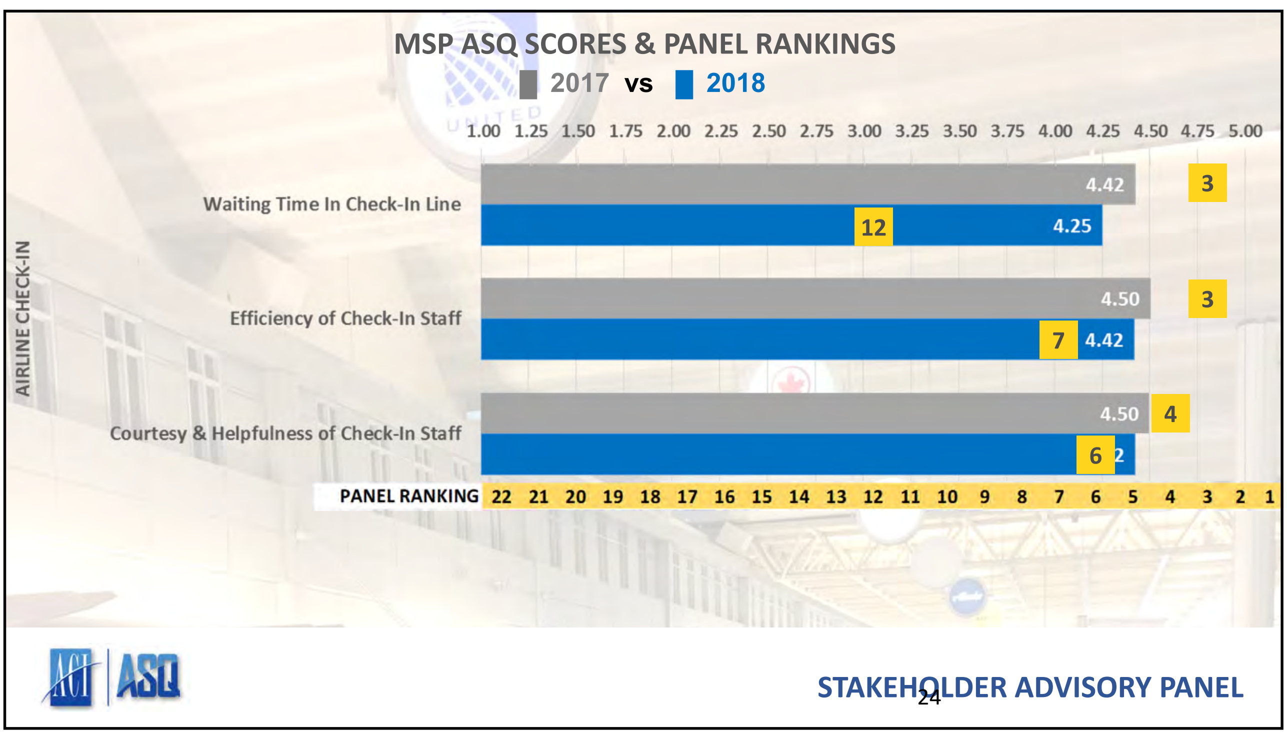
21



STAKEHOLDER ADVISORY PANEL

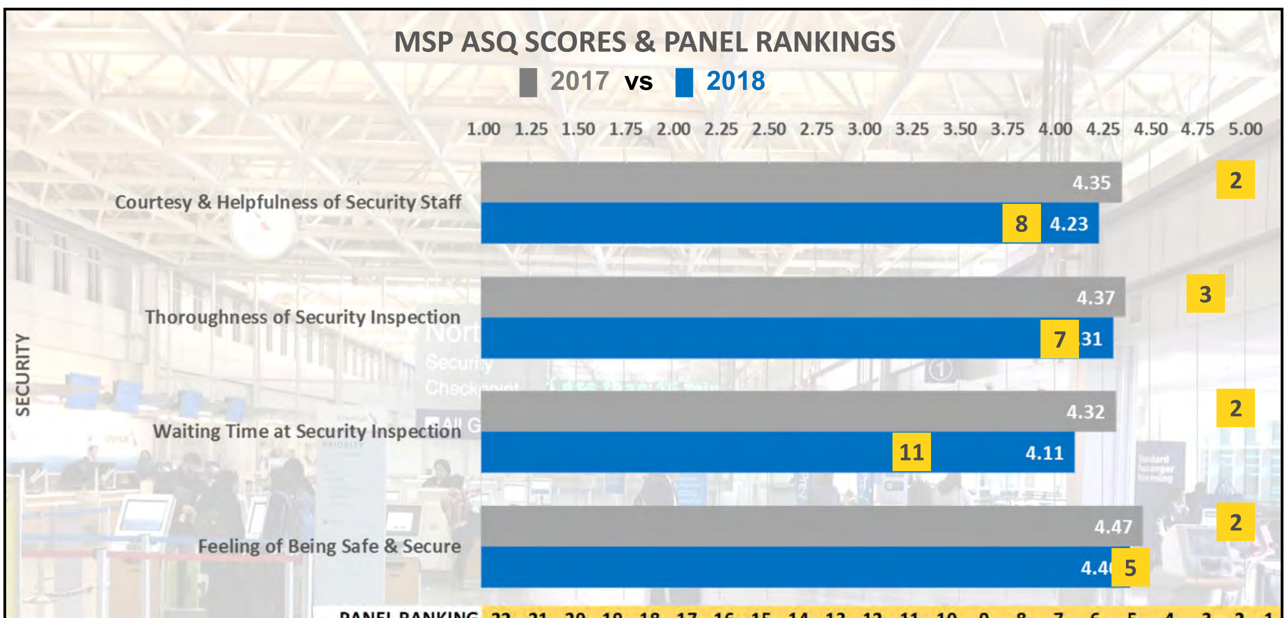
22


UNITED
Check-In
AIR CANADA
ACI ASQ
STAKEHOLDER ADVISORY PANEL
23


MSP ASQ SCORES & PANEL RANKINGS
2017 vs 2018
1.00 1.25 1.50 1.75 2.00 2.25 2.50 2.75 3.00 3.25 3.50 3.75 4.00 4.25 4.50 4.75 5.00
AIRLINE CHECK-IN
Waiting Time In Check-In Line
4.42
3
12
4.25
Efficiency of Check-In Staff
4.50
3
7
4.42
Courtesy & Helpfulness of Check-In Staff
4.50
4
6
2
PANEL RANKING 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
ACI ASQ
STAKEHOLDER ADVISORY PANEL
24

STAKEHOLDER ADVISORY PANEL

25



STAKEHOLDER ADVISORY PANEL

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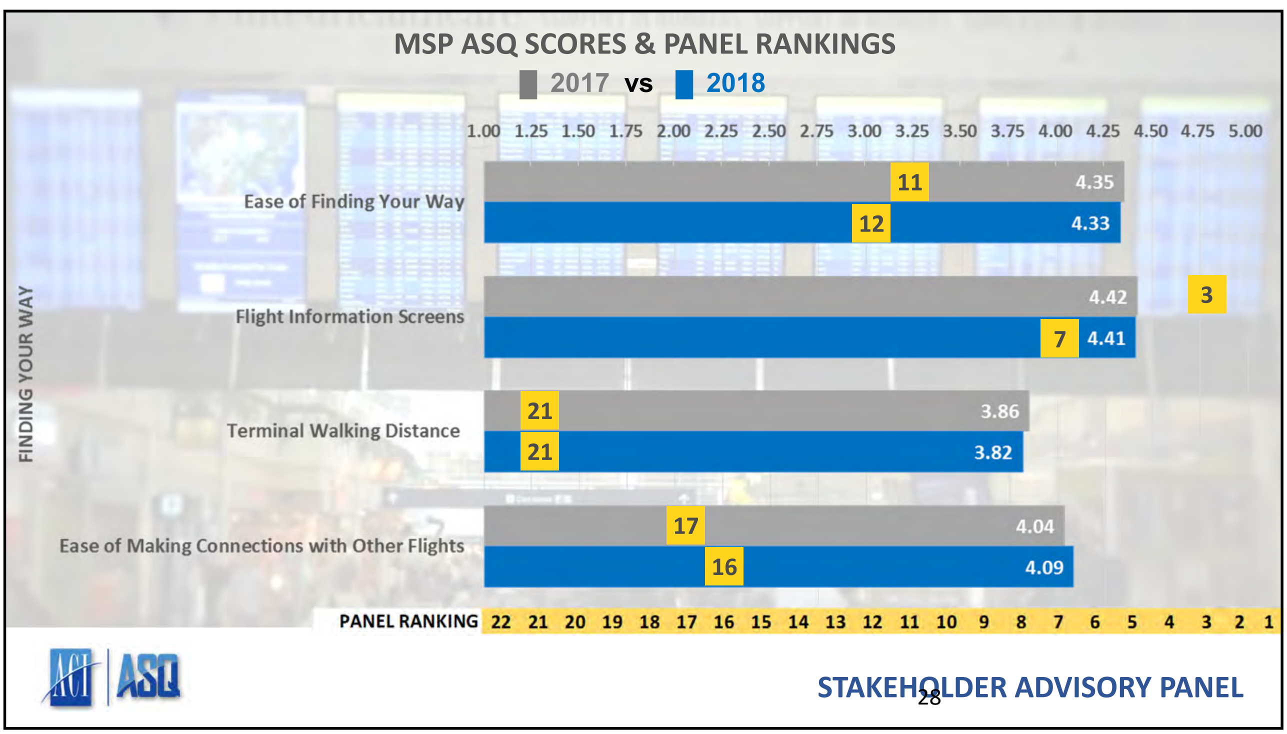
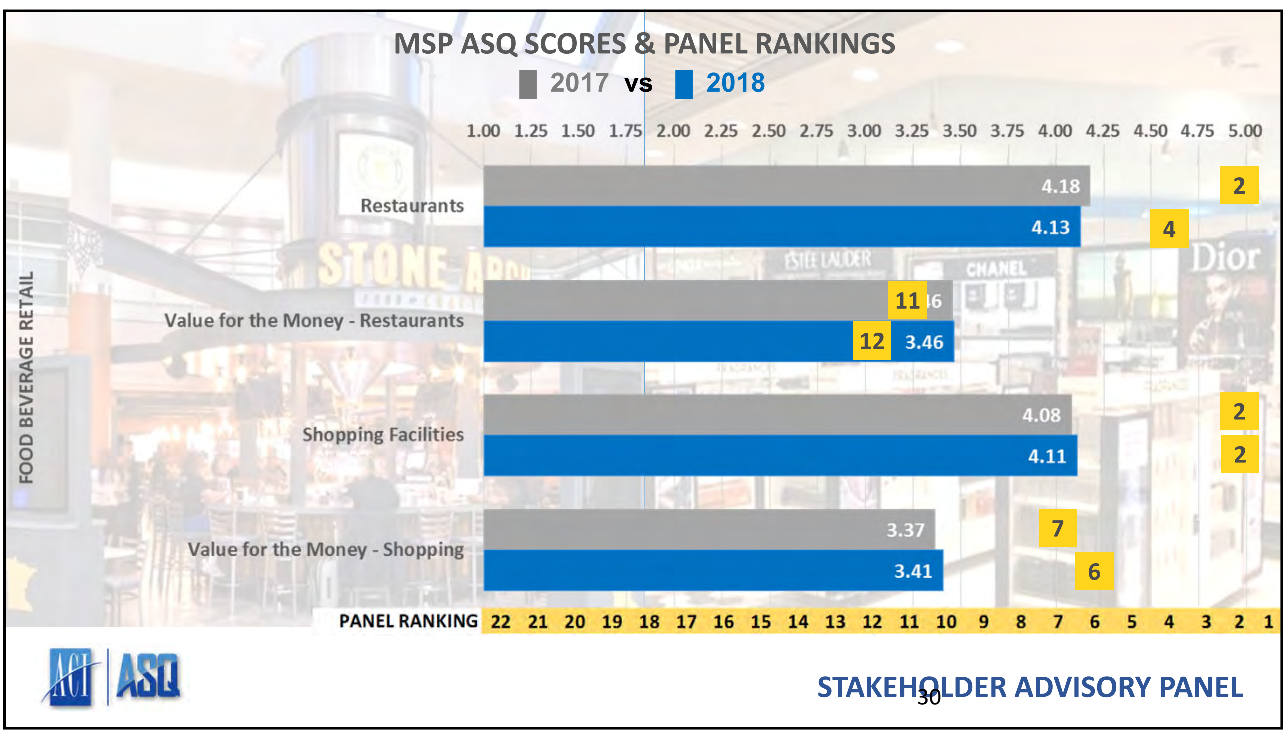
Finding Your Way
ACI ASQ
STAKEHOLDER ADVISORY PANEL
27



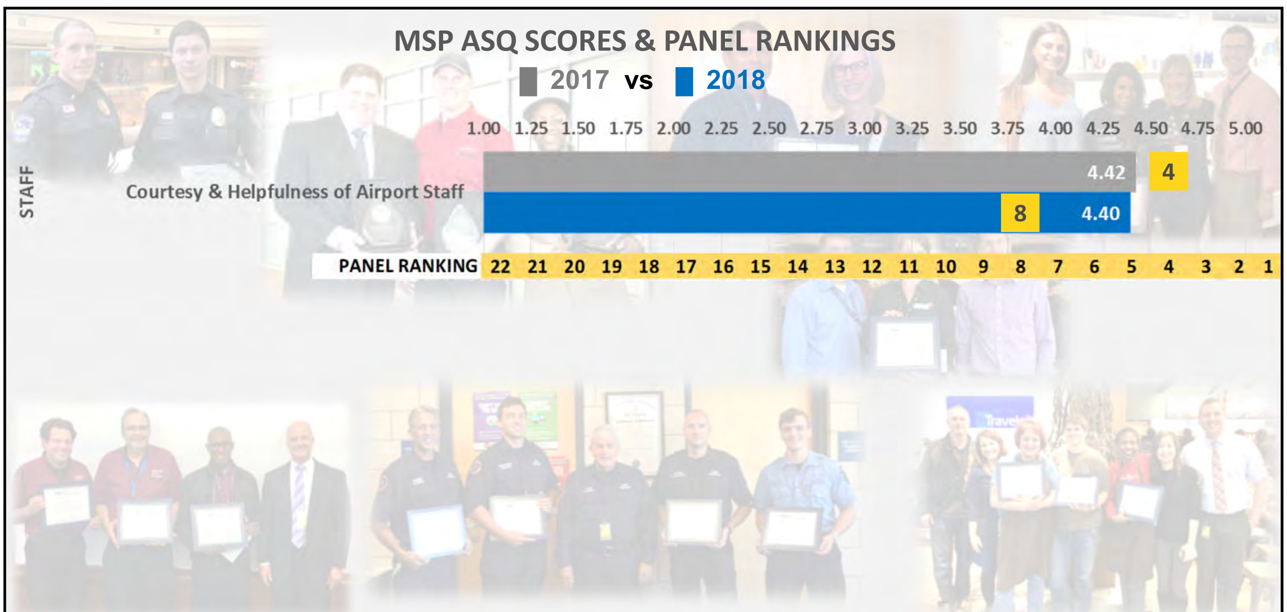
MSP ASQ SCORES & PANEL RANKINGS
2017 vs 2018
1.00 1.25 1.50 1.75 2.00 2.25 2.50 2.75 3.00 3.25 3.50 3.75 4.00 4.25 4.50 4.75 5.00
FINDING YOUR WAY
Ease of Finding Your Way
11 4.35
12 4.33
Flight Information Screens
4.42 3
7 4.41
Terminal Walking Distance
21 3.86
21 3.82
Ease of Making Connections with Other Flights
17 4.04
16 4.09
PANEL RANKING 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
ACI ASQ
STAKEHOLDER ADVISORY PANEL
28


Food
&
Beverage
Shopping
STONE ARCH
ESTĒE LAUDER
CHANEL
Dior
ACI ASQ
STAKEHOLDER ADVISORY PANEL
29


MSP ASQ SCORES & PANEL RANKINGS
2017 vs 2018
FOOD BEVERAGE RETAIL
1.00 1.25 1.50 1.75 2.00 2.25 2.50 2.75 3.00 3.25 3.50 3.75 4.00 4.25 4.50 4.75 5.00
Restaurants
4.18
2
4.13
4
Value for the Money - Restaurants
11
12
3.46
Shopping Facilities
4.08
2
4.11
2
Value for the Money - Shopping
3.37
7
3.41
6
PANEL RANKING 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
ACI ASQ
STAKEHOLDER ADVISORY PANEL
30

STAKEHOLDER ADVISORY PANEL

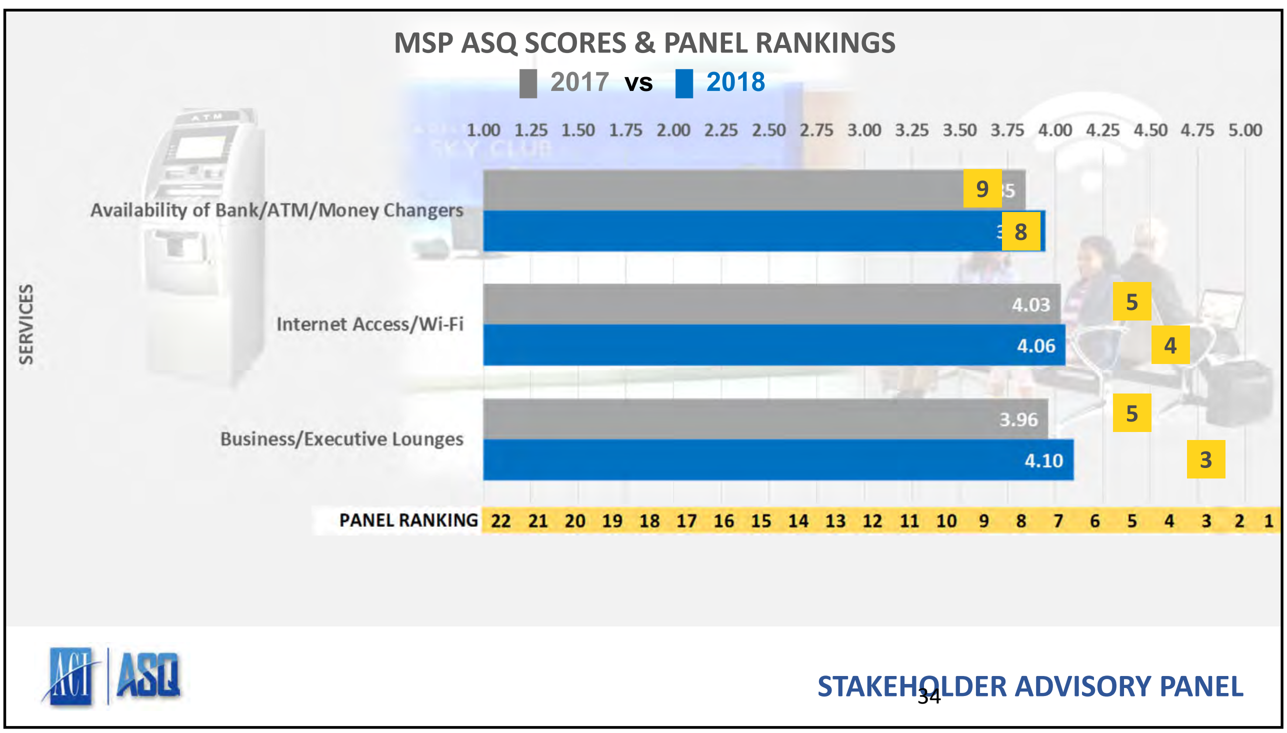
31

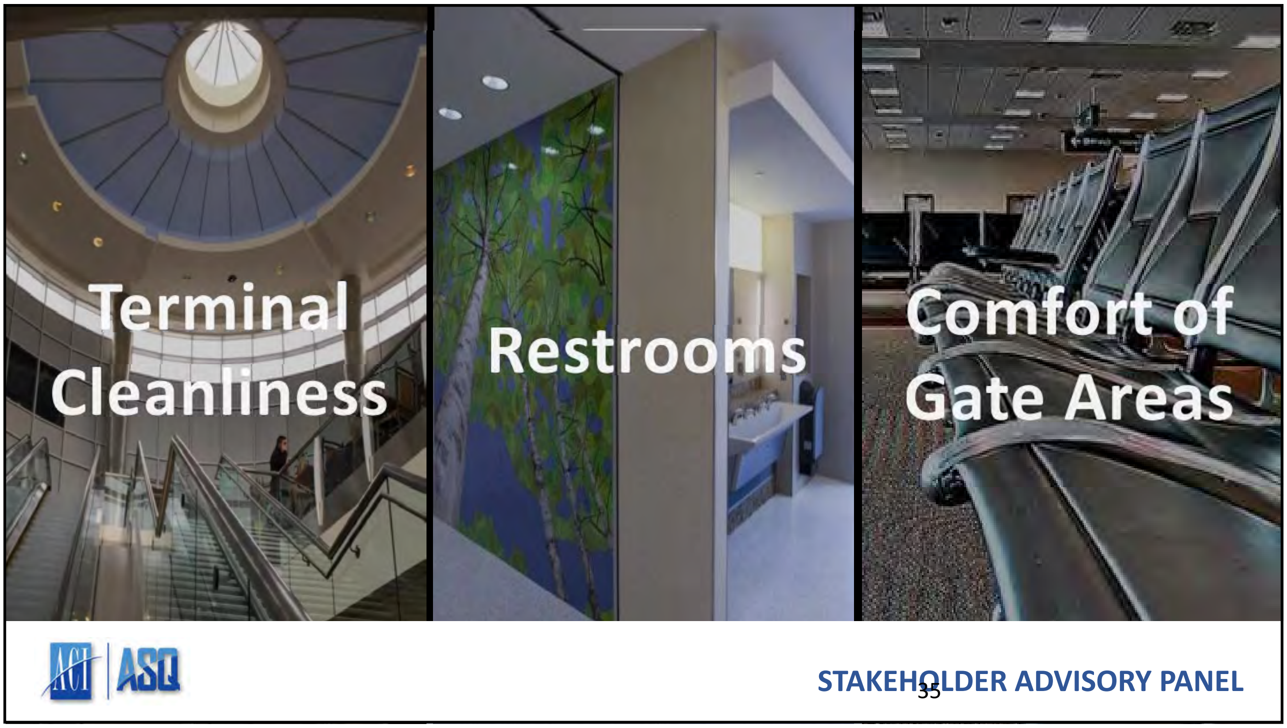


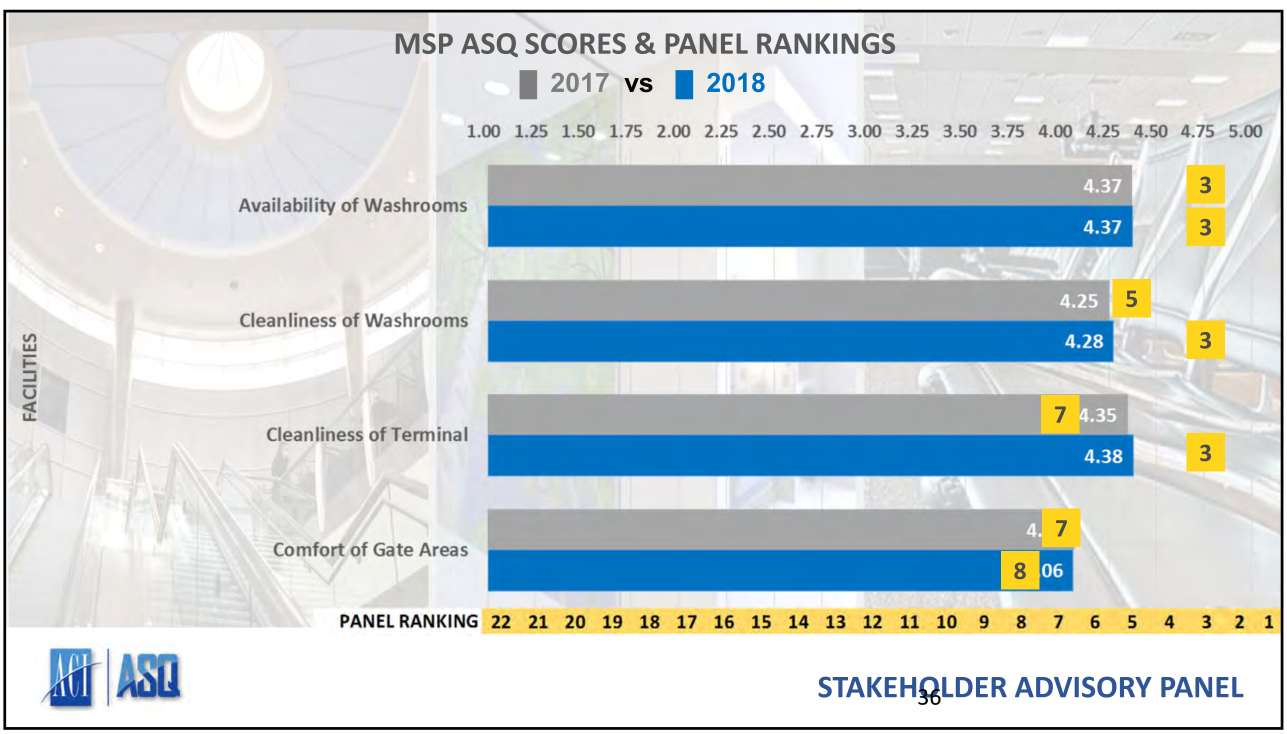
STAKEHOLDER ADVISORY PANEL

32


DELTA
SKY CLUB
Availability of Bank, ATM & Money Changers
Business/Executive Lounges
Internet Access/Wi-Fi
ACI ASQ
STAKEHOLDER ADVISORY PANEL
33


MSP ASQ SCORES & PANEL RANKINGS
2017 vs 2018
1.00 1.25 1.50 1.75 2.00 2.25 2.50 2.75 3.00 3.25 3.50 3.75 4.00 4.25 4.50 4.75 5.00
SERVICES
Availability of Bank/ATM/Money Changers
9
8
Internet Access/Wi-Fi
4.03
5
4.06
4
Business/Executive Lounges
3.96
5
4.10
3
PANEL RANKING 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
ACI ASQ
STAKEHOLDER ADVISORY PANEL
34


Terminal Cleanliness
Restrooms
Comfort of Gate Areas
ACI ASQ
STAKEHOLDER ADVISORY PANEL
35


MSP ASQ SCORES & PANEL RANKINGS
2017 vs 2018
1.00 1.25 1.50 1.75 2.00 2.25 2.50 2.75 3.00 3.25 3.50 3.75 4.00 4.25 4.50 4.75 5.00
FACILITIES
Availability of Washrooms
4.37 3
4.37 3
Cleanliness of Washrooms
4.25 5
4.28 3
Cleanliness of Terminal
7 4.35
4.38 3
Comfort of Gate Areas
4. 7
8 06
PANEL RANKING 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
ACI ASQ
STAKEHOLDER ADVISORY PANEL
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Overall Satisfaction
ACI ASQ
STAKEHOLDER ADVISORY PANEL
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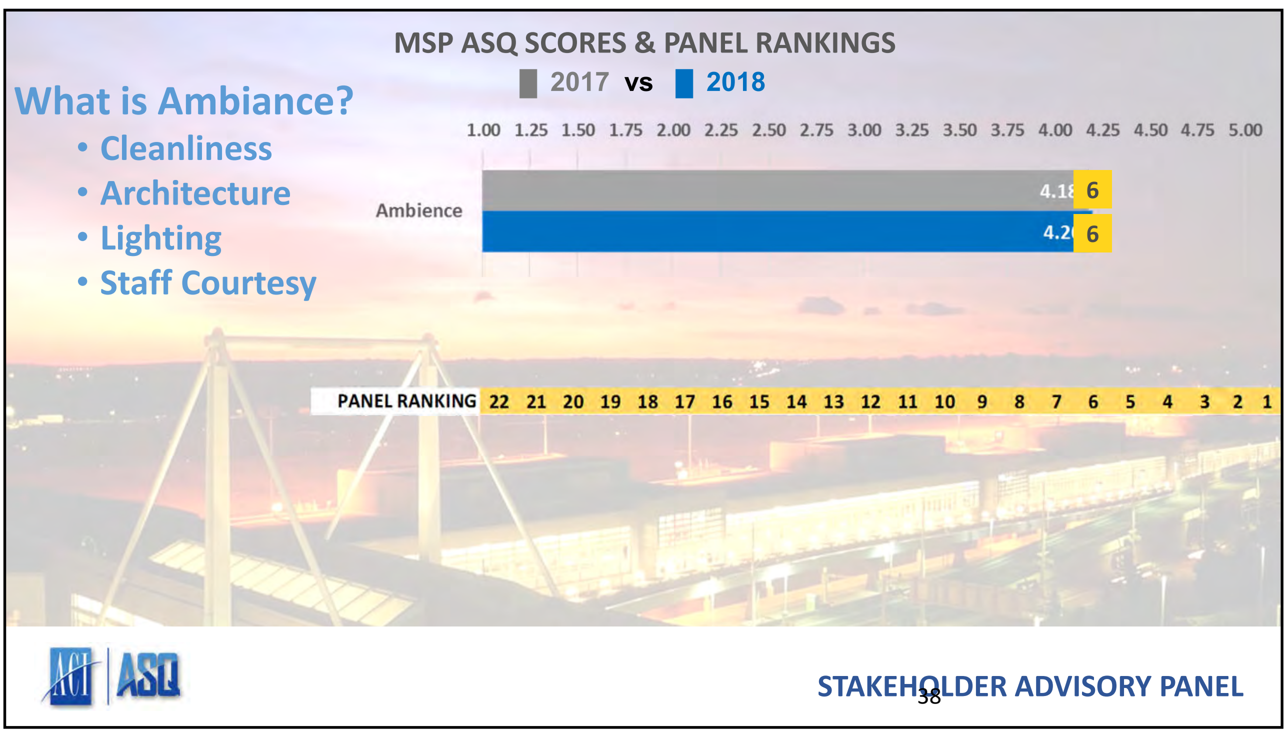
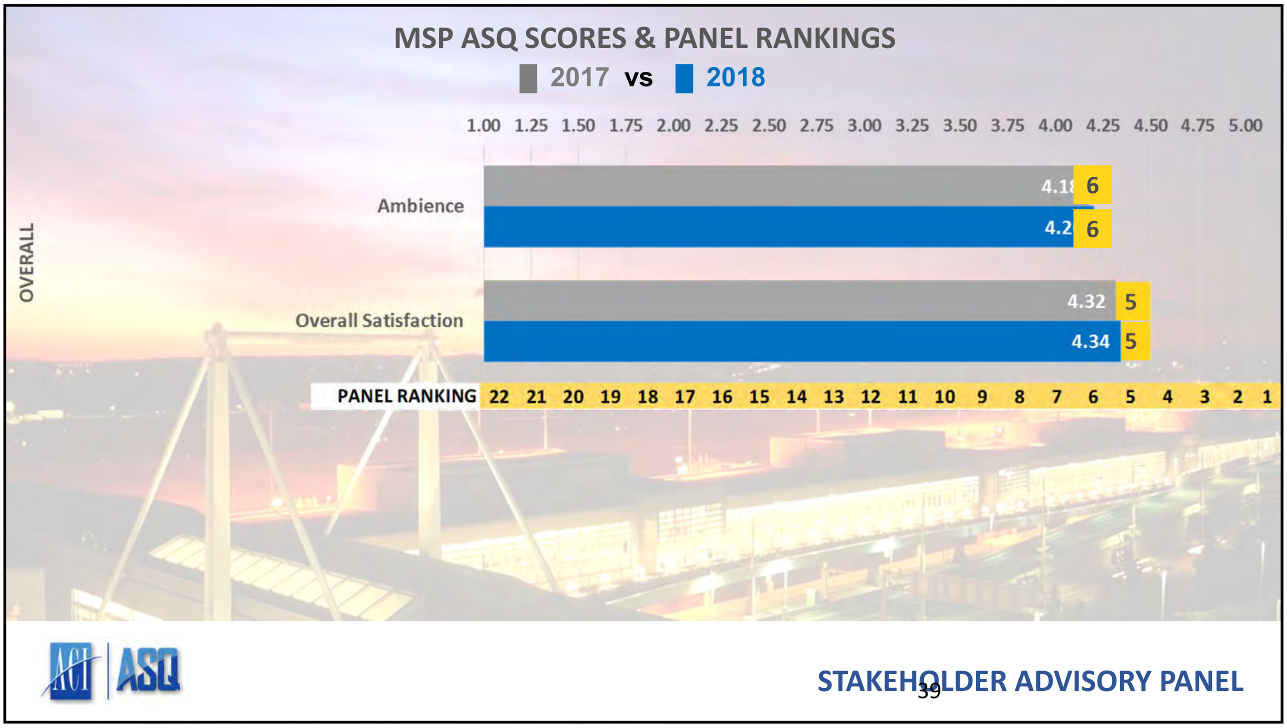
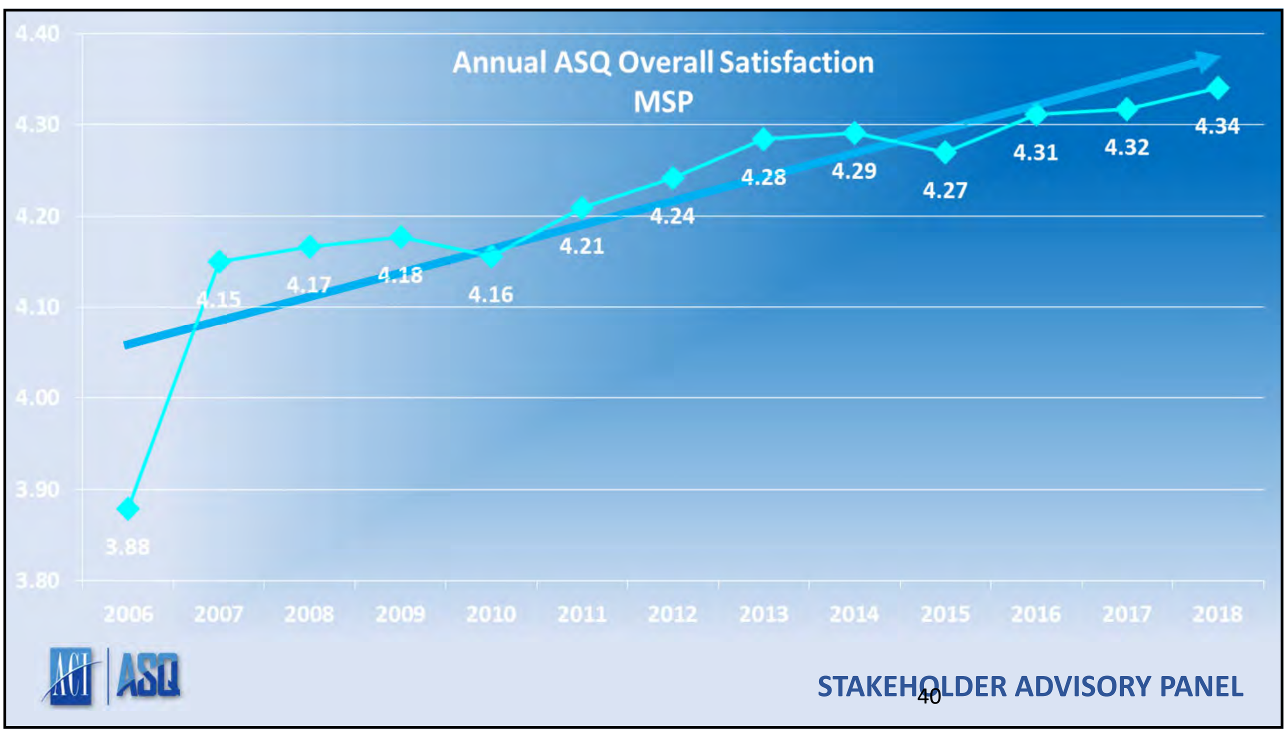

MSP ASQ SCORES & PANEL RANKINGS
2017 vs 2018
What is Ambiance?
• Cleanliness
• Architecture
• Lighting
• Staff Courtesy
1.00 1.25 1.50 1.75 2.00 2.25 2.50 2.75 3.00 3.25 3.50 3.75 4.00 4.25 4.50 4.75 5.00
Ambience
4.18 6
4.20 6
PANEL RANKING 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
ACI ASQ
STAKEHOLDER ADVISORY PANEL
38



MSP ASQ SCORES & PANEL RANKINGS
2017 vs 2018
1.00 1.25 1.50 1.75 2.00 2.25 2.50 2.75 3.00 3.25 3.50 3.75 4.00 4.25 4.50 4.75 5.00
OVERALL
Ambience
4.1
6
4.2
6
Overall Satisfaction
4.32
5
4.34
5
PANEL RANKING 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
STAKEHOLDER ADVISORY PANEL
39



Annual ASQ Overall Satisfaction
MSP
4.40
4.30
4.20
4.10
4.00
3.90
3.80
3.88
4.15
4.17
4.18
4.16
4.21
4.24
4.28
4.29
4.27
4.31
4.32
4.34
2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018
STAKEHOLDER ADVISORY PANEL
40

Questions?

STAKEHOLDER ADVISORY PANEL

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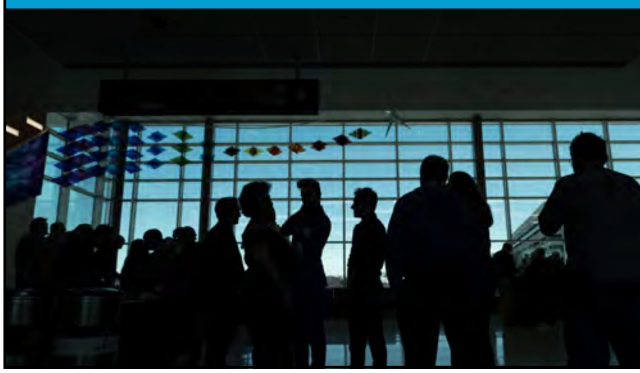
MSP Airport Long-Term Plan Update

42

MSP Airport Long-Term Plan Update



1. **Plan for future facilities that will meet projected passenger activity levels in a manner that maintains and enhances customer service, while facilitating a seamless experience.**

2. **Produce a development plan that positions the MAC to**
   - **meet future demand levels,**
   - **enhance financial strength,**
   - **leverage environmental stewardship, and**
   - **infuse sustainable thinking.**

3. **Conduct the planning process in a manner that includes meaningful stakeholder engagement processes.**

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Aviation Activity Forecasts

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Aviation Activity Forecasts

Objective: develop aviation forecasts for MSP that identify a likely range of demand levels in a manner that will facilitate a meaningful evaluation of facility performance

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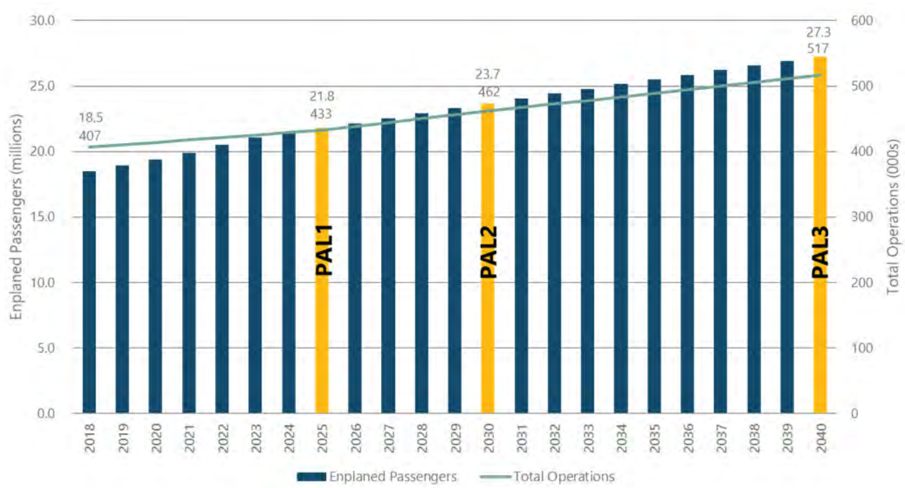
Annual Forecast Summary



NOTE: PAL = Planning Activity Level

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Design Day Flight Schedules (2040/PAL 3 Example)

2040 Representative Day

INBOUND

A_CODE	DAY	Type	Termina	Mkt Al	Flight	Orig	A_TIME	LF	Total	Cnx	OD	Seats	V_EQP	AGATE	G_Time
AA-1049	2	Sched Pax	1	AA	1049	CLT	9:00	86%	138	1	137	160	73H	E14	1:00
AA-1051	2	Sched Pax	1	AA	1051	DFW	9:46	96%	153	3	151	160	73H	E13	1:04
AA-1019	2	Sched Pax	1	AA	1019	PHL	10:13	78%	85	1	84	109	221	E16	0:41
AA-1053	2	Sched Pax	1	AA	1053	CLT	11:07	86%	138	1	137	160	73H	E12	0:47
AA-1021	2	Sched Pax	1	AA	1021	PHL	11:13	78%	85	1	84	109	221	E15	0:40
AA-1023	2	Sched Pax	1	AA	1023	MIA	11:28	89%	97	1	96	109	221	E14	0:32
AA-1025	2	Sched Pax	1	AA	1025	ORD	11:47	89%	97	4	93	109	221	E13	0:32
AA-1085	2	Sched Pax	1	AA	1085	DCA	11:55	86%	65	1	64	76	E75	E16	0:35
AA-1055	2	Sched Pax	1	AA	1055	DFW	12:38	96%	153	3	151	160	73H	E15	0:41
AA-1057	2	Sched Pax	1	AA	1057	ORD	13:37	89%	143	6	137	160	73H	E14	0:46
AA-1059	2	Sched Pax	1	AA	1059	PHX	13:46	86%	138	3	136	160	73H	E13	1:02
AA-1087	2	Sched Pax	1	AA	1087	LGA	14:10	72%	55	1	53	76	E75	E16	1:10
AA-1061	2	Sched Pax	1	AA	1061	CLT	14:25	86%	138	1	137	160	73H	E12	0:50
AA-1079	2	Sched Pax	1	AA	1079	DFW	14:39	96%	165	3	162	172	7M8	E11	0:45
AA-1063	2	Sched Pax	1	AA	1063	ORD	15:04	89%	143	6	137	160	73H	E14	0:45
AA-1027	2	Sched Pax	1	AA	1027	PHL	15:22	78%	85	1	84	109	221	E15	0:43
AA-1065	2	Sched Pax	1	AA	1065	DFW	15:30	96%	153	3	151	160	73H	E13	1:20
AA-1067	2	Sched Pax	1	AA	1067	CLT	16:32	86%	138	1	137	160	73H	E12	0:58
AA-1029	2	Sched Pax	1	AA	1029	ORD	16:45	89%	97	4	93	109	221	E14	0:45
AA-1089	2	Sched Pax	1	AA	1089	LGA	16:49	72%	55	1	53	76	E75	E16	0:31
AA-1069	2	Sched Pax	1	AA	1069	DFW	17:07	96%	153	3	151	160	73H	E11	0:58
AA-1091	2	Sched Pax	1	AA	1091	DCA	17:22	86%	65	1	64	76	E75	E15	0:30
AA-1071	2	Sched Pax	1	AA	1071	PHX	17:35	86%	138	3	136	160	73H	E13	0:46
AA-1093	2	Sched Pax	1	AA	1093	LGA	18:10	72%	55	1	53	76	E75	E16	1:10
AA-1073	2	Sched Pax	1	AA	1073	ORD	18:31	89%	143	6	137	160	73H	E15	0:54
AA-1075	2	Sched Pax	1	AA	1075	DFW	19:00	96%	153	3	151	160	73H	E14	2:00
AC-1097	2	Sched Pax	1	AC	1097	YYZ	10:04	91%	69	7	62	76	E75	E08	0:41
AC-1099	2	Sched Pax	1	AC	1099	YYZ	15:54	91%	69	7	62	76	E75	E08	0:41
AC-1101	2	Sched Pax	1	AC	1101	YYZ	17:10	91%	69	7	62	76	E75	E08	1:50
AF-1103	2	Sched Pax	1	AF	1103	CDG	15:45	94%	305	166	140	324	359	Unassigned	4:00
AF-1105	2	Sched Pax	1	AF	1105	CDG	17:00	94%	305	166	140	324	359	G04B	4:00
AS-1115	2	Sched Pax	1	AS	1115	SAN	11:45	83%	63	0	63	76	E75	E03	0:52
AS-1107	2	Sched Pax	1	AS	1107	SEA	11:51	89%	141	1	140	159	7M8	E01	0:59
AS-1113	2	Sched Pax	1	AS	1113	SEA	13:43	89%	158	2	157	178	7M9	E01	1:06
AS-1117	2	Sched Pax	1	AS	1117	PDX	15:18	83%	63	2	61	76	E75	E03	0:45
AS-1109	2	Sched Pax	1	AS	1109	SEA	17:45	89%	141	1	140	159	7M8	E04	0:57
AS-1119	2	Sched Pax	1	AS	1119	SAN	19:56	83%	63	0	63	76	E75	E03	0:34
DL-3669	2	Sched Pax	1	DL	3669	ATL	0:11	93%	178	0	178	192	3N1	F03	7:34
DL-3671	2	Sched Pax	1	DL	3671	LAX	5:15	96%	183	69	115	192	3N1	C09	2:45
DL-3397	2	Sched Pax	1	DL	3397	LAS	5:18	96%	172	76	96	180	739	G06B	2:57
DL-3357	2	Sched Pax	1	DL	3357	HNL	5:32	96%	294	210	84	306	350	G03W	5:48
DL-3673	2	Sched Pax	1	DL	3673	SFO	5:40	96%	185	64	121	192	3N1	F08	3:05
DL-3675	2	Sched Pax	1	DL	3675	SMF	5:43	78%	150	87	63	192	3N1	G15	3:02

OUTBOUND

D_CODE	DAY	Type	Mkt Al	Flight	Dest	D_TIME	LF	Total	Cnx	OD	Seats	V_EQP	DGATE
AA-1050	2	Sched Pax	AA	1050	CLT	10:00	82%	131	1	130	160	73H	E14
AA-1052	2	Sched Pax	AA	1052	DFW	10:50	94%	150	2	148	160	73H	E13
AA-1020	2	Sched Pax	AA	1020	PHL	10:54	78%	85	1	84	109	221	E16
AA-1054	2	Sched Pax	AA	1054	CLT	11:54	82%	131	1	130	160	73H	E12
AA-1022	2	Sched Pax	AA	1022	PHL	11:53	78%	85	1	84	109	221	E15
AA-1024	2	Sched Pax	AA	1024	MIA	12:00	88%	96	1	95	109	221	E14
AA-1026	2	Sched Pax	AA	1026	ORD	12:19	84%	92	4	87	109	221	E13
AA-1086	2	Sched Pax	AA	1086	DCA	12:30	84%	64	1	63	76	E75	E16
AA-1056	2	Sched Pax	AA	1056	DFW	13:19	94%	150	2	148	160	73H	E15
AA-1058	2	Sched Pax	AA	1058	ORD	14:23	84%	134	6	128	160	73H	E14
AA-1060	2	Sched Pax	AA	1060	PHX	14:48	86%	138	4	134	160	73H	E13
AA-1088	2	Sched Pax	AA	1088	LGA	15:20	72%	55	1	53	76	E75	E16
AA-1062	2	Sched Pax	AA	1062	CLT	15:15	82%	131	1	130	160	73H	E12
AA-1080	2	Sched Pax	AA	1080	DFW	15:24	94%	161	2	159	172	7M8	E11
AA-1064	2	Sched Pax	AA	1064	ORD	15:49	84%	134	6	128	160	73H	E14
AA-1028	2	Sched Pax	AA	1028	PHL	16:05	78%	85	1	84	109	221	E15
AA-1066	2	Sched Pax	AA	1066	DFW	16:50	94%	150	2	148	160	73H	E13
AA-1068	2	Sched Pax	AA	1068	CLT	17:30	82%	131	1	130	160	73H	E12
AA-1030	2	Sched Pax	AA	1030	ORD	17:30	84%	92	4	87	109	221	E14
AA-1090	2	Sched Pax	AA	1090	LGA	17:20	72%	55	1	53	76	E75	E16
AA-1070	2	Sched Pax	AA	1070	PHX	18:05	86%	138	4	134	160	73H	E11
AA-1092	2	Sched Pax	AA	1092	DCA	17:52	84%	64	1	63	76	E75	E15
AA-1072	2	Sched Pax	AA	1072	DFW	18:21	94%	150	2	148	160	73H	E13
AA-1094	2	Sched Pax	AA	1094	LGA	19:20	72%	55	1	53	76	E75	E16
AA-1074	2	Sched Pax	AA	1074	ORD	19:25	84%	134	6	128	160	73H	E15
AA-1076	2	Sched Pax	AA	1076	PHX	21:00	86%	138	4	134	160	73H	E14
AC-1098	2	Sched Pax	AC	1098	YYZ	10:45	91%	69	7	62	76	E75	E08
AC-1100	2	Sched Pax	AC	1100	YYZ	16:35	91%	69	7	62	76	E75	E08
AC-1102	2	Sched Pax	AC	1102	YYZ	19:00	91%	69	7	62	76	E75	E08
AF-1104	2	Sched Pax	AF	1104	CDG	19:45	92%	298	162	137	324	359	Unassigned
AF-1106	2	Sched Pax	AF	1106	CDG	21:00	92%	298	162	137	324	359	G04B
AS-1116	2	Sched Pax	AS	1116	SAN	12:37	83%	63	0	63	76	E75	E03
AS-1108	2	Sched Pax	AS	1108	SEA	12:50	86%	138	1	136	159	7M8	E01
AS-1114	2	Sched Pax	AS	1114	SEA	14:49	86%	154	2	152	178	7M9	E01
AS-1118	2	Sched Pax	AS	1118	PDX	16:03	83%	63	2	61	76	E75	E03
AS-1110	2	Sched Pax	AS	1110	SEA	18:42	86%	138	1	136	159	7M8	E04
AS-1120	2	Sched Pax	AS	1120	SAN	20:30	83%	63	0	63	76	E75	E03
DL-3670	2	Sched Pax	DL	3670	SEA	7:45	92%	177	32	145	192	3N1	F03
DL-3672	2	Sched Pax	DL	3672	SFO	8:00	90%	173	41	132	192	3N1	C09
DL-3398	2	Sched Pax	DL	3398	GEG	8:15	79%	143	89	54	180	739	G06B
DL-3358	2	Sched Pax	DL	3358	HNL	11:20	93%	284	173	112	306	350	G06A
DL-3674	2	Sched Pax	DL	3674	DTW	8:45	95%	183	66	116	192	3N1	F08
DL-3676	2	Sched Pax	DL	3676	LAX	8:45	88%	169	58	111	192	3N1	G15

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Design Day Flight Schedules – Summary of Results (Passengers)

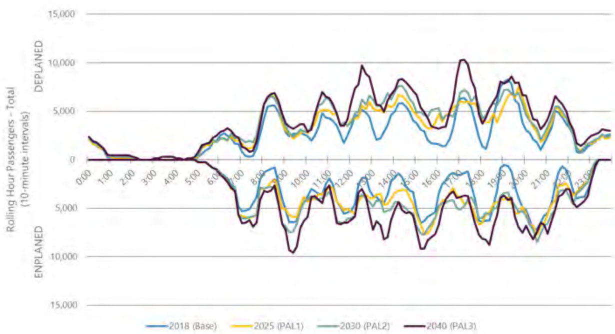
	DOMESTIC	INTERNATIONAL	TOTAL	DOMESTIC	INTERNATIONAL
2018 (Base)	115,688	9,032	124,720	93%	7%
2025 (PAL1)	139,546	13,475	153,022	91%	9%
2030 (PAL2)	152,047	15,476	167,524	91%	9%
2040 (PAL3)	174,129	16,456	190,585	91%	9%

	O&D	CONNECTING	TOTAL	O&D	CONNECTING
2018 (Base)	73,396	51,324	124,720	59%	41%
2025 (PAL1)	89,178	63,843	153,022	58%	42%
2030 (PAL2)	97,251	70,273	167,524	58%	42%
2040 (PAL3)	112,482	78,103	190,585	59%	41%

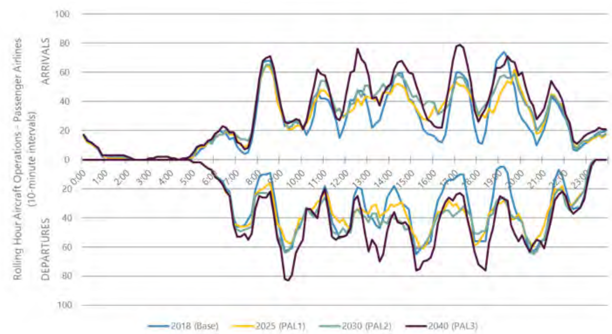
	DELTA	OTHERS	TOTAL	DELTA	OTHERS
2018 (Base)	90,123	34,597	124,720	72%	28%
2025 (PAL1)	107,748	45,273	153,022	70%	30%
2030 (PAL2)	118,319	49,205	167,524	71%	29%
2040 (PAL3)	132,407	58,178	190,585	69%	31%

48

Design Day Flight Schedules – Summary of Results



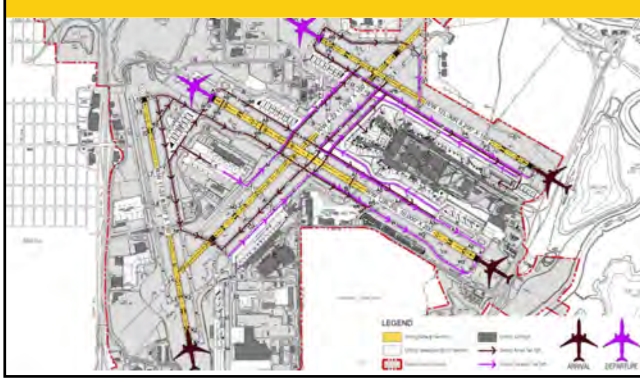
Rolling Hour Passenger Demand



Rolling Hour Passenger Airline Operations

49

Airfield Capacity Study



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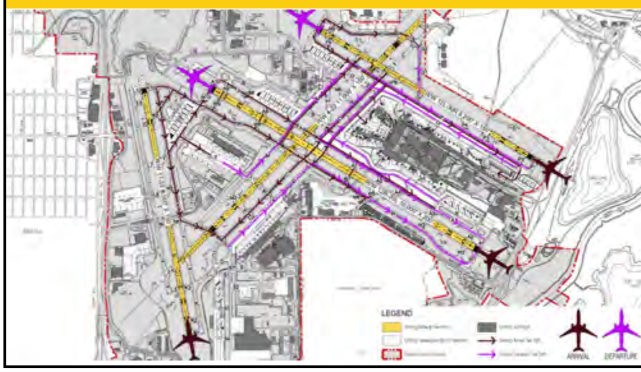
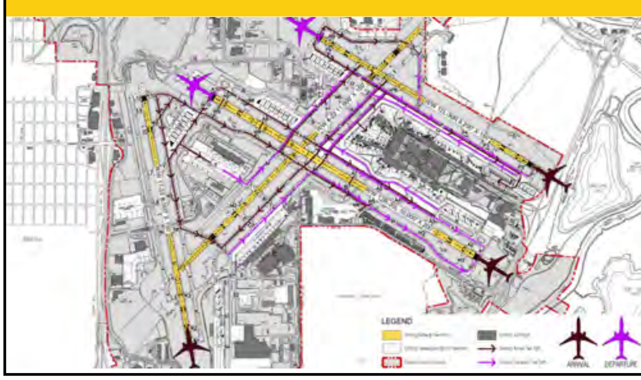
Airfield Capacity Study



Objective: use state-of-the-art simulation tools to predict how the MSP airfield and close-in airspace will perform under forecasted aircraft activity levels

51

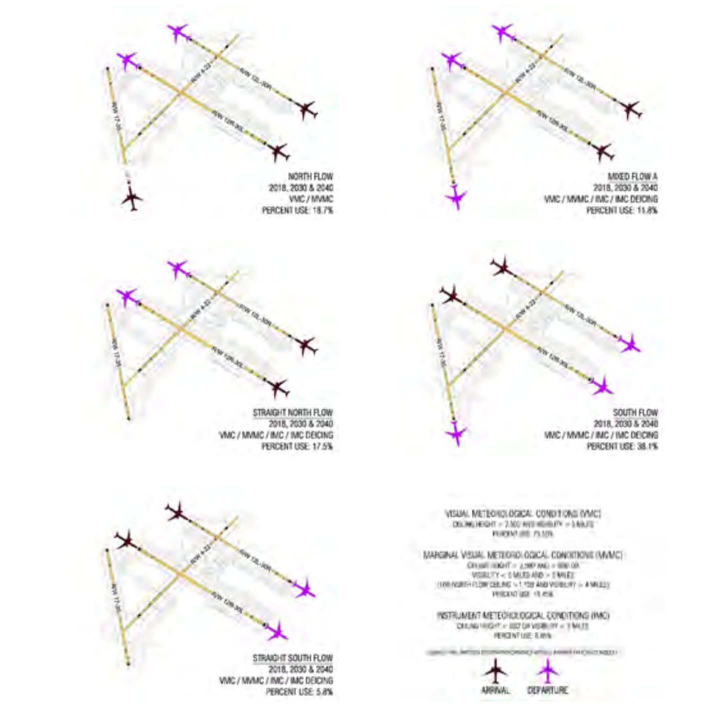
Airfield Capacity Study



Baseline Results - 2018

- **Average Delays**
- **Throughput Vs. Demand**
- **Throughput and Delay**
- **Animation of Simulated Traffic**

52

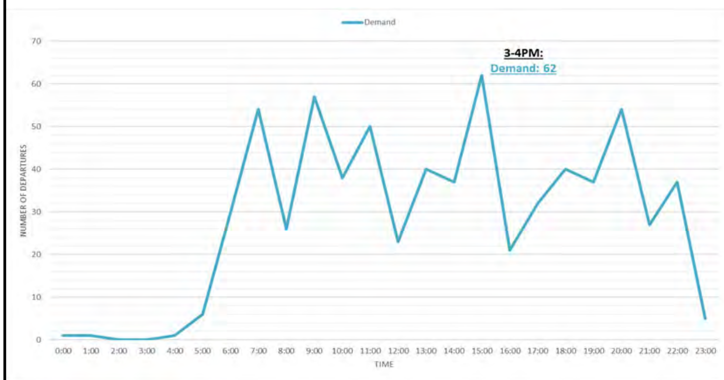


Model Inputs

- **Runway Use Configurations**
  - **Modeling the most commonly-used runway configurations representing 92% of total operations**
  - **Modeling operations in three weather conditions (visual, marginal visual, instrument)**

MSP Capacity Metrics Summary for 2018 ADPM Modeled Configurations (Minutes)

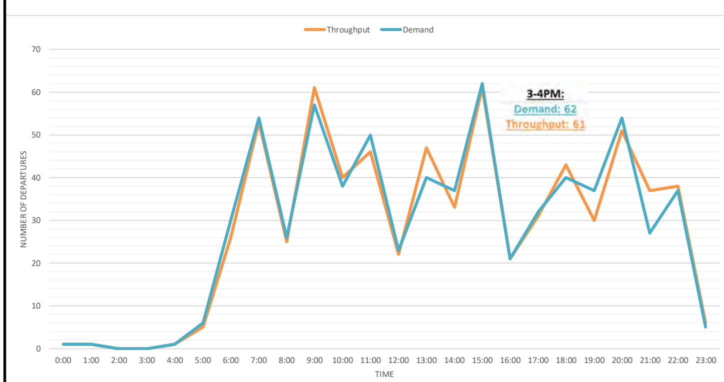
Flow	Weather Condition	Average Arrival Delay Per Operation	Average Departure Delay Per Operation	Average Total Delay Per Operation	Modeled Annual % In Flow	Average ADPM Delay
Straight North (N*)	VMC	2.93	3.88	3.41	11.18%	2.60
	MVMC	3.55	3.97	3.76	5.06%	
	IMC	3.67	4.27	3.97	1.30%	
North (N)	VMC	2.53	3.40	2.97	16.68%	
	MVMC	3.02	3.43	3.22	2.00%	
Mixed A (MA)	VMC	1.73	2.65	2.19	9.74%	
	MVMC	2.10	2.55	2.32	1.69%	
	IMC	2.13	2.57	2.35	0.38%	
South (S)	VMC	1.80	2.22	2.01	28.26%	
	MVMC	2.00	2.10	2.05	6.81%	
	IMC	1.98	2.27	2.12	2.99%	
Straight South (S*)	VMC	2.30	3.57	2.93	3.47%	
	MVMC	2.62	3.58	3.10	1.42%	
	IMC	2.67	3.80	3.23	0.94%	



Hourly Demand

- Straight North Flow
- Low Clouds and/or Visibility (Instrument Conditions)
- Departures only

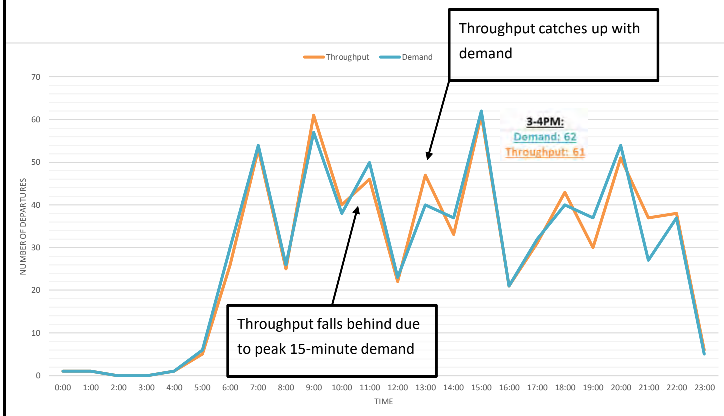
55



Hourly Throughput Vs. Demand

- Straight North Flow
- Low Clouds and/or Visibility (Instrument Conditions)
- Departures only
- Throughput generally keeps up with demand and recovers quickly

56



Hourly Throughput Vs. Demand

- Straight North Flow
- Low Clouds and/or Visibility (Instrument Conditions)
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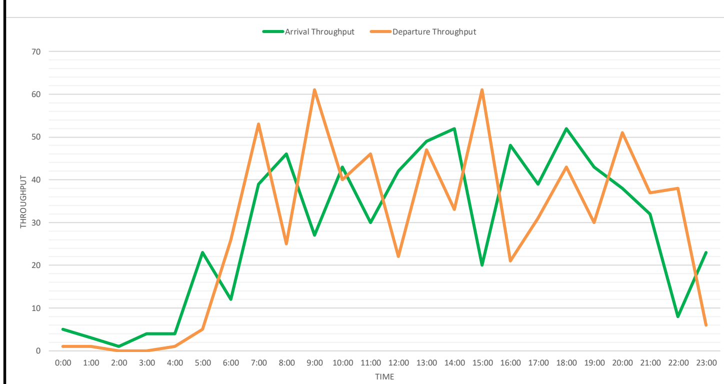
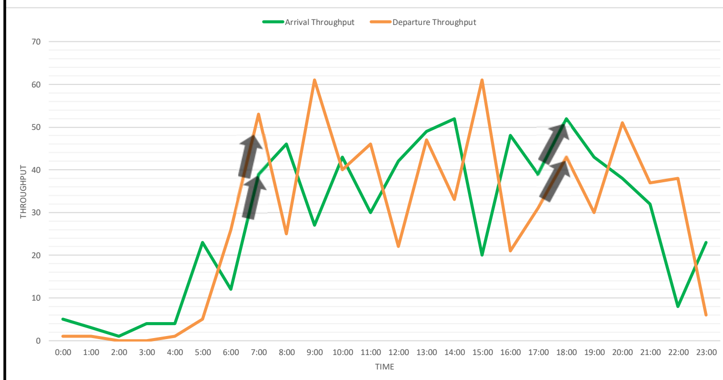
57



Arrival & Departure Throughput

- Straight North Flow
- Low Clouds and/or Visibility (Instrument Conditions)

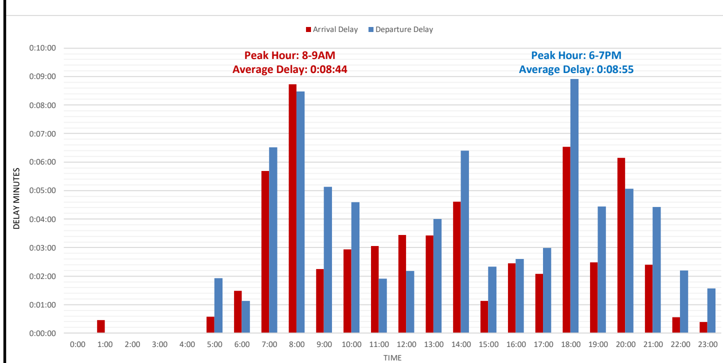
58



Arrival & Departure Throughput

- Straight North Flow
- Low Clouds and/or Visibility (Instrument Conditions)

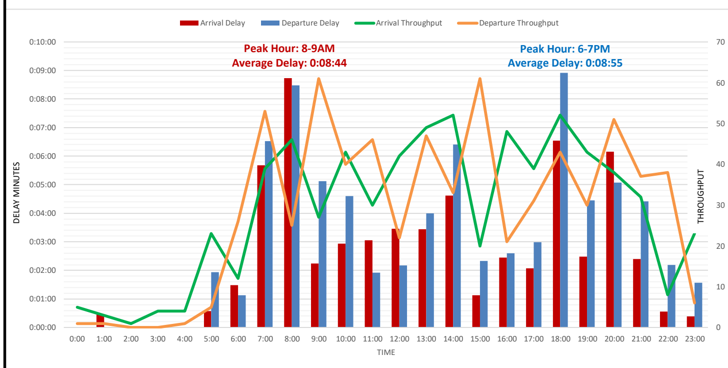
59



Arrival & Departure Delays

- Straight North Flow
- Low Clouds and/or Visibility (Instrument Conditions)
- Peak Hour Average Delays Approaching 9 Minutes

60



Throughput-Delay Comparison

- Straight North Flow
- Low Clouds and/or Visibility (Instrument Conditions)
- Departures and Arrivals
- Peak Hour Average Delays Approaching 9 Minutes

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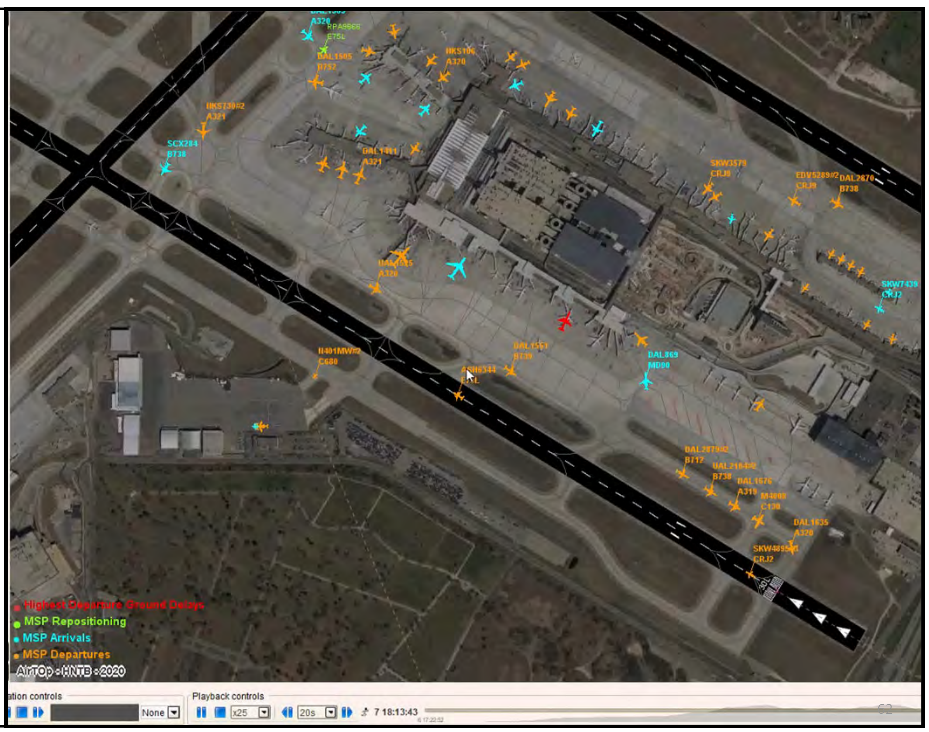
Animation:

Peak Hour Average Departure Delays

- Straight North Flow
- Instrument Conditions



Industry Guidance on Delay vs. Level of Service

- **4 to 6 minutes of Annual Average Delay (AAD) per operation**
  - Limited peak-hour Visual Flight Rules (VFR) delays
  - Instrument Flight Rules (IFR) delays in moderate and extreme weather conditions
- **6 to 8 minutes of AAD per operation**
  - Increasing VFR delays in peak hours
  - Increasing high levels of delays throughout the day in IFR
- **8 to 10 minutes of AAD per operation**
  - Delays expand beyond peak hours in VFR
  - IFR delay levels that can result in some cancellations
- **Over 10 minutes of AAD per operation**
  - Delays expand beyond peak hours in VFR in all but optimum conditions
  - Very high delays in IFR conditions, resulting in significant flight cancellations

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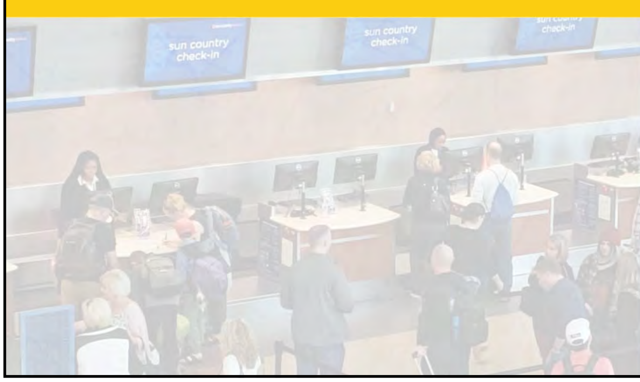
Terminal Facilities Planning



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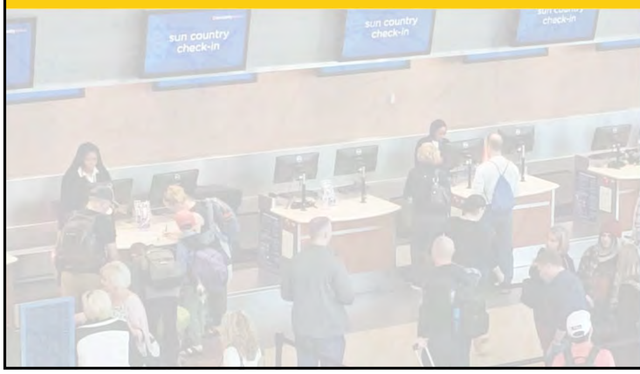
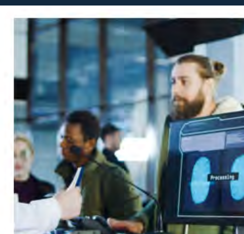
Terminal Facilities Planning



Objective: use state-of-the-art simulation tools to predict how the MSP terminals will perform under forecasted aircraft activity levels, and define terminal capital improvements through 2040 to accommodate growth and deliver a one-journey passenger service experience

65

Terminal Facility Planning



PEOPLE + FACILITIES + PROCESSES

Passenger Personas & Attributes
- Reasons for travel & cultural background
- Type of consumer & air travel frequency
- Type of passenger & getting to/from the airport
  - Originating/Terminating/Connecting
  - Domestic/International

Terminal Facility Inventory, Conditions and Capabilities
- Landside Terminal Facilities
  - Ground transportation services
  - Check-in
  - Commercial services and amenities
  - Security Checkpoints
- Airside Terminal Facilities
  - Concourses
  - International Arrivals
- Terminal and Ramp Operational Areas
  - Baggage operations
  - Aircraft parking (in-service aircraft)

Operating Concepts, Guidelines and Level of Service
- Guidelines, Benchmarks and Trends
  - Technology
  - Passenger interaction and processing rates
  - Operating clearances and spatial comfort
- Future-proofing & resiliency

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Terminal Facility Planning Workshops

Terminal Planning Parameters and Level of Service Workshops:

WS#1 – Landside/Non-Secure Terminal
WS#2 – Airside/Secure Terminal
WS#3 – Transportation Security Administration
WS#4 – U.S. Customs and Border Protection
WS#5 – Terminal Support/Ramp Operations

Terminal Planning Parameters and Level of Service Workshops

Objective: gain consensus on the planning parameters, level of service (LOS) standards, and evaluation criteria that will be used to determine facility requirements and evaluate terminal improvement alternatives for different planning horizons up to activity level correlating to 2040

- Planning parameters refers the passenger characteristics and terminal operating processes that drive the simulation modeling
- Level of Service (LOS) Standards are quantifiable measurements relating to passenger experience and comfort factors such as passenger maximum wait time, space requirements, seating, and occupancy

Objective: engage stakeholders to sense changes in passenger habits and preferences; and to the Airport's business and regulatory environments

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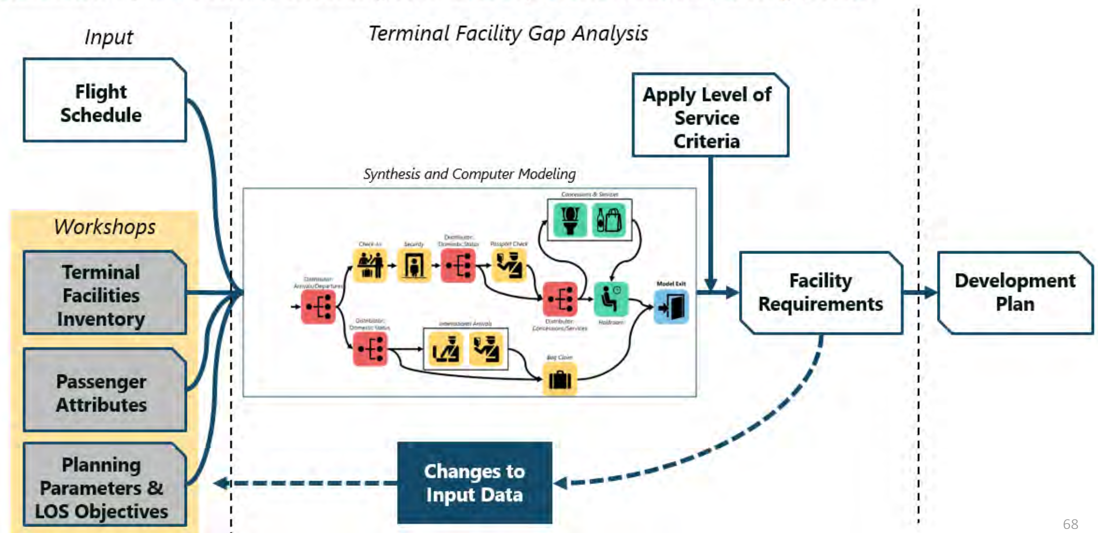
Terminal Facility Planning

Stakeholder input is critical to embedding continuous improvement into the planning process



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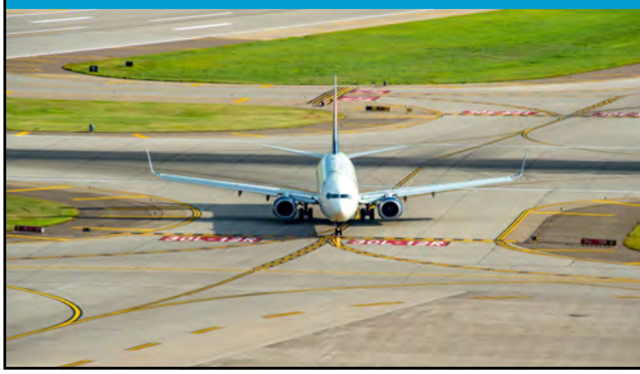
Public Comment



- Each speaker will have one opportunity to speak and is allotted three (3) minutes.
- If you would like to speak, stand up and state your name and address. If you are affiliated with any organization, please state your affiliation.
- Tonight's comments will not be responded to by MAC staff nor members of the Panel. Rather, they will be recorded as part of the meeting minutes.
- If you are asking a question, the planning staff will respond to those questions and include them in a document published on the Long-Term Plan project website.

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MSP Airport Long-Term Comprehensive Plan – A 20-Year Look Ahead
Stakeholder Advisory Panel
MEETING MINUTES
Thursday, January 30, 2020

Stakeholder Advisory Panel Meeting #3
Crown Plaza, Bloomington, MN

Panel Members: Kathleen Barrett, Airline Managers Council/Sun Country Airlines; Pam Dmytrenko, City of Richfield; Hal Gray, Cargo Operator/FedEx; Michael Garnier, T2 Users/Southwest Airlines; Bill Goins, Supply Chain Management; Rylan Juran, MnDOT Aeronautics; Kathleen Koetz, Customs and Border Protection; Jan Kroells, Bloomington Convention and Visitors Bureau; Cheng Lor, Airport Business/Aero Service Group; Dianne Miller, City of Eagan; Gina Mitchell, FAA Airport District Office; Dan O'Leary, Community At-Large; Andrew Palmberg, Travelers with Disabilities Advisory Committee; Linea Palmisano, City of Minneapolis; Shari Paul, Business Travel Advisor/Medtronic; Elizabeth Petschel, City of Mendota Heights; Joel Akason, Greater MSP; Russ Owen, Met Council; Dave Borgert, Regional Economic Development/St. Cloud; John Edman, Explore MN

MAC Staff: Brian Ryks, Executive Director/CEO; Roy Fuhrmann, COO; Atif Saeed, CFO; Bridget Rief, VP of Planning, Development and Environment; Neil Ralston, Airport Planner; Dana Nelson, Director of Stakeholder Engagement; Brad Juffer, Manager of Community Relations; Brian Peters, Assistant Director, CMAA, Air Service Business Development; Michele Ross, Assistant Manager of Community Relations; Jennifer Lewis, Community Relations Coordinator; Steve Gentry, Customer Research Analyst

Others: Loren Olson, City of Minneapolis; Greg Albjerg, HNTB; Todd Streeter, Community Collaboration; Nick Thompson, Met Council; Cheryl Jacobson, City of Mendota Heights; Connie Carrino, Edina

1) Welcome Remarks

Bridget Rief, MAC Vice President of Planning and Development, welcomed everyone to the third meeting. Ms. Rief gave a background of the MAC's Planning and Development branch of the organization.

2) Panel Introductions

The Stakeholder Advisory Panel consists of 30 members from tourism associations, airport tenants, public partnerships, regional businesses, passenger groups, local communities. Each member introduced themselves, mentioned the organization they represent as stakeholders, and gave a brief synopsis of what they'd like to learn through their panel participation. Afterwards, **Dana Nelson** asked all MAC staff to introduce themselves as well as any other members of the public.

3) **Recap of the first Experience MSP public Event**
Dana Nelson, MAC Director of Stakeholder Engagement, reviewed the event at the Mall of America. There were 60 individuals in attendance. There were nine exhibits, one of which was "Taste of MSP" hosted by an airport restaurant, in this case, Pinku.

Nelson shared a summary of what was heard from the attendees:

- Questions about future planning at MAC's reliever airports
- The projected number of domestic/international flights, cargo flights and how the airfield is big enough to handle future projections
- Questions about airport security/safety
- Changes to security screening for passengers

The next event is scheduled on April 9, 2020 at the Crowne Plaza Aire in Bloomington from 4:00 pm – 8:00 pm. The formal presentation will begin at 6:00 pm.

Note: The second Experience MSP Event was cancelled due to the COVID-19 pandemic.

4) **Public Survey Results**
Dana Nelson, MAC Director of Stakeholder Engagement, reviewed the results of the second Polco survey. The purpose of the survey was to gain a greater understanding of traveler and community attitudes, perceptions and airport issues. It was also to encourage people to sign up to the LTP distribution list and understand preferred news sources. A summary report of the results is posted on the LTP project website.

Nelson expanded with certain questions, such as, "what is your favorite airport and why?" MSP Airport represented 46% of the answers and "other airports" representing 54%. There were recommendations for more outside views. Another highlighted question was, "Of the following, what could be improved?" Curbside access and Ticketing/Check-in were the top two (38% and 30% respectively). She reiterated the importance of the stakeholder panel and participation and how much of a difference their efforts make in the long-term future of the airport.

To illustrate this, a short video was shown with renderings of Terminal 1. **Nelson** explained that the projects currently underway in Terminal 1 were projects included in the last Long-Term Plan. This includes ticketing level and baggage claim changes and unmanned exit lanes.

5) **MSP's Airport Service Quality (ASQ*) Survey Rankings**
Steve Gentry, MAC Customer Research Analyst, explained the survey background and introduced the ASQ. It is the world's leading airport customer satisfaction benchmark survey program. The program is owned and managed by Airports Council International (ACI). ACI has awarded the "Best Airport in North America" to the MAC in our size, for the past three years.

Gentry discussed each of the ASQ Scores and Panel Rankings. He compared 2017 and 2018 results. The items were broken down into four categories. He stressed how important customer service was in this to the organization. Overall satisfaction – these scores determine the awards and how airports are benchmarked. Beginning in 2006 the overall has an upward trend with slight dips.

Bill Goins – commented on the wonderful trend line – one area he would like to brainstorm is about access to the airport. There is one access point into the airport for parking. With the upcoming construction it will increase the difficulty and congestion to access the airport. Can we look a this differently in the long-term? How do we enhance the accessibility to the airport? Could the long-term plan for the airport include parking off of airport property (perhaps in partnership with MAC) to decrease congestion.

Dana Nelson responded and acknowledged that we need to accommodate all modes of travel to the airport.

Bridget Rief agreed that MAC needs to accommodate all modes of travel to the airport. There is a park and ride facility that sits in Anoka and Blaine. **Rief** responded to a question regarding traffic issues and acknowledges the lack of curb length. The Long-Term Plan currently includes these questions.

Nick Ralston – also responded to the traffic congestion. There is only so much real estate that can be used. There is a consultant that we are using to get into building scenarios for future alternatives to access the airport.

Dana Nelson also responded to a question regarding the ramps that are reaching end-of-life and if MAC is planning to rebuild them. **Nelson** mentioned that the plan for that space was yet to be determined and explained two options: one is removing the ramps and using the space for something different, the second is reconstructing the ramps. A third option was mentioned as a combination of the first and second options.

Steve Gentry answered a question regarding the ranking of North American airports. Indianapolis Airport scores incredibly high – it is underutilized.

Gentry also gave one strength and one weakness at the request of a panel member. The strength is our people. Customers want the "3 W's" which are waiting, wayfinding and washrooms.

6) **MSP Airport Long-Term Plan Update**

Neil Ralston, MAC Airport Planner, provided an update for the Long-Term Plan. He reviewed the three goals for the Long-Term Plan. **Ralston** also reviewed the aviation activity forecasts for both enplaned passengers and aircraft operations (takeoff/landing) that are expected to occur naturally over time. He explained that the Planning Activity Levels (PALs) are triggers that may lead to implementation of certain facility needs, not certain years or periods of time.

Ralston provided an update on the Airfield Capacity Study. The baseline modeling scenario will reflect 2018 activity during the five most commonly used runway use configurations. **Ralston** showed an MSP Capacity Metrics Summary for 2018 Average Day Peak Month modeled configurations. He defined the term "delay" as the difference between unimpeded travel time and the actual travel time. The baseline average annual flight delay is in the 2-3 minute per aircraft range. **Ralston** noted some aircraft may experience higher delay of 8-9 minutes; however, the existing airfield is able to quickly recover after peak operational times.

Ralston shared industry guidance on delay and level of service and noted that service levels degrade as average annual delay increases.

Ralston then shared an update on the terminal facilities planning phase, which intentionally looks at people, facilities, and processes in the overall facility needs. There will be a series of workshops to bring subject matter experts together to discuss the following components:

WS#1 Landside/Non-Secure Terminal
WS#2 Airside/Secure Terminal
WS#3 Transportation Security Administration
WS#4 US Customs and Border Protection
WS#5 Terminal Support/Ramp Operations

Ralston explained how stakeholder input is critical to embedding continuous improvement into the planning process.

John Edman – Asked for clarification regarding slide 48 of the presentation. Why is it perceived for international travel to be flat? **Ralston** explained the numbers are going up, but the percent of the larger pie, does stay the same.

Dan O'Leary – asked for clarification regarding peak hours and perhaps spreading out flights. **Ralston** responded that airline demands vary by carrier. Sun Country and Southwest representatives both spoke regarding their respective airline demands.

Liz Petschel - asked about the length of runway and timing of arrivals and departures. She also asked about lengthening 12L as part of the long-term planning. **Dana Nelson** – responded to the questions regarding 12L lengthening. Numerous airline representatives offered their feedback regarding the topic.

Bill Goins asked whether we are seeing growth in the origination and destination percentages? Is there an increase to passengers staying in MSP? **Goins** went on to say that MSP is the economic hub for the metro area. The heart of our market. By having the Hwy 5 challenges and other major construction about the impact of the construction on both commerce and commuters. How do we ensure that accessibility isn't going to be a key factor in people's decisions in getting to/from MSP? How can we partner with other businesses to work on the accessibility and ease of going in and out of MSP in the long-term?

Dana Nelson – took an informal poll on the timing for these meetings. Most members said this time works well. **Nelson** committed to sending out the next Doodle Poll with alternative meeting time options for the group to consider.

7) **Public Comment period**
No public comments were received.

Respectfully Submitted,
Kalae Verdeja, Recording Secretary

MSP Airport Long-Term Plan
December 10, 2020
10:00-11:30 a.m.
Microsoft Teams

STAKEHOLDER ADVISORY PANEL MEETING #4

Meeting Objective: Resume the MSP Long-Term Plan by re-engaging the Stakeholder Advisory Panel. Share how the pandemic has impacted the Airport and current and revised forecast trends in airport activity. Hear insights from Panel members on new airport planning considerations in light of the pandemic.

Agenda:

10:00 Welcome

Dana Nelson, MAC Director of Stakeholder Engagement

10:05 Emerging from the Pandemic

Roy Fuhrmann, MAC Chief Operating Officer

10:30 Recap and Reconnect

Dana Nelson, MAC Director of Stakeholder Engagement

10:40 Update from MAC's Airport Planner

Lydia Werner, MAC Airport Planner

10:50 MSP Airport Forecast Update

Jeff Stanley, Ricondo and Associates

11:05 Panel Discussion

What adjustments to long-term airport facility planning should be considered in light of the COVID-19 pandemic?

11:25 Comments and Announcements

11:30 Close

The MSP Airport Long-Term Planning website has been updated. Please visit www.mspairport.com/long-term-plan to view the current planning timeline, Stakeholder Advisory Panel Report, and other resources.

MSP Airport Long Term Plan Stakeholder Advisory Panel

Meeting #4
December 10, 2021

Housekeeping

- Attendees are asked to stay on mute unless participating in the discussion.
- We are recording this session for those who are unable to attend live.
- During Panel discussion, you may participate by:
  - Raising your hand in Teams
  - If calling in, unmute yourself by pressing *6 on your phone
  - Using the Chat
- Captions are available through teams if you click on the button with the 3 dots and click “Turn on Live Captions”.

Meeting Agenda

Emerging from the Pandemic
Roy Fuhrmann, COO

Recap and Reconnect
Dana Nelson, Director of Stakeholder Engagement

Update from MAC's Airport Planner
Lydia Werner, MAC Airport Planner

MSP Airport Forecast Update
Jeff Stanley, Ricondo and Associates

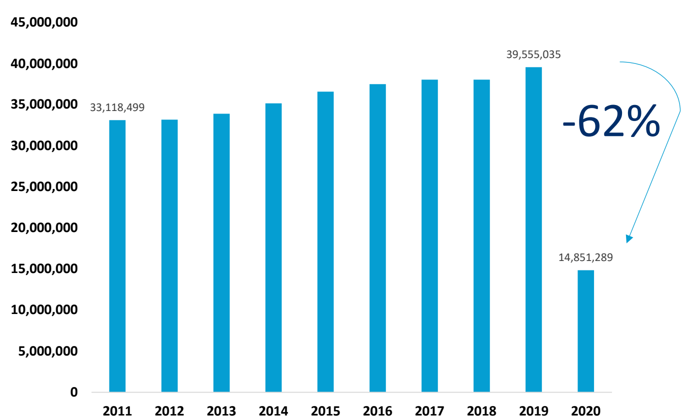
Panel Discussion
What adjustments to long-term airport facility planning should be considered in light of the pandemic?

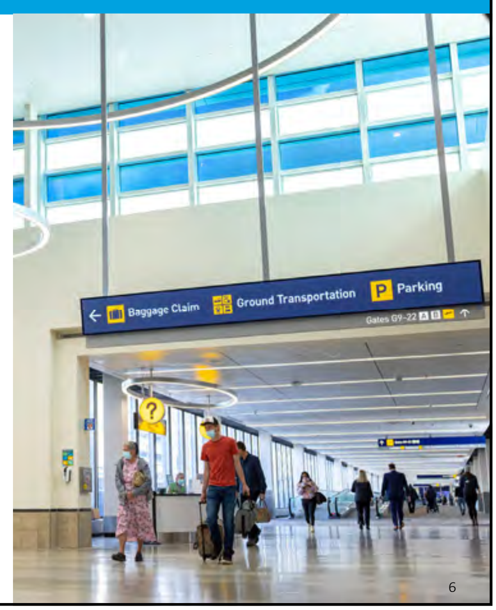
1

COVID Impacts

5

2020 MSP Passenger Activity





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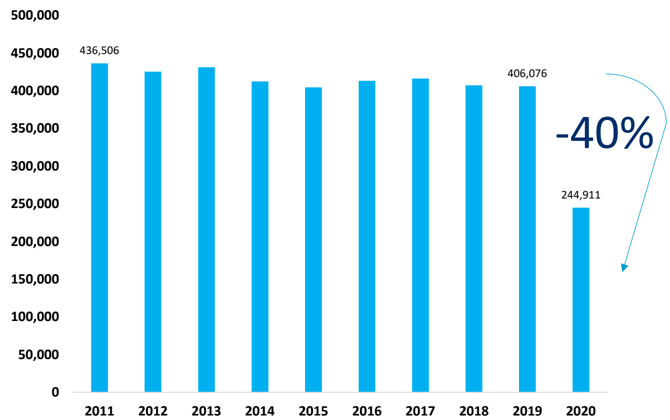
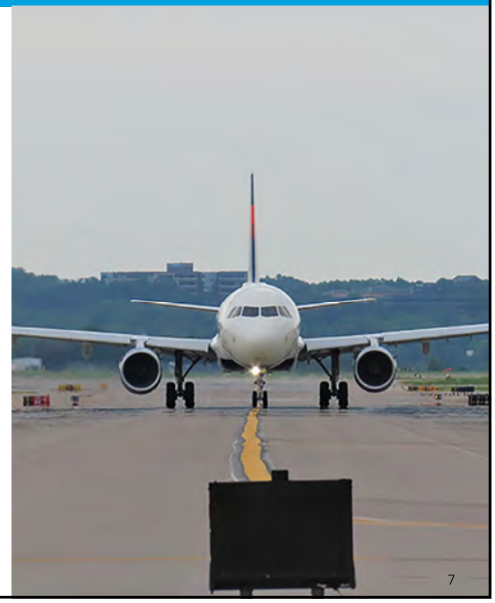
2020 MSP Operations Activity





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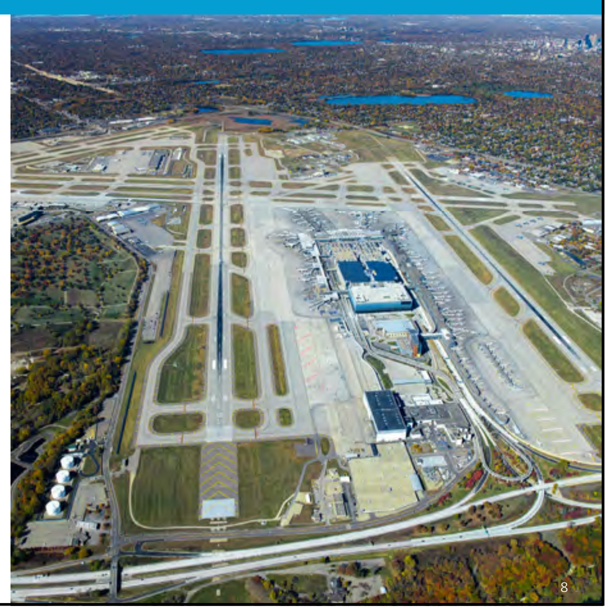
Pandemic - Industry Impact

- U.S. airports = losses of $40 billion
  March 2020-March 2022
- MAC losses = $215-$220 million in 2020
- MAC projected revenue decline of $93 million in 2021



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Pandemic - Relief and Partner Support

CARES ACT + Coronavirus Response and Relief Supplemental Grants

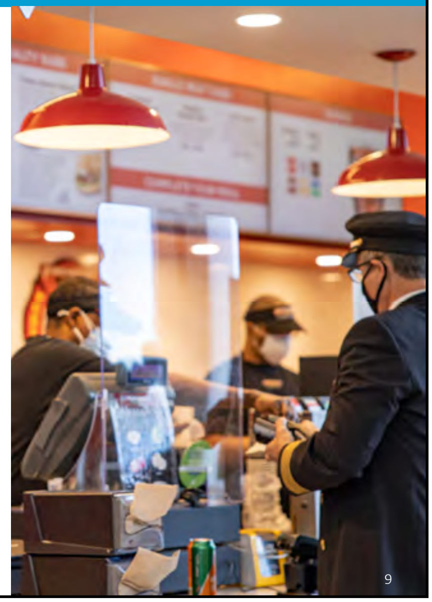
- MSP - $158 million allocated to date
- Other MAC airports - $678,000 allocated to date

American Rescue Plan Act of 2021 Grant

- MSP- $118 million
- MSP concessions- $16.4 million
- Other MAC airports - $621,000

Relief for our Partners

- Airlines - $68 Million
- Concessions, auto rental and passenger services businesses - $35 million



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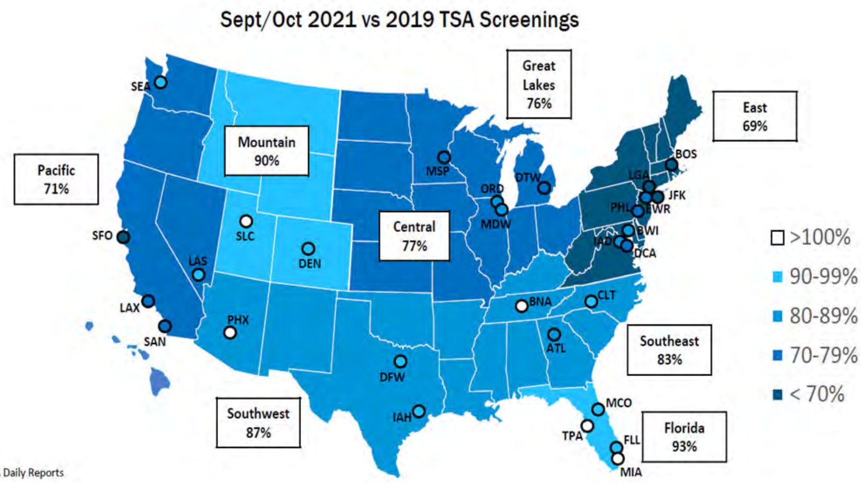
Pandemic – Federal Infrastructure Deal

- $20 billion for airports over 5 years
- AIP entitlement formula funding= $3 billion/year.
  - MSP would receive an estimated $37.5 million in FFY2022 and FFY2023 with future enplanements determining funding in years 2024 to 2026
  - Projects must be PFC eligible and subject to local matching share of 25%
- GA airports would share $520 million in funds based on projects included in FAA NPIAS
- Terminal Development Projects = $1 billion/year
  - MSP can compete for funding to replace aging infrastructure, increase ADA compliance or improve energy efficiency.
  - Amounts subject to local matching share of 20%

Pandemic – Uneven Passenger Recovery

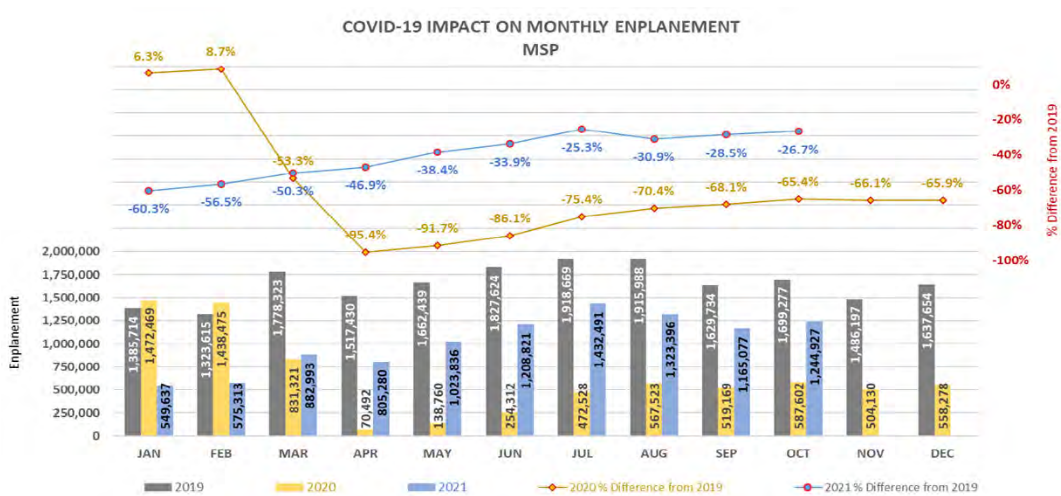
- All regions of US Now Recovering
- Easing of international entry restrictions into U.S. in November
- Business passenger recovery closing gap on leisure sector
- Recovery depends on mix of leisure/business or domestic/int’l service



Source: TSA Daily Reports

6

Pandemic Recovery - Enplanements



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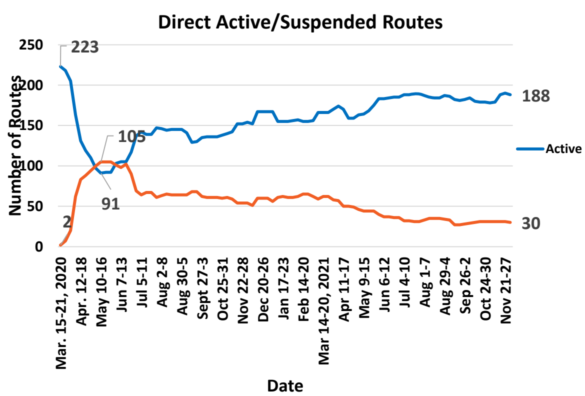
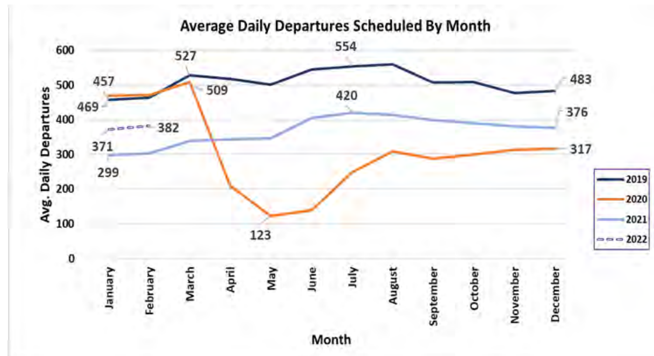
Pandemic Recovery - Routes

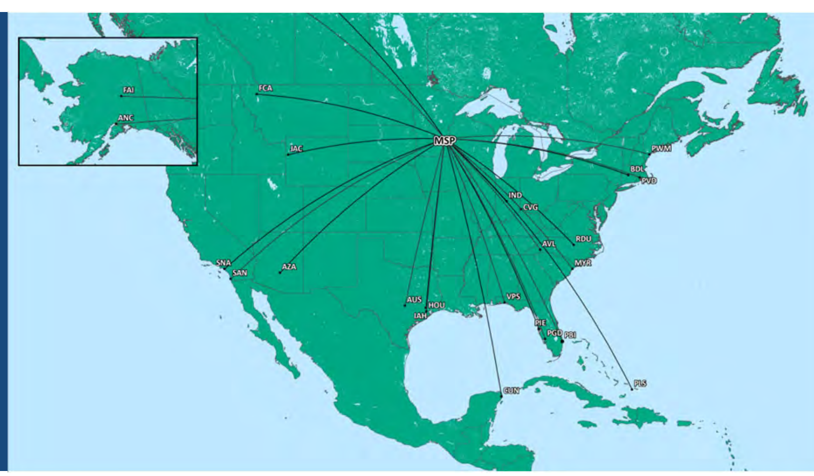




13

Air Service Recovery

27 NEW DOMESTIC ROUTES IN 2021

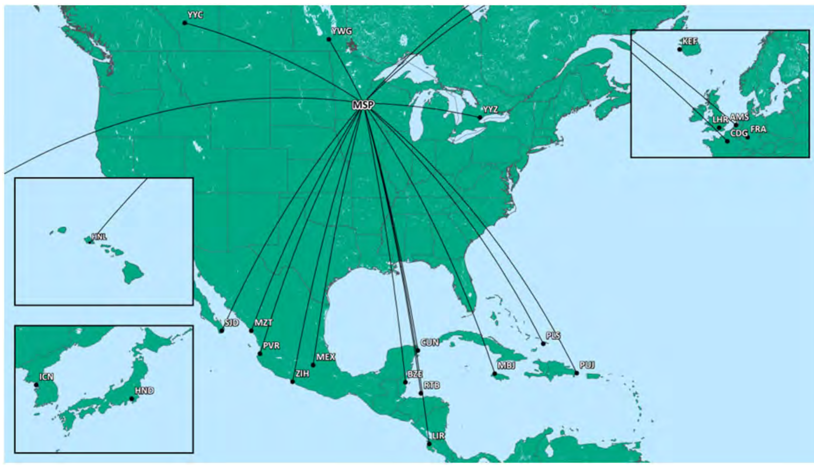


90% of Domestic Routes Recovered

14

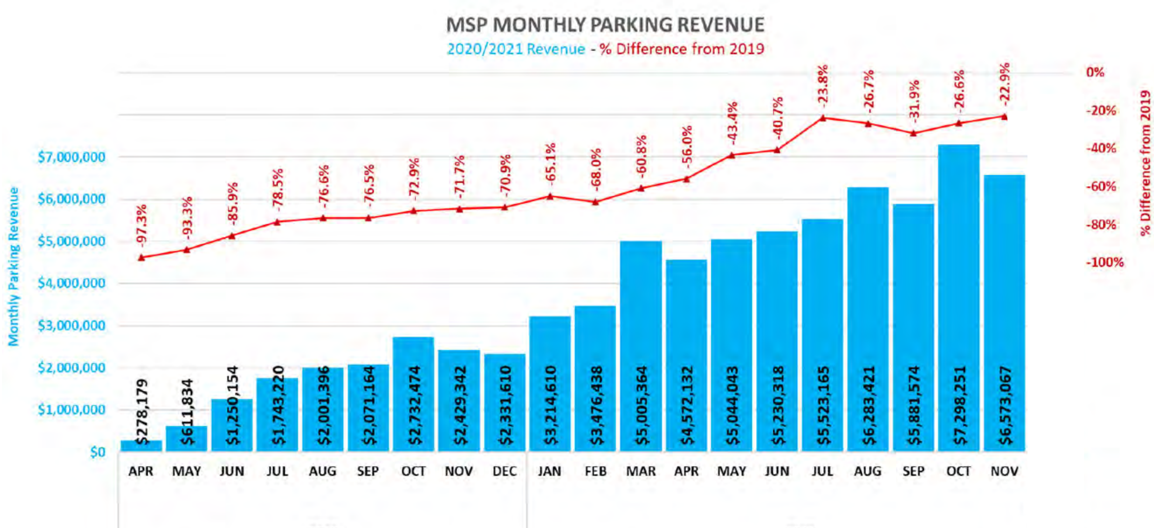
Air Service Recovery

66% of International Routes Recovered in 2021.



WINTER INTERNATIONAL SERVICE

Pandemic - Parking

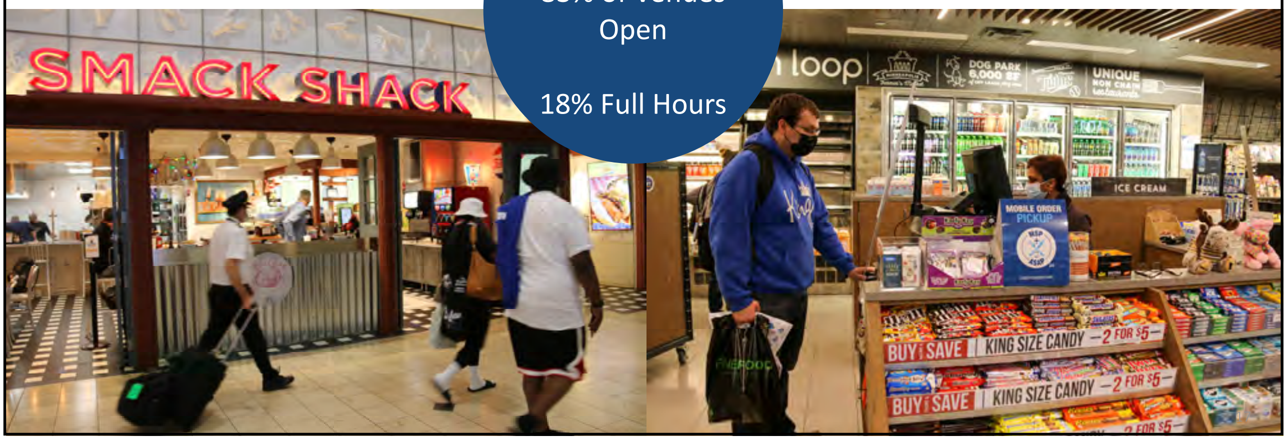


Pandemic - Concessions

131 Total Units

83% of Venues Open

18% Full Hours



4

Health Safety Program

TRAVEL CONFIDENTLY msp

18

TRAVEL CONFIDENTLY msp

Robust Cleaning	Hand Sanitizing	Face Covering
Social Distancing	Shields	Touchless Parking

19

Face Mask Regulations Update

- TSA security directive requires face coverings to be worn inside airports, on aircraft and on other modes of transportation.
- Enforcement of federal mask regulations extended through March 2022.

20

Best-in-Class Cleaning/Infectious Disease Prevention

GBAC Star™ Program

ACI Airport Health Accreditation Program

- Minimize the spread of COVID-19 and combat future health threats
- Require the highest standards of facility cleanness, safety and operational measures
- Consistent global standards build consumer confidence in airport health safety to help push for sustained recovery in air travel.

21

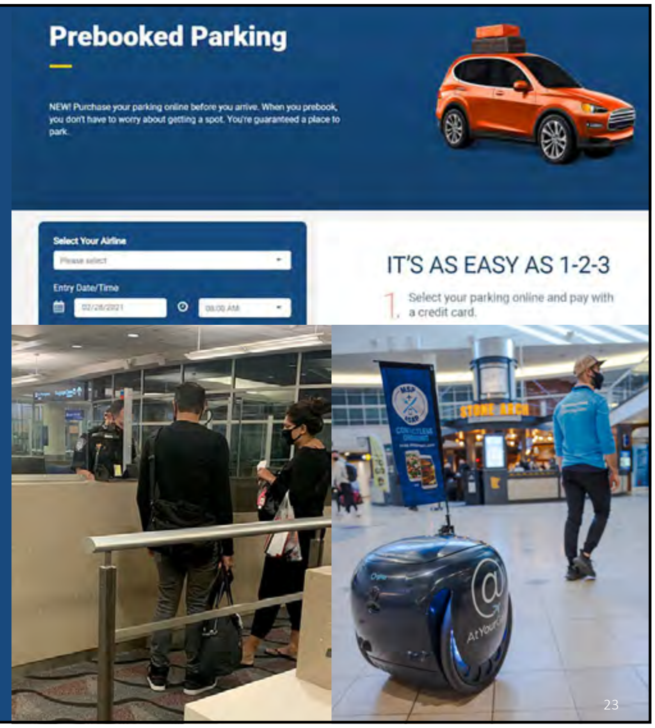
COVID-19 Testing & Vaccines

- MDH COVID-19 Saliva Test Site at MSP
- MSP Terminal 1 COVID-19 Wandertest rapid-testing site opened for passengers
- MN vaccination sites open at Terminal 1 and Terminal 2. Appointments via Minnesota Vaccine Connector: vaccineconnector.mn.gov

22

Toward a Touchless Journey

- Pre-booked Parking
  - Online reservation system
  - Customers receive confirmation email with a QR code used to enter and exit parking
- Simplified Arrival
  - Introduced at MSP in January
  - Streamlines process of re-entering the country
- MSP ASAP
  - One-stop online ordering for food pick up or delivery: asap.mspairport.com



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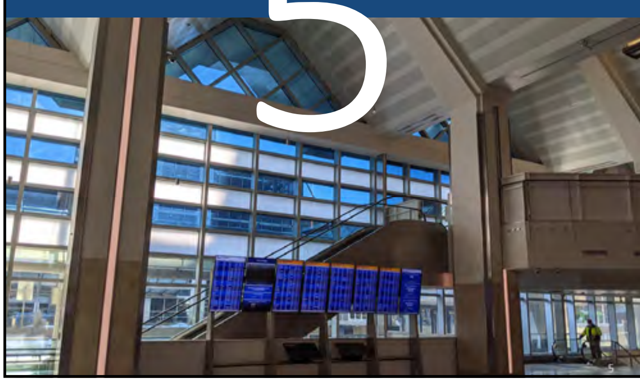

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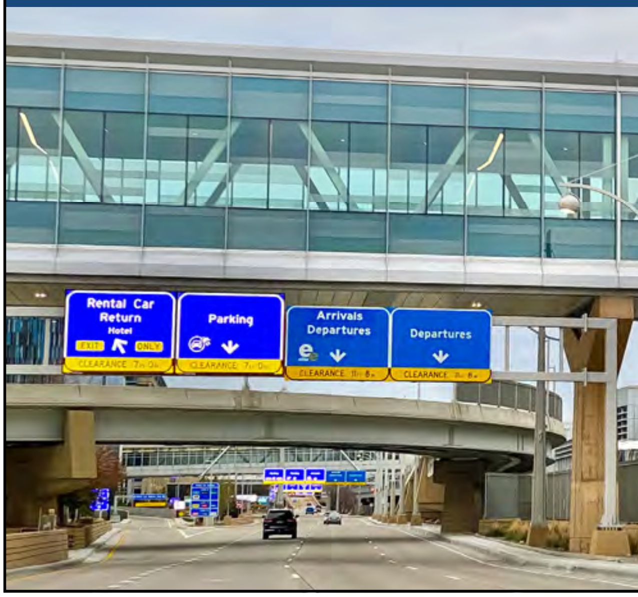
Reimagining Success

24

Terminal 1 Roadway, Ground Transportation and Parking



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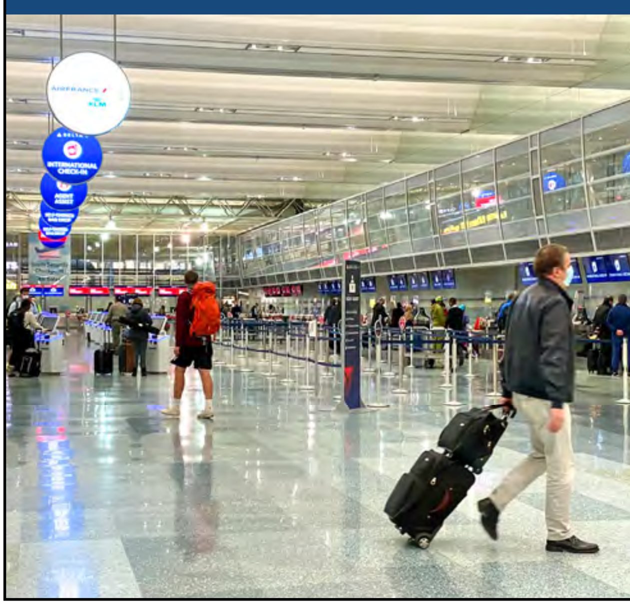
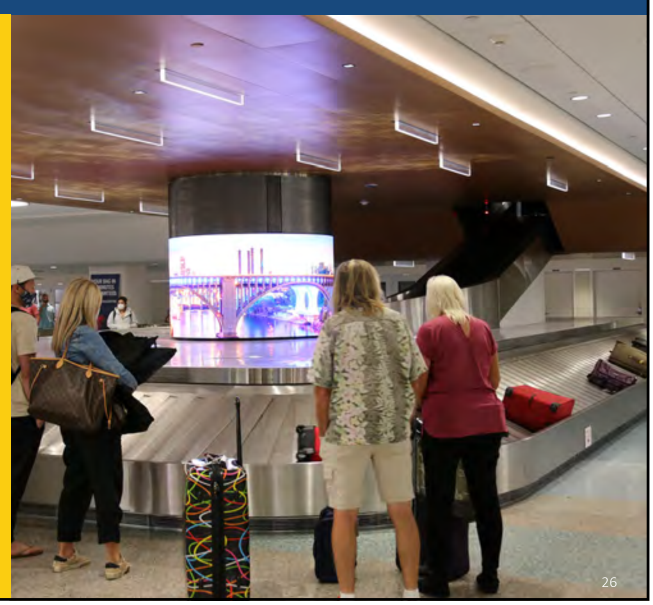
Terminal 1 Ticketing and Baggage Claim





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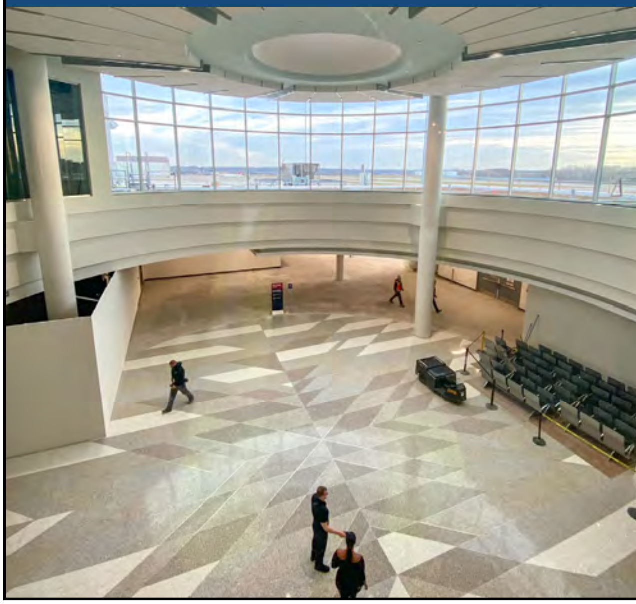
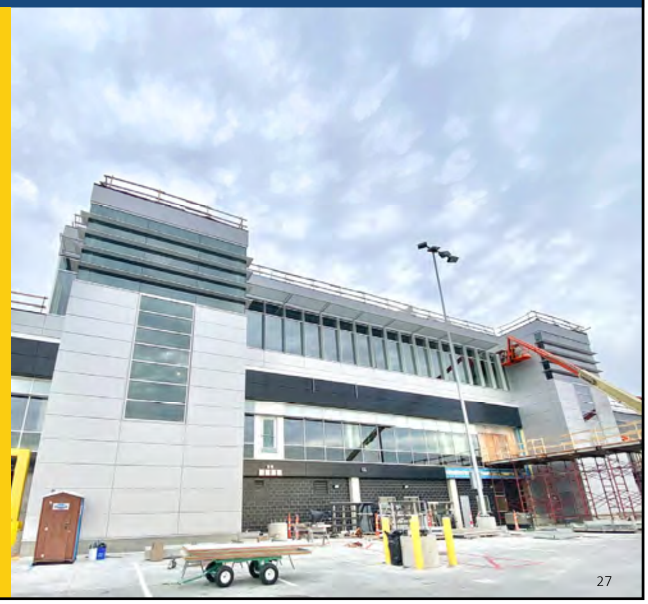
G Concourse Expansion & Delta Skyclub





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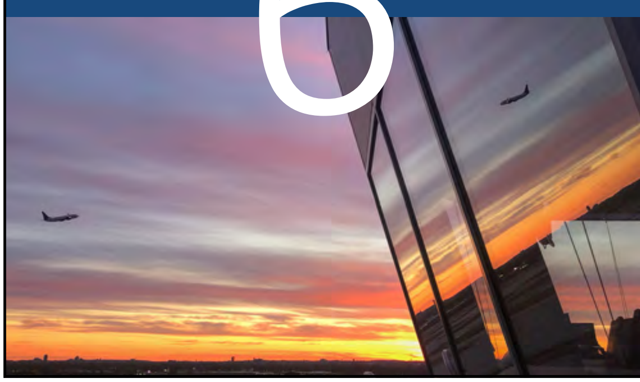


A Commitment to Excellence

28

Globally Recognized for Customer Service

- ACI Director General's Roll of Excellence
  - MSP was one of only seven airports worldwide to receive the Roll of Excellence recognition.
- The ASQ program surveys travelers at 300 airports around the world.
  - MSP was named the Best Airport in North America for four straight years.

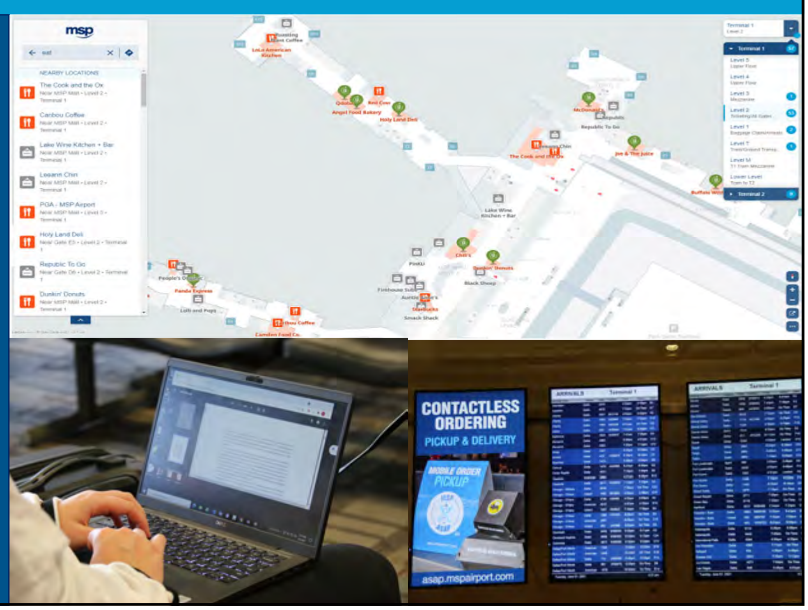
29

Digital Airport Index North America 2021

Mijksenaar
Helping people navigate spaces and places

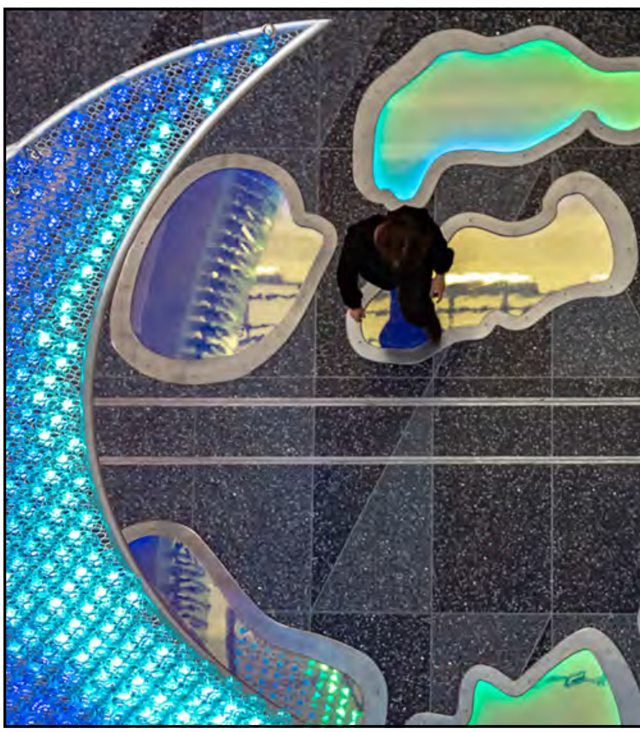
msp #1

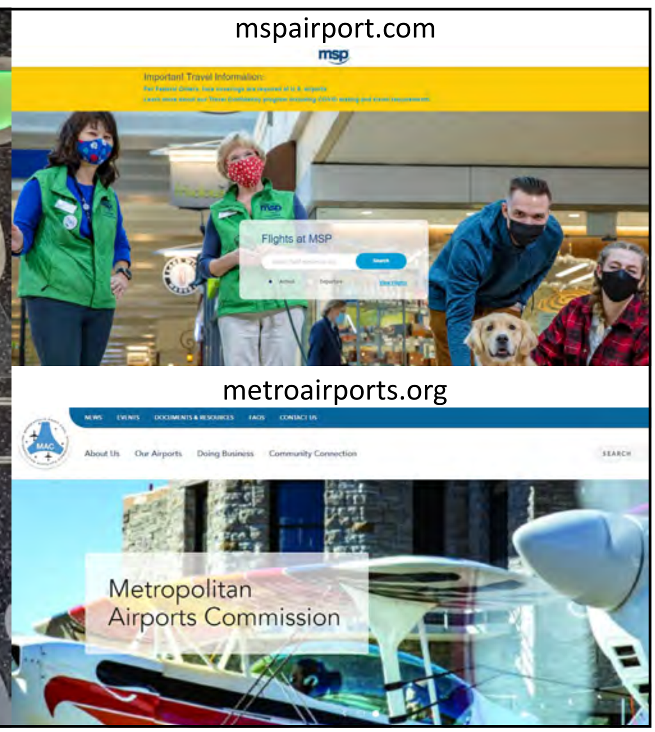
- Connectivity
- Social Service and Automation
- Website
- Interactive Maps
- Digital Wayfinding
- Commerce
- Social Media
- Data



Most Efficient Airport Award

- ATRS Annual Benchmarking Awards
- Most Efficient in North America, 25-40 million passenger category
- Only 12 Airports recognized globally this year
- Commitment to safe and efficient operations
- 4th Award in five years

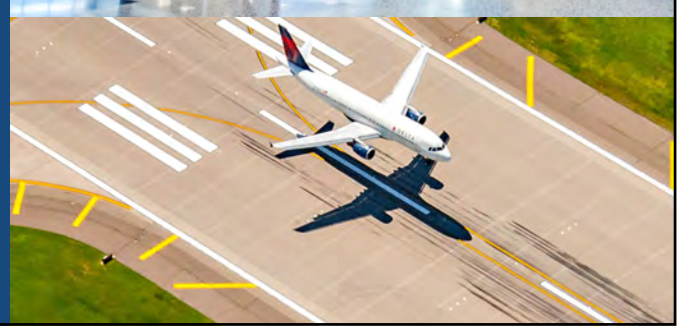




Recap and Reconnect

Stakeholder Advisory Panel

- An advisory board representing major stakeholder groups that have an interest in the planning process.
- The Panel serves several important functions, including:
  - Representing a broad range of stakeholder groups;
  - Receiving information about the planning process; and
  - Communicating public concerns and aspirations as the voice of key stakeholders.



Project Website

mspairport.com/long-term-plan

- Overview
- Community and Stakeholder Engagement
- Updated Progress and Schedule
- Documents and Links
  - Stakeholder Advisory Panel Report
  - Activity Forecast Executive Summary
- Frequently Asked Questions
- Contact Us

Airport Planning Update

- The MSP LTP process began in 2019
- Inventory of MSP as well as Aviation Forecasts were completed before COVID pause
- Aviation forecasts were updated with actual 2020 numbers and a post-pandemic recovery period
- Consultants have been reengaged for remaining tasks
- Process should be complete by the end of 2022

MSP 2040 LTP Forecast Update

- The Baseline MSP 2040 LTP Forecast was originally completed in late 2019
- The forecast has been updated for all activity segments (e.g., passenger, cargo, GA, military)
- Two scenarios have been explored for the short-term passenger recovery
- Baseline design day schedules (DDFS) have been revised

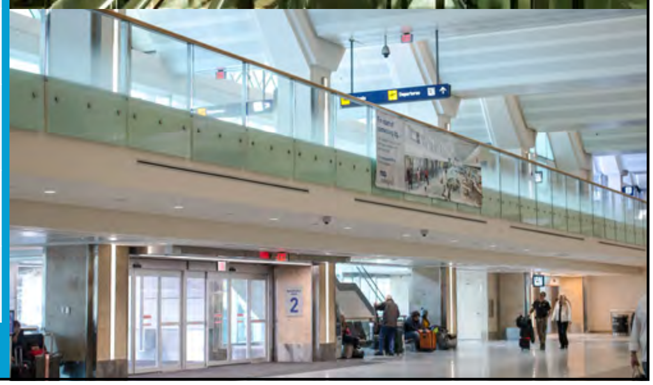
Short-Term Considerations

- Airline recovery trends at MSP and airports served from MSP
  - Seat capacity
  - Fleet changes
  - Passenger loads
  - Cargo volumes
  - Influences of other hubs
- Economic recovery locally and in regions served from MSP
- Other industry forecasts
- Influence of non-traditional factors
  - Border closures
  - Willingness to travel
- Range of outcomes developed

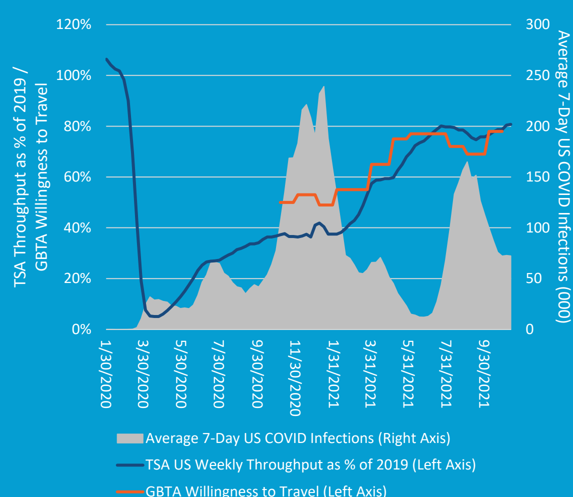
Recent MSP Performance

Airport Activity Metric	Year-to-Date *Jan-Oct 2021 vs. 2019*	Latest 3 Months *Aug-Oct 2021 vs. 2019*	Next 3 Months *Dec-Feb 21/22 vs. 19/20*
Passengers	**61%**	**71%**	***NA***
Scheduled Seat Capacity	**71%**	**76%**	**81%**
Passenger Aircraft Operations*	**72%**	**76%**	**78%**
Total Aircraft Operations	**74%**	**79%**	***NA***
Cargo Volumes	**100%**	**106%**	***NA***

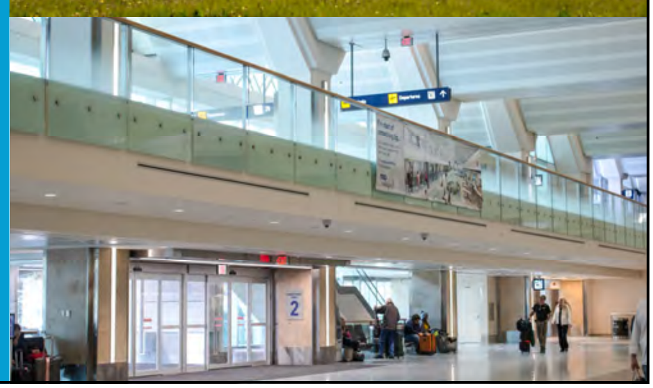
* Passenger aircraft operations for next three months are as scheduled.
Source: MAC Reports (actual); Diio mi (scheduled)



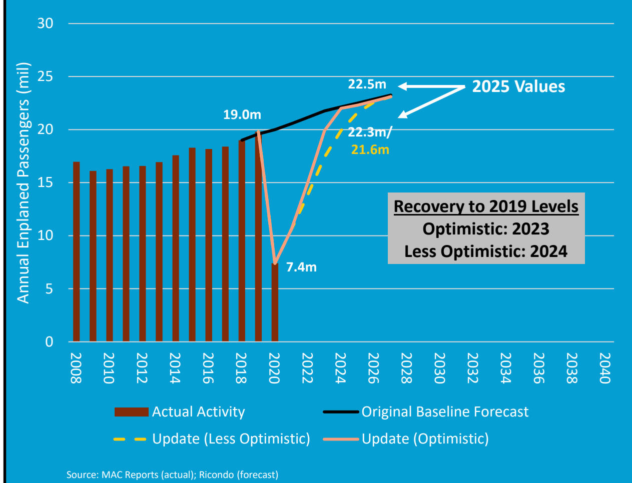
US Industry Travel Trends



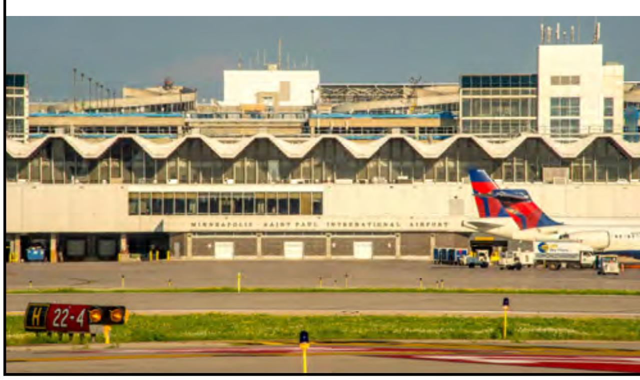
Sources: Transportation Security Administration (TSA) checkpoint reports; Global Business Travel Association Member COVID Poll (October 2021); Centers for Disease Control and Prevention



Annual Enplaned Passenger Forecast (Short Term Only)



Longer-Term Considerations

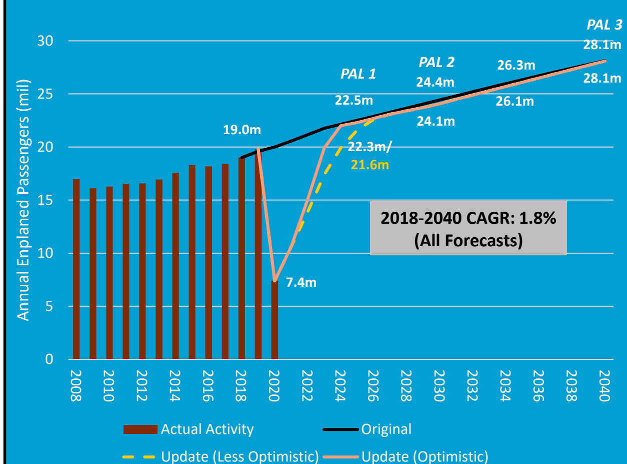


- Economic recovery projected for MSP area and regions served from MSP
- Financial performance of airlines serving the Airport
- Changes to the airline industry hub network and competitive landscape
- Changes to the cargo market outlook
- Fleet announcements

Highlights

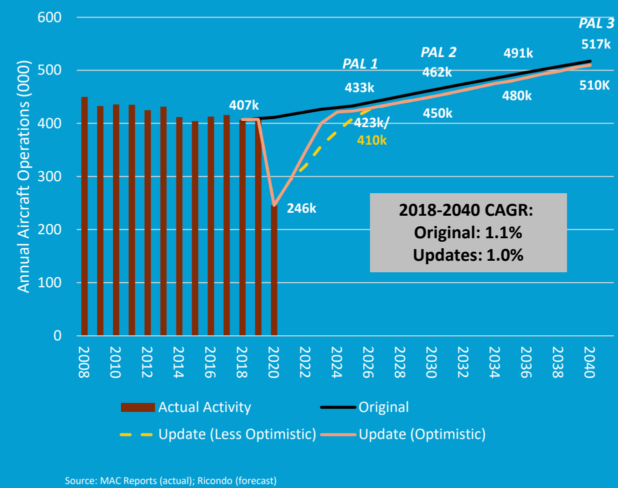
- No major structural changes expected for the airline industry hub network
- Longer-term economic drivers are mostly unchanged or improved from prior outlook
- Fleet changes cause a slight increase in the forecast of average seat capacity and slight decrease in forecast passenger aircraft operations
- An uptick in the cargo volume forecast results in a slight increase in cargo aircraft operations

Annual Enplaned Passenger Forecast



Source: MAC Reports (actual); Ricondo (forecast)

Annual Aircraft Operations Forecast



Planning Activity Level Years Achieved

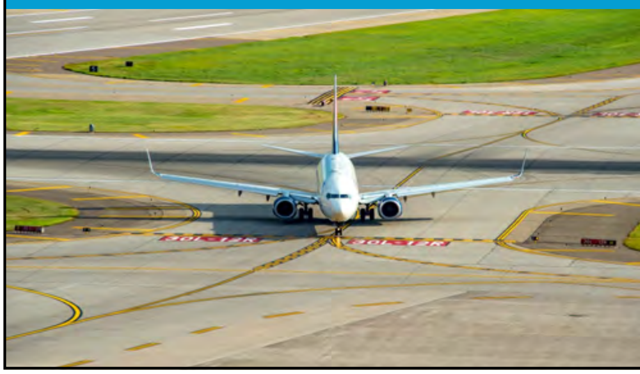
Forecast of Enplaned Passengers

Planning Activity Level	Value	Original	Update (Less Optimistic)	Update (Optimistic)
PAL 1	22.5m	2025	2026	2026
PAL 2	24.4m	2030	2031	2031
PAL 3	28.1m	2040	2040	2040

Forecast of Total Aircraft Operations

Planning Activity Level	Value	Original	Update (Less Optimistic)	Update (Optimistic)
PAL 1	433k	2025	2027	2027
PAL 2	462k	2030	2032	2032
PAL 3	517k	2040	2042	2042

Comments and Announcements



- Comments and announcements are welcome from both Panel members and attendees from the public not on the Panel.
- If you would like to speak, raise your hand on the Teams app or, if calling in, press *6 to unmute yourself.

MSP Airport Long-Term Plan
Stakeholder Advisory Panel
MEETING MINUTES
Friday, December 10th, 2021

Stakeholder Advisory Panel Meeting #4
Microsoft Teams

Panel Members: Hank Moody, Delta Air Lines; Kathleen Barrett, Sun Country Airlines; Charles Breer, Sun Country Airlines; Kyle ONeal, Southwest Airlines; Cheng Lor, Airport Business/Aero Service Group; Jana Webster, Executive Director, Airport Foundation; Shari Paul, Medtronic; Andrew Palmberg, Travelers with Disabilities Advisory Committee (TDAC); Lindsay Butler, FAA Airport District Office (ADO); Gina Mitchell, FAA ADO; Nancy Nistler, FAA ADO; Rebecca MacPherson, FAA Regional Office; Brian Peterson, Transportation Security Administration (TSA); Kathleen Koetz, Custom and Border Protection (CBP); Russel Owen, MetCouncil; Christopher Ferguson, MetCouncil; Karla Henderson, City of Bloomington; Glen Markegard, City of Bloomington; Cheryl Jacobson, City of Mendota Heights; Linea Palmisano, City of Minneapolis; Loren Olson, City of Minneapolis; Ryan Krzos, City of Richfield; Susan Heegaard, City of St. Paul; Kevin Gallatin, City of St. Paul; Dan O'Leary, Community At-Large; Morgan Hill, Greater MSP; Mark Ellingson, Microbiologics, Inc.; Dave Borgert, CentraCare; Bill Goins, Global Wellness Consortium; Donna Koren, Global Wellness Consortium; Bill Deef, Meet Minneapolis; Terry Mattson, Visit St. Paul/River Centre; Bonnie Carlson, Bloomington Convention and Visitor's Bureau; Dan O'Neill, Bloomington Convention and Visitor's Bureau; Jan Kroells, Bloomington Convention and Visitors Bureau; Beth Helle, Explore Minnesota

MAC Staff: Roy Fuhrmann, Chief Operating Officer; Pat Hogan, Director – Strategic Communications; Brad Juffer, Manager of Community Relations; Abby Kes, Event Coordinator; Mitch Killian, Associate Vice President – Governmental Affairs; Jeff Lea, Manager – Strategic Communications; Jennifer Lewis, Community Relations Specialist; Shelly Lopez, Customer Experience Coordinator; Dana Nelson, Director of Stakeholder Engagement; Naomi Pesky, Vice President – Strategy and Stakeholder Engagement; Brian Peters, Director – Air Service Development; Bridget Rief, Vice President – Planning and Development; Michele Ross, Assistant

Manager of Community Relations; Cassie Schmid, Director – Strategic Marketing; Melissa Scovronski, Manager – Strategic Campaigns; Kalae Verdeja, Administrative Specialist

Others: Jeff Stanley, Ricondo and Associates; Greg Albjerg, HNTB; Todd Streeter, Community Collaboration

1) Welcome Remarks

Dana Nelson, Director of Stakeholder Engagement, welcomed everyone to the fourth meeting. Ms. Nelson gave a background of the Metropolitan Airports Commission's (MAC's) Planning and Development branch of the organization.

Ms. Nelson reviewed the meeting's agenda, noting that the "Update from MAC's Airport Planner" item would be presented by **Bridget Rief, Vice President – Planning and Development**.

2) Emerging from the Pandemic

Ms. Nelson introduced **Roy Fuhrmann, Chief Operating Officer**.

Mr. Fuhrmann gave some background to the group regarding the pandemic and its effects on the industry in 2020. He began by presenting the 2020 MSP Passenger Activity levels. He continued with the impact the pandemic had in the overall industry in 2020. Mr. Fuhrmann explained the three federal relief grant programs which were critical to the sustainability of the MAC airports. He explained how MAC has also provided relief to key partners during the pandemic to position MSP for a strong recovery. These partners included airlines, concessions, auto rental and passenger services. Mr. Fuhrmann explained how the 2021 bipartisan federal infrastructure deal could be an additional source of funding for MSP.

Mr. Fuhrmann gave an overview of how the passenger recovery across the country. He compared current (2021) passenger regional figures to 2019 passenger regional figures and explained the easing of international entry restrictions in November, the increase in business travel has aided in the recovery. He discussed how most of the suspended routes in 2020 have been able to return to operation, and there have been an additional 27 new domestic seasonal or year-round rounds in 2021. International routes have also been added in December for seasonal destinations.

In 2021, MSP passenger enplanements have trended up each month through July. The impacts from the fourth COVID wave caused a downturn in national domestic and international travel. Mr. Fuhrmann continued to explain monthly enplanements have slowly trended up since August.

Daily parking, which is a key revenue source for the MAC, has been trending positively through most of 2021. Mr. Fuhrmann explained that 83% of all concession venues are now open and operating out of a total of 131 units.

Mr. Fuhrmann reviewed the health safety measures which are an integral part of the Travel Confidently MSP program. These measures include robust cleaning, social distancing, hand sanitizing, shields and face coverings. The federal government has extended the regulation

which requires the use of face masks inside all airports, on aircraft and other forms of public transportation. Mr. Fuhrmann mentioned MSP received two health and safety facility accreditations from the GBAC Star and Airport Health Accreditation Programs. He explained the testing and vaccines sites at MSP and noted people can get more information and make appointments through Minnesota's Vaccine Connector website: www.vaccineconnector.mn.gov. Mr. Fuhrmann continued to explain how more touchless options have given travelers confidence. He noted that MSP offers Pre-booked parking, simplified arrival and MSP ASAP – a one-stop online ordering for food pick up or delivery. Mr. Fuhrmann shared two major projects that were completed at MSP in 2020 that have vastly improved the passenger experience at Terminal 1: rebuilding the inbound roadway to Terminal one with concrete and completion of the Silver Ramp. He also gave an overview of current operational projects at Terminal.
MAC's mission is to provide people's best airport experience. MAC is continually working with airport partners; airlines, concessionaires, the TSA and others to continue to provide an excellent experience for travelers going forward. Mr. Fuhrmann announced MSP was named the Best Airport in North American in its size category for the fourth straight year, which led to Airports Council International (ACI) naming MSP to its Director General's Roll of Excellence in Airport Service Quality. MSP was ranked #1 the North America Digital Index. The Air Transport Research Society (ATRS) named MSP as the most efficient airport in North American in its call. MSP has won this honor 4 times in the last 5 years.
Mr. Fuhrmann mentioned the Minneapolis-St. Paul International Airport (MSP) Airport website at MSPAirport.com and there is a fully redesigned website at MetroAirports.org.

Kathleen Barrett, Sun Country Airlines, shared her thanks and commended the staff for their hard work in trying to keep rates stabilized and continued partnerships.
Mr. Fuhrmann, responded to an inquiry regarding passenger traffic from **Bill Deef, Meet Minneapolis**. Mr. Fuhrmann also responded to a question regarding capacity for MSP from **Dan O'Neill, Bloomington Convention and Visitor's Bureau**.

3) Recap and Reconnect
Dana Nelson, MAC Director of Stakeholder Engagement, reviewed the Stakeholder Advisory Panel vision. It consists of 30 members from tourism associations, airport tenants, public partnerships, regional businesses, passenger groups, local communities. Each member introduced themselves, mentioned the organization they represent as stakeholders, and gave a brief synopsis of what they'd like to learn through their panel participation.

Ms. Nelson gave more detailed information about the newly updated project website: www.mspairport.com/longterm-plan. It included Community and Stakeholder Engagement, Updated Progress and Schedules, Documents and Links, Frequently Asked Questions and how to Contact MAC staff regarding the long-term plan.

4) Update from MAC's Airport Planner

Ms. Nelson introduced **Bridget Rief, Vice President of Planning and Development.**

Ms. Rief gave an overview of the airport planning process. The MSP Long-Term Plan (LTP) began in 2019. Ms. Rief included some background of the plan and how it began in 2019. She continued by describing the inventory of MSP as well as Aviation Forecasts were completed before the COVID pause, Aviation forecasts were updated with actual 202 numbers and a post-pandemic recovery period; consultants have been re-engaged for remaining tasks and how the process should be completed by the end of 2022.

5) MSP Airport Forecast Update

Ms. Rief introduced **Jeff Stanley, from Ricondo and Associates**. Mr. Stanley explained the planning process to date. He continued to detail the MSP 2040 LTP Forecast Update. Mr. Stanley listed short-term considerations that were used to update the forecast. He continued by giving an overview of recent MSP Performance regarding passengers, scheduled seat capacity, passenger aircraft operations, total aircraft operations and cargo volume. He continued with US Industry Travel Trends and Annual Enplaned Passenger Forecast (in the short-term only) and Longer-Term considerations.

Mr. Stanley responded to an inquiry from **Glen Markegard, City of Bloomington**, regarding the percentage of travel through MSP in recent years being business travel and how remote meetings may have more impact on business travel forecasting.
Bill Goins, Global Wellness Consortium, asked for an update on the forecast regarding international travel, both business and leisure.
Mr. Stanley as well as Ms. Nelson responded to an inquiry from **Kyle O'Neal, Southwest Airlines**, regarding clarification on Planning Activity Level (PAL).

6) Panel Discussion

Dana Nelson, MAC Director of Stakeholder Engagement, reviewed the initial question posed for the panel, "What adjustment to long-term airport facility planning should be considered in light of the COVID-19 pandemic"? Ms. Nelson asked **Cheng Lor, Aero Service Group**, to share his insights.

Cheng Lor, Aero Service Group responded with a few thoughts. There is a separation between quick-service restaurants, full-service restaurants, kiosks, and online ordering and delivery. Kiosks are starting to come online with quick-service restaurants. There has been a lot of adaptation with electronic menus QR codes and the ability to pay at your table. Customers are still wanting hospitality touches at a full-service restaurant – there have been no massive changes to most full-service restaurants. Ordering by app and food delivery is relatively new to the industry and it is still early to see if this option will catch on in the long run. Mr. Lor also discussed the new idea of ghost kitchens. Some of these new options are still new and the industry is unsure of the long-term outcome.

7) Comments and Announcements

Ms. Nelson opened the meeting to comments from the audience:

Russ Owen, MetCouncil, commented that MAC's largest revenue is from parking, the plan should look at ways to diversify revenue streams, since technology is moving fast (electronic vehicles, autonomous vehicles, etc.) More people taking Uber to the airport instead of parking.

Andrew Palmberg, TDAC, commented, in light of COVID-19 and everything transitioning to technology, ensure everything online is still accessible for people with disabilities or low-vision and blind customers. Some apps do not have accessible features enabled or are not accessible friendly to navigate. Also, in the past pre-COVID some concessions have used iPads at the airport for their menus, but with the accessible feature menu locked out (to prevent customers from using the internet, etc) so low vision and blind customers weren't able to use it. Long point short - all technology intended for customer use, app, website, etc. please ensure it is accessible.

Kathleen Koetz, CBP, commented regarding FIS and long-term planning and incorporating the CDC earlier on in the process.

Bill Goins, Global Wellness Consortium, commented that he is hopeful we can continue to learn more about the needs of the international air cargo in support of the supply chain needs for key sectors, specifically the med-tech industry. He believes there is an opportunity for our Market.

Kevin Gallatin, City of St. Paul Representative, commented that the airport also serves as a transit hub for non-passengers. He thought this should be considered for wayfinding, potential concession, security, etc.

Ms. Nelson thanked everyone for their participation and noted that the presentation and minutes would be posted to the website when they are available, at:
Documents and Links | MSP Airport

Respectfully Submitted,
Kalae Verdeja, Recording Secretary

MSP Airport Long-Term Plan
August 4, 2022
1:30 – 3:30 PM
Virtual Zoom Meeting OR
In-Person at Bloomington Convention and Visitor's Bureau

STAKEHOLDER ADVISORY PANEL MEETING #5

If any members of the public would like to participate, please contact MSPAirportLongTermPlan@mspmac.org.

Meeting Objective: Review the MSP Long-Term Plan goals, process and engagement program. Share progress to-date, to include projected terminal, airside and landside facility requirements and a set of concepts ("alternatives") intended to fulfill projected requirements. Invite questions, ideas and concerns from Panel members about these alternatives.

Agenda:

1:30 Welcome Remarks

Bridget Rief, VP of Planning & Development

1:35 MSP Airport Long Term Plan Overview and Engagement Program

Review planning goals and objectives, process and engagement efforts for the LTP – Dana Nelson, MAC Director of Stakeholder Engagement

1:45 Update from MAC's Airport Planner

Progress update on facility requirements and preliminary alternatives – Eric Gilles, MAC Airport Planner

2:15 Break

2:25 Update from MAC's Airport Planner (continued)

3:00 Panel Discussion

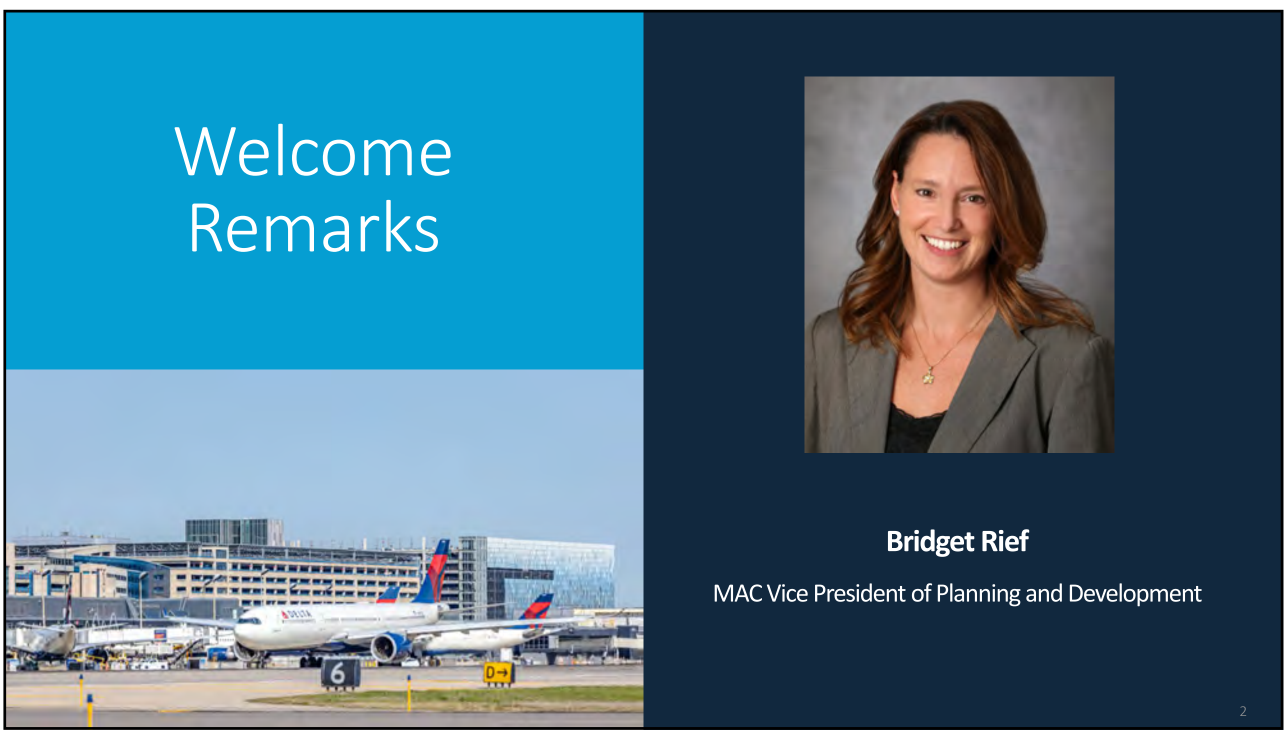
What questions, concerns or ideas do you have about projected facility requirements or preliminary alternatives?

3:25 Comments and Announcements

3:30 Close

The MSP Airport Long-Term Planning website has been updated. Please visit www.mspairport.com/long-term-plan to view the current planning timeline, Stakeholder Advisory Panel Report, and other resources.


MSP Airport
Long-Term Plan
Stakeholder Advisory Panel
Minneapolis • Saint Paul International Airport
msp
MAC
Meeting #5
August 4, 2022
1


Welcome Remarks
Bridget Rief
MAC Vice President of Planning and Development
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Meeting Objective

At this meeting, we will:

- Review the MSP Long-Term Plan goals, process and engagement program
- Share progress to-date, to include projected terminal, airside and landside facility requirements and a set of concepts ("alternatives") intended to fulfill projected requirements
- Invite questions, ideas and concerns from panel members about these alternatives

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Meeting Agenda

1:30 - Welcome Remarks
Bridget Rief – Vice President, Planning and Development

1:35 - MSP Airport Long Term Plan Overview and Engagement Program
Dana Nelson - Director of Stakeholder Engagement

1:45 - Update from MAC's Airport Planner
Eric Gilles, C.M., ACE - MAC Airport Planner

2:15 - Break

2:30 - Update from MAC's Airport Planner (Continued)

3:00 - Panel Discussion

3:25 - Comments and Announcements

3:30 - Close

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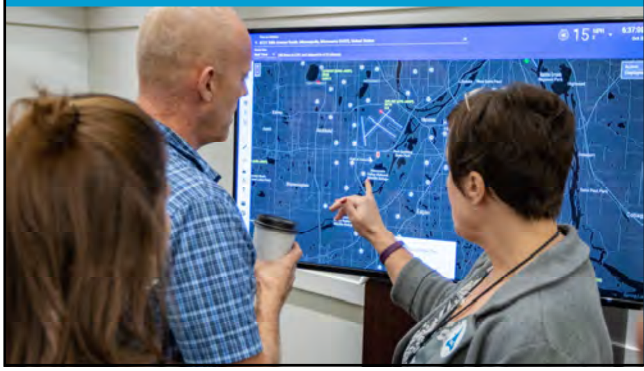
Long-Term Plan Overview and Engagement Program



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Long-Term Plan Overview

The Plan is:

A forward-looking planning tool that studies facility and infrastructure needs based on projected 20-year demand levels.

It will focus on evaluating when facility improvements are needed to accommodate projected demand in a manner that is safe, efficient, orderly and cost-effective.

The Plan does not:

Authorize construction or improvements to facilities, nor does it serve as a means of studying environmental impacts.

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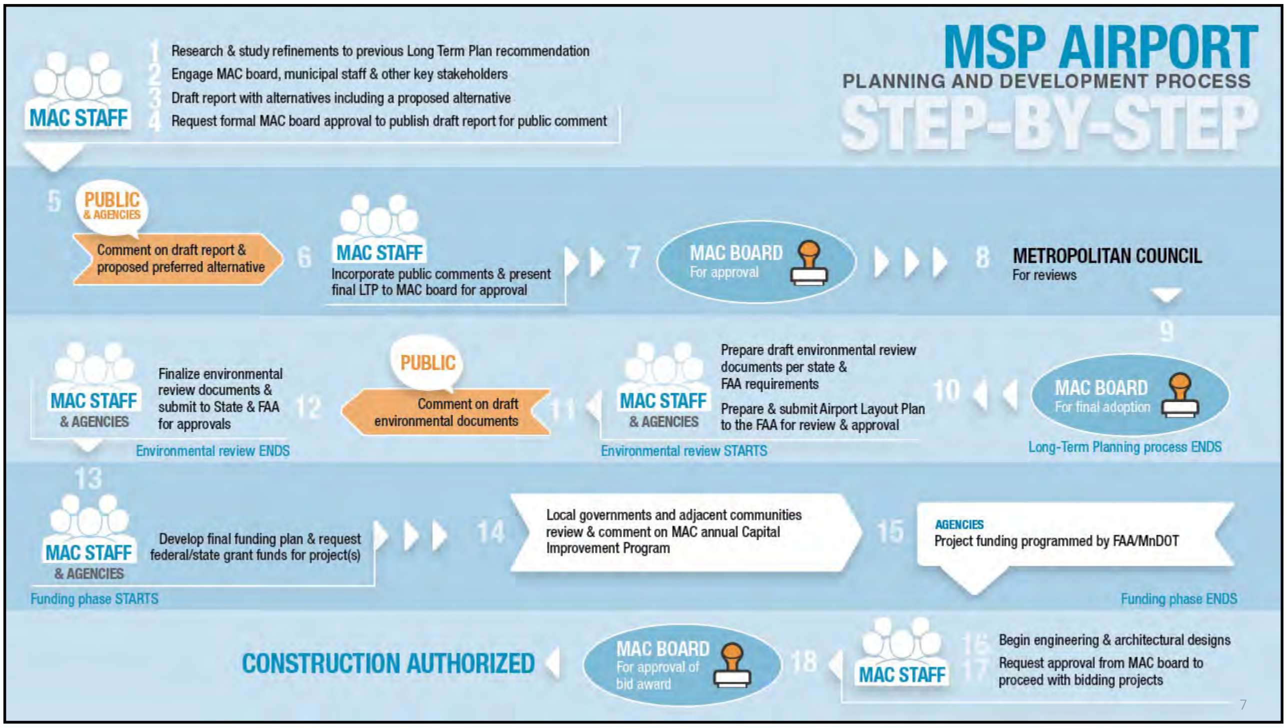
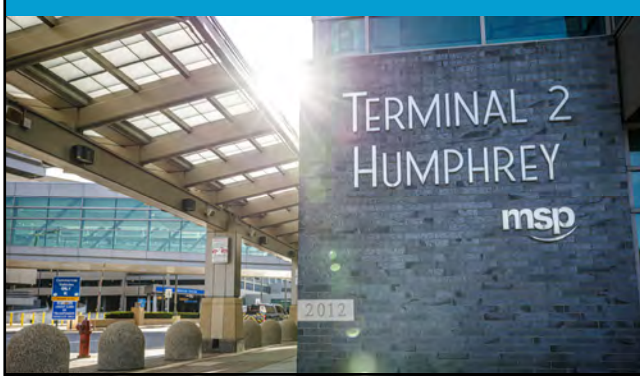


Long-Term Plan Goals



1. Plan for future facilities that will meet projected passenger activity levels in a manner that maintains and enhances customer service, while facilitating a seamless experience.

2. Produce a development plan that positions the MAC to
   - meet future demand levels,
   - enhance financial strength,
   - leverage environmental stewardship, and
   - infuse sustainable thinking.

3. Conduct the planning process in a manner that includes meaningful stakeholder engagement processes.

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Long-Term Planning Process

We are currently on these steps

Baseline Existing Facilities	• Inventory and document existing facilities and aviation activity levels to establish baseline conditions
Forecasts	• Forecast MSP aviation activity levels (passengers, cargo, and aircraft operations) for the milestone years between 2020 and 2040
Facility Requirements (Gap Analysis)	• Determine any facility deficiency gaps between the baseline condition and desired future conditions based on forecasted activity levels
Development Concepts	• Develop and evaluate alternative means to remedy facility deficiencies identified through the process
Proposed Development	• Determine a proposed development program, funding plan, and implementation strategy to present to the community and the MAC board
Environmental Considerations	• Prepare an overview of environmental factors that should be taken into consideration when implementing the plan

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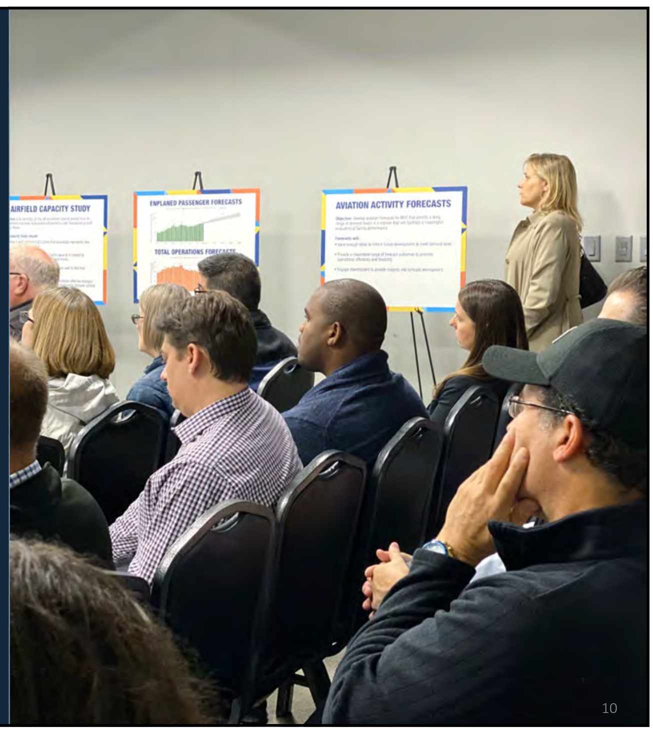
MSP Long-Term Plan Stakeholder Engagement Program

- Stakeholder Advisory Panel
- Experience MSP Public Event Series
- Project Website (mspairport.com/long-term-plan)
- E-News Monthly Project Updates
- Public surveys and polls
- Project Newsletters
- Print Notifications for Public Events
- Updates at NOC and MAC's PD&E Committee



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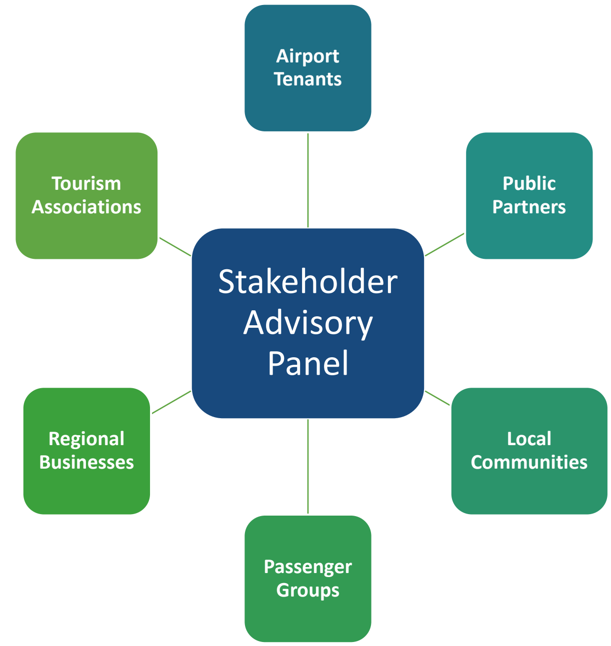
MSP Long-Term Plan Stakeholder Advisory Panel

An advisory board representing major stakeholder groups that have an interest in the planning process.

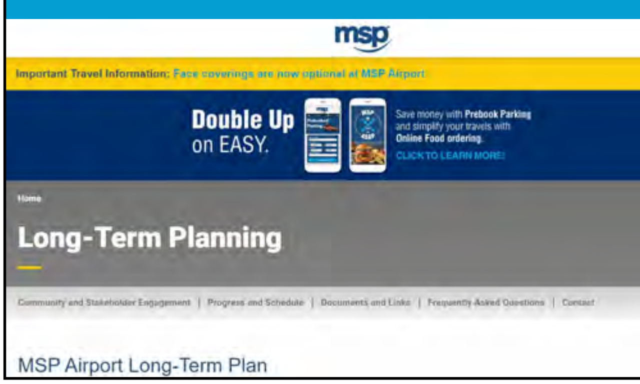
The Panel serves **several important functions**:

- Representing a broad range of stakeholder groups;
- Receiving information about the planning process;
- Communicating public concerns and aspirations as the voice of key stakeholders.



Project Website

[mspairport.com/long-term-plan]



Overview

Community and Stakeholder Engagement

Progress and Schedule

Documents and Links
Stakeholder Advisory Panel Report

Frequently Asked Questions

Contact Us

Sign up to receive updates on the project

Questions or Comments about the MSP Long-Term Plan?

- Contact us via email at MSPAirportLongTermPlan@mspmac.org
- Visit the project website at www.mspairport.com/long-term-plan
- Receive regular updates by signing up for our e-newsletter

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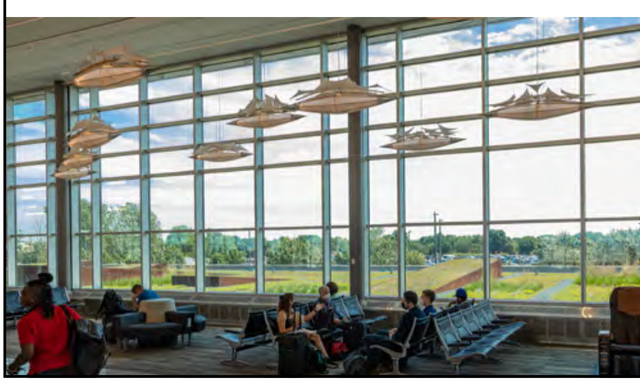
Questions or Comments about the MSP Long-Term Plan?



- The Plan may not incorporate all input provided by the public
- The Project Team will listen to concerns, input and aspirations shared by the public and, when possible, make changes
- Things to balance include:
  - Maintaining a high level of service
  - Achieving the established goals of the Plan
  - Conforming to design standards
  - Safety
  - Operational feasibility
  - Federal and state policies
  - Project costs

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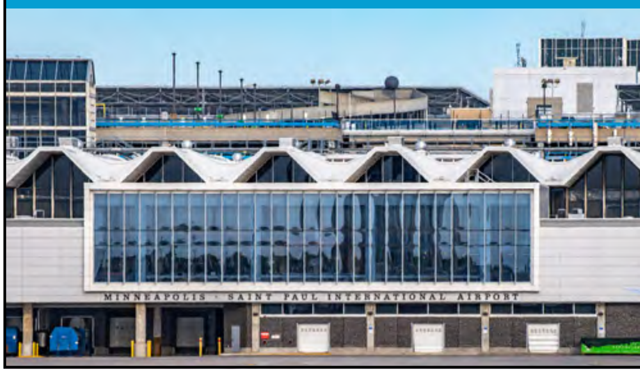
Airport Planning Update



- Airport Planner Introduction
- Long-Term Plan (LTP) Project Timeline
- Overview of Facility Requirements
- Draft Alternatives

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Airport Planner Introduction

Eric Gilles, C.M., ACE

- Education
  - University of North Dakota – BBA in Airport Management
  - Licensed Private Pilot
  - Aircraft Rescue and Fire Fighting (ARFF) Certification
- Experience
  - Started with MAC April 4, 2022
  - Previous 5.5 years as Project Manager/Senior Planning Consultant working on MAC airport projects
  - 12+ years airport planning experience
- MAC Roles and Responsibilities
  - Project Manager for all airport planning projects at the MAC, including MSP and six relievers

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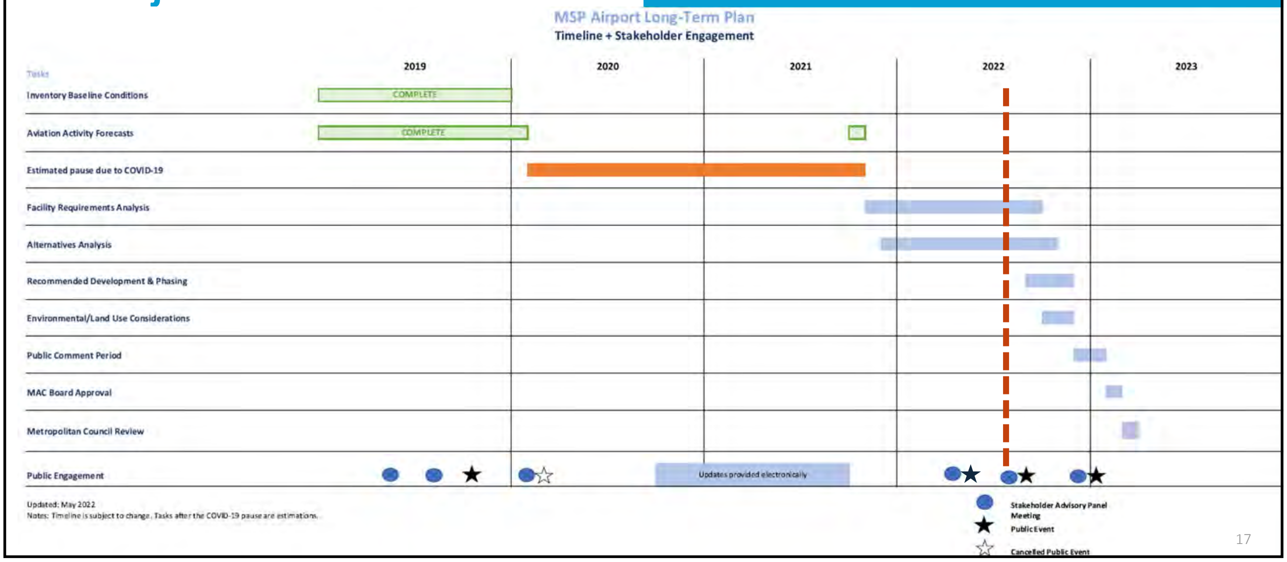
Long-Term Plan (LTP) Project Timeline

Current Project Status



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Overview of Facility Requirements

- Terminal, airside, and landside design standards were considered for both Planning Activity Levels (PALs) 2 and 3
- PALs are used to consider when development should occur, but does not authorize construction
- Development is tied to PALs instead of specific years, but years are associated as an estimated timeline from forecast
- PALs often fluctuate based on actual demand.
- PAL 2 = 2030; PAL 3 = 2040

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Overview of Facility Requirements

- Terminal Challenges
  - Gating requirements and passenger connectivity
  - Flight Inspection Services (FIS)
- Airside Challenges
  - Maintain airfield efficiency
  - Long-term Remain Overnight (RON) aircraft parking needs
  - Address airfield design standards
- Landside Challenges
  - Curbside and roadway congestion
  - Address long-term parking needs (private, rental, ride-share, etc.)

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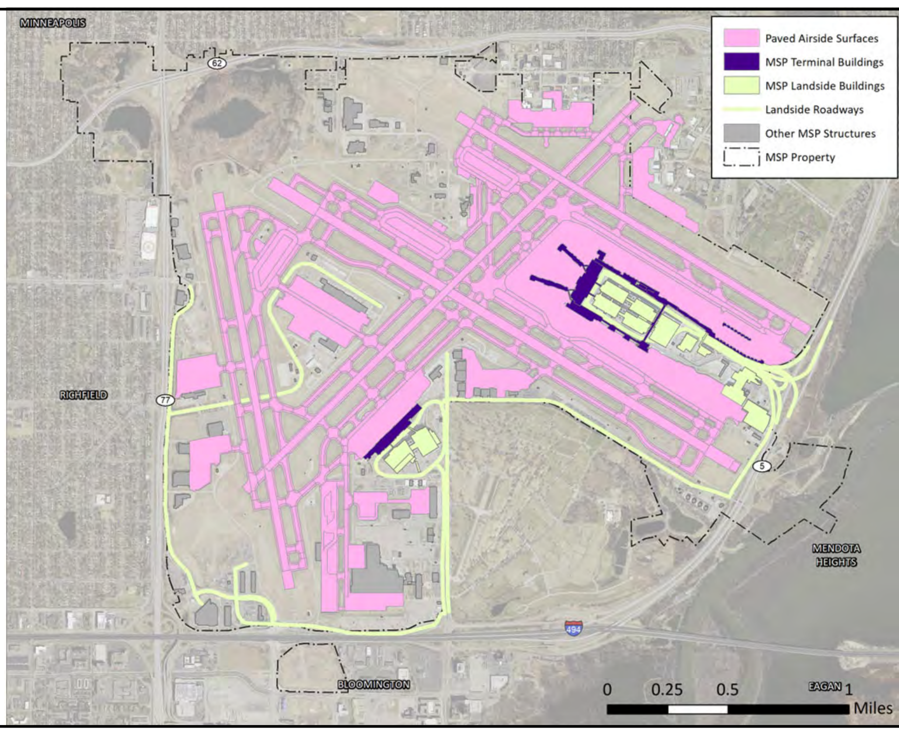

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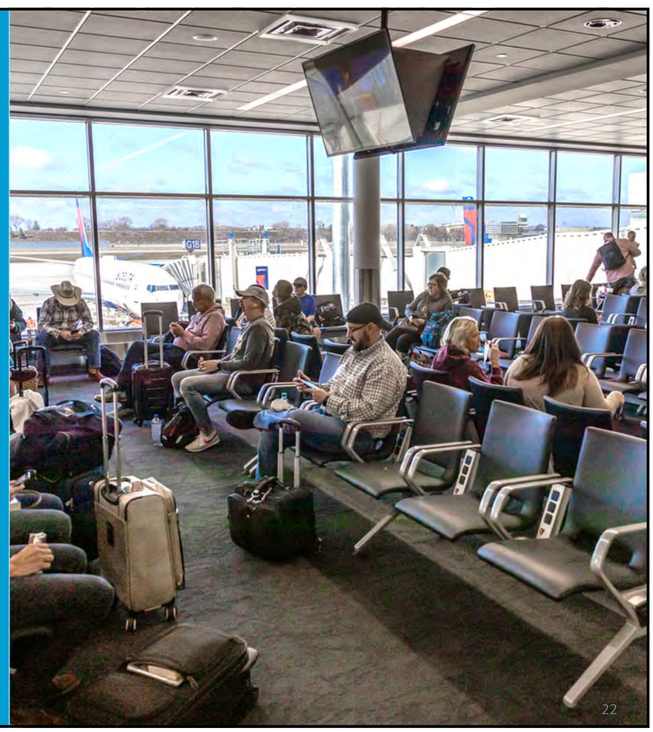
Facility Requirements - Terminal

- Evaluated based on existing terminal footprint and operating conditions
- Reviewed operational standards for multiple areas of the terminal
- Gating strategies, passenger connectivity, and international arrival facilities were primary drivers in evaluating potential future terminal layouts

Facility Requirements - Terminal

Terminal 1			
Facility	PAL 2 (2030)	PAL 3 (2040)	Notes
Check-In	✔	✔	More kiosks for proprietary needs (PAL 3)
Security	✔	✖	Remote screening may resolve PAL 3
Bag Inspection	✔	✔	
Bag Claim	✔	✔	
Holdroom Space	✖	✖	All except Concourses C and D
International	✖	✖	Need 7 more inspection booths and 1,700 SF of queue space in PAL 2

Legend	
✔	Existing Layout Meets Future Demand
✖	Existing Layout Does Not Meet Future Demand



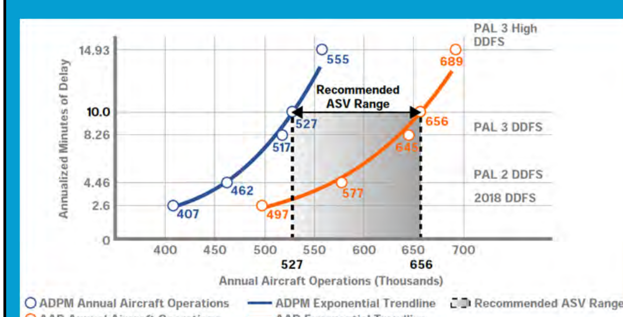
Facility Requirements - Terminal

Terminal 2			
Facility	PAL 2 (2030)	PAL 3 (2040)	Notes
Check-In	✓	✓	More kiosks for proprietary needs (PAL 3)
Security	✓	✗	Remote screening may resolve PAL 3
Bag Inspection	✗	✗	One additional screening device (PAL 2/3)
Bag Claim	✓	✓	
Holdroom Space	✓	✓	
International	✓	✓	

Legend	
✓	Existing Layout Meets Future Demand
✗	Existing Layout Does Not Meet Future Demand

Facility Requirements - Airside

- Completed airfield capacity study
- Recommended Annual Service Volume (ASV) range – 527-656 thousand operations
  - Represents Average Day Peak Month (ADPM)
  - No need for new runway



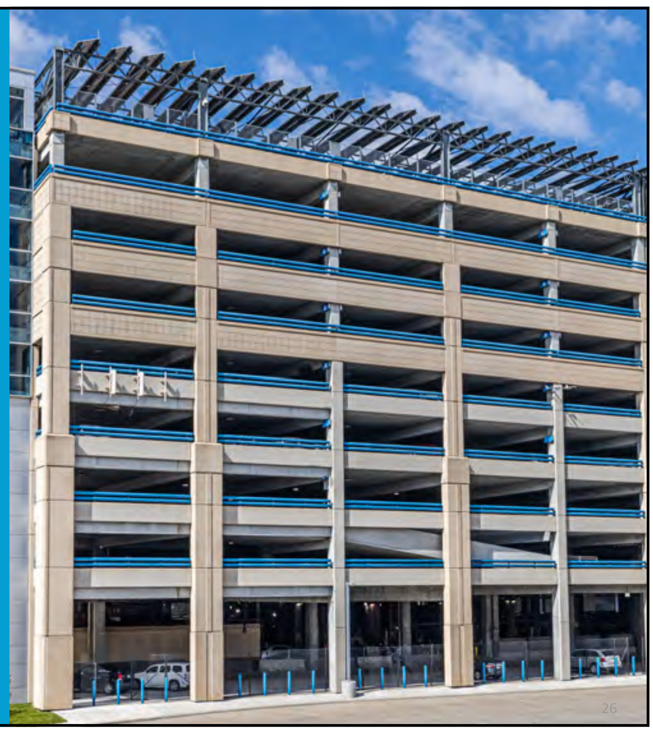
Facility Requirements - Airside

Airfield Campus			
Facility	**PAL 2 (2030)**	**PAL 3 (2040)**	**Notes**
# of Runways	✓	✓	
Runway Length	✓	✓	
Noise Abatement	✓	✓	Continue industry-leading noise abatement and mitigation efforts
Taxiways	✓	✓	Additional taxiways may enhance operational flexibility
NAVAIDs	✓	✓	
Aircraft Parking	✓	✖	Additional Remain Overnight (RON) PAL 3
Aircraft Deicing	✓	✓	
Air Cargo	✓	✓	

Legend	
✓	Existing Layout Meets Future Demand
✖	Existing Layout Does Not Meet Future Demand

Facility Requirements - Landside

- Private Parking
  - Loss of some off-airport operators by PAL 3
  - Green/Gold ramp end of useful life
- Private Vehicle Pick-Up and Drop-Off
  - Peak hour congestion at both terminals
- Rental Cars
  - Existing maintenance/quick turnaround facility deficit (wash bays, fueling, storage)
- Commercial Vehicle Operations
  - Inconsequential deficits at both terminals through PAL 3

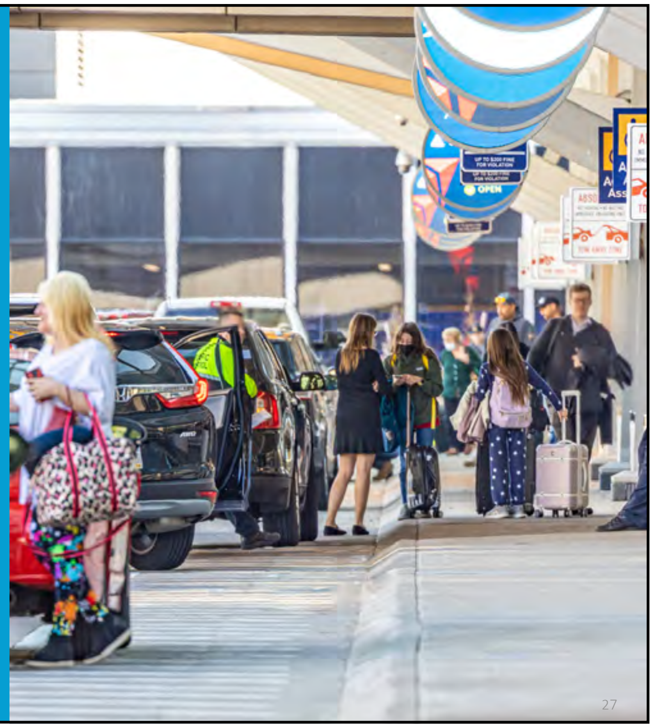


Facility Requirements - Landside

- Other Landside Influencers
  - Growing interest in accommodating Electric Vehicles (EVs)
  - Future Energy Management Center (EMC) requirements

Terminal 1 and Terminal 2			
Facility	PAL 2 (2030)	PAL 3 (2040)	Notes
Private Parking	✔	✖	Green/Gold Ramp; off-airport providers
Curbside	✖	✖	Deficiency exists today
Rental Cars	✖	✖	Deficiency exists today
Commercial	✔	✔	

Legend	
✔	Existing Layout Meets Future Demand
✖	Existing Layout Does Not Meet Future Demand



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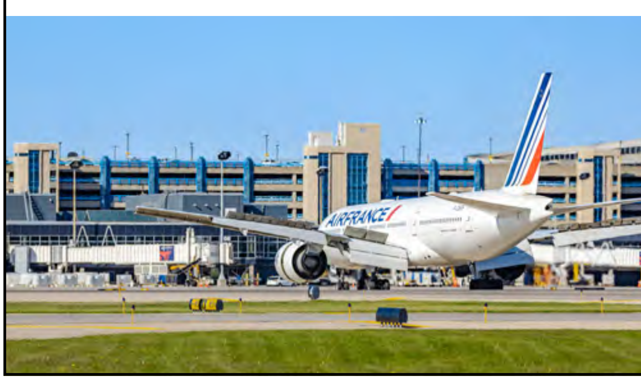
Draft Alternatives



- Alternative Concept Families
  - Alternative 1A
    - Single Flight Inspection Service (FIS) facility at Terminal 1
    - Maximize preferential gating
  - Alternative 2A
    - Single FIS at Terminal 2
    - Emphasis on common-use gating
  - Alternative 3A
    - Two FIS facilities (Terminal 1 and 2)
    - Maximize preferential gating
    - How the airport operates today

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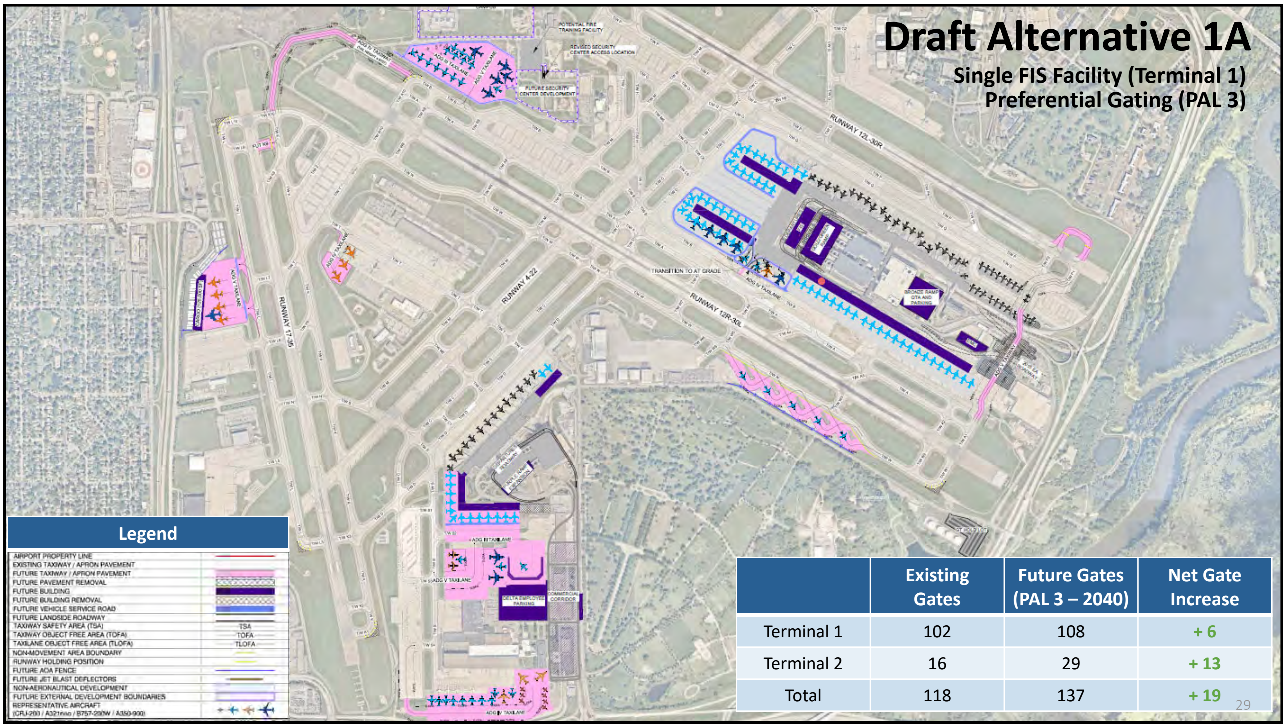

	Existing Gates	Future Gates (PAL 3 – 2040)	Net Gate Increase
Terminal 1	102	108	+ 6
Terminal 2	16	29	+ 13
Total	118	137	+ 19

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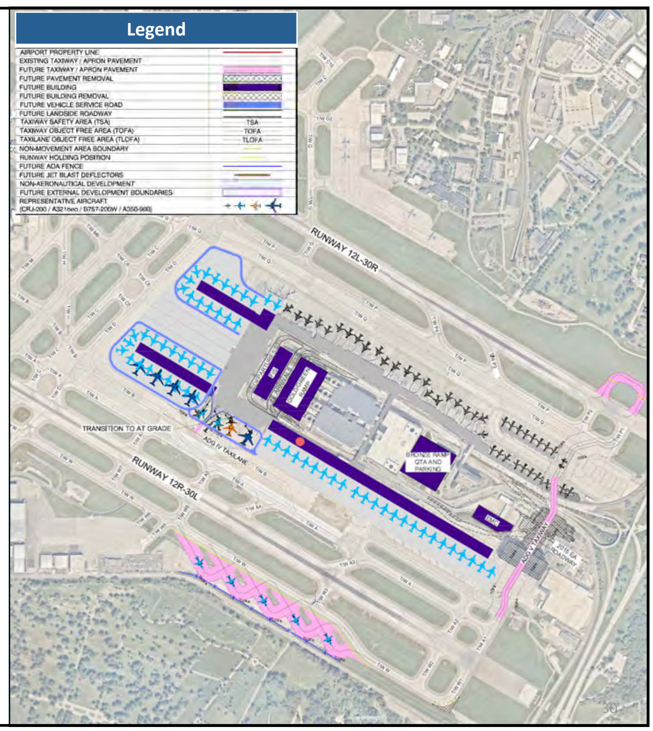
Draft Alternative 1A

- Terminal
  - Concourse E and F Reconstruction
  - Extend Concourse G
- Airside
  - Cover Vehicle Service Road
  - Crossover Taxiway (RWY 30L & 30R)
  - Relocate RWY 30L Deicing (TWY W)
  - North Partial Parallel Taxiway (RWY 30R)
- Landside
  - Reconstruct Green/Gold Ramps
  - Construct Single FIS Facility (Green/Gold Area)
  - Additional Vehicle Curb Frontage
  - Bronze Ramp/EMC Needs



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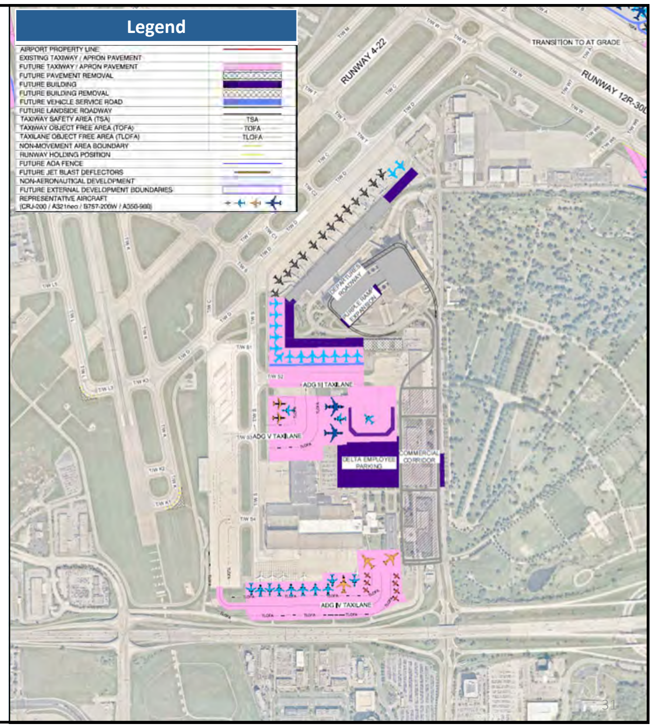
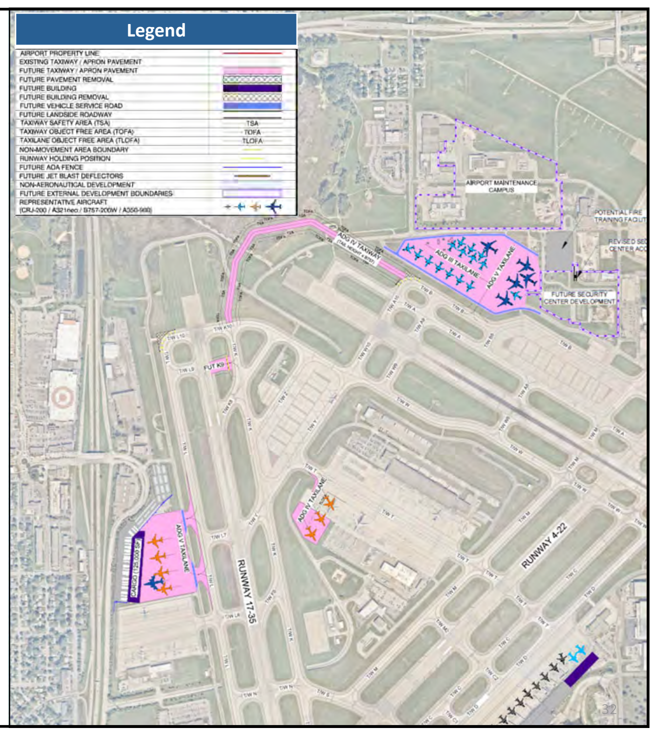
Draft Alternative 1A

- Terminal
  - Extend Terminal 2 South and North
- Airside
  - Additional Remain Overnight (RON) Parking for Sun Country (Humphrey Pad) and Delta (Near i494)
- Landside
  - Purple Ramp Expansion
  - Potential Commercial Development Along 34th
  - Delta Employee Parking Structure



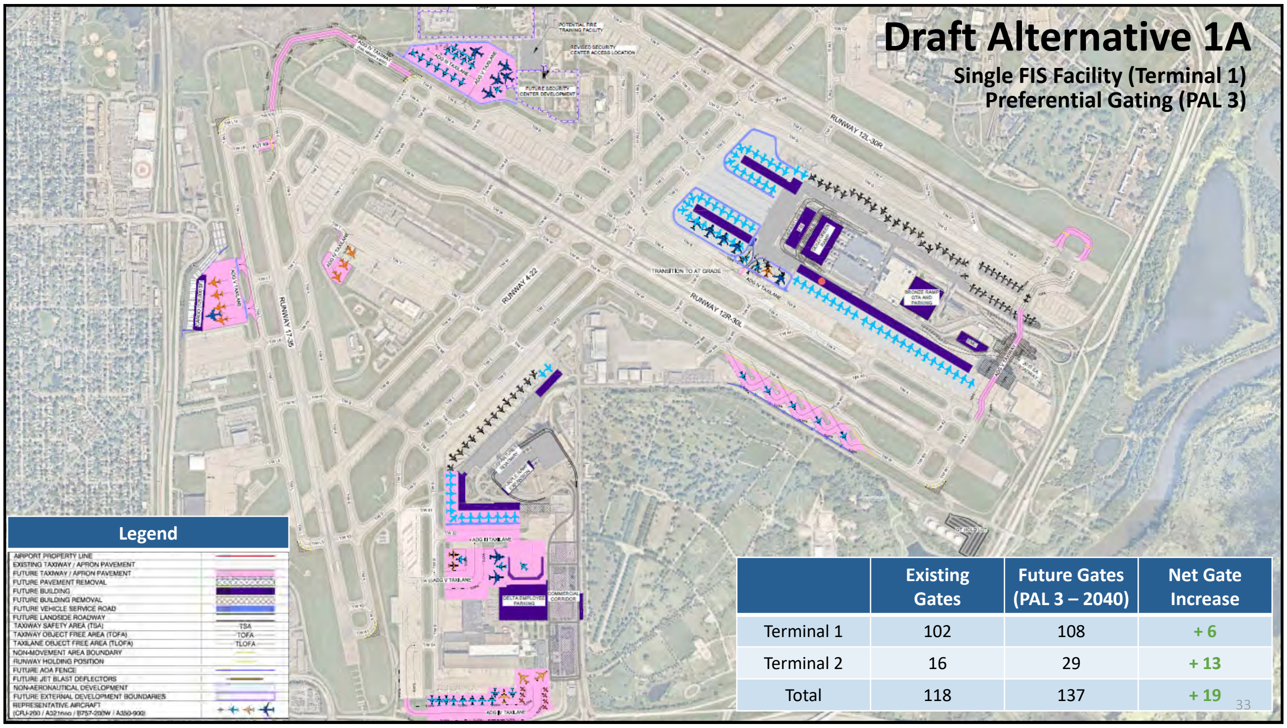
Draft Alternative 1A

- Terminal
  - None in-View
- Airside
  - Additional Remain Overnight (RON) Parking
  - RWY 12R End-Around Taxiway
  - Potential for Small Cargo Expansion
- Landside
  - None in-View



Draft Alternative 1A

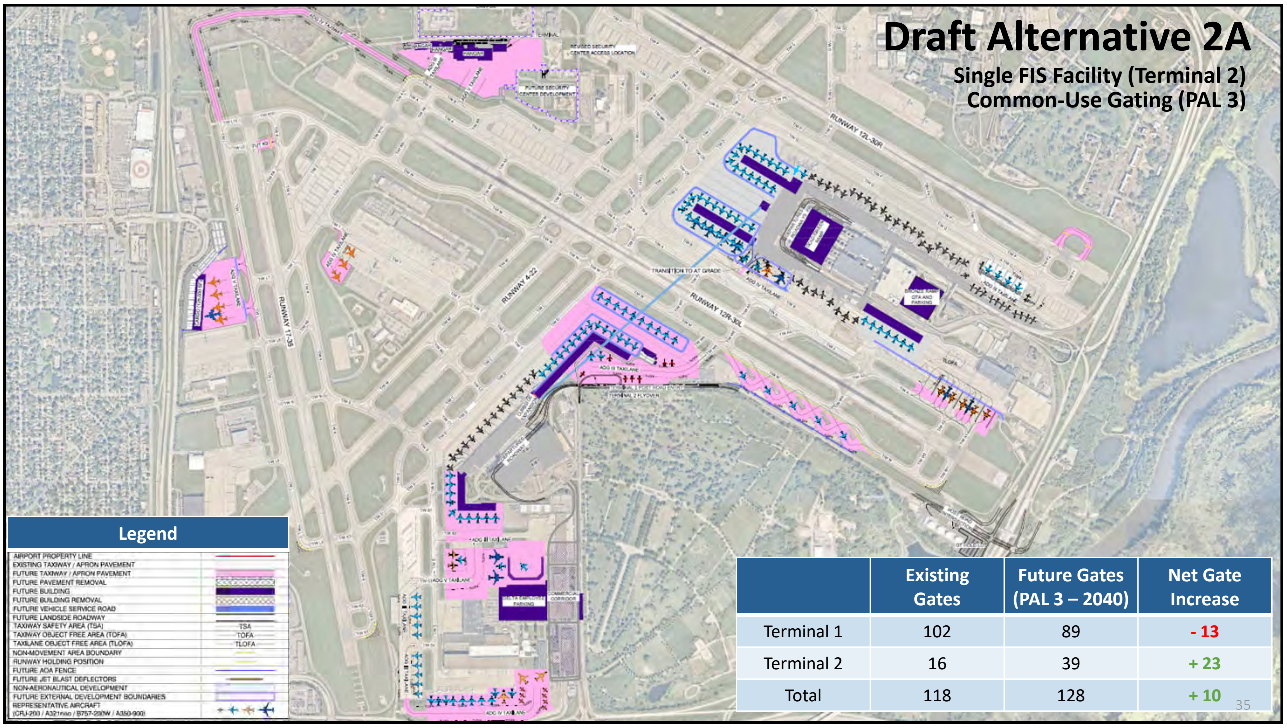
Single FIS Facility (Terminal 1)
Preferential Gating (PAL 3)



	Existing Gates	Future Gates (PAL 3 – 2040)	Net Gate Increase
Terminal 1	102	108	+ 6
Terminal 2	16	29	+ 13
Total	118	137	+ 19

33

- Break – 5 minutes



Draft Alternative 2A

Single FIS Facility (Terminal 2)
Common-Use Gating (PAL 3)

	Existing Gates	Future Gates (PAL 3 – 2040)	Net Gate Increase
Terminal 1	102	89	- 13
Terminal 2	16	39	+ 23
Total	118	128	+ 10

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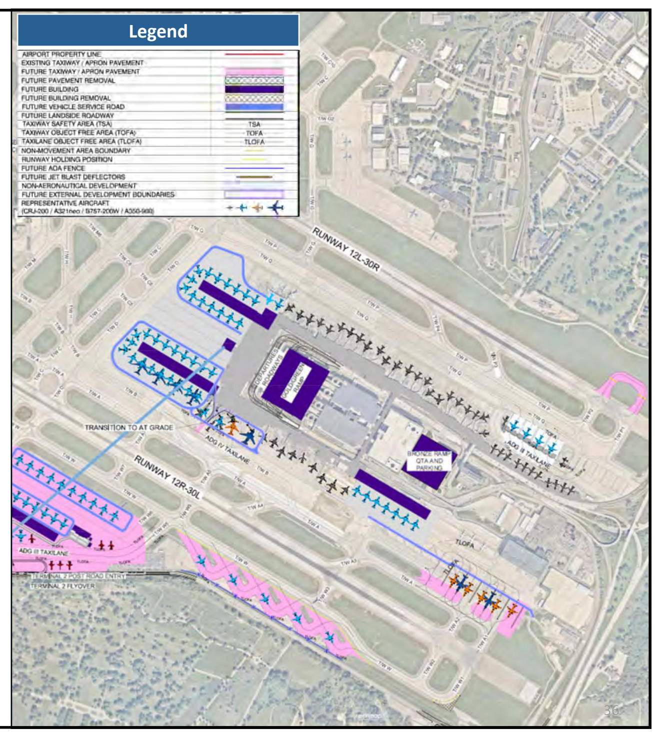
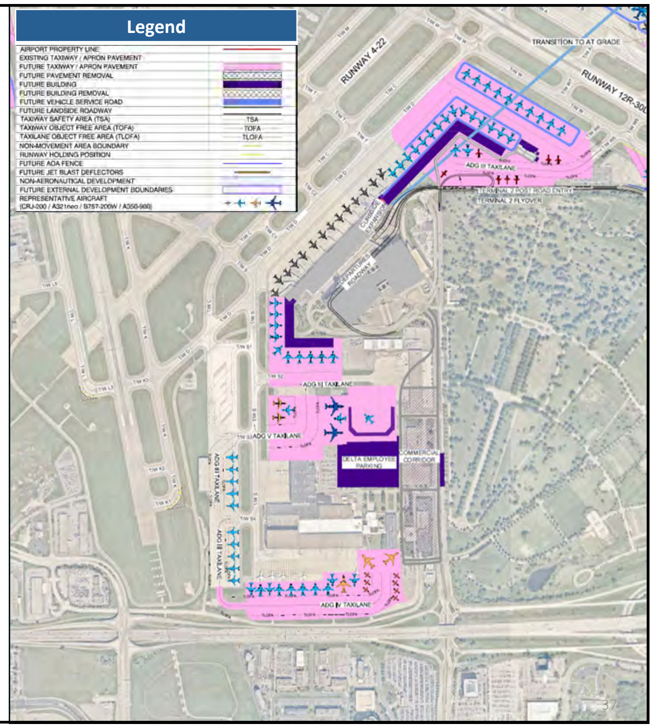
Draft Alternative 2A

- Terminal
  - Concourse E and F Reconstruction
  - Extend Concourse G
- Airside
  - Cover Vehicle Service Road
  - Expand RWY 30L Deicing (TWYs B and W)
  - North Partial Parallel Taxiway (RWY 30R)
  - Demolish Concourse B; Add Deicing (RWY 30R)
- Landside
  - Reconstruct Green/Gold Ramps
  - Additional Vehicle Curb Frontage
  - Bronze Ramp/EMC Needs



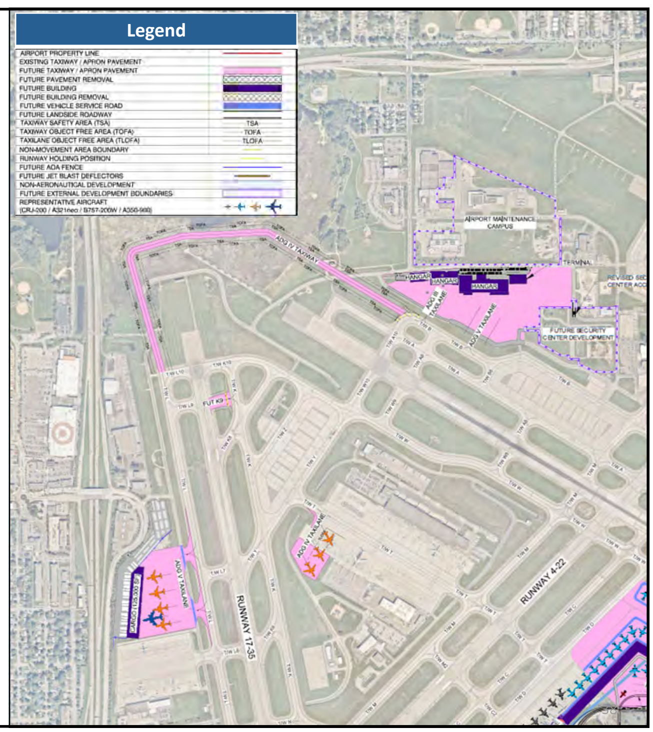
Draft Alternative 2A

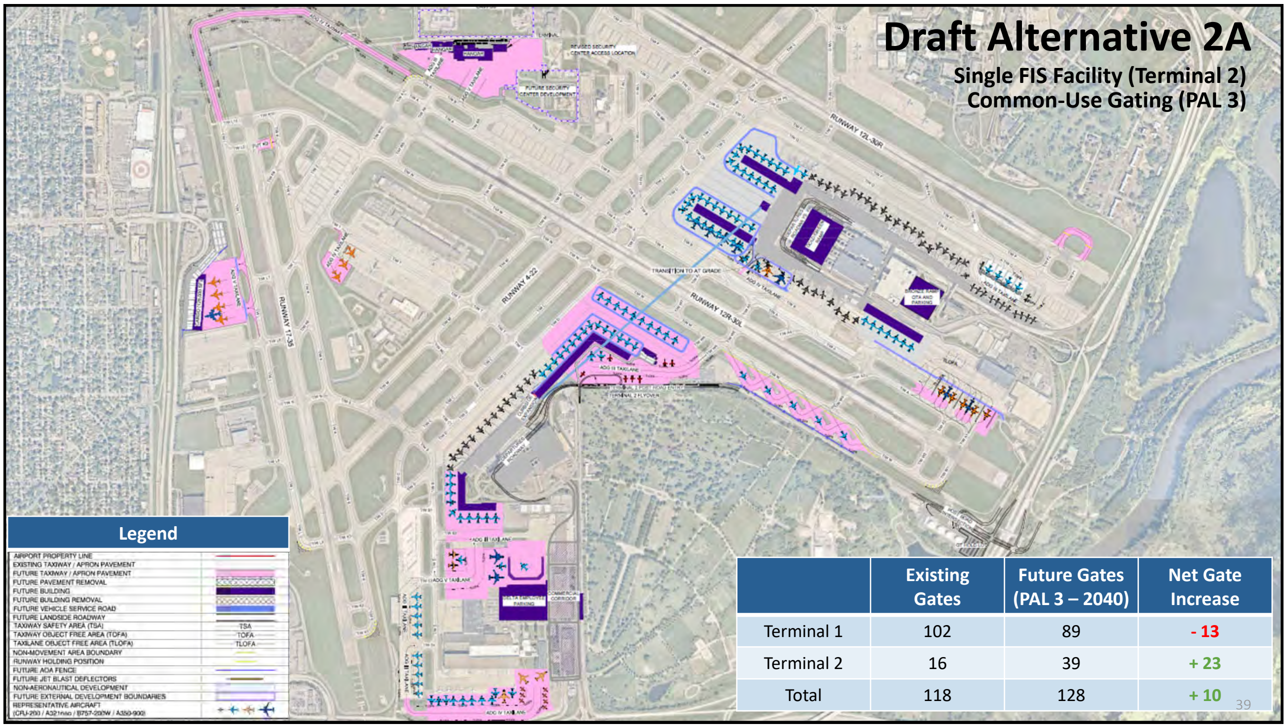
- Terminal
  - Extend Terminal 2 South and North
  - Sterile Connection to Terminal 1
- Airside
  - Additional Remain Overnight (RON) Parking for Sun Country (Humphrey Pad) and Delta (Near i494)
  - RON/Deicing Pad North of Terminal 2
- Landside
  - 34th Flyover; Post-Road Improvements
  - Potential Commercial Development Along 34th
  - Delta Employee Parking Structure



Draft Alternative 2A

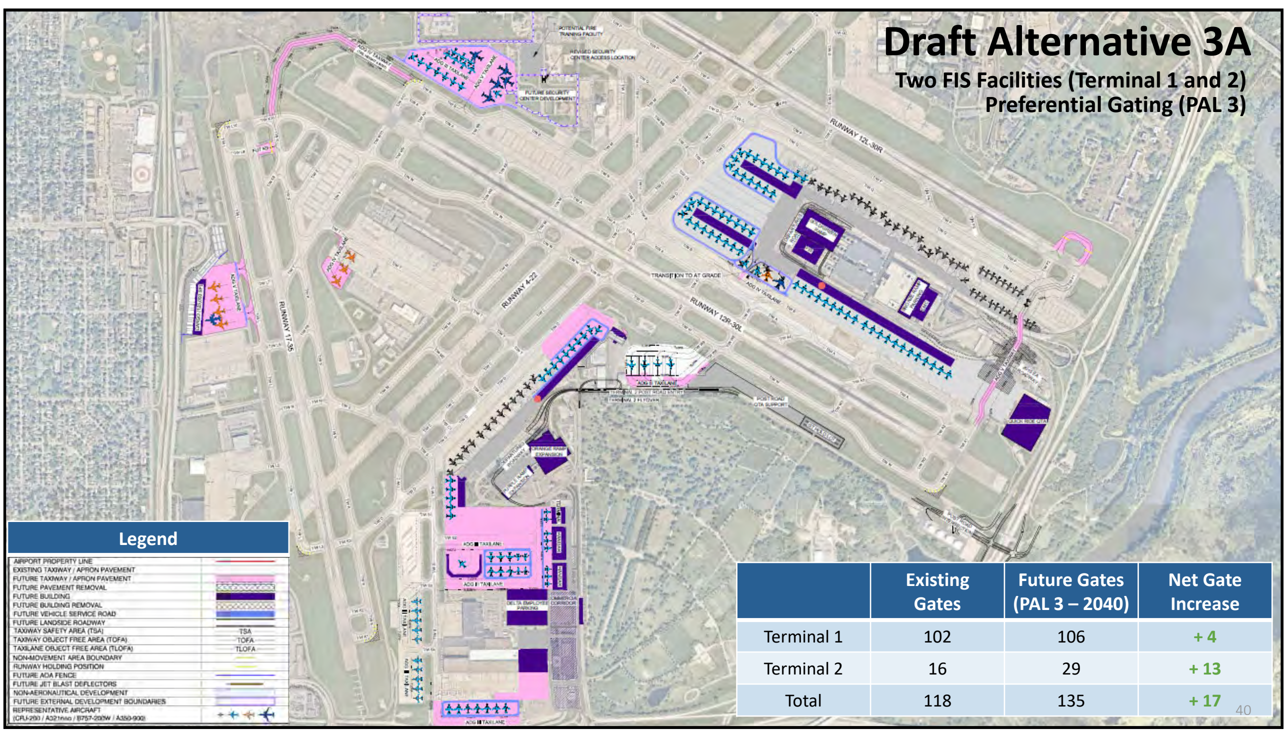
- Terminal
  - None in-View
- Airside
  - Additional Remain Overnight (RON) Parking
  - RWY 12R End-Around Taxiway
  - Potential for Small Cargo Expansion
  - Relocated Fixed-Base Operator (FBO)
- Landside
  - None in-View





	Existing Gates	Future Gates (PAL 3 – 2040)	Net Gate Increase
Terminal 1	102	89	- 13
Terminal 2	16	39	+ 23
Total	118	128	+ 10

39

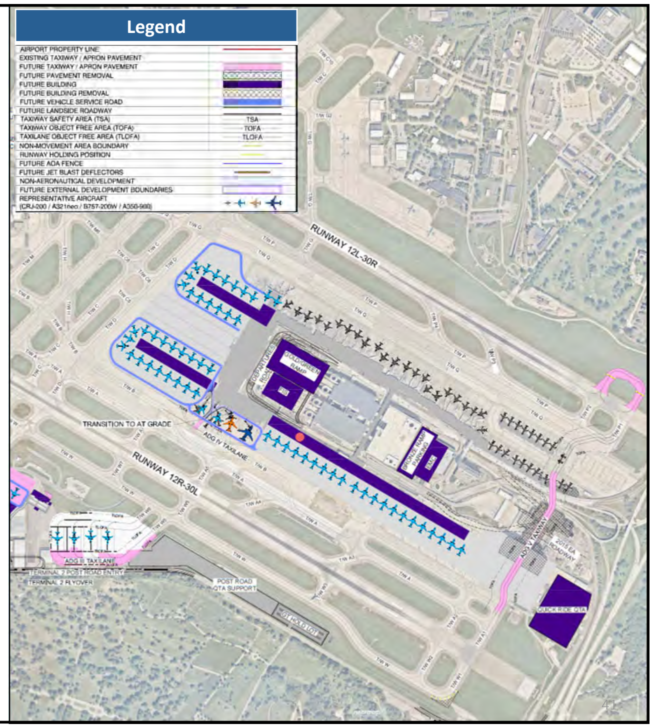


	Existing Gates	Future Gates (PAL 3 – 2040)	Net Gate Increase
Terminal 1	102	106	+ 4
Terminal 2	16	29	+ 13
Total	118	135	+ 17

40

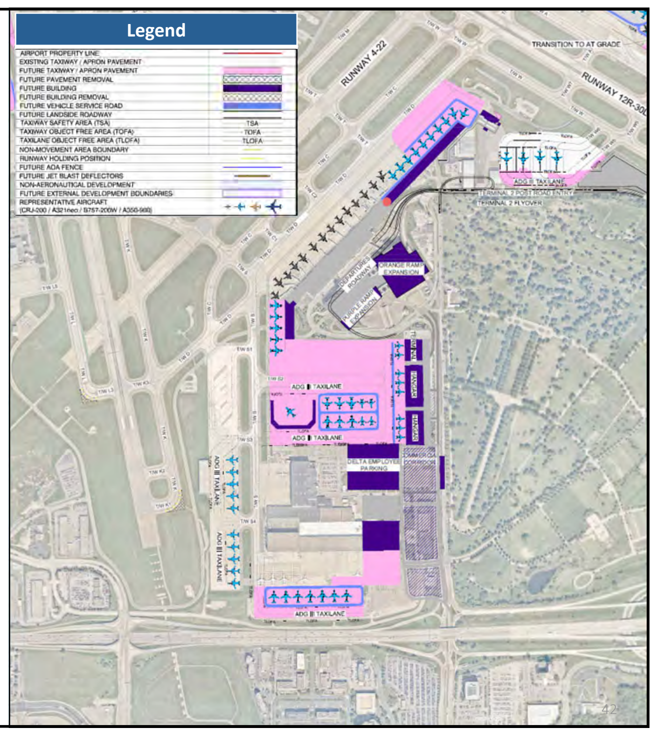
Draft Alternative 3A

- Terminal
  - Concourse E and F Reconstruction
  - Extend Concourse G
- Airside
  - Cover Vehicle Service Road
  - Relocate RWY 30L Deicing (Existing FBO)
  - North Partial Parallel Taxiway (RWY 30R)
  - Crossover Taxiway (RWY 30L & 30R)
- Landside
  - Reconstruct Green/Gold Ramps
  - Additional Vehicle Curb Frontage
  - Bronze Ramp/EMC Needs



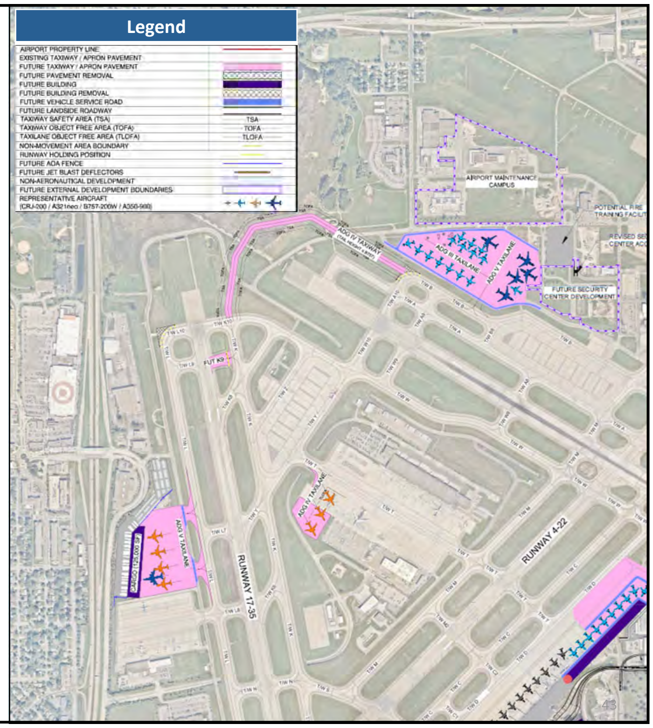
Draft Alternative 3A

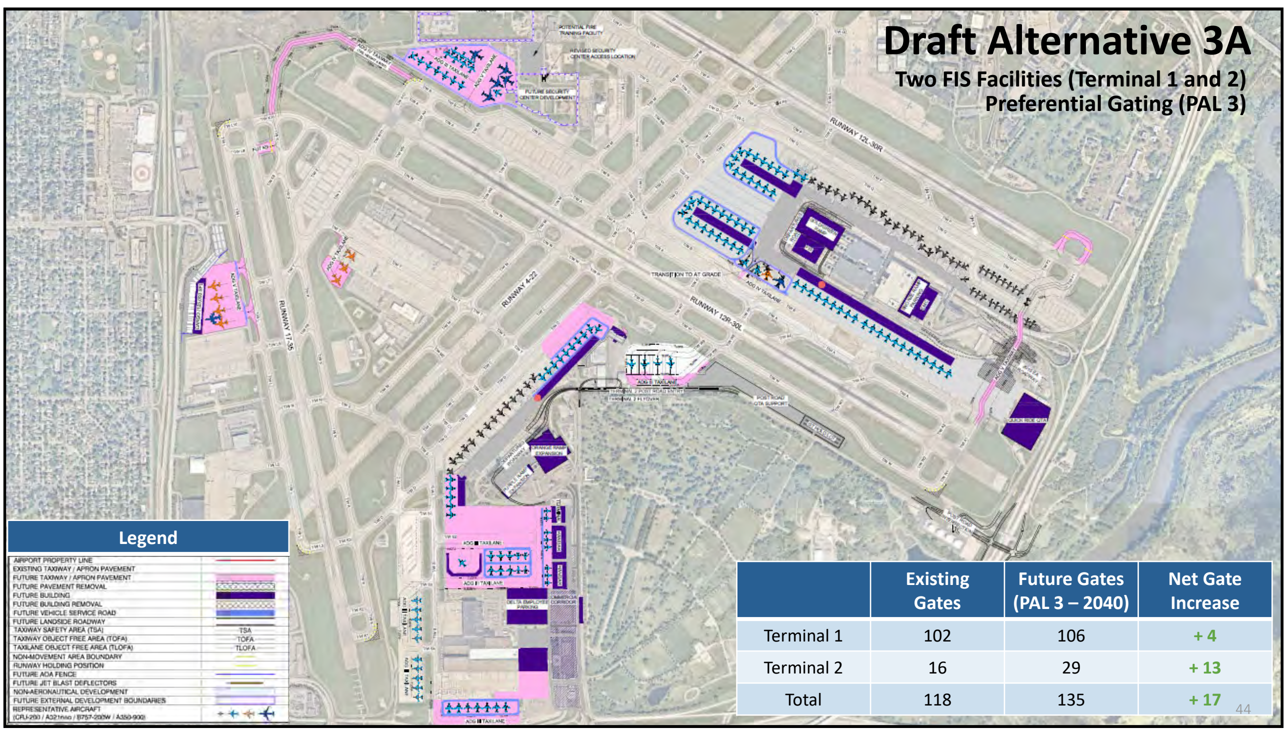
- Terminal
  - Extend Terminal 2 South and North
- Airside
  - Additional Remain Overnight (RON) Parking for Sun Country (Humphrey Pad) and Delta (Near i494)
  - Relocate FBO Along 34th
- Landside
  - 34th Flyover; Post-Road Improvements
  - Potential Commercial Development Along 34th
  - Delta Employee Parking Structure



Draft Alternative 3A

- Terminal
  - None in-View
- Airside
  - Additional Remain Overnight (RON) Parking
  - RWY 12R End-Around Taxiway
  - Potential for Small Cargo Expansion
- Landside
  - None in-View





Draft Alternative 3A

Two FIS Facilities (Terminal 1 and 2)
Preferential Gating (PAL 3)

	Existing Gates	Future Gates (PAL 3 – 2040)	Net Gate Increase
Terminal 1	102	106	+ 4
Terminal 2	16	29	+ 13
Total	118	135	+ 17

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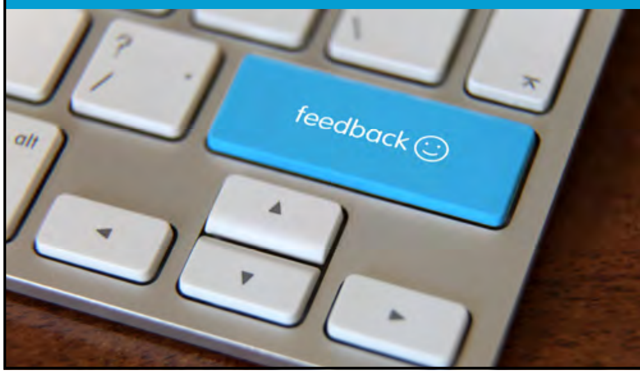
Panel Discussion



What questions, concerns or ideas do you have about…

- The projected facility requirements
- The preliminary alternatives

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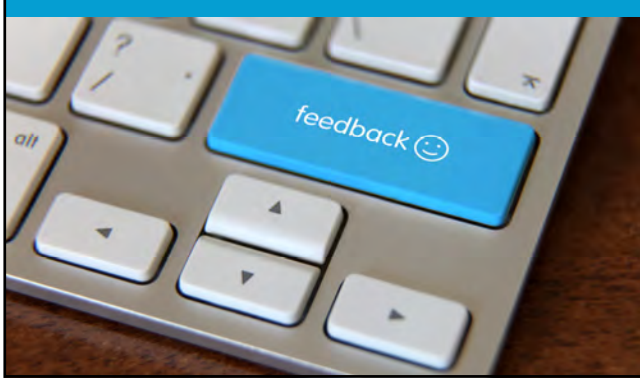
Comments and Announcements



Comments and announcements are welcome from both Panel members and attendees from the public not on the Panel.

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August 23rd Experience MSP Event

EXPERIENCE msp

The public is invited to the next Experience MSP event

Tuesday, August 23, 2022

MAC Administrative Offices

6040 28th Avenue South, Minneapolis

Show up any time between 4:30 and 7 p.m. for interactive booths, knowledgeable resources in a welcoming setting. Presentation on the MSP Long-Term Plan will begin at 5:30 p.m.

Presentation begins at 5:30 p.m.

This event is the third in a four-part series where the public can learn about MSP's Long-Term Plan and provide input.

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MSP Airport Long-Term Plan
Stakeholder Advisory Panel
MEETING MINUTES
Thursday, August 4, 2022

Stakeholder Advisory Panel Meeting #5
Virtual: Zoom Meeting
In-Person: Bloomington Convention and Visitor's Bureau

Panel Members: Hank Moody, Delta Air Lines; Gary Berndt, Sun Country Airlines; Kyle O`Neal, Southwest Airlines; Jana Webster, Executive Director, Airport Foundation; Shari Paul, Medtronic; Gina Mitchell, FAA ADO; Nancy Nistler, FAA ADO; Brian Peterson, Transportation Security Administration (TSA); Glen Markegard, City of Bloomington; Cheryl Jacobson, City of Mendota Heights; Loren Olson, City of Minneapolis; Kevin Gallatin, City of St. Paul; Dan O'Leary, City of Sunfish Lake; Bill Goins, Supply Chain Management; Bill Deef, Meet Minneapolis; Terry Mattson, Visit St. Paul/River Centre; Bonnie Carlson, Bloomington Convention and Visitor's Bureau; Dan O'Neill, Bloomington Convention and Visitor's Bureau; Jan Kroells, Bloomington Convention and Visitors Bureau; Dan Jasper, Mall of America; Kyle Schmaltz, Signature; Emily Koski, City of Minneapolis; Rylan Juran, MnDOT Aero; Sarah Alig, City of Eagan

MAC Staff: Roy Fuhrmann, Chief Operating Officer; Eric Gilles, Airport Planner; Alan Howell, Senior Airport Architect; Brad Juffer, Manager of Community Relations; Abby Kes, Event Coordinator; Mitch Killian, Associate Vice President – Governmental Affairs; Chad Leqve, Vice President – Management and Operations; Jennifer Lewis, Community Relations Coordinator; Dana Nelson, Director of Stakeholder Engagement; Naomi Pesky, Vice President – Strategy and Stakeholder Engagement; Brian Peters, Director – Air Service Development; Bridget Rief, Vice President – Planning and Development; Michele Ross, Assistant Manager of Community Relations; Brian Ryks, Executive Director/CEO; Cassie Schmid, Director – Strategic Marketing; Melissa Scovronski, Manager – Strategic Campaigns; Kalae Verdeja, Administrative Specialist

Others: Todd Streeter, Community Collaboration; Andrew Blaisdell, HNTB; Bill Schmitz, Kimley-Horn; Joe Chang, Ricondo & Associates; Phil Kolctan; MBJ Construction

1) **Welcome Remarks**
Bridget Reif, Vice President of Planning and Development of the Metropolitan Airports Commission (MAC) welcomed everyone to the fifth meeting of the Minneapolis-St. Paul (MSP) Stakeholder Advisory Panel.

2) **MSP Airport Long Term Plan Overview and Engagement Program**
Ms. Rief reviewed the overarching goal of the Metropolitan Airports Commission (MAC): "Our goal is to create a plan that positions MAC to meet future demand, enhances our financial strength, leverages environmental stewardship, and infuses sustainable and innovative thinking in all that we do". Ms. Rief also gave an overview of the preparation going on behind the scenes regarding planning.

Ms. Rief introduced **Dana Nelson, MAC's Director of Stakeholder Engagement.** Ms. Nelson thanked Jan Kroells, Dan O'Neill and Bonnie Carlson from the Bloomington Convention and Visitor's Bureau, for hosting our meeting. Ms. Nelson reviewed the various ways to participate in the virtual portion of the meeting. She continued reviewing the meeting's agenda and objectives which included: the MSP Long-Term Plan goals, process, and engagement program; progress to date, including projected terminal, airside and landside facility requirements and a set of concepts ("alternatives") intended to fulfill projected requirements; and invite questions, ideas, and concerns from panel members about these alternatives.

Ms. Nelson then gave an overview, including a step-by-step process, of the Long-Term Plan. Ms. Rief expanded by noting there were some items in the process that have already been approved in the current plan. Ms. Nelson reviewed the Long-Term Plan Goals which include:

(1) Plan for future facilities that will meet projected passenger activity levels in a manner that maintains and enhances customer service, while facilitating a seamless experience.

(2) Produce a development plan that positions the MAC to:
- meet future demand levels,
- enhance financial strength,
- leverage environmental stewardship, and
- infuse sustainable thinking.

(3) Conduct the planning process in a manner that includes meaningful stakeholder engagement process.

Ms. Nelson elaborated on what steps of the Long-Term Planning Process MAC is currently working on and what next steps could be expected. She reviewed the Stakeholder Engagement Program which includes the Stakeholder Advisory Panel, Experience MSP Public Event Series, Project Website www.metroairport.com/long-term-plan, E-News Monthly Project Updates, Public surveys and polls, Project Newsletters, Print Notifications for Public Events, as well as Updates at the Noise Oversight Committee and MAC's Planning, Development and Environment Committee.

The definition of the stakeholder advisory panel was discussed. Several important functions that the panel serves include: Representing a broad range of stakeholder groups; receiving information about the planning process; communicating public concerns and aspirations as the voice of key stakeholders.

The Project Website was reviewed. The site contains the overview, community and stakeholder engagement, progress and schedule, documents and links, and frequently asked questions.

Questions or Comments about the MSP Long-Term Plan can be sent:
Contact us via email at:
MSPAirportLongTermPlan@mspmac.org

Visit the project website at:
www.mispairport.com/long-term-plan

Sign up to receive news updates at:
Metropolitan Airports Commission (govdelivery.com)

3) Update from MAC's Airport Planner

Eric Gilles, MAC's Airport Planner, thanked the group for their participation. Mr. Gilles gave some of his background, education, and experience. He also reviewed his roles and responsibilities as the current airport planner at MAC.

Mr. Gilles gave a refresher on the Long-Term Plan Project process. Prior to COVID, the focus was on an inventory of existing conditions and aviation activity forecast. There was approximately an 18-month pause due to COVID, but since then the focus has been on two elements: facility requirements and preliminary alternatives analysis. Going forward, the study will move toward: the selection of a preferred alternative and phasing, high-level environmental review, public comments, MAC board approval, and eventually Met Council review. Mr. Gilles noted that the primary goal is to have the study wrapped up at the beginning of 2023. He then defined a term that would be used a lot during the presentation: PAL which is Planning Activity Level. PALs are used to consider when development should occur but does not authorize construction. It also helps the Long-Term Plan follow activity-based airport development instead of a specific year. Although, years are associated with each PAL to tie them into the forecast timeline as an estimate. For the purposes of this Long-Term Plan, PAL 2 is referring to approximately 2030 and PAL 3 refers to 2040 but will fluctuate based on actual demand.

Mr. Gilles gave an overview of the Facility Requirements. This included gate requirements and passenger connectivity Federal Inspection Services (FIS), airfield efficiency, long-term Remain Overnight (RON) aircraft parking needs, airfield design and standards, curbside and roadway congestion and long-term parking needs.

Loren Olson, City of Minneapolis, asked for a more descriptive definition of Annual Service Volume (ASV). Mr. Gilles explained that ASV is a theoretical throughput based on how many operations are going through the airport based on the runway configuration that MSP has. The potential delays could deter airlines from doing business at MSP.

Ms. Olson inquired more about the future private parking capabilities. Ms. Rief and Mr. Gilles each responded to the inquiry. There is no specific answer at this point in the planning process, as there are a number of unknown logistics such as moving airlines to a different terminal. Mr. Gilles also noted the number of parking requirements at each terminal is difficult to quantify at each facility without a preferred layout.

Bill Goins, Supply Chain Management, posed a question regarding Cargo. He brought up the cargo study that was recently done and the potential of increasing the cargo business at MSP. Mr. Gilles mentioned the alternatives will show potential cargo expansion opportunity areas on the airfield, and also offered to follow up with more information.

Dan O`Leary, Village of Sunfish Lake, made the comment the inbound roadway system around the airport is an existing issue. Mr. O'leary suggested MAC review the roadway system around the airport to help ease congestion. Mr. Gilles responded by stating we are limited in the plan to review what is on airport property. He also mentioned some of the congestion issues in front of the terminal with curbside drop-off, if alleviated, would help with inbound roadway congestion issues as well.

Eric Gilles continued after the break. He spoke about the draft alternatives. Alternative 1A consists of a single Federal Inspection Services (FIS) at Terminal 1 and maximizing preferential gating. Alternative 2A consists of a single FIS at Terminal 2 and an emphasis on common-use gating. Alternative 3A consists of two FIS facilities (Terminals 1 and 2), maximizing preferential gating which is how the airport operates today. Mr. Gilles then outlined each of the draft alternatives individually.

During the explanation of Alternative 1A, **Mr. O`Leary** inquired about the current United States Postal Service (USPS) building and the anticipated changes. Mr. Gilles responded the USPS footprint may need to be used for vehicle parking expansion, and could be an enabling project for future parking structure rehabilitation projects, but is not known yet if it will needed.

Mr. Goins asked about the cargo expansion acreage and the potential of having larger cargo planes at MSP during Alternative 2A. Mr. Gilles responded the recent cargo facility study showed modest growth in cargo activity, but the potential for cargo growth near Runway 17-35 as shown on the alternatives could accommodate approximately one large aircraft.

Kyle Schmaltz, Signature Flight Support, inquired about the alternatives being discussed in the event of moving their facility. He also mentioned Signature's preference to be located on the north field option near the Air Traffic Control Tower (ATCT) facility.

Gary Berndt, Sun Country Airlines, asked if the sterile corridor option would be added to all three alternatives. Mr. Gilles responded by indicating that is being considered as a priority for the preferred alternative but has not been finalized yet.

Mr. Gilles responded to numerous questions regarding the FIS process at Terminal 2.

4) Panel Discussion

Dana Nelson, MAC Director of Stakeholder Engagement, reviewed the initial question posed to the panel, "What questions, concerns or ideas do you have about projected facility requirements or preliminary alternatives"? Ms. Nelson opened the floor to questions.

Mr. O`Leary congratulated the group for the thoughtful process in putting the long-term plan together. He mentioned the ongoing challenge with noise complaints in his community. He asked if there were any plans underway for the arrival and departure of passengers by inbound roadway.

Mr. Gilles and Ms. Rief both responded to the inquiry regarding the inbound roadway traffic challenges. Mr. Gilles also commented on the curbside linear footage. Ms. Rief mentioned the opportunity of expanding the curbside footage when the parking ramps are being deconstructed.

Mr. Berndt also commented on the constraints for passengers being dropped off and picked up at the airport, especially at Terminal 2.

Mr. Gilles responded to an inquiry from **Glen Markegard, City of Bloomington,** who asked more about the potential commercial development mentioned during the presentation off of 34th.

Ms. Olson built upon the conversation regarding accessing the airport by car. She offered that there are robust public transportation options including buses, light rail and bicycling. She acknowledged that there are safety concerns surrounding the light rail currently but wanted to emphasize the potential lowering of the carbon footprint at the airport and its neighboring areas.

Ms. Olson also inquired about the taxiway that was shown on one of the slides. She wanted to know how that would be used and if it would increase ground noise, especially if it were to be used as a queuing area.

Mr. Gilles explained the intention of the end around taxiway would decrease the number of taxiway crossings.

Mr. Gilles and Ms. Rief also responded to an inquiry from **Mr. O`Neill** regarding clarification on enhancing priority check-in.

5) Comments and Announcements

Mr. Gilles thanked everyone for their participation.
Ms. Nelson also mentioned that questions and feedback are encouraged.

Questions or Comments about the MSP Long-Term Plan can be sent:
MSPAirportLongTermPlan@mspmac.org

Respectfully Submitted,
Kalae Verdeja, Recording Secretary

MSP Airport Long-Term Plan
April 13, 2023 at 2:00 – 4:00PM
Virtual Teams Meeting OR
In-Person at Crowne Plaza Aire, Humphrey Room
3 Appletree Square, Bloomington 55425

STAKEHOLDER ADVISORY PANEL MEETING #6

If any members of the public would like to participate, please contact MSPAirportLongTermPlan@mspmac.org.

Meeting Objectives:

- Review the MSP Long-Term Plan goals, process and engagement program.
- Share progress to-date, to include an overview of facility requirements and the preferred alternative intended to fulfill LTP goals and projected requirements.
- Invite questions, ideas and concerns from Panel members about these alternatives.

Agenda:

2:00 Welcome Remarks
Brian Ryks, MAC Executive Director/CEO

2:10 LTP Purpose, Goals and Timeline
Eric Gilles, MAC Senior Airport Planner

2:20 MSP Airport Planning Process Update
Eric Gilles, MAC Senior Airport Planner

2:50 Break

3:00 LTP Aircraft Noise Analysis
Dana Nelson, MAC Director of Stakeholder Engagement

3:15 Panel Discussion
What questions, concerns or ideas do you have about the preferred alternative?

3:30 Next Steps

3:40 Comments and Announcements

4:00 Closing Thank You

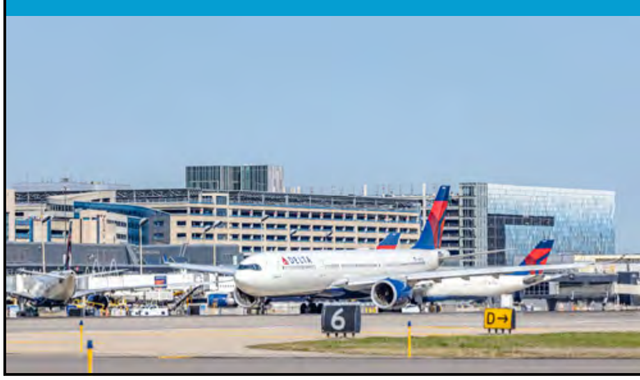
The MSP Airport Long-Term Planning website has been updated. Please visit www.mspairport.com/long-term-plan to view the current planning timeline, Stakeholder Advisory Panel Report, and other resources.

MSP Airport Long-Term Plan Stakeholder Advisory Panel

Meeting #6
April 13, 2023

1

Welcome Remarks



Brian Ryks

MAC Executive Director/CEO

2

Meeting Objective

At this meeting, we will:

- Review the MSP Long-Term Plan goals, process and engagement program
- Share progress to-date, to include the preferred airport design alternative intended to fulfill goals and projected requirements
- Invite questions, ideas and concerns from panel members about the preferred alternative

3

Meeting Agenda

2:00 - Welcome Remarks
Brian Ryks – MAC Executive Director/CEO

2:10 – Review LTP Purpose, Goals and Timeline
Eric Gilles, C.M., ACE - MAC Senior Airport Planner

2:20 – MSP Airport Planning Process Update

2:50 – Break

3:00 – LTP Aircraft Noise Analysis
Dana Nelson – MAC Stakeholder Engagement Director

3:15 – Panel Discussion
What questions, concerns or ideas do you have about the preferred alternative?

3:30 – Next Steps

3:45 – Comments and Announcements

4:00 – Close

4

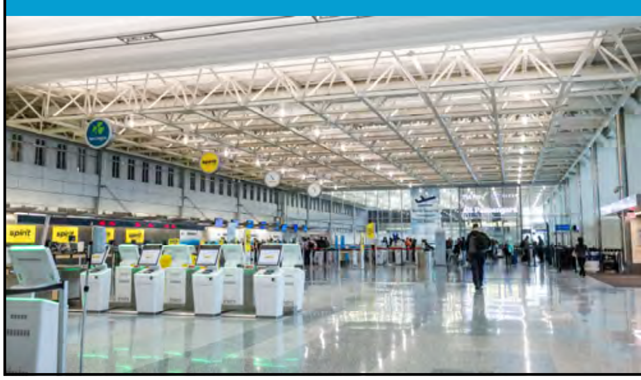
Purpose of the Long-Term Plan

Evaluate existing and future facility/infrastructure requirements based on 20-year projected demand

Consider when facility improvements are required to accommodate projected demand in a manner that is:

- safe
- efficient
- orderly
- cost-effective, and
- continues to deliver a high level of customer service

Purpose of the Long-Term Plan



The Plan does not:

Authorize construction or improvements to facilities, nor does it serve as a basis for determining eligibility for noise mitigation programs.

Rather, it is intended to help the MAC better understand and plan for future facility requirements.

Plan Goals

1. Plan for future facilities that will meet projected passenger activity levels in a manner that maintains and enhances customer service, while facilitating a seamless experience.
2. Produce a development plan that positions the MAC to
   - meet future demand levels
   - enhance financial strength
   - leverage environmental stewardship, and
   - infuse sustainable thinking
3. Conduct the planning process in a manner that includes meaningful stakeholder engagement.

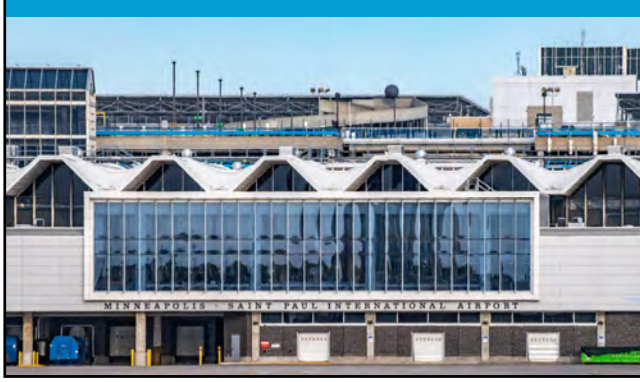
Long-Term Planning Process

Baseline Existing Facilities	• Inventory and document existing facilities and aviation activity levels to establish baseline conditions
Forecasts	• Forecast MSP aviation activity levels (passengers, cargo, and aircraft operations) for the milestone years between 2020 and 2040
Facility Requirements (Gap Analysis)	• Determine any facility deficiency gaps between the baseline condition and desired future conditions based on forecasted activity levels
Development Concepts	• Develop and evaluate alternative means to remedy facility deficiencies identified through the process
Proposed Development	• Determine a proposed development program, funding plan, and implementation strategy to present to the community and the MAC board
Environmental Considerations	• Prepare an overview of environmental factors that should be taken into consideration when implementing the plan

We are currently on these steps

8

Airport Planning Update



- Overview of Facility Requirements
- Preferred Alternative
- Forecast Noise Contours

Overview of Facility Requirements

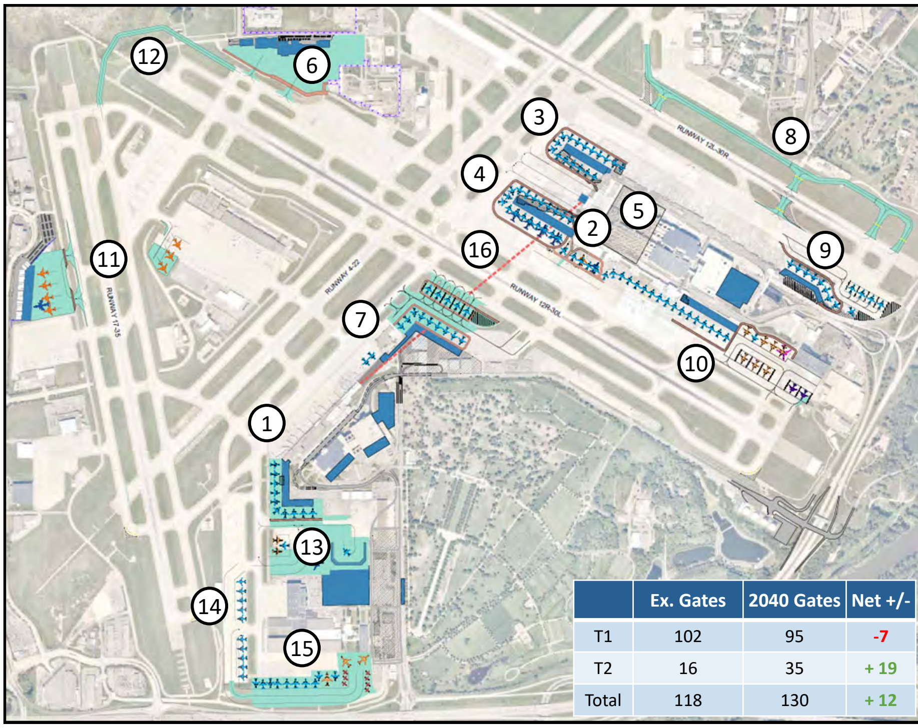
- Terminal Challenges
  - Gating requirements and passenger connectivity
  - Federal Inspection Services (FIS)
- Airside Challenges
  - Maintain airfield efficiency
  - Long-term Remain Overnight (RON) aircraft parking requirements
  - Address airfield design standards
- Landside Challenges
  - Curbside and roadway congestion
  - Address long-term parking requirements (private, rental, ride-share, etc.)

11

Preferred Alternative

- Incorporates stakeholder feedback (Airlines, FBO, MAC Internal Workshops, Senior Leadership, SAP and Public)
- Assumes FIS at both Terminals 1 and 2
- Emphasizes the need for additional gates beyond what exists today
- Mindfulness of airside impacts
- Landside elements will continue to be refined beyond LTP scope

12



	Ex. Gates	2040 Gates	Net +/-
T1	102	95	-7
T2	16	35	+ 19
Total	118	130	+ 12

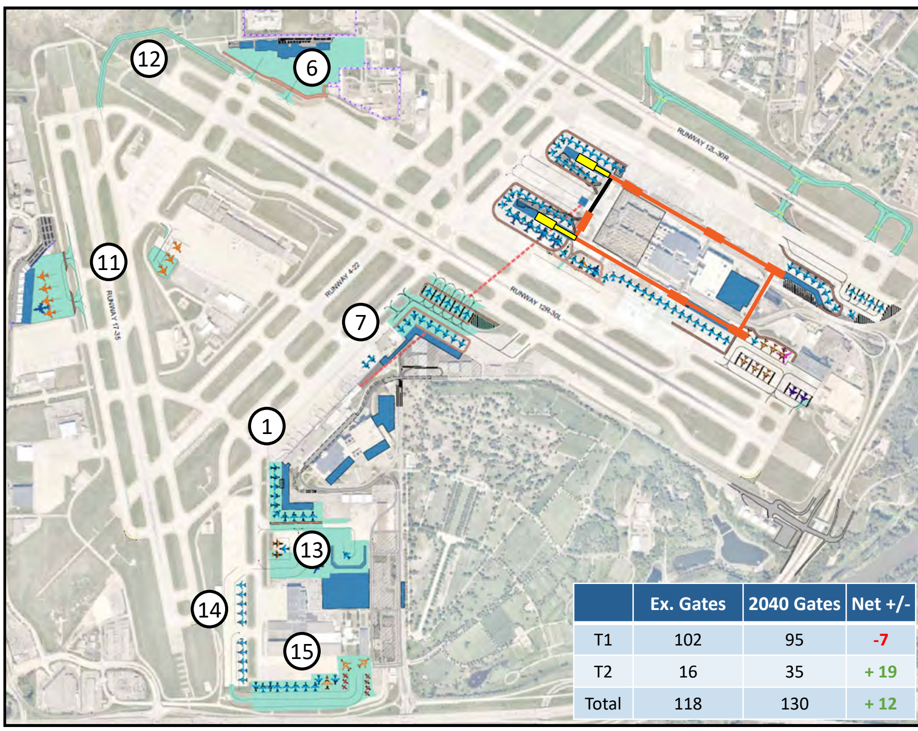
Preferred Alt.

Potential Project List:

1. T2 Gate Expansion
2. T1 FIS Improvements (Ex. Site)
3. Reconstruct Concourse E
4. Reconstruct Concourse F
5. Reconstruct Green/Gold Area
6. Relocate Signature FBO
7. T2 Gate Expansion (Maximize)
8. North Parallel TWY (RWY 30R)
9. Reconstruct Concourse A
10. Extend Concourse G
11. Expand Cargo Facilities
12. Construct RWY 12R EAT
13. Relocate GRE/RON Parking
14. T2 Remote Improvements
15. Construct Delta RON Expansion
16. Connect T1 to T2 (Sterile)

Legend

FUTURE TAXIWAY / APRON PAVEMENT
FUTURE DEMO
FUTURE BUILDING
FUTURE VEHICLE SERVICE ROAD
FUTURE ELEVATED LANDSIDE ROADWAY
FUTURE LANDSIDE PAVEMENT
FUTURE GROUND SERVICE EQUIPMENT STAGING
RUNWAY HOLDING POSITION
FUTURE AOA FENCE
NON-AERONAUTICAL DEVELOPMENT
FUTURE EXTERNAL DEVELOPMENT BOUNDARIES
TERMINAL 1 / TERMINAL 2 CONNECTION
REPRESENTATIVE AIRCRAFT (CRJ-200 / A321neo / B757-200W / A350-900)



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FUTURE TAXIWAY / APRON PAVEMENT
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RUNWAY HOLDING POSITION
FUTURE AOA FENCE
NON-AERONAUTICAL DEVELOPMENT
FUTURE EXTERNAL DEVELOPMENT BOUNDARIES
TERMINAL 1 / TERMINAL 2 CONNECTION
REPRESENTATIVE AIRCRAFT (CRJ-200 / A321neo / B757-200W / A350-900)

- Break – 10 minutes

LTP Aircraft Noise Analysis

Base Year - 2018 Annual Noise Contour

2040 Forecast Scenarios

- Baseline - expected outcome
- High - optimistic socioeconomic drivers
- Low - conservative financial planning forecast

2018 Actual Contour and 2040 Baseline Forecast Comparison

Total Operations

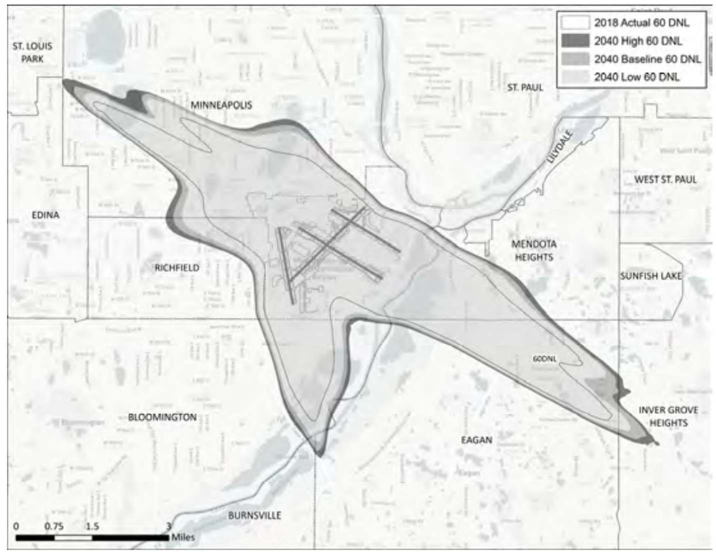
- 2018 – 406,913 Annual Operations
- 2040 – 509,700 Forecast Operations

Nighttime Operations

- 2018 – 10.8% of all operations (120 Average Daily)
- 2040 – 11.5% of all operations (161 Average Daily)

Stage 5 Operations

- 2018 – 211 Average Daily Operations
- 2040 – 874 Average Daily Operations



Updates in Aircraft Types

Airbus New Engine Option (neo)
A319, A320, A321

- 15 dB below Stage 4 noise standards
- 1.6 average daily operations in 2018
- 273 average daily operations in 2040 forecast

Source: www.airbus.com

Boeing B737 MAX
MAX 7, MAX 8, MAX 9, MAX 10*

- 40% noise reduction from B737-800
- 1.5 average daily operations in 2018
- 30 average daily operations in 2040 forecast

Source: www.boeing.com

**B737 MAX 10 does not have a noise profile in AEDT; the B737 MAX 8 was used as an FAA approved substitute.*

Airbus A220-100 and A220-300

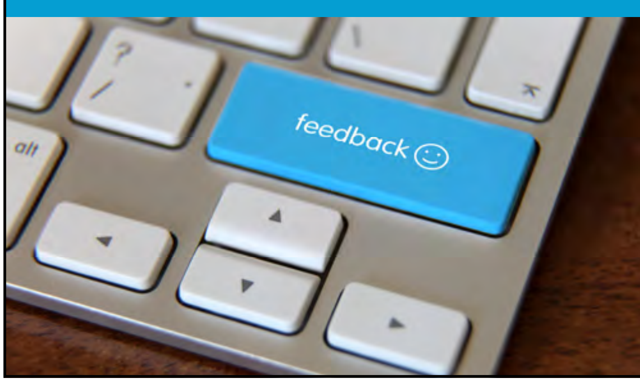
- 50% noise reduction from previous generation
- 0 average daily operations in 2018
- 499 average daily operations in 2040 forecast

Source: www.airbus.com

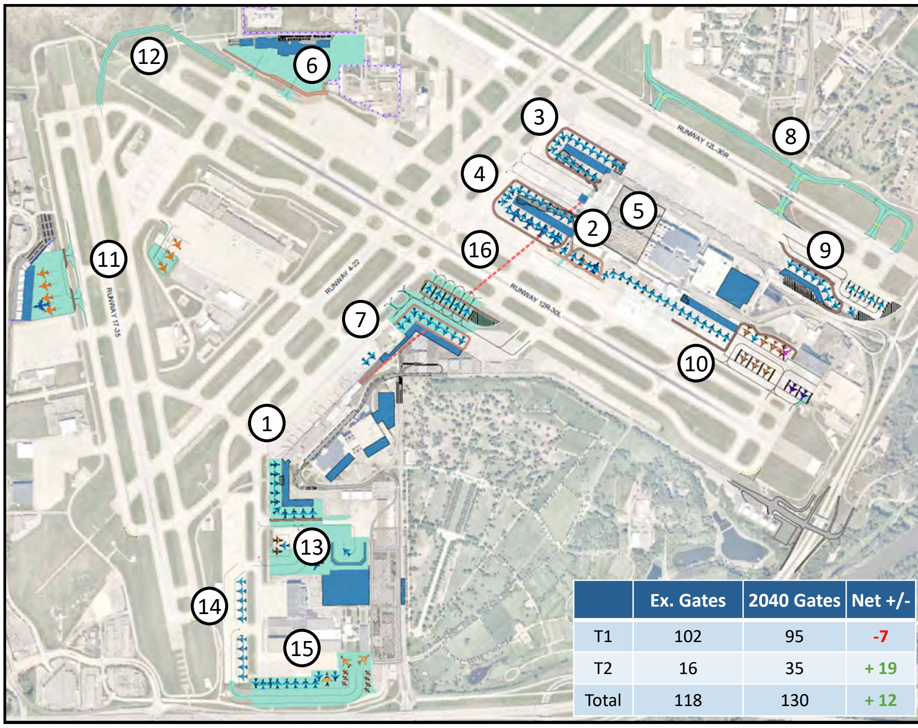
2040 Baseline Forecast Contour
vs.
2018 Actual Contour

65 dB DNL	60 dB DNL
5,933 acres	15,775 acres
33.5% increase from 2018	39.3% increase from 2018

Panel Discussion



What questions, concerns or ideas do you have about the preferred alternative?



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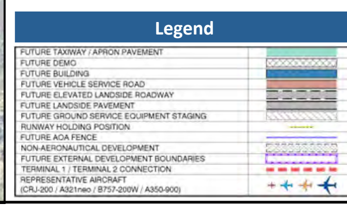
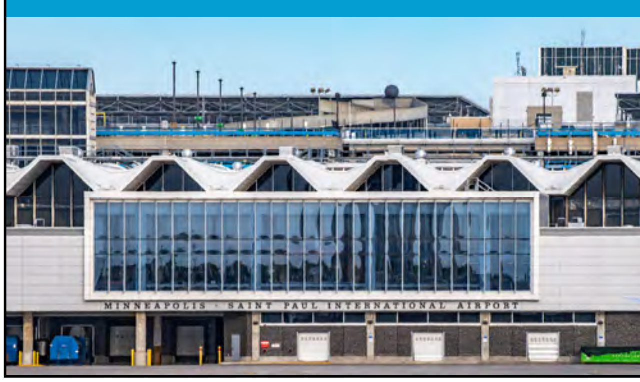


Next Steps



Long-Term Plan Steps:

- Airfield Simulation (Base + Deicing)
- Develop Prioritization and Project Costs
- LTP Report Writing

Stakeholder Engagement Steps:

- Informational Updates to MetCouncil
  - TAC (May 3)
  - TAC Planning Sub-Committee (May 11)
  - Transportation Advisory Board (May 17)
- Publish Draft Report for Public Comment
- Hold Public Experience MSP Event (TBD)
- Review Public Comments
- Finalize Plan and Send for MetCouncil Review

Comments and Announcements

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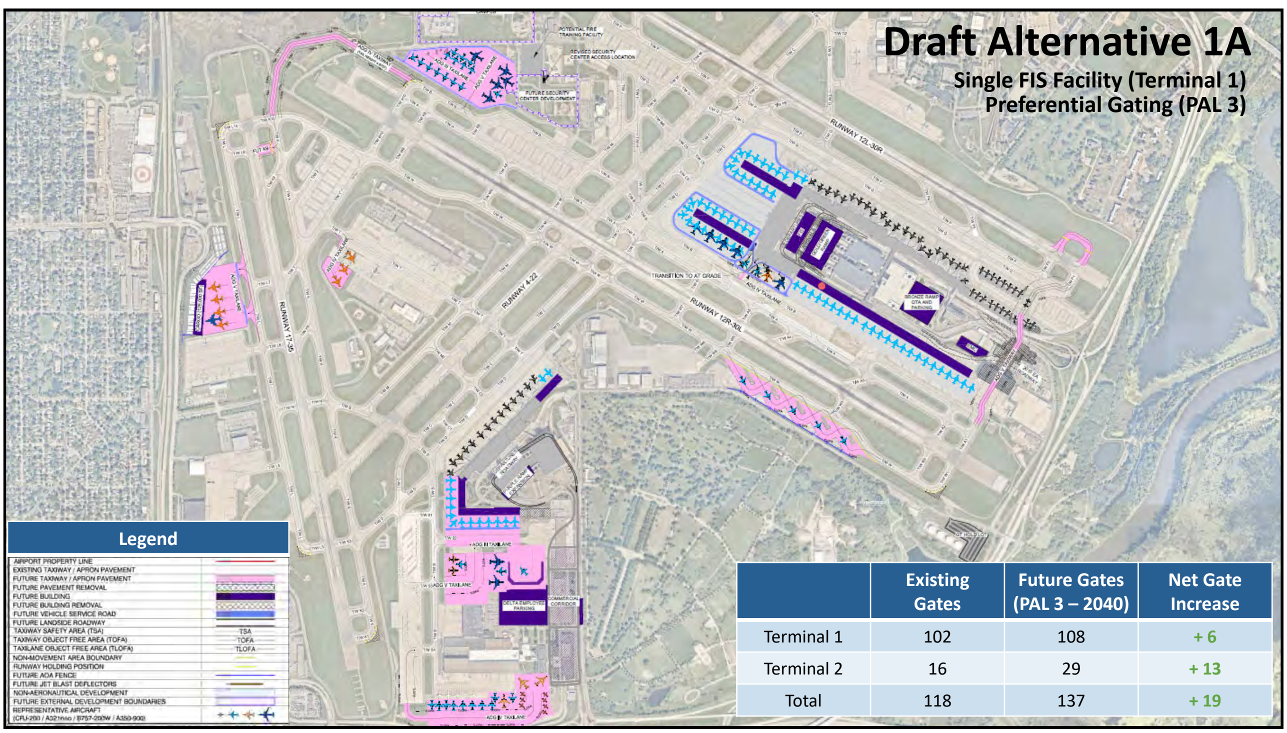
Closing Thank You

24



	Existing Gates	Future Gates (PAL 3 – 2040)	Net Gate Increase
Terminal 1	102	108	+ 6
Terminal 2	16	29	+ 13
Total	118	137	+ 19

MSP Airport Long-Term Plan
Stakeholder Advisory Panel
MEETING MINUTES
Thursday, April 13, 2023

Stakeholder Advisory Panel Meeting #6
Crown Plaza Aire, Humphrey Room
3 Appletree Square, Bloomington

Panel Members: Hank Moody, Delta Air Lines; Gary Berndt, Sun Country Airlines; Kyle O`Neal, Southwest Airlines; Jana Webster, Executive Director, Airport Foundation; Shari Paul, Medtronic; Gina Mitchell, FAA ADO; Nancy Nistler, FAA ADO; Melissa Jenny, FAA; Mark Johnson, FAA; Brian Peterson, Transportation Security Administration (TSA); Augustine Moore, Customs and Border Protection (CBP); Glen Markegard, City of Bloomington; Cheryl Jacobson, City of Mendota Heights; Kevin Gallatin, City of St. Paul; Dan O'Leary, City of Sunfish Lake; Bill Goins, Global Wellness Connects; Dan O'Neill, Bloomington Convention and Visitor's Bureau; Rylan Juran, MnDOT Aero; Connie Kozlak, Consultant for Met Council; Joe Widing, Met Council; Cheng Lor, Aero Service Group; Beth Helle, Explore Minnesota; Andrew Palmer, Travelers with Disabilities Advisory Committee; Cindy Dupont, Visit Saint Paul; Hal Gray, FedEx; Melissa Hill, City of Minneapolis; David Borgert, Regional Economic Development; Sarah Alig, City of Eagan; Kali Judd, Greater MSP.

MAC Staff: Eric Gilles, Airport Planner, Abby Kes, Event Coordinator; Dana Nelson, Director of Stakeholder Engagement; Naomi Pesky, Vice President – Strategy and Stakeholder Engagement; Brian Peters, Director – Air Service Development; Allison Winters, Assistant Director Strategic Communications; Bridget Rief, Vice President – Planning and Development; Michele Ross, Manager of Community Relations; Jack Egan, Assistant Manager of Community Relations; Brian Ryks, Executive Director/CEO; Roy Fuhrmann, Chief Operating Officer; Kalae Verdeja, Administrative Specialist; Jennifer Lewis, Community Relations Coordinator; Jeff Lea, Manager Strategic Communications.

Others: Greg Albjerg; HNTB; Andrew Blaisdell, HNTB; Bill Schmitz, Kimley-Horn; Larry Hilton, Ricondo; Cole Hiniker, Met Council.

1) Welcome Remarks

Brian Ryks, Executive Director/CEO of the Metropolitan Airports Commission (MAC), welcomed everyone to the sixth meeting of the Minneapolis-St. Paul (MSP) Stakeholder Advisory Panel. He reviewed the MSP Long-Term Plan (LTP) goals, process and engagement program. Mr. Ryks introduced **Dana Nelson, MAC Director of Stakeholder Engagement.**

2) LTP Purpose, Goals and Timeline

Ms. Nelson reviewed the meeting objectives and the agenda. She introduced **Eric Gilles, MAC Senior Airport Planner.**

3) MSP Airport Planning Process Update

Mr. Gilles reviewed the purpose of the Long-Term Plan (LTP). He also reviewed the three overarching goals:

(1) Plan for future facilities that will meet projected passenger activity levels in a manner that maintains and enhances customer service, while facilitating a seamless experience.
(2) Produce a development plan that positions the MAC to meet future demand levels, enhance financial strength, leverage environmental stewardship and infuse sustainable thinking from both an environmental and financial perspective.
(3) Conduct the planning process in a manner that includes meaningful stakeholder engagement.

He also reviewed the Long-Term Planning Process which includes these six steps:

(1) Inventor Baseline Conditions, which have been completed.
(2) Developing Forecasts
(3) Facility requirements, which have been completed.
(4) Alternatives Analysis, which has been completed.
(5) Recommended development and Phasing, which is in progress.
(6) Environmental/Land Use Considerations, which is in progress.

Mr. Gilles noted that MAC is at the Proposed Development and Environmental Considerations steps in the process today. He also reviewed the LTP Timeline and Stakeholder Engagement process.

Mr. Gilles gave an overview of the Preferred Alternative. He explained that the facility improvements could fall into three categories: Terminals, Airside and Landside. He reviewed a list of potential projects.

Mr. Gilles responded to an inquiry clarifying the LTP is a high-level view of the future and that once approved, the plan starts being broken down into more detailed design and timeline-based projects.

Bill Goins, Global Wellness Connects – thanked the MAC and everyone involved with keeping MSP open and safe during the challenging weather this winter season. He mentioned commerce and how much freight is being driven by trucks outside of the twin cities. Mr. Goins also asked if there are there any alternatives to entice more commerce-based airlines. **Mr. Gilles** mentioned there are discussions taking place on how that growth can be facilitated at MSP.

Dan O'Leary, Sunfish Lake, mentioned getting in and out of the airport being a challenge to users of the airport. **Mr. Gilles** acknowledged that it has been an ongoing issue at MSP.

Kevin Gallatin, City of St. Paul, asked if the proposed alternative of a sterile connection between Terminal 1 (T1) and Terminal 2 (T2) would have a people mover. **Mr. Gilles** expanded on the project and noted that there are a number of options available that would need to be reviewed in more detail.

Andrew Palmberg, Travelers with Disabilities Advisory Committee, inquired if there are any plans to improve accessibility to the end of Concourse G if it gets built for people with mobility issues or senior citizens to walk while not needing to rely on cars or airport service operators. **Mr. Gilles** did note that there are numerous discussions taking place in the planning process.

Cheng Lor, Aero Service Group, commended the staff for including the connection between terminals in the Preferred Alternative.

Gary Berndt, Sun Country Airlines, asked for more information regarding T1's net loss of seven gates. **Mr. Gilles** explained that the gates would be lost during the deconstruction of Concourse B and reconstruction of Concourse A to allow for larger aircraft. Passenger numbers may be offset by having larger aircraft that carry more passengers rather than a number of smaller aircraft that carry fewer passengers. **Mr. Gilles** also expanded that the newer aircraft are quieter, more fuel efficient and carry more passengers than current aircraft.

Mr. Goins inquired about fuel alternatives. **Mr. Ryks** commented that discussions have been taking place with Delta Air Lines and Greater MSP regarding Sustainable Aviation Fuel at MSP.

Kyle O'Neal, Southwest, clarified a question about the new gates at Terminal 1. He also thanked the group for their participation.

2) LTP Aircraft Noise Analysis

Dana Nelson, MAC Director of Stakeholder Engagement, introduced the Long-Term Plan (LTP) Aircraft Noise Analysis. She explained that the 2018 Annual Noise Contour was selected as the base year for this analysis. The contour was completed at the time of the

LTP kick-off, it is consistent with LTP activity forecasts, reflects pre-pandemic activity and the activity leading up to 2018 was relatively stable.

Ms. Nelson noted that aviation activity forecasts were developed at the beginning of this planning process. The forecasts go out to the planning horizon of 2040. She explained three 2040 forecast scenarios: Baseline – expected outcome, High – Optimistic socioeconomic drivers, and Low – conservative financial planning forecast.

Ms. Nelson presented and discussed a comparison of the 2018 Base Year noise contour and 2040 Baseline Forecast. She reviewed the total, nighttime and stage 5 operations. Stage 5 noise certification is defined as a noise level is 17 dB in effective perceived noise level from stage 3. All newly manufactured jets are required to meet Stage 5 certification.

An update in aircraft types was reviewed. This included aircraft that were anticipated to increase operations at Minneapolis-St. Paul International Airport (MSP) based on airline input, aircraft orders and deliveries. As an example, Delta Air Lines ordered the Airbus A220s, and placed more orders for a total of 119 new A220 aircraft.

3) Panel Discussion

Ms. Nelson opened the discussion up to the attendees to ask questions or voice concerns and ideas regarding the preferred alternative.

There were a number of inquiries regarding parking at both terminals, transportation network companies, and the future plans for cargo at MSP.

4) Next Steps

Mr. Gilles reviewed the next steps in the process which include:
Long-Term Plan Steps are Airfield simulation, developing prioritization and project costs, and writing of the LTP plan report. Stakeholder Engagement Steps which are informational updates to MetCouncil committees and sub-committees. Then publishing a draft report for public comment , reviewing public comments and finalizing the plan to send to MetCouncil for review.

5) Comments and Announcements

Mr. Gilles thanked everyone for their participation and appreciated the extensive discussion and feedback to date.

Mr. Ryks also thanked everyone for their contributions, both in the room and virtually, noting that the comments have helped us to reach the point where we are in the plan and ensure we are as environmentally responsible as possible. He recognized Bridget Rief, Vice President of Planning and Development, and her staff. He also recognized Naomi Pesky, Vice President of Strategy and Stakeholder Engagement, and her staff. Lastly, he recognized

Ms. Nelson, Michele Ross, Manager of Community Relations, and their staff. He also thanked the consultancy teams for their hard work.

Ms. Nelson thanked the panel members for their participation and dedication to helping move this plan along. She also mentioned that questions and feedback are encouraged.

Questions or Comments about the MSP Long-Term Plan can be sent:
MSPAirportLongTermPlan@mspmac.org

Respectfully Submitted,
Kalae Verdeja, Recording Secretary

MSP Airport Long-Term Plan Survey #1

SURVEY BACKGROUND

A survey was created and distributed to the public using the website platform, Polco. Polco is an online polling software intended to reach an audience wider than typical public meeting audiences. Responses allow for purposeful information offering greater value for ongoing planning considerations well beyond complaint-based feedback.

The first round of questions was positioned to:

- Gather general information from respondents about their travel habits
- Generate positive airport attributes
- Find improvement ideas
- Discover innovative opportunities

DATA COLLECTION

The survey was open for three weeks beginning on July 22, 2019 and was distributed through the following channels:

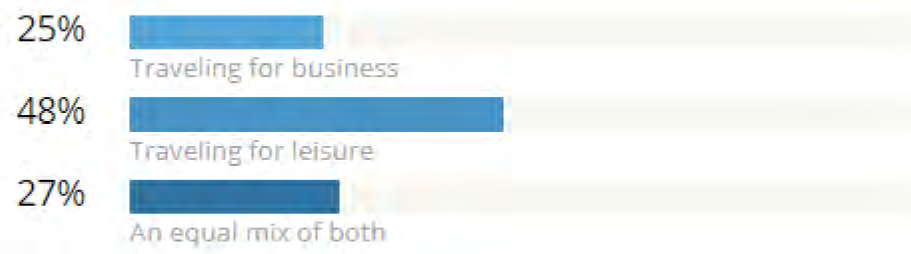
- MSP Facebook and Twitter post
- MAC News newsletters
- MSP News newsletter
- Airport WiFi Landing Page
- Long-Term Plan project website

The survey was closed on August 13, 2019. A total of 269 people participated. The survey results were collected and summarized in this document. Results will be considered in the development of the MSP Long-Term Plan.

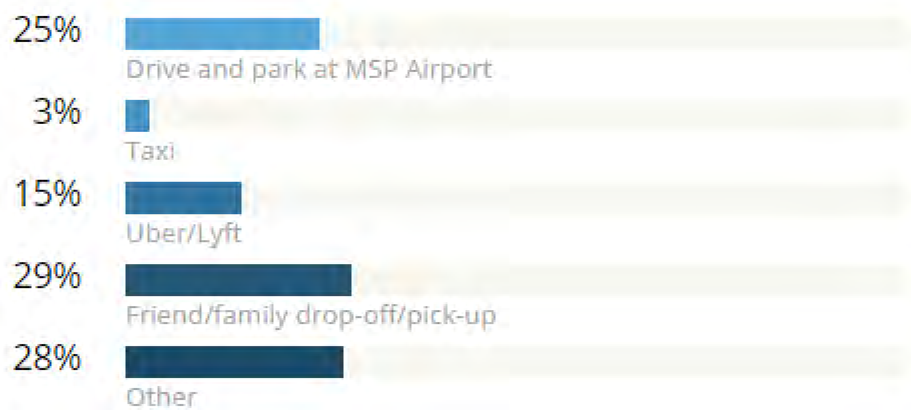
RESULTS

Question 1 **How often do you fly into/out of/through MSP Airport?**

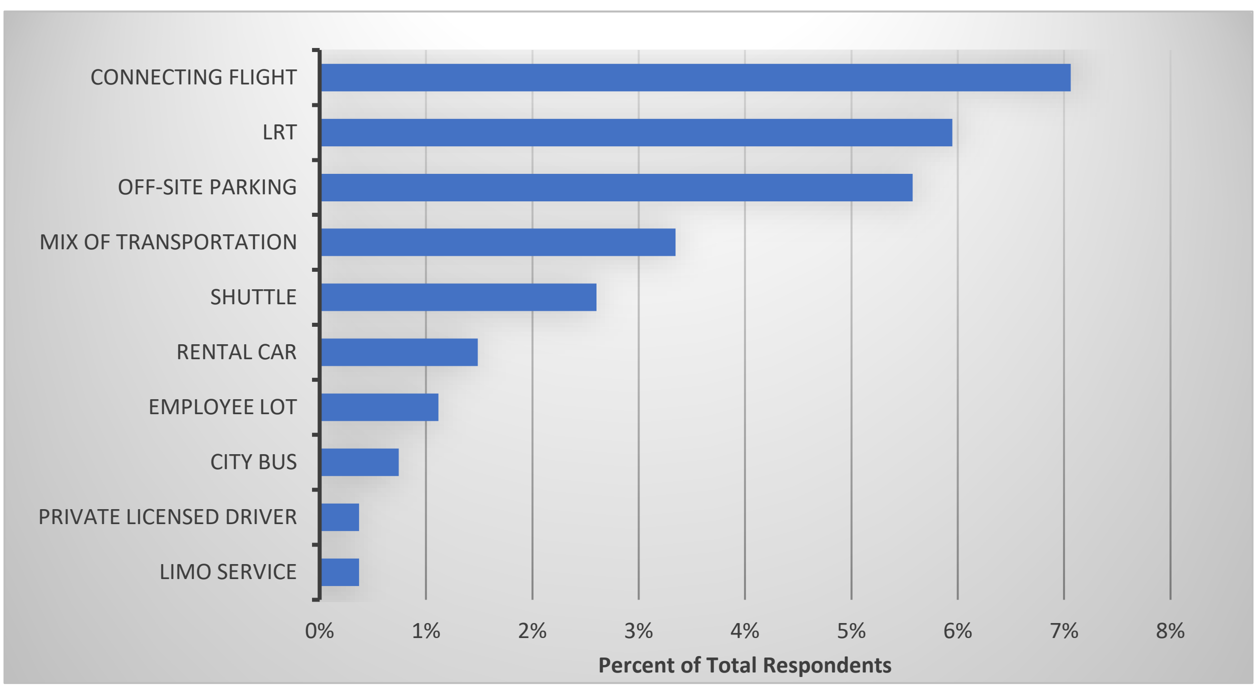
Question 2 **How would you typically classify your travel?**



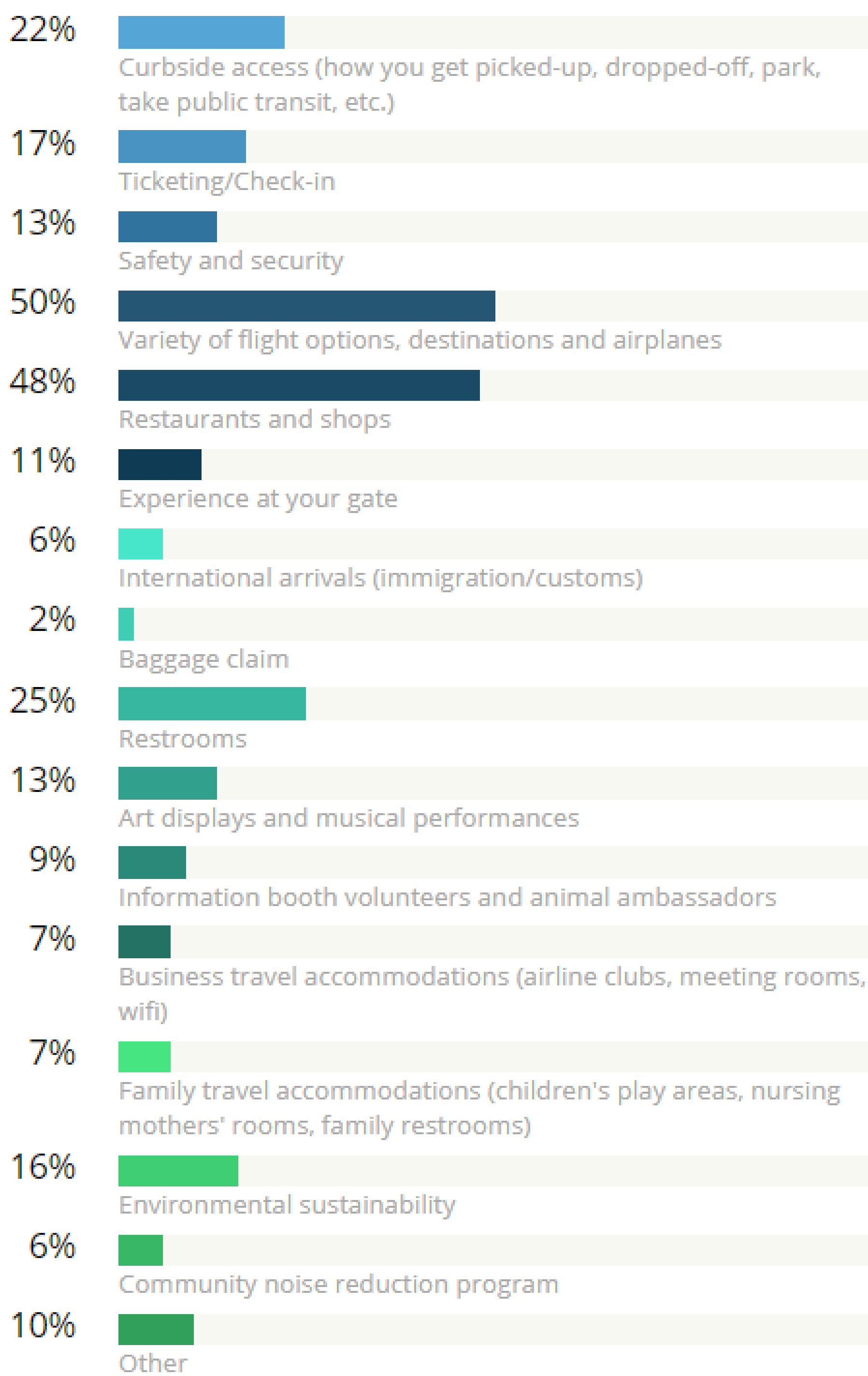
Question 3 **How would do you typically get to and from MSP airport?**



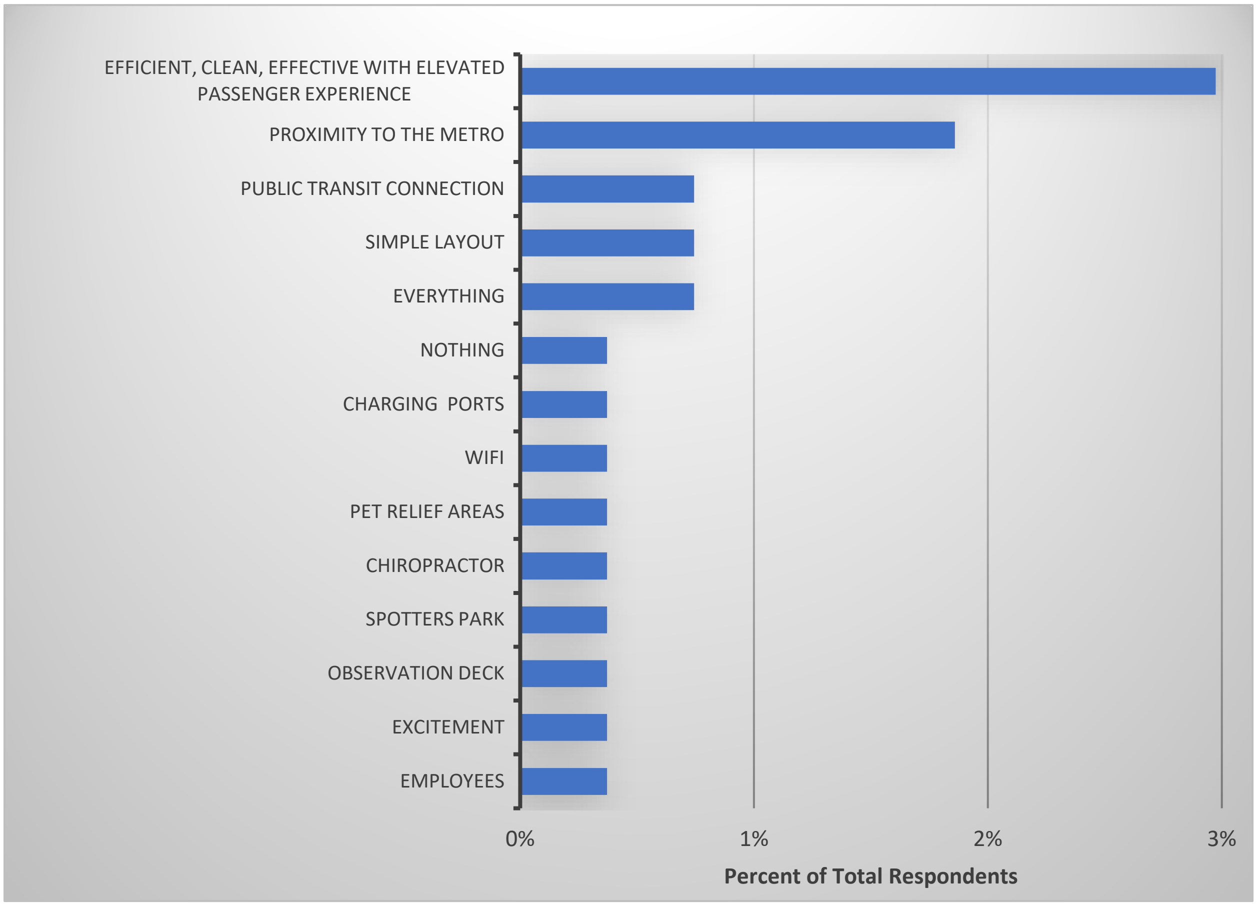
Question 4 **If you selected 'Other' above, please explain:**



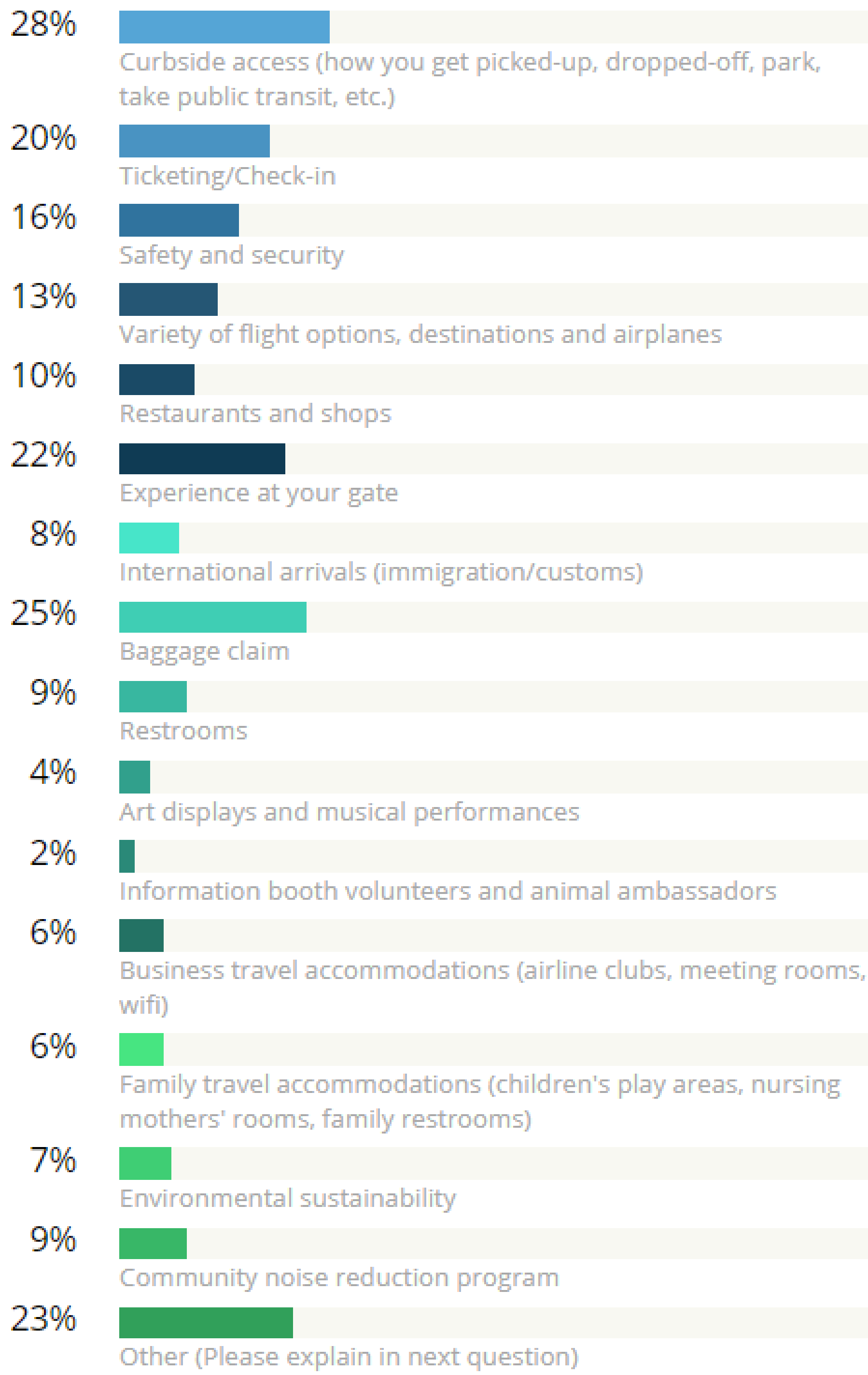
Question 5 **What do you appreicate most about MSP airport? (Select 3)**



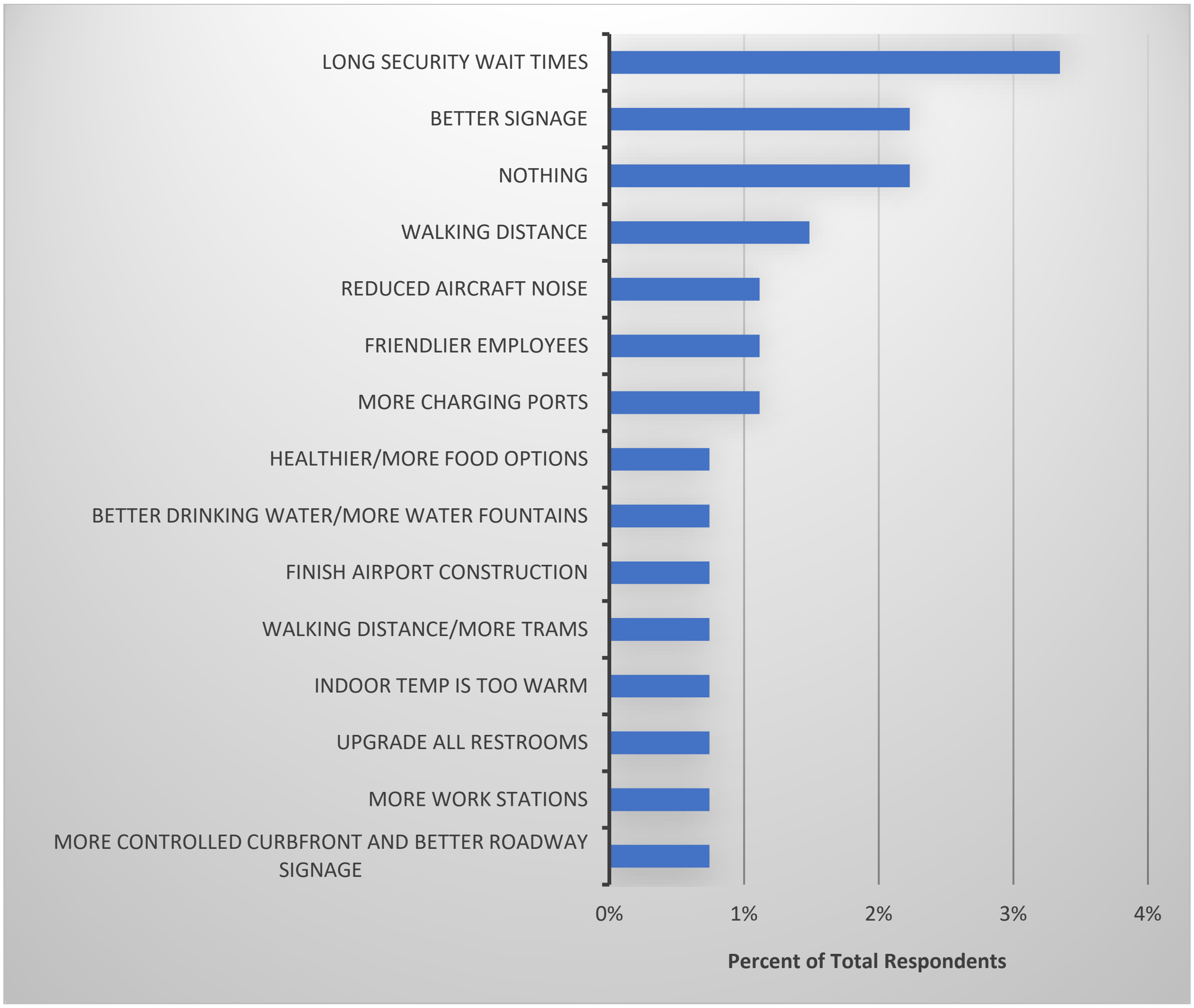
Question 6 **If you selected 'Other' above, please explain:**



Question 7 **What areas of MSP airport could be improved upon? (Select 3)**



Question 8 **If you selected 'Other' above, please explain:**

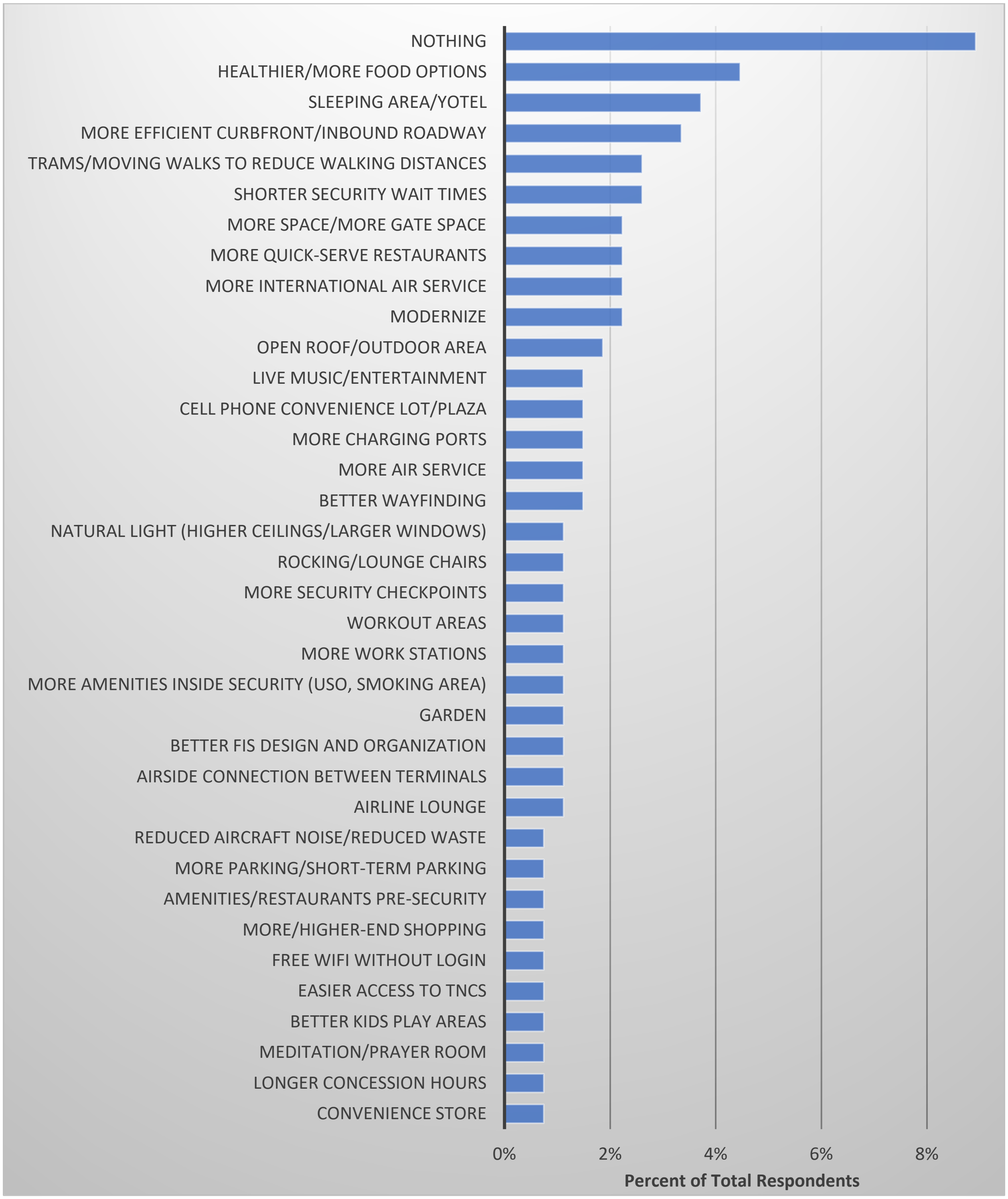


**Due to the variety of responses, this chart shows ideas with greater than one response. The following list includes the ideas mentioned one time (each item listed accounts for 0.4% of total survey respondents).*

Question #8 single-response ideas

- Checkpoint 10 staffing and availability on website
- Cleanliness in gates
- Greeters from curb to gate
- Hand wipes
- Inaccurate announcements on the Tram
- Mobile Pass upgrades
- More air service to East Asia and Dubai
- More iPads at the gates
- More nursing mothers rooms and signage
- More womens restrooms
- Non-secured area concessions
- Pick up area for offsite parking
- Road construction near airport
- Small gatehold areas
- Eliminate iPads at resteraunts
- Curbfront congestion
- Need more T2 amenities and resteraunts
- Expand art and culture program
- Need T2 bus access
- Restrooms at the Aircraft Viewing Area
- Free WiFi
- Bicycle access
- Quieter and cleaner Quiety Seating Area
- Smoking area post-security
- Cleaner restrooms
- Everything
- Easier layout

Question 9 **What is missing at MSP Airport that other airports have?* (free form text)**



**Due to the variety of responses, this chart shows ideas with greater than one response. The following list includes the ideas mentioned one time (each item listed accounts for 0.4% of total survey respondents).*

Question #9 single-response ideas

- Activated social media spaces
- Admirals Club
- Aircraft Viewing Area
- Bathroom monitoring/notification to request service
- Better on-time service from the airlines
- Bicycle access and parking at T1
- Cheaper parking
- Checkpoints devoted to TSA PreCheck only
- Cleaner facilities
- Clocks
- Common seating areas
- Community Activities
- Easier layout
- Easy transportation for buses and special call cars
- Free luggage carts
- Friendly employees
- Healthier/more food options at T2
- High speed hand dryers
- Ice cream
- Indoor temp is too warm
- Integration with Air Guard or Northwest museum
- Interactive area highlighting Minnesota
- Larger restrooms
- LED light displays
- Longer parking times for employees
- Louder announcements
- Lower airline fares
- Luggage lockers in restroom
- More accessible elevators
- More fiscally responsible
- More nursing mothers' rooms
- More police presence
- More restrooms
- More ticket kiosks
- Mounted camera of the view out the Observation Deck
- Movie theater/video game entertainment lounges
- New control tower
- New private single-use restrooms
- Post-security access to non-ticketed public
- Public transit from the south metro
- Remote check-in and baggage drop
- Slot Machines
- T2 Clear
- T2 Priority Pass Lounge
- Uniforms for airport employees
- USO at T2
- Welcoming baggage claim area
- Wider concourse walkway

CONCLUSIONS

The survey resulted in constructive feedback and provides the Stakeholder Advisory Panel and MAC planning team ideas to evaluate for the MSP Long-Term Plan.

The MAC planning team will continue using Polco to invite stakeholder groups to provide feedback. The next survey will be focused on obtaining feedback from the communities and residents surrounding the MSP Airport. The Long-Term Plan will reflect themes identified in Polco surveys to the extent practical.

MSP Airport Long-Term Plan Survey #2

SURVEY BACKGROUND

A survey was created and distributed to the public using the website platform, Polco. Polco is an online polling software intended to reach an audience wider than typical public meeting audiences. Responses allow for purposeful information offering greater value for ongoing planning considerations well beyond complaint-based feedback.

The second round of questions was positioned to:

- Gain a greater understanding of traveler and community attitudes, perceptions and airport issues
- Educate public on several interesting airport facts
- Find examples of preferred airports and what makes them stand out to the general public
- Generate specific ideas and suggestions for airport improvements

DATA COLLECTION

The survey was open for four weeks beginning on September 24, 2019 and was distributed through the following channels:

- MSP e-newsletter to over 700 individuals subscribed to the MSP Long-Term Plan topic
- MAC News newsletters
- MSP News newsletter
- Postcard mailing to over 8,000 residents around MSP
- Experience MSP public event
- Emailed to members of the MAC Commission, Stakeholder Advisory Panel, and MSP Noise Oversight Committee members

The survey was closed on October 22, 2019. A total of 456 people participated. The survey results were collected and summarized in this document. Results will be considered in the development of the MSP Long-Term Plan.

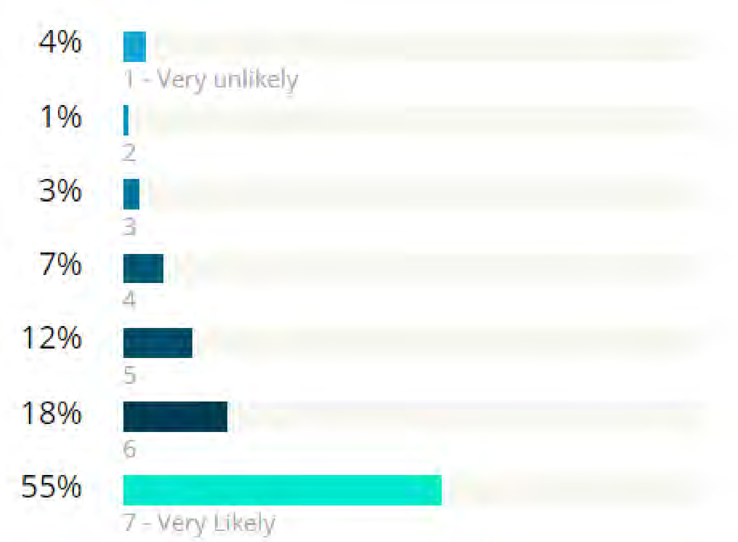
RESULTS

Question 1 **How often do you fly into/out of/through MSP Airport?**

Question 2 Do you work at MSP Airport?

90% No 10% Yes

Question 3 On a scale of one to seven, where one is very unlikely and seven is very likely, how likely are you to recommend using the MSP Airport for travel?



Question 4 What is your favorite airport to fly into or out of and why?

46 % MSP 54% Other Airports

Representative respondent comments favoring MSP:

- *MSP! It is clean, spacious, thoughtfully designed, with great bathrooms, improving restaurants and shops, and quality programs such as art, therapy dogs, the program for special needs kids, and live music. I also appreciate that it is one of the top airports in the world for on-time performance.*

- *MSP is my favorite for several reasons. It is welcoming with the pet ambassadors, music, shops and art displays. Even when I am rushing through on business, it is a pleasant airport. Also it is well organized and clean. Many other airports seem to be in disarray and chaos frequently.*

- *MSP!!! There are plenty of relaxing, spacious places to sit. Food choices are unparalleled. The ART!! OH! LOVE the mosaics!! The local pottery, paintings, sculptures, media, musical talents... all of it! The BEST!!! and it's easy to get from one gate to the other. New addition of an exit from the G to baggage claim...aces... and larger moving walkways. No beeping carts. I love my airport! Great job! (MSP DELTA Flight Attendant)*

Respondents offering other examples of their favorite airports:

Chicago O'Hare - *Multiple restaurant options, great little shops, easy to navigate.*

Amsterdam - *It's extremely efficient and well-organized.*

Zürich - *Clean and modern - elegant in design and extremely functional and well organized. Also home destination.*

Atlanta - *Subways move people quickly for a major hub.*

Incheon in Seoul - *It was like the most efficient shopping mall I've ever been to! So many options to kill time if you have a long layover, etc. Loved it!*

Phoenix Sky Harbor Airport - *It is nicely laid out with easy access to connections/ground transport and the airport itself is close to the city center and visually appealing inside and out with many references to the desert.*

Heathrow Terminal 5 - *All airport terminal should "soar" like this one does. Open, inspirational, it evokes the grand railway stations of Europe. Detroit's new terminal A is beautiful. Again, open, light, truly a pleasant place to be. Vancouver, BC is one of the most beautiful airports I have ever been to. Excellent access to public transportation, Open spaces, it doesn't have the open soaring feel of the others, but, it somehow manages to feel relaxed, uncrowded, comfortable. Sorry but Chicago O'hare. Its brighter and doesn't seem so far from gate to security in coming. Also MSP if we are TSA prechecked because they are so friendly and its small enough to care but big enough to deliver services.*

Amsterdam - *So functional, spacious, clear markings, ease of use, and beautiful.*

New York - JFK - *Great lounges and priority experience.*

So far this is the best to fly out of, but **Kansas City** *is easier to fly into. The hotel shuttles are more clearly marked.*

Chicago airports - *Lots of food and stores open late hours.*

Detroit - *Good services in airport. Excellent transportation within airport.*

Philadelphia - *I love the parking lot for waiting for arrivals -- the "cellphone" lot.*

Singapore Changi - *So many amenities and options! and it's beautiful.*

Detroit - *Love the tunnel w lights/music, and the fountain. MSP for the food and art.*

Dallas-Fort Worth - *Easy to get around.*

Denver International - *Nice layout, interesting exhibits and decor.*

Edinburgh UK - *Has excellent security after a major redesign a few years ago. Don't copy their baggage reclaims though as it is dreadful!*

Denver - *TSA has their act together.*

Stockholm - *Easy in and quick security checks.*

Dallas-Fort Worth - *Their security line processes.*

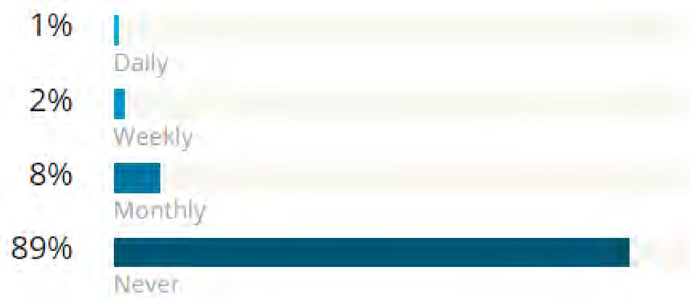
Singapore - *Sleeping areas for all passengers, butterfly garden, and great food options.*

Denver - *Very easy to navigate.*

Atlanta - *The most efficient.*

Dallas-Fort Worth - *Ease of concourse transportation.*

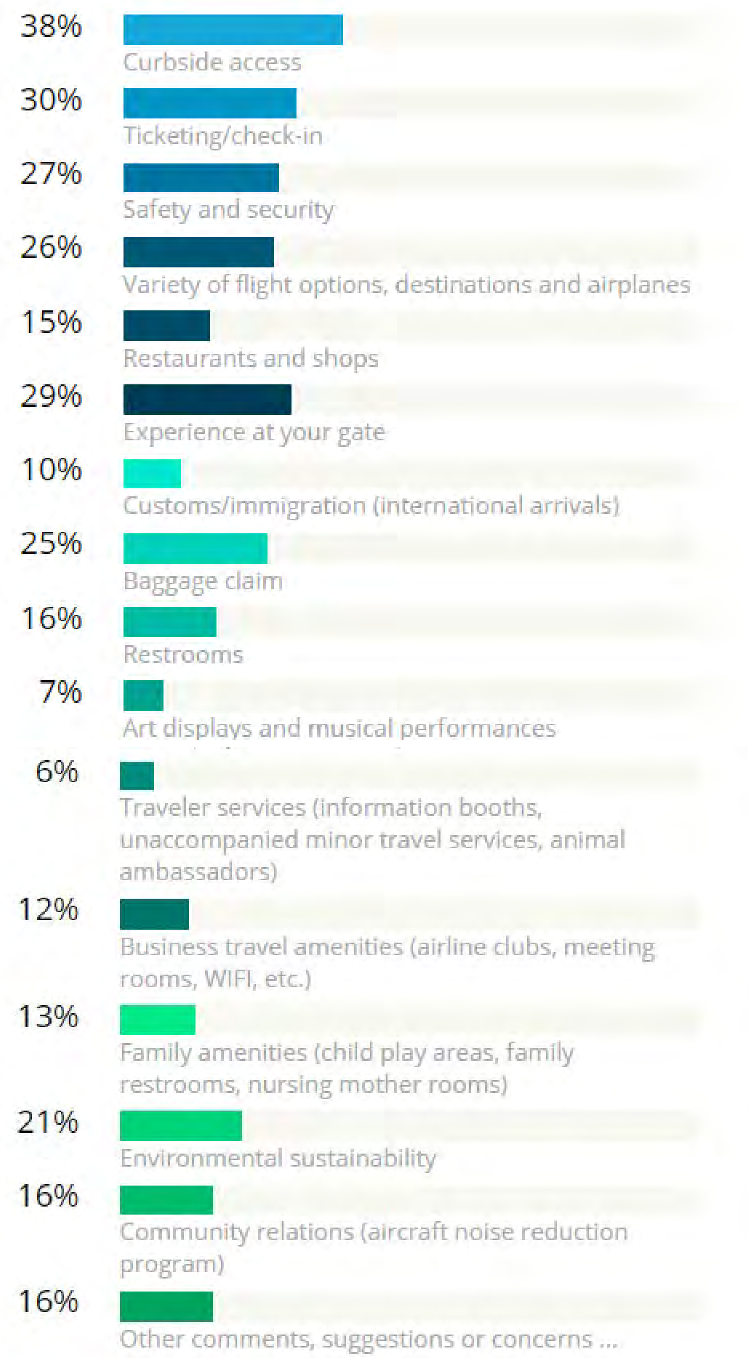
Question 5 **If there was a way to bike directly to Terminal 1 at MSP Airport, how often would you use it?**



Question 6 **How frequently do you use each of the following media sources to stay informed on local news and information?**

	Daily	Weekly	Monthly	Never
Online regional newspapers (such as the StarTribune or Pioneer Press)	29%	20%	18%	33%
Local newspaper delivery	13%	18%	4%	66%
Local TV stations	35%	21%	18%	26%
AM or FM radio	52%	20%	9%	20%
Local news websites/blogs	31%	27%	16%	25%
Facebook	45%	14%	10%	31%
Twitter	24%	11%	10%	55%
Neighborhood or community websites	9%	24%	25%	42%
Talking with neighbors, friends, family, or co-workers	39%	36%	16%	9%
Attending community meetings	1%	5%	30%	65%
Viewing YouTube news channels	8%	8%	13%	70%
Online forums	7%	10%	22%	61%

Question 7 Of the following, what could be improved? Use Question 8 to give details on how you would make improvements. Please be specific on Terminal 1 or Terminal 2.



Question 8 **Please provide your comments for Question 7 in the box below.**

Below are some of the respondents' suggestions on how they might improve MSP:

- *Why not make the entire length of Terminal C on the drive into the airport a drop-off zone with heated, moving walkways to the security checkpoints?*
- *Separate the ticketing / baggage from the terminals like SMF.*
- *I would like to see more self-bag drops.*
- *Reopen the skyway security checkpoint regularly.*
- *Need to have more TSA options for people who have no luggage/baggage with them.*
- *Terminal 1 - skyway checkpoint should be TSAPre + carry on only.*
- *Replace the coffee place on E concourse with Caribou or Starbucks (preferably Caribou).*
- *Food on public side.*
- *Have mini food trucks that travel to high traffic areas at ends of terminals.*
- *Make MSP feel even more like a home.*
- *Club-like seating areas in the main terminal.*
- *More comfortable seating + work stations.*
- *Run the train in a circular fashion to all these gates.*
- *Seating area in bathrooms.*
- *Informational displays on local history/museums/events.*
- *Roving "helpers" to assist with all aspects of checking in, baggage claim etc.*
- *Signage that matches what the agents are saying.*
- *I'd like to see NexTrip countdown signs in more places.*
- *More lounges not just ones attached to airlines.*
- *How about lounges at Heathrow T3 with pod bedrooms?*
- *High-end gaming equipment for playing video games while on a layover.*
- *Expand the therapy dogs program!*
- *T2 needs a club!!*
- *A day pass created for the general public to enjoy restaurants and shopping*
- *A playground or even an indoor swing set with turf would be SO COOL!*
- *More water bottle fill stations and better labeled recycling cans.*
- *Offer discounts or air miles to people who bring their own cutlery or coffee mugs*
- *Stationary bikes available for people to charge their phones*

Question 9 What is your zip code? (This is used to distinguish between twin cities travelers versus outstate travelers)

82% Minnesota (55xxx, 56xxx) 18% Out-State

CONCLUSIONS

The survey resulted in constructive feedback and provides the Stakeholder Advisory Panel and MAC planning team ideas to evaluate for the MSP Long-Term Plan.

The MAC planning team will continue using Polco to invite stakeholder groups to provide feedback. The Long-Term Plan will reflect themes identified in Polco surveys to the extent practical.

YOU'RE INVITED TO

EXPERIENCE

EXPERIENCE msp™

An opportunity to learn more about Minneapolis-St. Paul International Airport and how the Metropolitan Airports Commission is planning for its future.

EXPERIENCE msp™

WHEN: **Wednesday, Oct. 2, 2019** – 4 to 8 p.m. Presentation at 5:30 p.m.

WHERE: Mall of America Executive Center, 410 East Broadway
Bloomington, MN 55425

WHAT: In addition to an introduction to the MSP Airport long-term planning process, learn about **MSP's history**, experience a **"Taste of MSP"** featuring airport restaurants, and join in on **kids' aviation-themed activities.**

Sign up to receive updates about future events and about the planning process by visiting: **mspairport.com/long-term-plan.**

PARKING AND DIRECTIONS TO EXECUTIVE CENTER:

- Enter EAST PARKING RAMP, accessible from 24th Avenue South.
- Park on the 5th level, P5 New York.
- Go up the ½ flight of stairs, walk through the skyway and enter into the mall.
- Proceed straight, toward the elevators, then turn right down the hall.
- At the end of the hall you see well-lit wooden doors for the Mall of America Executive Center.

Minneapolis Saint Paul INTERNATIONAL AIRPORT msp™

MINNEAPOLIS SAINT PAUL METROPOLITAN AIRPORTS COMMISSION MAC

CAN'T MAKE THE EVENT?
Take our survey at https://polco.us/mac

EXPERIENCE MSP is a series of four events for the public to learn about the MSP Airport long term planning process and to provide input into that process. The Metropolitan Airports Commission welcomes your interest and input throughout.

AFFIDAVIT OF PUBLICATION

STATE OF MINNESOTA

COUNTY OF RAMSEY

PUBLIC NOTICE
EXPERIENCE MSP
PUBLIC EVENT

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Wednesday, October 2, 2019, 4:00 to 8:00 PM
Presentation beginning at 5:30 PM

Mall of America Executive Center, 410 East Broadway
Bloomington, MN 55425

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Can't make the event? Take our survey at https://poloc.us/mac

Kathleen Bartholomay,
being duly sworn on oath, says: that she is, and during all times herein states has been, Clerk of Northwest Publications, Inc., Publisher of the newspaper known as the Saint Paul Pioneer Press, a newspaper of general circulation within the Counties of Chisago, Dakota, Ramsey and Washington in Minnesota and Pierce and St. Croix in Wisconsin.

That the notice hereto attached was from the columns of said newspaper and was printed and published therein on the following date(s):

25th of August, 2019
Newspaper Ref./Ad #71441551

Kathleen Bartholomay

Subscribed and sworn to before me this 1st of October, 2019

Barbara L. Regal

Barbara Lynn Regal

NOTARY PUBLIC

Ramsey County, Minnesota

My commission expires January 31, 2022

BARBARA LYNN REGAL
Notary Public-Minnesota
My Commission Expires Jan 31, 2022

AFFIDAVIT OF PUBLICATION

STATE OF MINNESOTA)
COUNTY OF HENNEPIN)

StarTribune

650 3rd Ave. S, Suite 1300 | Mineapolis, MN | 55488

Terri Swanson, being first duly sworn, on oath states as follows:

1. (S)He is and during all times herein stated has been an employee of the Star Tribune Media Company LLC, a Delaware limited liability company with offices at 650 Third Ave. S., Suite 1300, Minneapolis, Minnesota 55488, or the publisher's designated agent. I have personal knowledge of the facts stated in this Affidavit, which is made pursuant to Minnesota Statutes §331A.07.

2. The newspaper has complied with all of the requirements to constitute a qualified newspaper under Minnesota law, including those requirements found in Minnesota Statutes §331A.02.

3. The dates of the month and the year and day of the week upon which the public notice attached/copied below was published in the newspaper are as follows:

Dates of Publication		Advertiser	Account #	Order #
StarTribune	09/25/2019	METROPOLITAN AIRPORTS COMMIS	1000018584	327991

4. The publisher's lowest classified rate paid by commercial users for comparable space, as determined pursuant to § 331A.06, is as follows: **$285.60**

5. Mortgage Foreclosure Notices. Pursuant to Minnesota Statutes §580.033 relating to the publication of mortgage foreclosure notices: The newspaper's known office of issue is located in Hennepin County. The newspaper complies with the conditions described in §580.033, subd. 1, clause (1) or (2). If the newspaper's known office of issue is located in a county adjoining the county where the mortgaged premises or some part of the mortgaged premises described in the notice are located, a substantial portion of the newspaper's circulation is in the latter county.

FURTHER YOUR AFFIANT SAITH NOT.

Terri Swanson

Subscribed and sworn to before me on: 09/25/2019

Jalene K Howard

JALENE K. HOWARD
NOTARY PUBLIC - MINNESOTA
My Commission Expires Jan. 31, 2020

Notary Public

StarTribune
Wednesday, September 25, 2019

Ad Number: 0000327991-01
Insertion Number: N/A
Size: 1 Col x 4.44 in
Color Type: 0
Advertiser: Metropolitan Airport Commission
Agency: N/A
Section-Page-Zone(s): K-1-All
Description: PUBLIC NOTICE EXPERIENCE MSP PUBL...

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Legal Notices

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Can't make the event? Take our survey at https://poloc.us/mac

Certificates of Assumed Name

CERTIFICATE of Assumed Name, State of Minnesota, Pursuant to Chapter 333 Minnesota Statutes: the undersigned, who is or will be conducting business in the State of Minnesota under an assumed name, hereby certifies:
1. State the exact assumed name under which the business is or will be conducted: Excel AV Group
2. State the address of the principal place of business.
2750 Niagara Lane N Plymouth MN 55447 United States
3. List the name and complete street address of all persons conducting business under the above Assumed Name.
Aufderworld Corporation
2750 Niagara Lane N Plymouth MN 55447 United States
4. I certify that I am authorized to sign this certificate and I further certify that I understand that by signing this certificate, I am subject to the penalties of perjury as set forth in Minnesota Statutes section 609.48 as if I had signed this certificate under oath.
Dated: 9/23/19
(Signed) Cynthia A Schelske

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StarTribune

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Proposals for Bids

Attention TGB/VET/
Subcontractors and Suppliers

Ames Construction is soliciting quotes from qualified vendors for the following project: MNDOT - I-94 Maple Grove to Rogers Design--Build Project S.P. 2780-97
TGB Goal: 8% VET Goal 3.3%.The directory of certified vendors can be found at
http://www.mmd.admin.state.mn.us/mn02001.htm.
Subcontractor quotes due to Ames no later than 11:00 AM on October 4, 2019. Proposals shall be emailed to bidinfo@amesco.com or faxed to 952-435-0913. Bid closes October 9, 2019 @ 9:30 AM. You can access project information on MNDOTS website at:
ftp://ftp2.dot.state.mn.us/pub/outbound/DesignBuild/I94_Maple_Grove/
Type of Work includes but not limited to: Excavation, Aggregates, Trucking, Asphalt Paving, Concrete Paving, Noise Wall, Erosion Control, Geotextiles, Utilities, ITS, Lighting, Signals, Guardrails, Signage, Removals, Pavement Markings, Curb & Gutter, Traffic Control and Electrical. When submitting your quotes please indicate whether items are tied or not tied. Also include your bonding rate in your quote. For information regarding specific jobs and any assistance you may need, please contact our office.
Ames Construction, Inc.
2000 Ames Drive, Burnsville, MN 55306. Phone: 952-435-7106
Fax: 952-435-0913 or
email: bidinfo@amesco.com.

Garage Sales - NW, SW & W Suburbs

EXCELSIOR UNITED METHODIST CHURCH FALL RUMMAGE SALE
Sept 26-28. Preview night Thurs. $3 adm, 4-8 pm; Fri. 3-7 pm; Sat. 9-noon - $4 bag sale/half price. **BARGAIN PRICES!** 881 Third Ave., Excelsior.
www.excelsiorumc.org

Rummage Sales - Odds 'n Ends

MPLS FALL SALE - EPWORTH UNITED METHODIST CHURCH 3207 37th Ave
Sept 27 & 28, 9-3pm

140 Therapeutic Massage

60 minute massage with hot stones $59 per hour; $85 for 90 minutes. Thai Massage Crystal, MN 763-208-3897

317 Estate Sales

ST. LOUIS PARK. 9312 Minnetonka Blvd. 9/25-28. (9-6). Furn, Toys, Tools, Misc.

324 Collectibles

Buying: old toys, Tonkas, Hot Whls, die cast, action figs, G.I. Joe, sports cards, records & more! 612.559.0666

WE BUY IT ALL! We need diamonds! Paying Cash - not check. BBB A+ rating. WCCO TVs #1 Appraiser/Gemologist. House/Bank calls within 90 miles TC. Silver coins/flatwr, gold, dental gold, estate jewelry, QVC/costume, diamonds, comics, baseball cards, militaria, much more. Call for free advice. 41 yrs in biz. Mark 612-802-9686

395 Misc. For Sale & Wanted

WANTED FREON R12. We pay CA$H.
R12 R500 R11. Convenient. Certified professionals. 312-291-9169
www.refrigerantfinders.com/ad

403 Cats

Bengal Kittens 1 M and 3 F. Purebred w/o papers. Located in Central MN $500 218-371-6282

404 Dogs

AUSSIE SHEPHERD AKC MINI PUPS Merles, Tri-Color & Brown, 10 wks Call: 612-325-2360 or 612-802-5283

Bernedoodle F1b Standard Bernedoodle girls. Born 6/6. 1st vaccinations. $200. 763-670-1397

BERNEDOODLE MINI PUPS $1800-$2500. Hypoallergenic. Ready 9/20. 1 older dog **karisdoodles.com** 651-214-1286

BERNEDOODLE PUPS
Bernese Mountain dog x Poodle
www.BouncingBernedoodles.com
507-251-1909

Bernedoodles
Details @ RidgeviewKennels.com
Ridgeviewpuppies@gmail.com

Border Collie Reg. Vacc, dewormed. Best Friend, $600. Will meet. Call after 4pm 715-257-7215

BOXER Brindle Boys (4) Parents are health tested AKC CH. Vaccinated & microchipped. 612-749-0070

Cavalier/Cocker Spaniel Six gorgeous Cockalier puppies for sale, Beautiful mom & dad. Born and cared for with our family. Five males one female. Ready the week of October 1. All shots, worming and vet checked. Started potty training. References available. raised right! Will hold with deposit. 320-630-7574

ENGLISH FIELD SPRINGER SPANIEL Pups, AKC, OFA approved, liver & white, exc hunting & field trial background. M/F $2000. 218-348-4394

GERMAN SHEPHERD PUPS
AKC. Exc temp. Genetic guar antee. 715-537-5413. **www.jerland.com**

404 Dogs

Goldendoodles Mini and standard f1b goldendoodles available. Call/text 7157030180 visit website www.morethangoldenpups.com

Goldendoodles F1b Beautiful phantoms, brindles and whites. Health tested parents. Ready mid October, located in Duluth man. $1,200. 218-393-5804

GOLDEN RETRIEVERS AKC, dews removed, shots, dewormed. F and M $900. 612-383-7103

Gordon Setter male puppies 8 weeks old. Bred for beauty and birds. European and Am field bloodlines. $800 218-776-2155

HAVANESE AKC Chocolate, 8 wks, vet checked, shots, dews, family raised. Ready now! 218-689-4002

LAB AKC BLACK EXCELLENT BLOODLINES, FIELD & HUNTING, 2M/3F, $350, BORN 7/19. KATIE 952-388-9752

LAB AKC CHOCOLATE shots,-wormed, dews, ready NOW. M $600, F $650, parents onsite. 218-391-9627

LAB BLACK AKC PUPS born 8/4/2019 4 F, 3 M. dew claws , dewormed, shots UTD, vet check. will meet for del. $500 Call or text 507-530-7268

Lab Pointing Pups AKC red, blk, yellow, microchip, vet ck, shots, dews, wrmd, guar. $300-$600. 320-424-0596

LABRADOR PUPS AKC registered, vet checked, shots, dewormed. M/F $300-$400. 612-418-2779

Labrador Retriever AKC Champ FOX RED pups Pedigrees have multiple GMPR's & MH's. Health Guarantee READY FOR THEIR NEW FAMILIES $950. for more info call: 507-696-3450

LABS AKC Fox red & choc F $750; blk M $450, F $500; Shots, dews, wormed, vet chkd, champ lines. 80% house trained/rsd 320-200-8089

Lab, White Puppies. AKC Avail Oct. $800. Moose Lake, MN. 218-269-1444 for info and pics

Mastiff/Daniff 3/4 Mastiff, 1/4 Great Dane. Fam raised, current on shots and worming, $700. 507-360-3043

Pitpull Pups, white/mostly white. 7.5 wks, 4M, 5F. $200-$250 Please Call: 612-226-1095

Poodle, Standard Pups AKC Phantom males. Raised w/kids. $1500. UTD vaccs, microchp'd. 608-495-1324

Rottweiler Puppies Purebred . Tails docked, dew claws removed. Born 7/13 $600 715-245-6246

Schnauzer, Miniature 5-14wk Blk/Sil full vetted home raised & potty trained. Socialized w/ kids.Purebred very luvd! Plz call 507-370-5400

Sheepadoodles We have mini and standard sheepadoodles available. Call/text 715-703-0180 visit website www.morethangoldenpup.com

SHIHPOO, COCKAPOO, HAVAPOO, CAVAPOO
puppiesupnorth.com 320-250-2464

404 Dogs

Shorkie F, 6 mos., spayed, utd shots, 4#,potty pad & outside trained. Loves everyone! $850 612-840-7054

EQUAL HOUSING OPPORTUNITY

All rental advertising in the Star Tribune is subject to the laws which make it illegal to advertise "any preference, limitation or discrimination based on race, color, national origin, ancestry, religion, creed, sex, marital status, sexual orientation, handicap, disability, familial status or status regarding public assistance or an intention to make any such preference, limitation or discrimination".
The Star Tribune will not knowingly accept any advertisements which are in violation of the law. All dwellings advertised in the Star Tribune publications are available on an equal opportunity basis.

Resources:
Mpls. Civil Rights 612-673-3012
MN Human Rights 651-296-5663
Rental Home Line 612-728-5767
HUD 1-800-669-9777

AUTO AUCTIONS & EVENTS

***** STATE PATROL *****
SEIZED VEHICLE AUCTION
GREAT VALUES TO BE HAD
60+ CARS, TRUCKS, MOTORCYCLES
'17 KIA FORTE, '08 HONDA ACCORD, '10 DODGE AVENGER, '79 BEETLE CONVERTIBLE, '13 CHEVY CAMARO, '12 HYUNDAI VELOSTER , '09 FORD EXPEDITION, '07 CHEV COBALT
BUY WAY BELOW LIST
SATURDAY, SEPT 28 2019
VIEW AT 9 AM;
AUCTION BEGINS AT 11 AM
Held at: Jeff, Bobby & Steve's
3701 Central Ave NE
Call For Complete List
763-788-1113 or
bobbyandstevesautoworld.com
Mark Rime, Auctioneer
#0275 Anoka, MN

VEHICLES WANTED

$$$$$ CASH FOR CARS $$$$$
Repairables or Junkers 612.414.4924

$150 to $800 for most junkers
and repairables. 612-781-1804

Your move. Your ad.

Mortgage Foreclosures

NOTICE OF MORTGAGE FORECLOSURE SALE
THE RIGHT TO VERIFICATION OF THE DEBT AND IDENTITY OF THE ORIGINAL CREDITOR WITHIN THE TIME PROVIDED BY LAW IS NOT AFFECTED BY THIS ACTION.
NOTICE IS HEREBY GIVEN, that default has occurred in the conditions of the following described mortgage:
Mortgagor: Eric B Hershey, a single man
Mortgagee: Mortgage Electronic Registration Systems, Inc. as nominee for Franklin American Mortgage Company, a Tennessee corporation
Dated: 12/18/2017
Recorded: 01/09/2018
Scott County Recorder Document No. A1040293
Assigned To: Citizens Bank, N.A.
Dated: 11/17/2018
Recorded: 11/20/2018
Scott County Recorder Document No. A1057637
Transaction Agent: Mortgage Electronic Registration Systems, Inc.
Transaction Agent Mortgage Identification Number: 100052211022540288
Lender or Broker: Franklin American Mortgage Company, a Tennessee corporation
Residential Mortgage Servicer: Cenlar FSB
Mortgage Originator: Franklin American Mortgage Company, a Tennessee corporation
LEGAL DESCRIPTION OF PROPERTY: Lot 19 except the North 5 feet thereof, the North 1/2 of Lot 20 and the North 10 feet of the South 1/2 of Lot 20 all in Block 50, Borough of Belle Plaine, Scott County, Minnesota
This is Abstract Property.
TAX PARCEL NO.: 200011350
ADDRESS OF PROPERTY:
122 Eagle St S
Belle Plaine, MN 56011
COUNTY IN WHICH PROPERTY IS LOCATED: Scott
ORIGINAL PRINCIPAL AMOUNT OF MORTGAGE: $241,414.00
AMOUNT DUE AND CLAIMED TO BE DUE AS OF DATE OF NOTICE: $255,483.92
That prior to the commencement of this mortgage foreclosure proceeding Mortgagee/Assignee of Mortgagee complied with all notice requirements as required by statute; that no action or proceeding has been instituted at law or otherwise to recover the debt secured by said mortgage, or any part thereof;
PURSUANT to the power of sale contained in said mortgage, the above described property will be sold by the Sheriff of said county as follows:
DATE AND TIME OF SALE: July 11, 2019, 10:00 AM
PLACE OF SALE: Scott County Sheriff's Office, Civil Unit, 301 Fuller Street S., Shakopee, MN to pay the debt then secured by said Mortgage, and taxes, if any, on said premises, and the costs and disbursements, including attorneys' fees allowed by law subject to redemption within 6 Months from the date of said sale by the mortgagor(s), their personal representatives or assigns.
DATE TO VACATE PROPERTY: The date on or before which the mortgagor must vacate the property if the mortgage is not reinstated under Minnesota Statutes section 580.30 or the property redeemed under Minnesota Statutes section 580.23 is January 11, 2020 at 11:59 p.m. If the foregoing date is a Saturday, Sunday or legal holiday, then the date to vacate is the next business day at 11:59 p.m.
MORTGAGOR(S) RELEASED FROM FINANCIAL OBLIGATION ON MORTGAGE: NONE
THE TIME ALLOWED BY LAW FOR REDEMPTION BY THE MORTGAGOR, THE MORTGAGOR'S PERSONAL REPRESENTATIVES OR ASSIGNS, MAY BE REDUCED TO FIVE WEEKS IF A JUDICIAL ORDER IS ENTERED UNDER MINNESOTA STATUTES SECTION 582.032, DETERMINING, AMONG OTHER THINGS, THAT THE MORTGAGED PREMISES ARE IMPROVED WITH A RESIDENTIAL DWELLING OF LESS THAN FIVE UNITS, ARE NOT PROPERTY USED IN AGRICULTURAL PRODUCTION, AND ARE ABANDONED.
Dated: May 28, 2019
Citizens Bank, N.A., Assignee of Mortgagee
By: PFB LAW, PROFESSIONAL ASSOCIATION
Attorneys for:
Citizens Bank, N.A., Assignee of Mortgagee
55 East Fifth Street, Suite 800
St. Paul, MN 55101-1718
651-291-8955
651-228-1753 (fax)
THIS COMMUNICATION IS FROM A DEBT COLLECTOR ATTEMPTING TO COLLECT A DEBT. ANY INFORMATION OBTAINED WILL BE USED FOR THAT PURPOSE.
NOTICE OF POSTPONEMENT OF MORTGAGE FORECLOSURE SALE
NOTICE IS HEREBY GIVEN, that the above Mortgage Foreclosure Sale is hereby postponed to August 15, 2019, at 10:00 AM, Scott County Sheriff's Office, Civil Unit, 301 Fuller Street S., Shakopee, MN in said County and State.
Dated: July 12, 2019
Citizens Bank, N.A., Assignee of Mortgagee
By: PFB Law, Professional Association
Attorneys for: Citizens Bank, N.A., Assignee of Mortgagee
55 East Fifth Street, Suite 800
St. Paul, MN 55101-1718
651-209-7599
NOTICE OF POSTPONEMENT OF MORTGAGE FORECLOSURE SALE
NOTICE IS HEREBY GIVEN, that the above Mortgage Foreclosure Sale is hereby postponed to September 19, 2019, at 10:00 AM, Scott County Sheriff's Office, Civil Unit, 301 Fuller Street S., Shakopee, MN in said County and State.
Dated: August 16, 2019
Citizens Bank, N.A., Assignee of Mortgagee
By: PFB Law, Professional Association
Attorneys for: Citizens Bank, N.A., Assignee of Mortgagee
55 East Fifth Street, Suite 800
St. Paul, MN 55101-1718
651-209-7599
NOTICE OF POSTPONEMENT OF MORTGAGE FORECLOSURE SALE
NOTICE IS HEREBY GIVEN, that the above Mortgage Foreclosure Sale is hereby postponed to November 5, 2019, at 10:00 AM, Scott County Sheriff's Office, Civil Unit, 301 Fuller Street S., Shakopee, MN in said County and State.
Dated: August 28, 2019
Citizens Bank, N.A., Assignee of Mortgagee
By: PFB Law, Professional Association
Attorneys for: Citizens Bank, N.A., Assignee of Mortgagee
55 East Fifth Street, Suite 800
St. Paul, MN 55101-1718
651-209-7599
NOTICE OF POSTPONEMENT OF MORTGAGE FORECLOSURE SALE
NOTICE IS HEREBY GIVEN, that the above Mortgage Foreclosure Sale is hereby postponed to December 5, 2019, at 10:00 AM, Scott County Sheriff's Office, Civil Unit, 301 Fuller Street S., Shakopee, MN in said County and State.
Dated: September 18, 2019
Citizens Bank, N.A., Assignee of Mortgagee
By: PFB Law, Professional Association
Attorneys for: Citizens Bank, N.A., Assignee of Mortgagee
55 East Fifth Street, Suite 800
St. Paul, MN 55101-1718
651-209-7599
14795-18-00384-4
9/25/19 Star Tribune

NOTICE OF MORTGAGE FORECLOSURE SALE
THE RIGHT TO VERIFICATION OF THE DEBT AND IDENTITY OF THE ORIGINAL CREDITOR WITHIN THE TIME PROVIDED BY LAW IS NOT AFFECTED BY THIS ACTION.
NOTICE IS HEREBY GIVEN, that default has occurred in the conditions of the following described mortgage:
Mortgagor: Daniel S. Williams-Goldberg, unmarried
Mortgagee: Mortgage Electronic Registration Systems, Inc. as nominee for American Brokers Conduit
Dated: 05/11/2006
Recorded: 05/24/2006
Ramsey County Recorder Document No. 3950590
Assigned To: Deutsche Bank National Trust Company as Trustee for HSI Asset Loan Obligation Trust 2007-AR1, Mortgage Pass-Through Certificates, Series 2007-AR1
Dated: 12/28/2018
Recorded: 01/10/2019
Ramsey County Recorder Document No. 04742290
Transaction Agent: Mortgage Electronic Registration Systems, Inc.
Transaction Agent Mortgage Identification Number: 100024200012889149
Lender or Broker: American Brokers Conduit
Residential Mortgage Servicer: PHH Mortgage Services
Mortgage Originator: American Brokers Conduit
LEGAL DESCRIPTION OF PROPERTY: Lot 24, Block 3, Bryant's Randolph St. Addition
This is Abstract Property.
TAX PARCEL NO.: 112823310196
ADDRESS OF PROPERTY:
963 Watson Ave
Saint Paul, MN 55102
COUNTY IN WHICH PROPERTY IS LOCATED: Ramsey
ORIGINAL PRINCIPAL AMOUNT OF MORTGAGE: $152,000.00
AMOUNT DUE AND CLAIMED TO BE DUE AS OF DATE OF NOTICE: $148,651.60
That prior to the commencement of this mortgage foreclosure proceeding Mortgagee/Assignee of Mortgagee complied with all notice requirements as required by statute; that no action or proceeding has been instituted at law or otherwise to recover the debt secured by said mortgage, or any part thereof;
PURSUANT to the power of sale contained in said mortgage, the above described property will be sold by the Sheriff of said county as follows:
DATE AND TIME OF SALE: September 18, 2019, 10:00 AM
PLACE OF SALE: Sheriff's Office, Civil Process Unit, 25 W. 4th Street, Suite 150, St. Paul, MN to pay the debt then secured by said Mortgage, and taxes, if any, on said premises, and the costs and disbursements, including attorneys' fees allowed by law subject to redemption within 6 Months from the date of said sale by the mortgagor(s), their personal representatives or assigns.
DATE TO VACATE PROPERTY: The date on or before which the mortgagor must vacate the property if the mortgage is not reinstated under Minnesota Statutes section 580.30 or the property redeemed under Minnesota Statutes section 580.23 is March 18, 2020 at 11:59 p.m. If the foregoing date is a Saturday, Sunday or legal holiday, then the date to vacate is the next business day at 11:59 p.m.
MORTGAGOR(S) RELEASED FROM FINANCIAL OBLIGATION ON MORTGAGE: NONE
THE TIME ALLOWED BY LAW FOR REDEMPTION BY THE MORTGAGOR, THE MORTGAGOR'S PERSONAL REPRESENTATIVES OR ASSIGNS, MAY BE REDUCED TO FIVE WEEKS IF A JUDICIAL ORDER IS ENTERED UNDER MINNESOTA STATUTES SECTION 582.032, DETERMINING, AMONG OTHER THINGS, THAT THE MORTGAGED PREMISES ARE IMPROVED WITH A RESIDENTIAL DWELLING OF LESS THAN FIVE UNITS, ARE NOT PROPERTY USED IN AGRICULTURAL PRODUCTION, AND ARE ABANDONED.
Dated: August 1, 2019
Deutsche Bank National Trust Company as Trustee for HSI Asset Loan Obligation Trust 2007-AR1, Mortgage Pass-Through Certificates, Series 2007-AR1, Assignee of Mortgagee
By: PFB LAW, PROFESSIONAL ASSOCIATION
Attorneys for:
Deutsche Bank National Trust Company as Trustee for HSI Asset Loan Obligation Trust 2007-AR1, Mortgage Pass-Through Certificates, Series 2007-AR1, Assignee of Mortgagee
55 East Fifth Street, Suite 800
St. Paul, MN 55101-1718
651-291-8955
651-228-1753 (fax)
THIS COMMUNICATION IS FROM A DEBT COLLECTOR ATTEMPTING TO COLLECT A DEBT. ANY INFORMATION OBTAINED WILL BE USED FOR THAT PURPOSE.
NOTICE OF POSTPONEMENT OF MORTGAGE FORECLOSURE SALE
NOTICE IS HEREBY GIVEN, that the above Mortgage Foreclosure Sale is hereby postponed to September 30, 2019, at 10:00 AM, Sheriff's Office, Civil Process Unit, 25 W. 4th Street, Suite 150, St. Paul, MN in said County and State.
Dated: September 23, 2019
Deutsche Bank National Trust Company as Trustee for HSI Asset Loan Obligation Trust 2007-AR1, Mortgage Pass-Through Certificates, Series 2007-AR1, Assignee of Mortgagee
By: PFB Law, Professional Association
Attorneys for: Deutsche Bank National Trust Company as Trustee for HSI Asset Loan Obligation Trust 2007-AR1, Mortgage Pass-Through Certificates, Series 2007-AR1, Assignee of Mortgagee
55 East Fifth Street, Suite 800
St. Paul, MN 55101-1718
651-209-7599
18787-18-00399-1
9/25/19 Star Tribune

NOTICE OF MORTGAGE FORECLOSURE SALE
THE RIGHT TO VERIFICATION OF THE DEBT AND IDENTITY OF THE ORIGINAL CREDITOR WITHIN THE TIME PROVIDED BY LAW IS NOT AFFECTED BY THIS ACTION.
NOTICE IS HEREBY GIVEN, that default has occurred in the conditions of the following described mortgage:
Mortgagor: Josh Odegard, a single man and Shantelle Sumner, a single woman
Mortgagee: Mortgage Electronic Registration Systems, Inc. as nominee for GreenPoint Mortgage Funding, Inc.
Dated: 04/27/2006
Recorded: 06/19/2006
Hennepin County Recorder Document No. 8813900
Assigned To: HSBC Bank USA, National Association, as trustee for the Certificateholders of Deutsche Alt-A Securities Inc. Mortgage Loan Trust, Series 2006-AR4, Mortgage Pass-Through Certificates Series 2006-AR4
Dated: 07/03/2012
Recorded: 07/05/2012
Hennepin County Recorder Document No. A9808112
Transaction Agent: Mortgage Electronic Registration Systems, Inc.
Transaction Agent Mortgage Identification Number: 100013800894576830
Lender or Broker: GreenPoint Mortgage Funding, Inc.
Residential Mortgage Servicer: PHH Mortgage Services
Mortgage Originator: GreenPoint Mortgage Funding, Inc.
LEGAL DESCRIPTION OF PROPERTY: The South 248.12 feet of the North 718.5 feet of the Northwest Quarter of the Northeast Quarter, Section 10, Township 117, Range 23 except the West 400 feet of the North 110 feet thereof, Hennepin County, Minnesota
This is Abstract Property.
TAX PARCEL NO.: 10-117-23-12-0003
ADDRESS OF PROPERTY:
930 Brown Rd S
Orono, MN 55391
COUNTY IN WHICH PROPERTY IS LOCATED: Hennepin
ORIGINAL PRINCIPAL AMOUNT OF MORTGAGE: $452,000.00
AMOUNT DUE AND CLAIMED TO BE DUE AS OF DATE OF NOTICE: $442,132.53
That prior to the commencement of this mortgage foreclosure proceeding Mortgagee/Assignee of Mortgagee complied with all notice requirements as required by statute; that no action or proceeding has been instituted at law or otherwise to recover the debt secured by said mortgage, or any part thereof;
PURSUANT to the power of sale contained in said mortgage, the above described property will be sold by the Sheriff of said county as follows:
DATE AND TIME OF SALE: November 6, 2019, 09:00 AM
PLACE OF SALE: Hennepin County Sheriff's Office, Civil Unit, 350 South Fifth Street, Room 30, Minneapolis, MN to pay the debt then secured by said Mortgage, and taxes, if any, on said premises, and the costs and disbursements, including attorneys' fees allowed by law subject to redemption within 6 Months from the date of said sale by the mortgagor(s), their personal representatives or assigns.
DATE TO VACATE PROPERTY: The date on or before which the mortgagor must vacate the property if the mortgage is not reinstated under Minnesota Statutes section 580.30 or the property redeemed under Minnesota Statutes section 580.23 is May 6, 2020 at 11:59 p.m. If the foregoing date is a Saturday, Sunday or legal holiday, then the date to vacate is the next business day at 11:59 p.m.
MORTGAGOR(S) RELEASED FROM FINANCIAL OBLIGATION ON MORTGAGE: NONE
THE TIME ALLOWED BY LAW FOR REDEMPTION BY THE MORTGAGOR, THE MORTGAGOR'S PERSONAL REPRESENTATIVES OR ASSIGNS, MAY BE REDUCED TO FIVE WEEKS IF A JUDICIAL ORDER IS ENTERED UNDER MINNESOTA STATUTES SECTION 582.032, DETERMINING, AMONG OTHER THINGS, THAT THE MORTGAGED PREMISES ARE IMPROVED WITH A RESIDENTIAL DWELLING OF LESS THAN FIVE UNITS, ARE NOT PROPERTY USED IN AGRICULTURAL PRODUCTION, AND ARE ABANDONED.
Dated: September 20, 2019
HSBC Bank USA, National Association, as trustee for Deutsche Alt-A Securities Inc. Mortgage Loan Trust, Mortgage Pass-Through Certificates Series 2006-AR4, Assignee of Mortgagee
By: PFB LAW, PROFESSIONAL ASSOCIATION
Attorneys for:
HSBC Bank USA, National Association, as trustee for Deutsche Alt-A Securities Inc. Mortgage Loan Trust, Mortgage Pass-Through Certificates Series 2006-AR4, Assignee of Mortgagee
101 Fifth Street East, Suite 2626
St. Paul, MN 55101
651-291-8955
651-228-1753 (fax)
THIS COMMUNICATION IS FROM A DEBT COLLECTOR ATTEMPTING TO COLLECT A DEBT. ANY INFORMATION OBTAINED WILL BE USED FOR THAT PURPOSE.
18787-18-00243-2
9/25, 10/2, 10/9, 10/16, 10/23, 10/30/19 Star Tribune

NOTICE OF MORTGAGE FORECLOSURE SALE
THE RIGHT TO VERIFICATION OF THE DEBT AND IDENTITY OF THE ORIGINAL CREDITOR WITHIN THE TIME PROVIDED BY LAW IS NOT AFFECTED BY THIS ACTION.
NOTICE IS HEREBY GIVEN, that default has occurred in the conditions of the following described mortgage:
Mortgagor: Donald Zierden and Anne Zierden, husband and wife
Mortgagee: Mortgage Electronic Registration Systems, Inc. as nominee for Homecomings Financial, LLC (f/k/a Homecomings Financial Network, Inc.)
Dated: 03/23/2007
Recorded: 04/24/2007
Hennepin County Recorder Document No. 8968470
Assigned To: U. S. Bank National Association, as Trustee for Residential Funding Mortgage Securities I, Inc., Mortgage Pass-Through Certificates, Series 2007-S7
Dated: 03/06/2019
Recorded: 03/12/2019
Hennepin County Recorder Document No. 10642162
Transaction Agent: Mortgage Electronic Registration Systems, Inc.
Transaction Agent Mortgage Identification Number: 100062604733087730
Lender or Broker: Homecomings Financial, LLC (f/k/a Homecomings Financial Network, Inc.)
Residential Mortgage Servicer: PHH Mortgage Services
Mortgage Originator: Homecomings Financial, LLC (f/k/a Homecomings Financial Network, Inc.)
LEGAL DESCRIPTION OF PROPERTY: Lot 4, Block 1, Windchime Trail 3rd Addition, Hennepin County, Hennepin County, MN
Abstract Property
This is Abstract Property.
TAX PARCEL NO.: 04-119-21-44-0096
ADDRESS OF PROPERTY:
10102 Orchard Trail N
Brooklyn Park, MN 55443
COUNTY IN WHICH PROPERTY IS LOCATED: Hennepin
ORIGINAL PRINCIPAL AMOUNT OF MORTGAGE: $460,000.00
AMOUNT DUE AND CLAIMED TO BE DUE AS OF DATE OF NOTICE: $522,945.22
That prior to the commencement of this mortgage foreclosure proceeding Mortgagee/Assignee of Mortgagee complied with all notice requirements as required by statute; that no action or proceeding has been instituted at law or otherwise to recover the debt secured by said mortgage, or any part thereof;
PURSUANT to the power of sale contained in said mortgage, the above described property will be sold by the Sheriff of said county as follows:
DATE AND TIME OF SALE: November 6, 2019, 09:00 AM
PLACE OF SALE: Hennepin County Sheriff's Office, Civil Unit, 350 South Fifth Street, Room 30, Minneapolis, MN to pay the debt then secured by said Mortgage, and taxes, if any, on said premises, and the costs and disbursements, including attorneys' fees allowed by law subject to redemption within 6 Months from the date of said sale by the mortgagor(s), their personal representatives or assigns.
DATE TO VACATE PROPERTY: The date on or before which the mortgagor must vacate the property if the mortgage is not reinstated under Minnesota Statutes section 580.30 or the property redeemed under Minnesota Statutes section 580.23 is May 6, 2020 at 11:59 p.m. If the foregoing date is a Saturday, Sunday or legal holiday, then the date to vacate is the next business day at 11:59 p.m.
MORTGAGOR(S) RELEASED FROM FINANCIAL OBLIGATION ON MORTGAGE: NONE
THE TIME ALLOWED BY LAW FOR REDEMPTION BY THE MORTGAGOR, THE MORTGAGOR'S PERSONAL REPRESENTATIVES OR ASSIGNS, MAY BE REDUCED TO FIVE WEEKS IF A JUDICIAL ORDER IS ENTERED UNDER MINNESOTA STATUTES SECTION 582.032, DETERMINING, AMONG OTHER THINGS, THAT THE MORTGAGED PREMISES ARE IMPROVED WITH A RESIDENTIAL DWELLING OF LESS THAN FIVE UNITS, ARE NOT PROPERTY USED IN AGRICULTURAL PRODUCTION, AND ARE ABANDONED.
Dated: September 20, 2019
U.S. Bank National Association, as Trustee for Residential Funding Mortgage Securities I, Inc., Mortgage Pass-Through Certificates, Series 2007-S7, Assignee of Mortgagee
By: PFB LAW, PROFESSIONAL ASSOCIATION
Attorneys for:
U.S. Bank National Association, as Trustee for Residential Funding Mortgage Securities I, Inc., Mortgage Pass-Through Certificates, Series 2007-S7, Assignee of Mortgagee
101 Fifth Street East, Suite 2626
St. Paul, MN 55101
651-291-8955
651-228-1753 (fax)
THIS COMMUNICATION IS FROM A DEBT COLLECTOR ATTEMPTING TO COLLECT A DEBT. ANY INFORMATION OBTAINED WILL BE USED FOR THAT PURPOSE.
18787-19-00059-1
9/25, 10/2, 10/9, 10/16, 10/23, 10/30/19 Star Tribune

NOTICE OF MORTGAGE FORECLOSURE SALE
THE RIGHT TO VERIFICATION OF THE DEBT AND IDENTITY OF THE ORIGINAL CREDITOR WITHIN THE TIME PROVIDED BY LAW IS NOT AFFECTED BY THIS ACTION.
NOTICE IS HEREBY GIVEN, that default has occurred in the conditions of the following described mortgage:
Mortgagor: Joyce M. Tisland, a single woman
Mortgagee: Hiway Federal Credit Union
Dated: 09/15/2010
Filed: 10/25/2010
Ramsey Registrar of Titles Document No. 2124276 Against Certificate of Title No.: 576234
Transaction Agent: N/A
Transaction Agent Mortgage Identification Number: N/A
Lender or Broker: Hiway Federal Credit Union
Residential Mortgage Servicer: Hiway Federal Credit Union
Mortgage Originator: Hiway Federal Credit Union
LEGAL DESCRIPTION OF PROPERTY: Lot 16, Reiling Park, Ramsey County, Minnesota
This is Registered Property.
TAX PARCEL NO.: 022923330004
ADDRESS OF PROPERTY:
2729 LAKEVIEW AVE
ROSEVILLE, MN 55113
COUNTY IN WHICH PROPERTY IS LOCATED: Ramsey
ORIGINAL PRINCIPAL AMOUNT OF MORTGAGE: $50,000.00
AMOUNT DUE AND CLAIMED TO BE DUE AS OF DATE OF NOTICE: $10,239.77
That prior to the commencement of this mortgage foreclosure proceeding Mortgagee/Assignee of Mortgagee complied with all notice requirements as required by statute; that no action or proceeding has been instituted at law or otherwise to recover the debt secured by said mortgage, or any part thereof;
PURSUANT to the power of sale contained in said mortgage, the above described property will be sold by the Sheriff of said county as follows:
DATE AND TIME OF SALE: November 6, 2019, 10:00 AM
PLACE OF SALE: Sheriff's Office, Civil Process Unit, 25 W. 4th Street, Suite 150, St. Paul, MN to pay the debt then secured by said Mortgage, and taxes, if any, on said premises, and the costs and disbursements, including attorneys' fees allowed by law subject to redemption within 1 Year from the date of said sale by the mortgagor(s), their personal representatives or assigns.
DATE TO VACATE PROPERTY: The date on or before which the mortgagor must vacate the property if the mortgage is not reinstated under Minnesota Statutes section 580.30 or the property redeemed under Minnesota Statutes section 580.23 is November 6, 2020 at 11:59 p.m. If the foregoing date is a Saturday, Sunday or legal holiday, then the date to vacate is the next business day at 11:59 p.m.
MORTGAGOR(S) RELEASED FROM FINANCIAL OBLIGATION ON MORTGAGE: NONE
THE TIME ALLOWED BY LAW FOR REDEMPTION BY THE MORTGAGOR, THE MORTGAGOR'S PERSONAL REPRESENTATIVES OR ASSIGNS, MAY BE REDUCED TO FIVE WEEKS IF A JUDICIAL ORDER IS ENTERED UNDER MINNESOTA STATUTES SECTION 582.032, DETERMINING, AMONG OTHER THINGS, THAT THE MORTGAGED PREMISES ARE IMPROVED WITH A RESIDENTIAL DWELLING OF LESS THAN FIVE UNITS, ARE NOT PROPERTY USED IN AGRICULTURAL PRODUCTION, AND ARE ABANDONED.
Dated: September 23, 2019
Hiway Federal Credit Union, Mortgagee
By: PFB LAW, PROFESSIONAL ASSOCIATION
Attorneys for:
Hiway Federal Credit Union, Mortgagee
101 Fifth Street East, Suite 2626
St. Paul, MN 55101
651-291-8955
651-228-1753 (fax)
THIS COMMUNICATION IS FROM A DEBT COLLECTOR ATTEMPTING TO COLLECT A DEBT. ANY INFORMATION OBTAINED WILL BE USED FOR THAT PURPOSE.
3390-19-00266-1
9/25, 10/2, 10/9, 10/16, 10/23, 10/30/19 Star Tribune

More time for the family.

Weekend at Home
Saturdays
StarTribune

MSP Airport
Long-Term Comprehensive Plan – A 20-Year Look Ahead

EXPERIENCE msp

Neil Ralston, MAC Airport Planner
Dana Nelson, MAC Stakeholder Engagement

October 2, 2019

Presentation Overview

MSP Airport Long-Term Plan Introduction

Stakeholder Engagement Program

Planning Process Update:

- **Aviation Activity Forecasts**
- **Airfield Capacity Study Update**

1

MSP Airport Long-Term Plan Introduction

Long-Term Plan Overview

The Plan is:

A forward-looking planning tool that studies facility and infrastructure needs based on projected 20-year demand levels.

It will focus on evaluating when facility improvements are needed to accommodate projected demand in a manner that is safe, efficient, orderly and cost-effective.

The Plan does not:

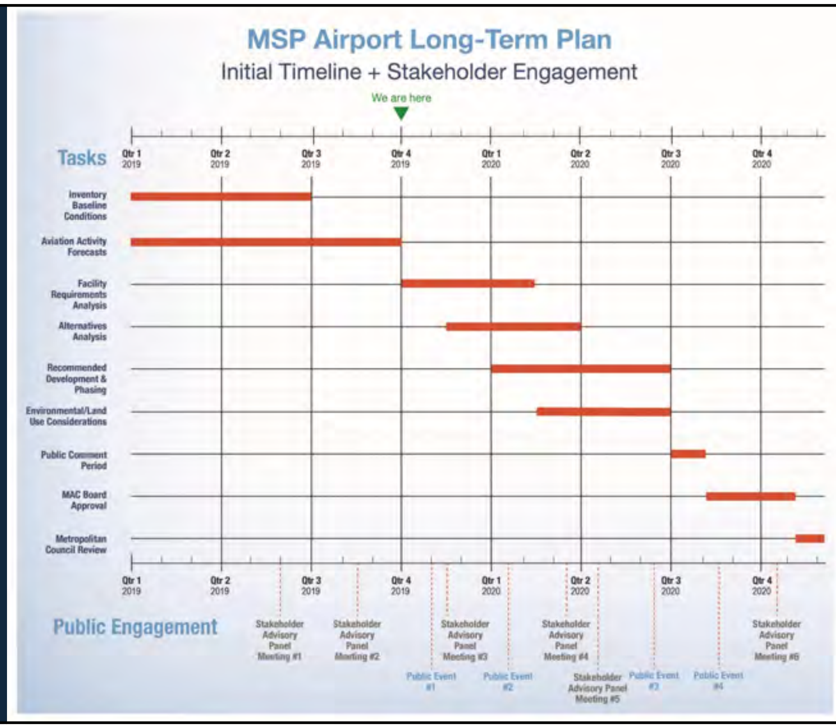
Authorize construction or improvements to facilities, nor does it serve as a basis for determining eligibility for noise mitigation programs.

Long-Term Plan Goals

1. Plan for future facilities that will meet projected passenger activity levels in a manner that maintains and enhances customer service, while facilitating a seamless experience.
2. Produce a development plan that positions the MAC to
   - meet future demand levels,
   - enhance financial strength,
   - leverage environmental stewardship, and
   - infuse sustainable thinking.
3. Conduct the planning process in a manner that includes meaningful stakeholder engagement processes.

Planning Process

Baseline Existing Facilities	Inventory and document existing facilities and aviation activity levels to establish baseline conditions
Forecasts	Forecast MSP aviation activity levels (passengers, cargo, and aircraft operations) for the milestone years between 2020 and 2040
Facility Requirements (Gap Analysis)	Determine any facility deficiency gaps between the baseline condition and desired future conditions based on forecasted activity levels
Development Concepts	Develop and evaluate alternative means to remedy facility deficiencies identified through the process
Proposed Development	Determine a proposed development program, funding plan, and implementation strategy to present to the community and the MAC board
Environmental Considerations	Prepare an overview of factors that should be considered when determining the appropriate level of environmental review needed to implement the plan



2

Stakeholder Engagement Program

Stakeholder Engagement Program Objectives

Fulfill the MAC's legislative purpose

- Promote air navigation in and through the State.
- Promote the efficient, safe and economical handling of air commerce.
- Assure minimum environmental impact from air navigation.

Conduct responsible and transparent planning for future airport facilities with engagement designed to build trust and establish a shared understanding of airport, traveler, and community needs.

Support and document a thorough and effective public involvement process.

MSP Long-Term Plan Stakeholder Engagement Program

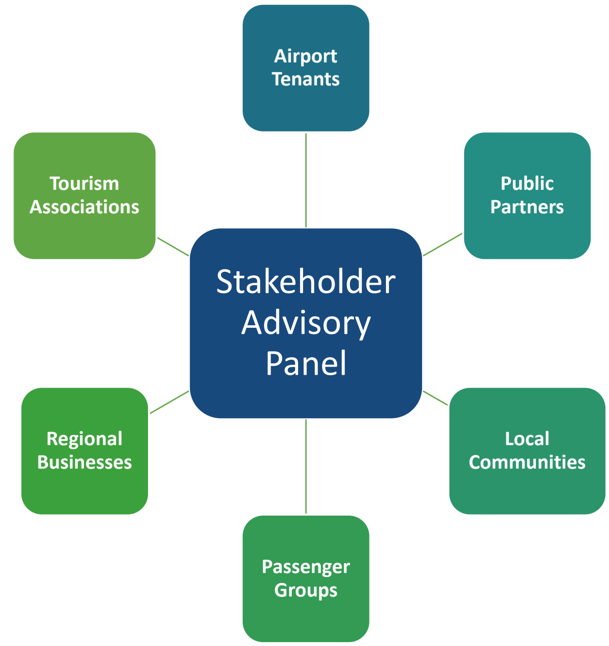
- Stakeholder Advisory Panel
- Experience MSP Public Event Series
- Project Website (mspairport.com/long-term-plan)
- E-News Monthly Project Updates
- Online Public Polling through Polco
- Project Newsletters
- Print Notifications for Public Events
- Updates at NOC and MAC's PD&E Committee

MSP Long-Term Plan Stakeholder Advisory Panel

An advisory board representing major stakeholder groups that have an interest in the planning process.

The Panel serves **several important functions**:

- Representing a broad range of stakeholder groups;
- Receiving information about the planning process;
- Communicating public concerns and aspirations as the voice of key stakeholders.



Project Website

mspairport.com/ long-term-plan

Overview

Community and Stakeholder Engagement

Progress and Schedule

Documents and Links

Frequently Asked Questions

Contact Us

Sign up to receive updates on the project

Questions or Comments about the MSP Long-Term Plan?

- **Contact us via email at MSPAirportLongTermPlan@mspmac.org**
- **Visit the project website at www.mspairport.com/long-term-plan**
- **Receive regular updates by signing up for our e-newsletter**

What the MAC will do with input

The Project Team will listen to concerns, input and aspirations and, when possible, make changes

The Plan may not incorporate all input provided by the public

Things to balance include:

- Maintaining a high level of service
- Achieving the established goals of the Plan
- Conforming to design standards
- Safety
- Operational feasibility
- Federal and state policies
- Project costs

3

Planning Process Update

Aviation Activity Forecasts

Objective: develop aviation forecasts for MSP that identify a likely range of demand levels in a manner that will facilitate a meaningful evaluation of facility performance

Forecasts will:

Have enough detail to inform future development to meet demand level

Provide a reasonable range of forecast outcomes to promote operational efficiency and flexibility

Engage stakeholders to provide insights into forecast development

Forecast Elements
(2018 – 2040)

Passengers

Cargo Activity

Aircraft Operations

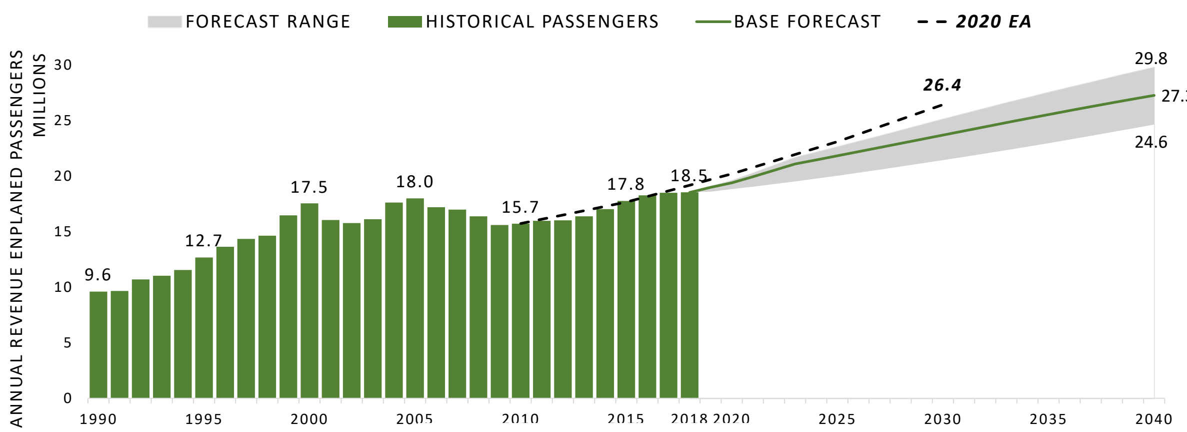
Forecast Scenarios

Baseline

High

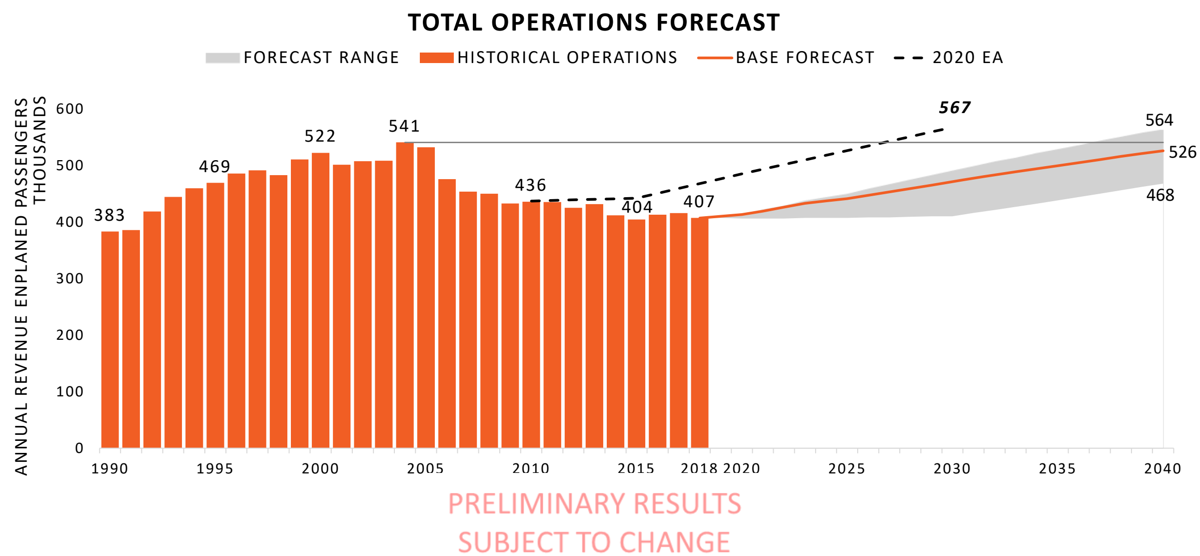
Low

Enplaned Passenger Forecasts

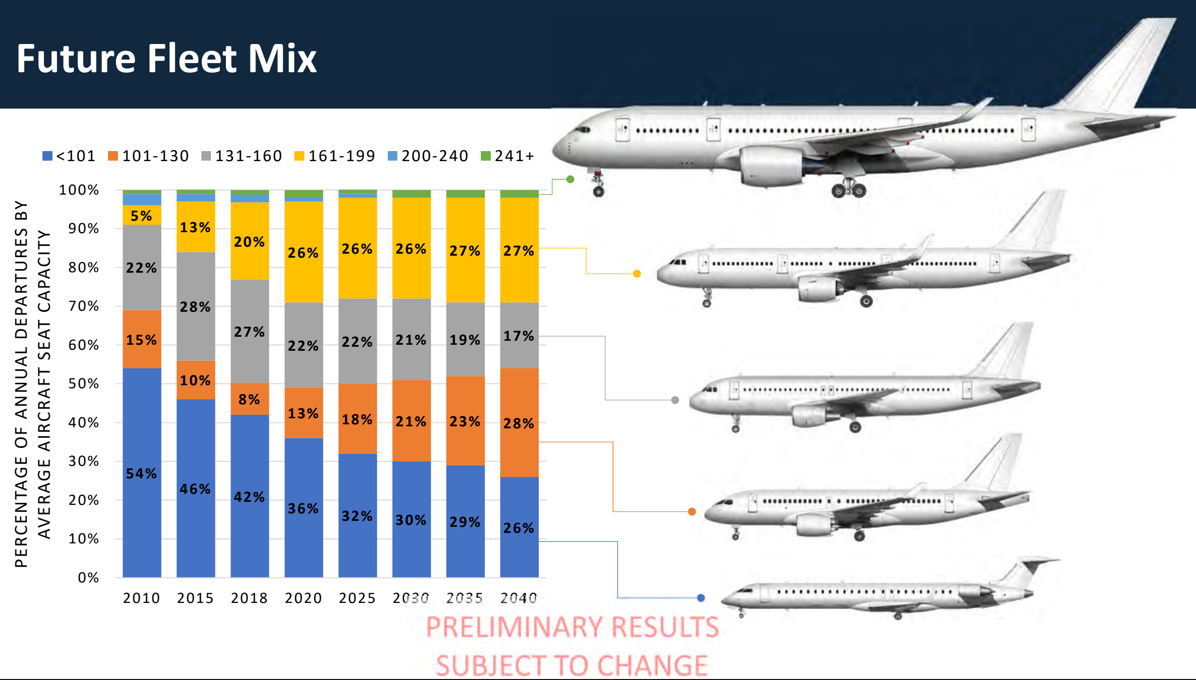


PRELIMINARY RESULTS
SUBJECT TO CHANGE

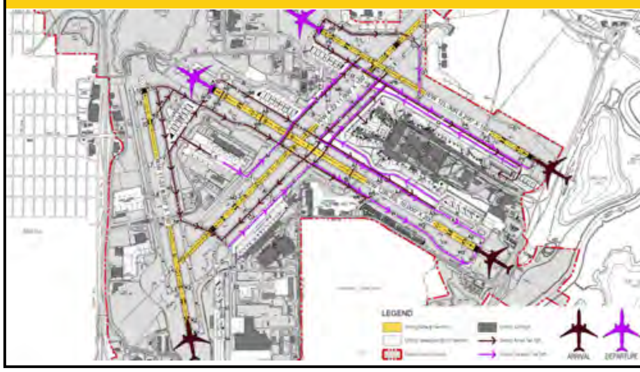
Total Operations Forecast



Future Fleet Mix



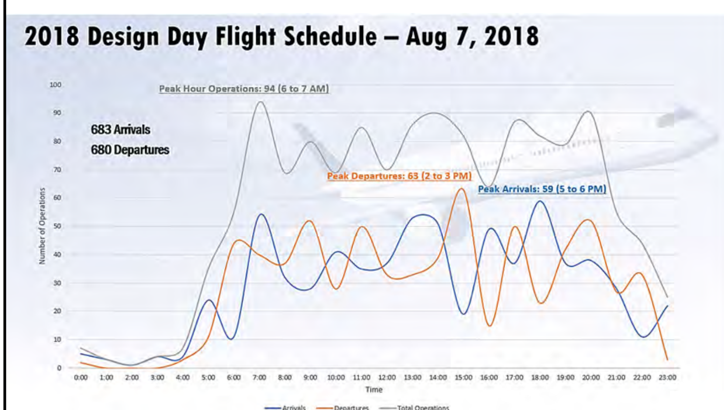
Airfield Capacity Study



Objective is to use state-of-the-art simulation tools to predict how the MSP airfield and close-in airspace will perform under forecasted aircraft activity levels.

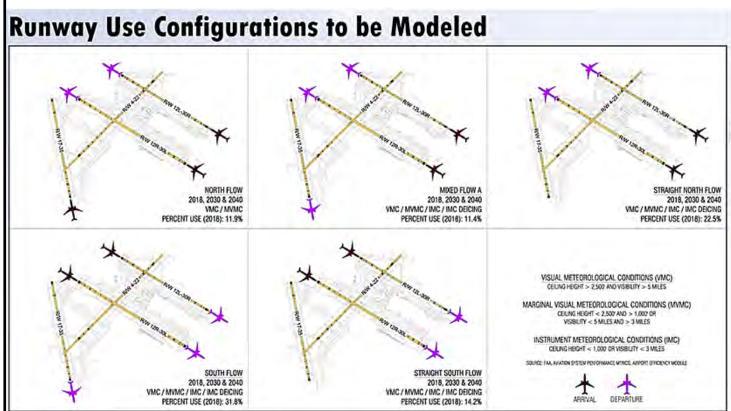
The capacity study should:

- Develop a well-calibrated simulation that accurately represents how actual air traffic is managed.
- Predict how much of the existing airfield's capacity is needed to accommodate existing and forecast demand levels.
- Develop a flexible simulation model that can be used to test how alternative scenarios affect airfield capacity.
- Provide summary results in a manner that facilitates effective dialogue and promotes a better understanding of the relationship between airfield capacity and delay.



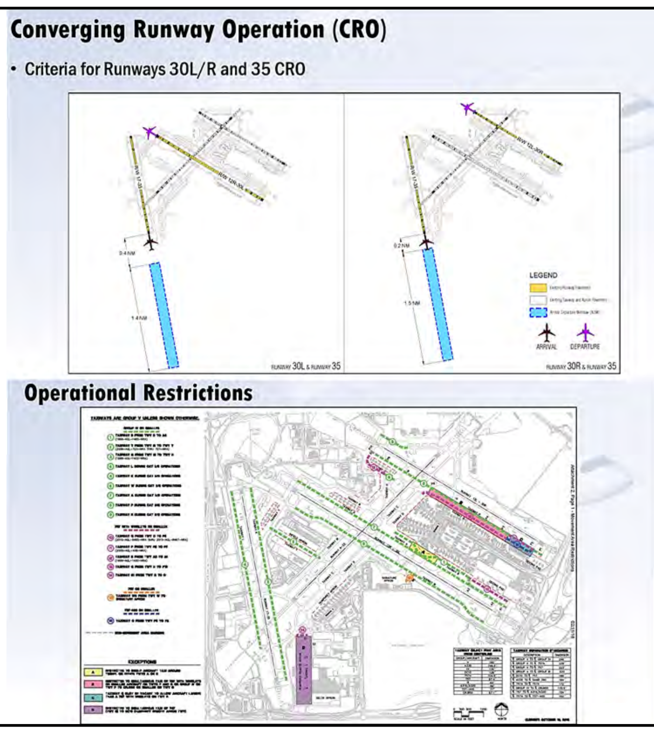
Model Inputs

- Peak Month, Average Day Flight Schedule
  - August 7, 2018
  - 683 arrivals, 59 in peak hour
  - 680 departures, 63 in peak hour
  - 1,363 combined operations, 94 in peak hour



Model Inputs

- Runway Use Configurations
  - Modeling the most commonly-used runway configurations representing 92% of total operations
  - Modeling operations in three weather conditions (visual, marginal visual, instrument)



Model Inputs

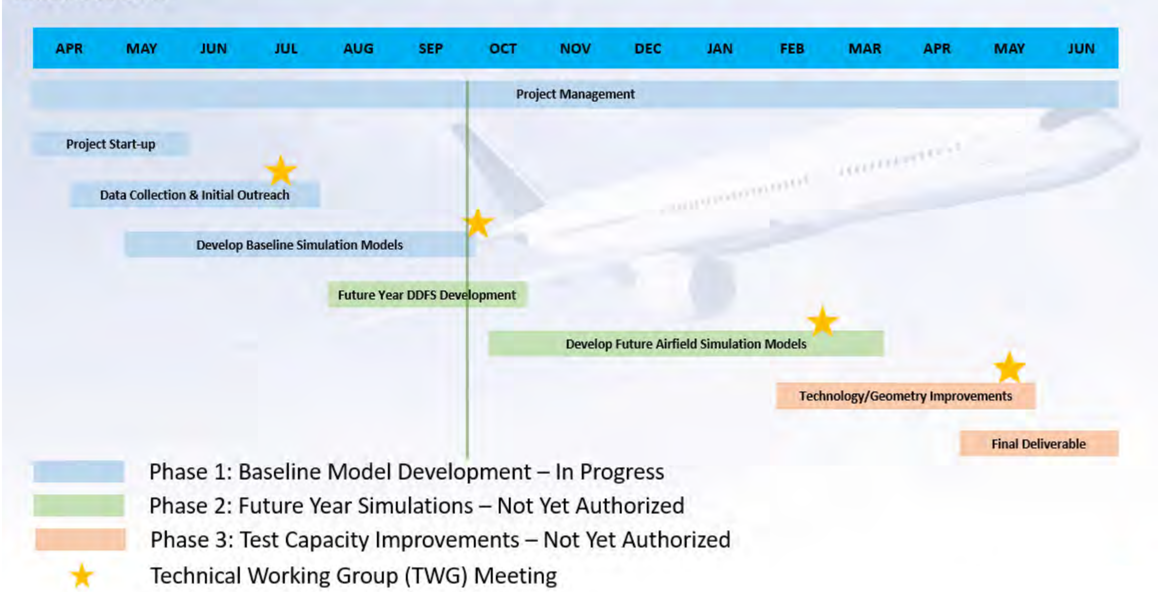
- Converging Runway Operations (CRO)
- Airfield Operational Restrictions

	Baseline (2018)				
	North VMC	Mixed A VMC	Straight N VMC	South VMC	Straight S VMC
Arrival Delay (Minutes)					
Ground - Taxi Delay	0.33	0.50	0.52	0.30	0.43
Airspace - Sequencing & Holding Delays	*1.92*	*1.22*	*1.63*	*1.25*	*1.37*
Average Arrival Delay (Exclude Airspace Delays)	**0.33**	**0.50**	**0.52**	**0.30**	**0.43**
Average Arrival Delay (Include Airspace Delays)	**2.25**	**1.72**	**2.15**	**1.55**	**1.80**
Undelayed Taxi Time	**4.50**	**4.10**	**4.22**	**5.08**	**4.98**
Total Arrival Travel Time	**4.83**	**4.60**	**4.73**	**5.38**	**5.42**
Departure Delay (Minutes)					
Ground - Gate Traffic Delay	0.72	0.75	0.95	0.57	0.40
Ground - Runway Crossing Delay	0.37	0.40	0.43	0.22	0.18
Ground - Taxi Delay	1.03	0.58	0.90	1.17	0.60
Ground - Runway Queue Delay	4.05	1.83	5.37	0.97	5.20
Average Departure Delay	**6.17**	**3.57**	**7.65**	**2.92**	**6.38**
Undelayed Taxi Time	**7.18**	**7.72**	**7.05**	**7.95**	**7.00**
Total Departure Travel Time	**13.35**	**11.28**	**14.70**	**10.87**	**13.38**
Average Delay Excluding Arrival Airspace Delays					
Average Total Delay Per Operation (Minutes)	**3.3**	**2.0**	**4.1**	**1.6**	**3.4**
ADPM Annualization Adjustment Factor	82.0%	82.0%	82.0%	82.0%	82.0%
Annual Percent in Flow	13.5%	13.0%	24.1%	33.4%	15.8%
Representative ADPM Delay (Minutes)	0.4	0.3	1.0	0.5	0.5
Representative Annual Delay (Minutes)	0.4	0.2	0.8	0.4	0.4
Average Delay Including Arrival Airspace Delays					
Average Total Delay Per Operation (Minutes)	4.2	2.6	4.9	2.2	4.1
ADPM Annualization Adjustment Factor	82.0%	82.0%	82.0%	82.0%	82.0%
Annual Percent in Flow	13.5%	13.0%	24.1%	33.4%	15.8%
Representative ADPM Delay (Minutes)	0.6	0.3	1.2	0.7	0.6
Representative Annual Delay (Minutes)	0.5	0.3	1.0	0.6	0.5
Average ADPM Delay (Minutes / Operation) Excluding Arrival Airspace Delay	**2.8**				
Average ADPM Delay (Minutes / Operation) Including Arrival Airspace Delay	**3.5**				
Average Annual Delay (Minutes / Operation) Excluding Arrival Airspace Delay	**2.3**				
Average Annual Delay (Minutes / Operation) Including Arrival Airspace Delay	**2.9**				

PRELIMINARY RESULTS

SUBJECT TO CHANGE

Schedule




Questions
MetroAirports.org MSPAirport.com
@mspairport

YOU'RE INVITED TO

EXPERIENCE

EXPERIENCE msp™

Learn more about Minneapolis-St. Paul International Airport and how the Metropolitan Airports Commission is planning for its future.

WHAT: View pre-recorded informational videos starting March 28 and attend a virtual open house on April 12. At the event you can ask questions of the experts.

WHEN: **Monday, March 28, 2022 or after** – View pre-recorded videos at your leisure

Tuesday, April 12, 2022 – Attend a virtual open house – 4:30 - 6:00 p.m.

HOW:
Find both the pre-recorded videos and how to attend the virtual open house by scanning the QR code below. You will be directed to the MSP long-term plan website where you can also submit questions to be answered during the April 12 event. Note: The virtual event will be held via Microsoft Teams software. You do not need to have the software on your computer, however, to participate.

OR CALL IN for the virtual open house on April 12 starting at 4:30 p.m.:
1-612-405-6798
Conference ID 423 520 486#

Don't have access to a computer or telephone? Many libraires and community centers offer free access to computers and the Internet. **Can't make the event?** View the pre-recorded videos and submit questions or comments by sending an email to: MSPAirportLongTermPlan@mspmac.org

Minneapolis Saint Paul International Airport msp™

Minneapolis Saint Paul Metropolitan Airports Commission MAC

Sign up to receive updates about future events and about the planning process by visiting: **mspairport.com/long-term-plan.**

EXPERIENCE MSP is a series of four events for the public to learn about the MSP Airport long term planning process and to provide input into that process. The Metropolitan Airports Commission welcomes your interest and input throughout.

Recovering from the Pandemic

- The COVID pandemic was far-reaching for the aviation industry as a whole
  - Prior to 2020, MSP had 10 straight years of passenger growth, reaching a record 39.5 million passengers in 2019
  - In 2020, total passengers decline more than 62% due to the pandemic and remained depressed at 36.3% in 2021 compared to pre-pandemic
  - Aircraft operations at MSP declined by approximately 40% equating to nearly 245,000 takeoffs and landings in 2020

EXPERIENCE msp

Recovering from the Pandemic, cont.

- U.S. airports had losses upward of $40 billion between March 2020 and March 2022
  - MAC losses were $215-$220 million in 2020
- MAC took advantage of the lull in passengers to move certain projects ahead of schedule including:
  - Total reconstruction of the Terminal 1 roadway
  - Continuation of the Terminal 1 Ticketing and Baggage Claim renovations as part of the Operational Improvements program
  - G Concourse Expansion & Delta Skyclub

EXPERIENCE msp

What is the Purpose of the Long-Term Plan?

- The LTP is a forward-looking planning tool that studies facility and infrastructure needs based on projected passenger and operations numbers
- The LTP looks ahead to the next 20 years
- The LTP process includes:
  - – Assessing existing facilities' conditions and capacity
  - – Identifying gaps in existing capacity and forecasted growth

EXPERIENCE msp

Goals for the MSP Long-Term Plan

- Plan for future facilities that will meet projected passenger activity levels in a manner that maintains and enhances customer service, while facilitating a seamless, "one-journey" experience.
- Produce a development plan that positions the MAC to meet future demand levels, enhances financial strength, leverages environmental stewardship, and infuses sustainable thinking.
- Conduct the planning process in a manner that includes meaningful stakeholder engagement.

EXPERIENCE msp

Moving the MSP Long-Term Plan Forward

- The LTP was put on hold in early 2020
  - The MAC re-engaged with Ricondo; the firm that completed aviation activity forecasts for MSP prior to the pandemic
  - Ricondo updated forecasts to account for 2020 and forecast a recovery period specific to MSP
    - Jeff Stanely of Ricondo will discuss specific changes to the forecast in another video
- The MAC has re-engaged with its consultants for the LTP to initiate the remaining tasks
  - HNTB; airside planning
  - Kimley-Horn; landside planning
  - Ricondo; terminal planning

EXPERIENCE msp

Areas of Focus

- Inventory and document existing facilities and aviation activity levels to establish baseline conditions
- Determine the gap between the baseline and future conditions based on forecasted activity levels – otherwise known as a gap analysis
- Develop and evaluate alternative means to remedy facility deficiencies identified through the process and meet future forecasted demand
- Determine a proposed development program, funding plan, and implementation strategy to present to the community and the MAC board
- Prepare an overview of environmental factors that should be taken into consideration when implementing the plan

EXPERIENCE msp

Engaging with Stakeholders

- MAC engages with many different stakeholders including:
  - Internal staff
  - Airlines
  - Community
  - Public
  - Agencies
  - Regional Businesses
  - Tenant partners

EXPERIENCE msp

Engaging with the Community

- These videos and upcoming virtual event are just a few ways for you to engage
- Engage in other ways:
  - The project website
  - Written updates in our e-newsletter

EXPERIENCE msp

Public Input

- Our job is to listen to concerns, input, and aspirations shared by a wide range of stakeholders, including the public
- When possible, we can make changes to alternatives to reflect input we receive

Looking to the Finish Line

- Draft for public comment available late this summer
  - Subject to change and dependent on many factors
- Other public engagement opportunities to come with 2 more public events where we will share updates and receive input

Contact Us…

- Website
  - https://www.mspairport.com/long-term-plan/contact

- Email
  - MSPAirportLongTermPlan@mspmac.org

Jeff Stanley
Vice President, Ricondo & Associates, Inc.

Aviation Activity Forecasts and Terminal Planning

EXPERIENCE msp

Updated Activity Forecasts

EXPERIENCE msp

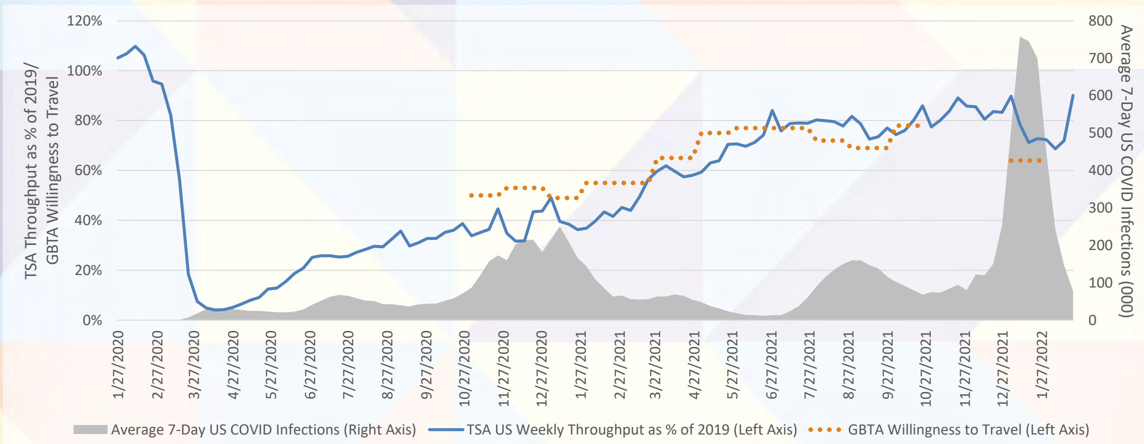
Work Completed

- The Baseline MSP 2040 LTP Forecast was originally completed in late 2019
- The forecast has been updated for all activity segments (e.g., passenger, cargo, GA, military)
- Two scenarios have been explored for the short-term passenger recovery

Short-Term Recovery Considerations

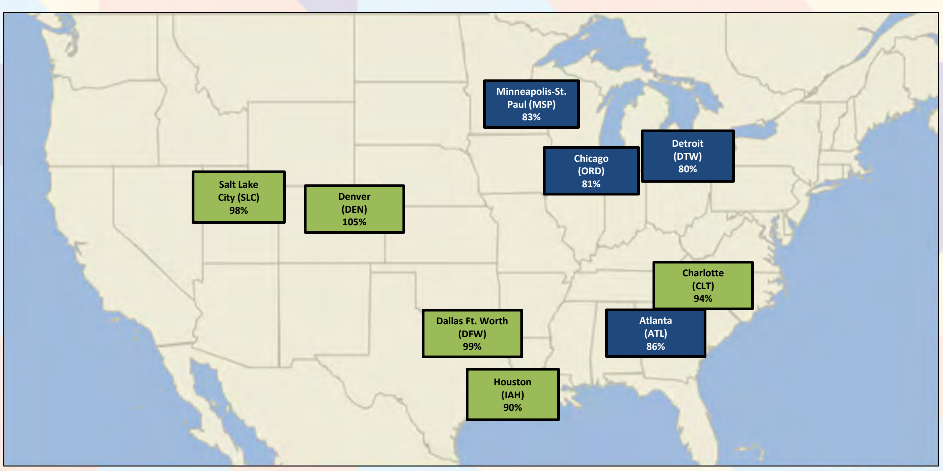
- Airline recovery trends at MSP and airports served from MSP
- Economic recovery locally and in regions served from MSP
- Influence of non-traditional factors
- Other industry forecasts
- Two scenarios of outcomes developed

US Industry Travel Trends



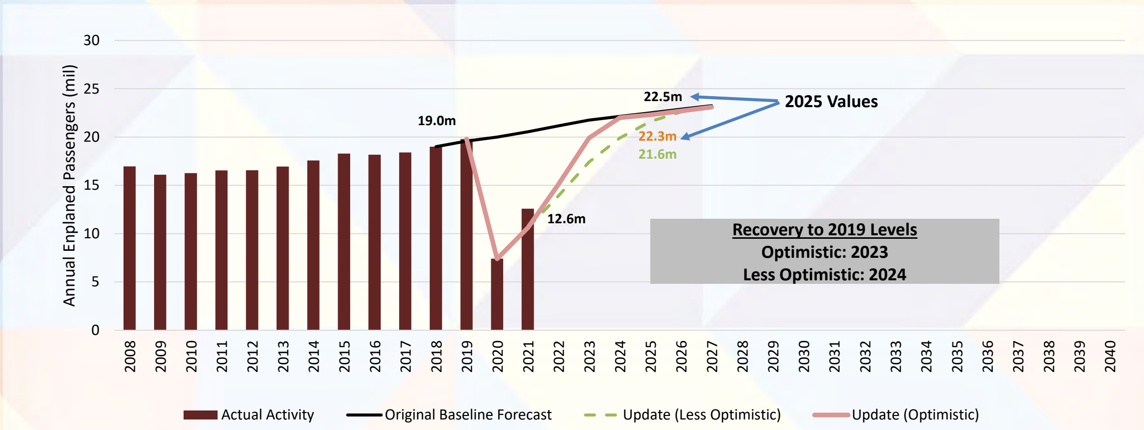
Sources: Transportation Security Administration (TSA) checkpoint reports; Global Business Travel Association Member COVID Poll (November 2020 - January 2022); Centers for Disease Control and Prevention

Seat Capacity Recovery at Peer Airports
(Q1 2022 as a Percent of Q1 2019)



Source: Diio mi

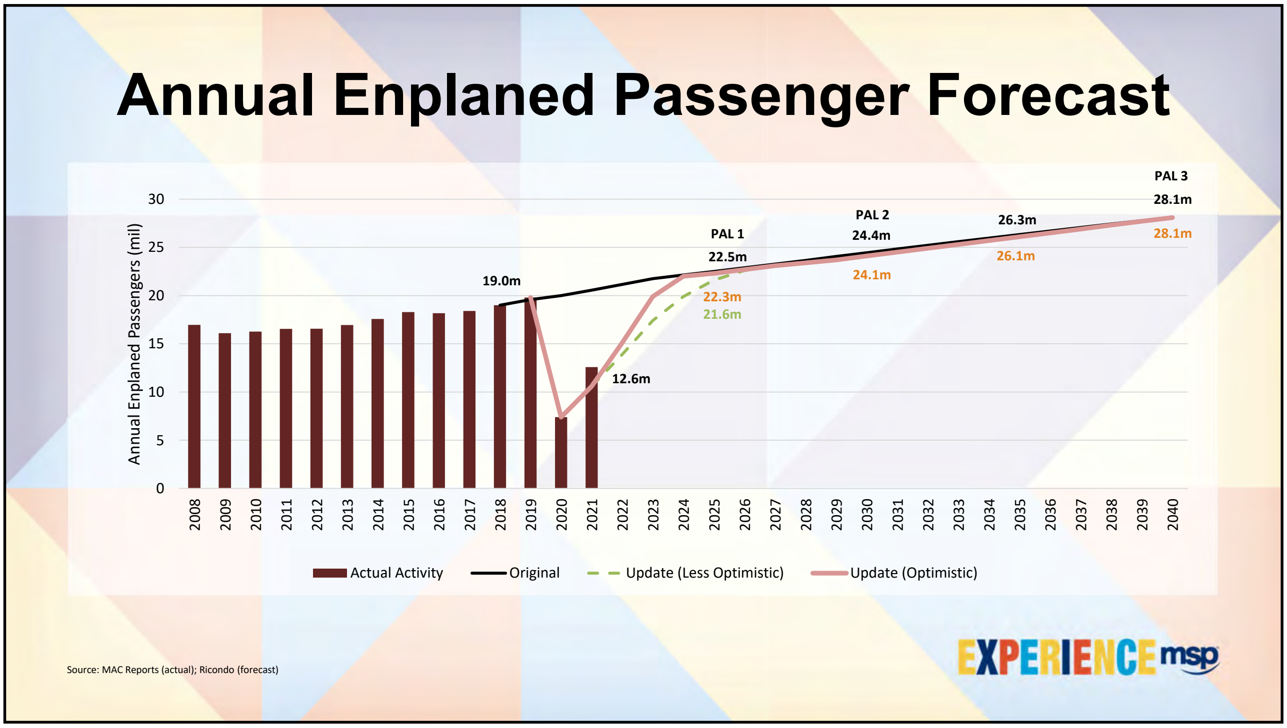
Annual Enplaned Passenger Forecast
(Short Term Only)

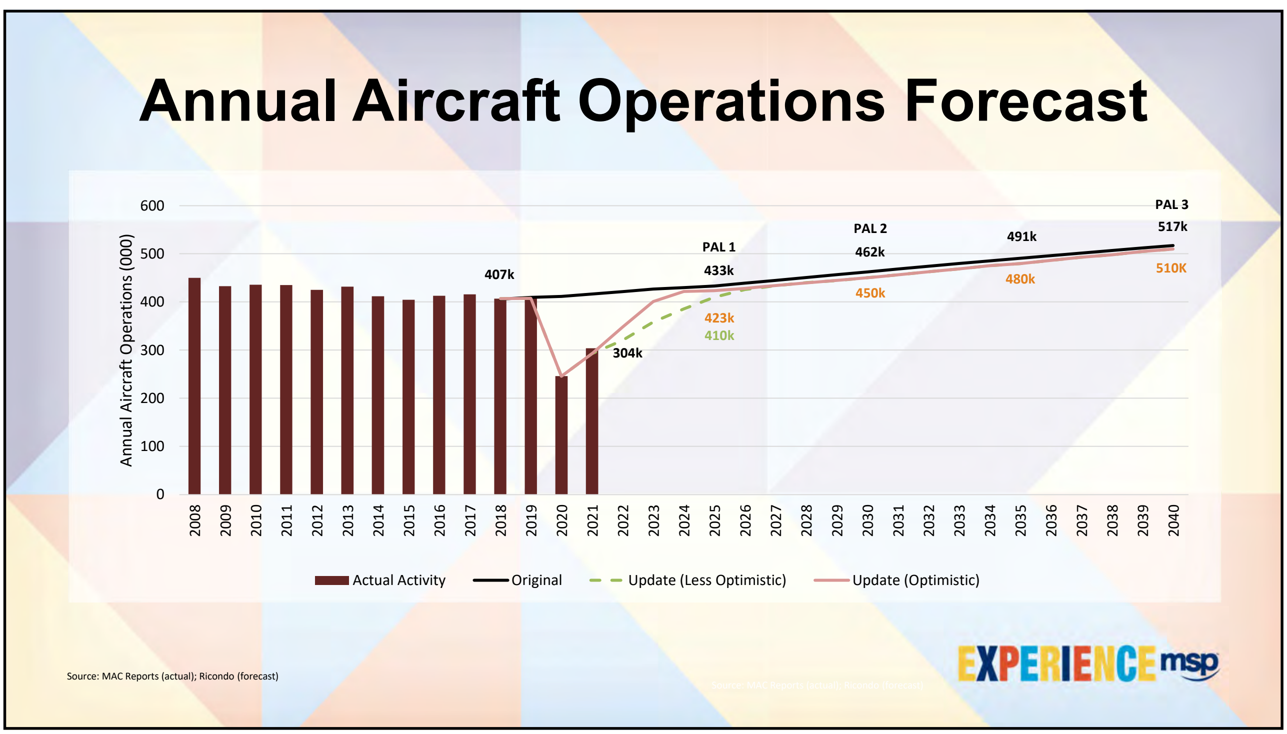


Source: MAC Reports (actual); Ricondo (forecast)

Long-Term Forecast Considerations

Economic recovery projected for MSP area and regions served from MSP	Longer-term economic drivers are mostly unchanged or improved from prior outlook
Changes to the airline industry route network and competitive landscape	No major structural changes expected for the airline industry route network
Changes in aircraft types	Aircraft changes cause a slight increase in the forecast of average seat capacity and slight decrease in forecast passenger aircraft operations
Changes to the cargo market outlook	An uptick in the cargo volume forecast results in a slight increase in cargo aircraft operations


Annual Enplaned Passenger Forecast
Annual Enplaned Passengers (mil)
0
5
10
15
20
25
30
2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038 2039 2040
19.0m
12.6m
PAL 1
22.5m
22.3m
21.6m
PAL 2
24.4m
24.1m
26.3m
26.1m
PAL 3
28.1m
28.1m
Actual Activity
Original
Update (Less Optimistic)
Update (Optimistic)
Source: MAC Reports (actual); Ricondo (forecast)
EXPERIENCE msp


Annual Aircraft Operations Forecast
Annual Aircraft Operations (000)
0
100
200
300
400
500
600
2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038 2039 2040
407k
304k
PAL 1
433k
423k
410k
PAL 2
462k
450k
491k
480k
PAL 3
517k
510K
Actual Activity
Original
Update (Less Optimistic)
Update (Optimistic)
Source: MAC Reports (actual); Ricondo (forecast)
EXPERIENCE msp

Planning Activity Levels and Years Estimated

Forecast of Enplaned Passengers

Planning Activity Level	Value	Original Forecast	Update (Less Optimistic)	Update (Optimistic)
PAL 1	22.5m	2025	2026	2026
PAL 2	24.4m	2030	2031	2031
PAL 3	28.1m	2040	2040	2040

Forecast of Total Aircraft Operations

Planning Activity Level	Value	Original Forecast	Update (Less Optimistic)	Update (Optimistic)
PAL 1	433k	2025	2027	2027
PAL 2	462k	2030	2032	2032
PAL 3	517k	2040	2042	2042

Source: Ricondo (forecast)

Planning Activity Levels (PALs) are activity-based milestones (i.e., the point when passenger levels or aircraft operations occur) rather than time-based milestones (i.e., years).

PALs are used in airport planning to mitigate the inherent uncertainty in the timing of airport activity forecasts.

EXPERIENCE msp

Greg Albjerg, P.E.

- **Vice President, Senior Aviation Consultant**
- **HNTB Corporation**
- **MSP Long Term Plan (Responsible for Airside Planning)**

Airfield Capacity Study

HNTB Corporation

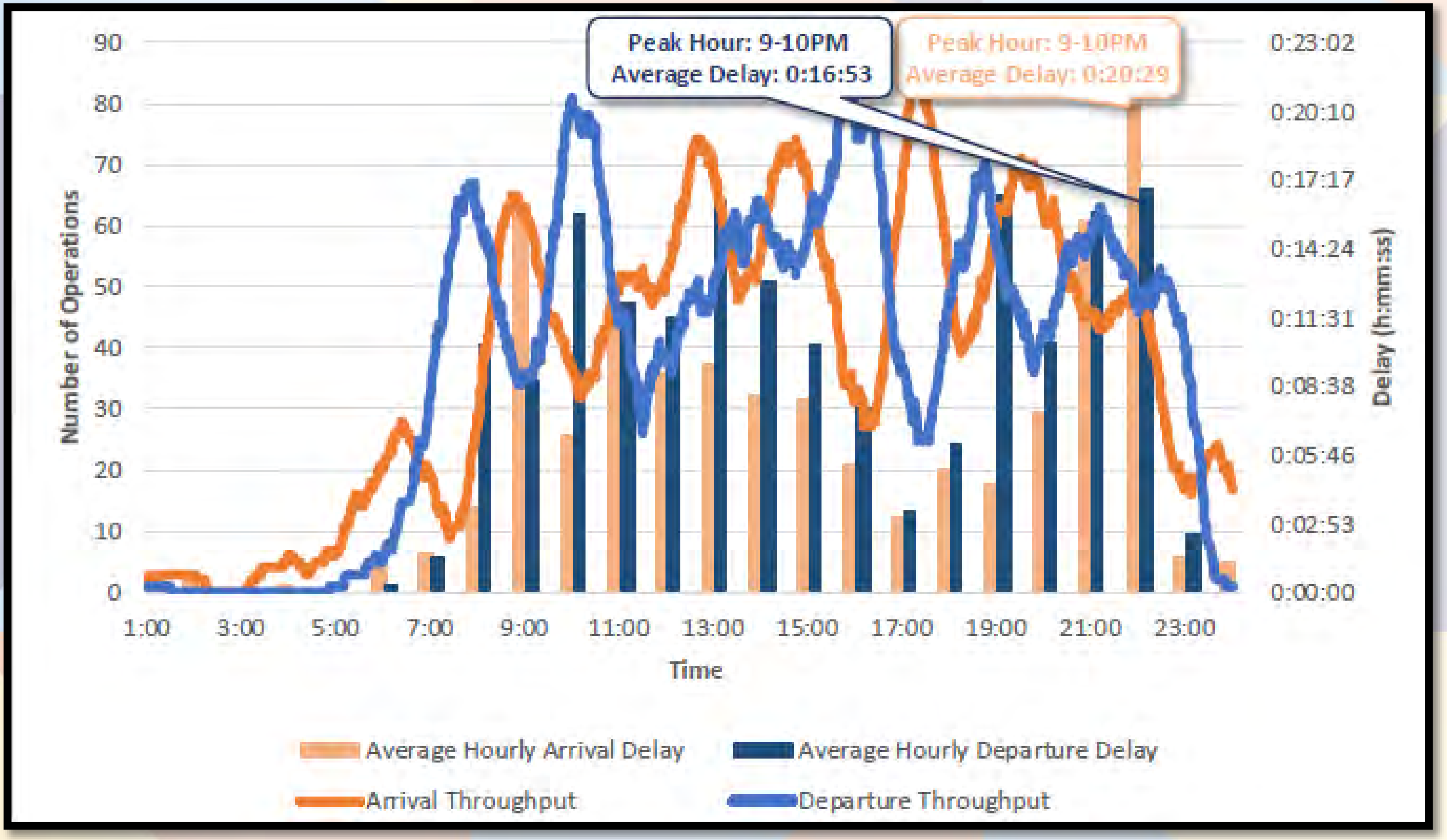
Greg Albjerg, P.E.

EXPERIENCE msp

Study Objectives

- Develop A Well-Calibrated Baseline Simulation That Takes Into Account The Present-State Airfield And Close-In Airspace
- Predict How Much Of The Existing Airfield's Capacity Is Needed To Accommodate Existing And Forecast Demand Levels And Estimate Associated Levels Of Delay
- Develop A Flexible Simulation Model That Can Be Used To Test How Alternative Scenarios Affect Airfield Capacity
- Provide Summary Results In A Manner That Facilitates Effective Dialogue Across Stakeholder Groups And Promote A Better Understanding Of The Relationship Between Airfield Capacity Aircraft Delay

Capacity Definition: Demand vs. Delay



- Number Of Aircraft Operations (takeoffs and landings) That Can Be Accommodated Along With An Acceptable Or Tolerable Amount Of Delay

Capacity: Considerations

- Annual Capacity Is Best Indication Of How Much Airport Traffic Can Be Handled Throughout A Year
- Many Variables Need To Be Considered
  - When Flights And Peak Activity Occurs (Daily and Seasonal)
  - Runway Use As Directed By ATC
    - Five Typical Configurations
    - Each Affects How Quickly Aircraft Can Arrive, Depart and Move Around The Airfield
  - Weather Conditions
    - Wind Has A Major Impact On Which Runways Can Be Used
    - The Safe Distances Required Between Aircraft Is Less In Good Visibility Than In Poor Weather Conditions
- Hourly Capacity Has Also Been Determined For This Study

Delay Definition

- Delay is any increase in time beyond the time it would take an aircraft to make its trip by flying or taxiing at normal speeds along the shortest typical route
  - Examples of Delays:
    - Waiting for room to push from gate
    - Waiting for clearance to enter the runway and takeoff
    - Congestion along a taxiway
    - Waiting to cross a runway
    - An aircraft needs to slow down or take a longer path to provide spacing

EXPERIENCE msp

MSP Capacity and Delay

- Utilize the state-of-the-art fast-time airport/airspace simulation software, AirTOP
- Models were calibrated working closely with: FAA Air Traffic, MAC, Airlines
- 56 Simulations constructed:
  - 5 primary runway use configurations with 3 major weather categories
  - 4 planning activity levels (PALs)

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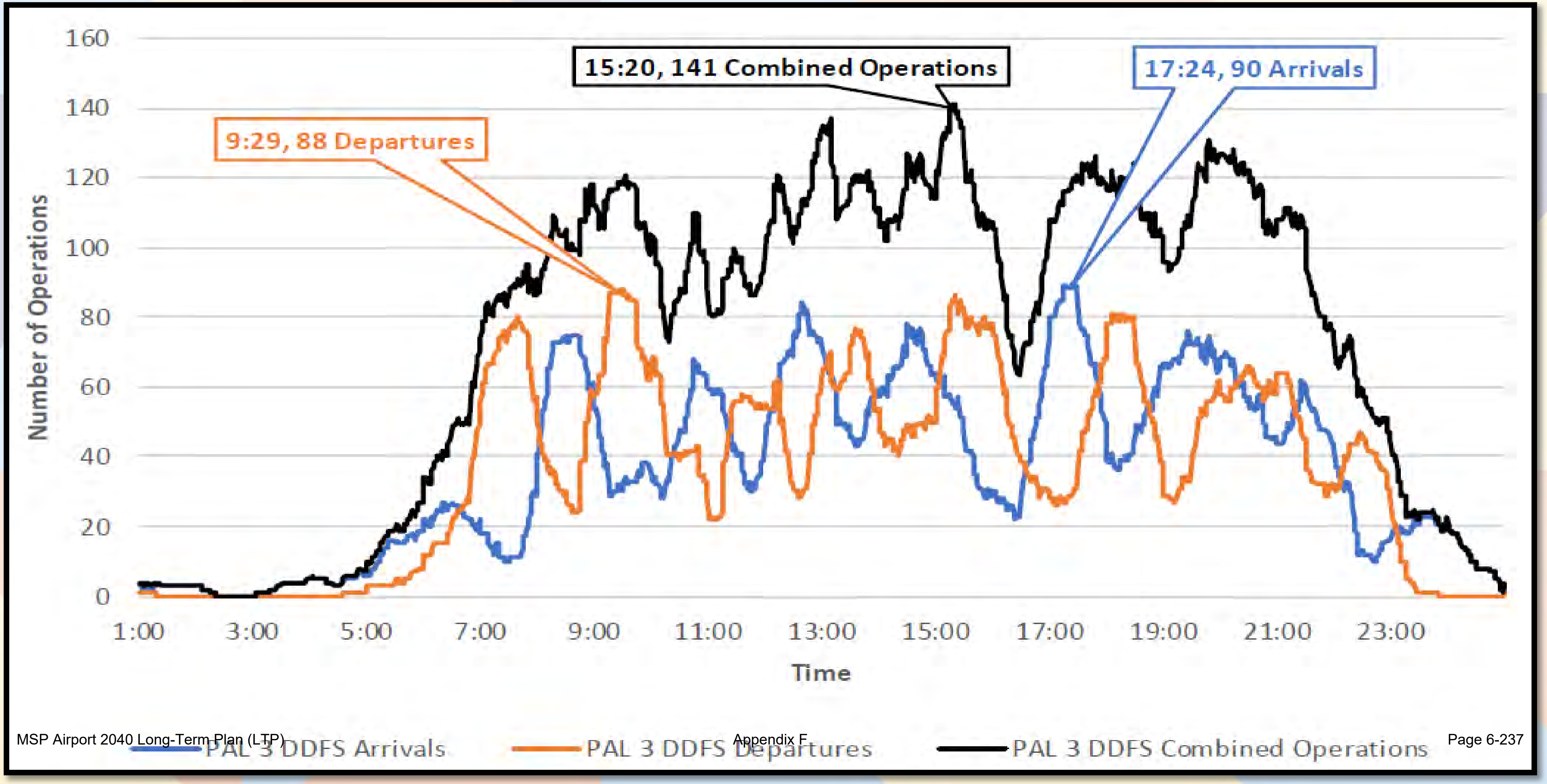
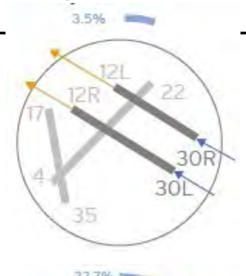
Planning Activity Level (PAL) 3 Design Day Flight Schedule



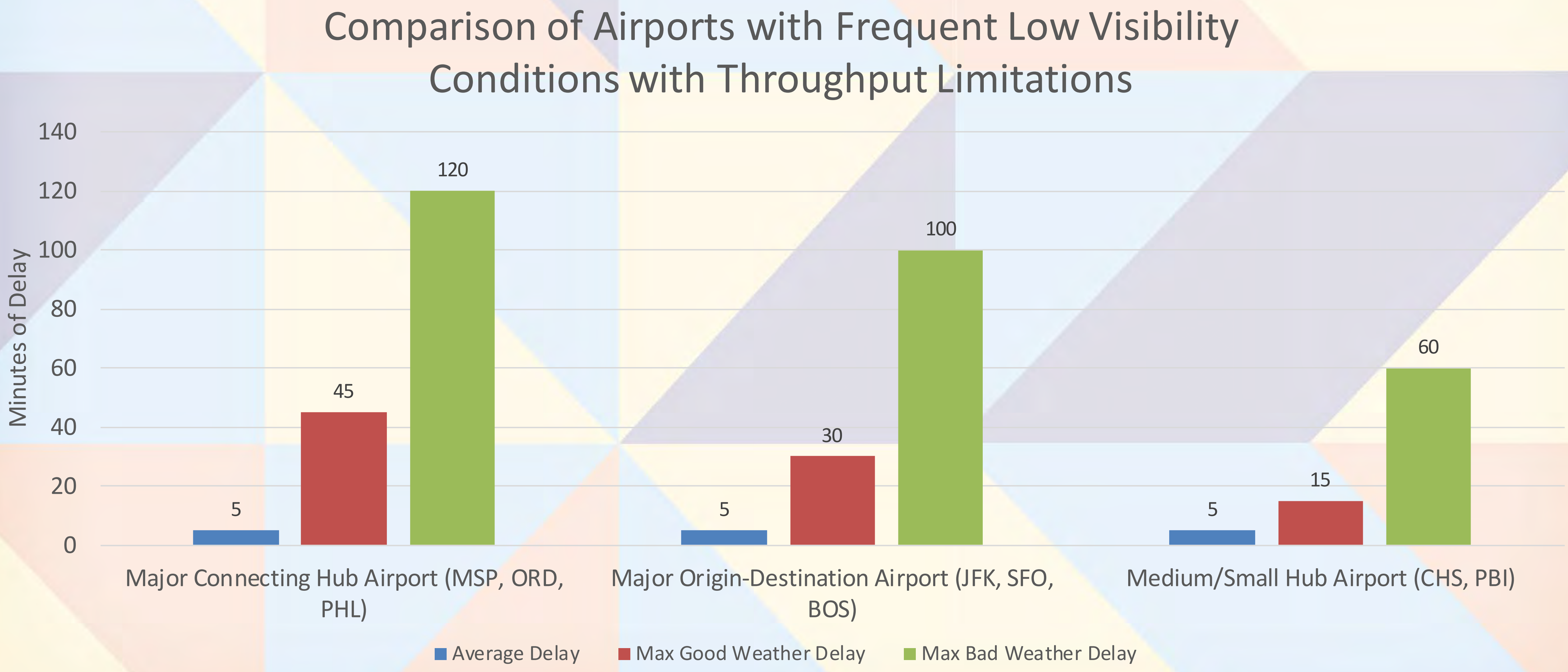
MSP Capacity Metrics Summary for 2018 ADPM Modeled Configurations (Minutes)

Runway Configuration		Weather	Average Total Delay Per Operation	Modeled Annual % In Flow	Average ADPM Delay
Straight North		Good (VMV)	3.41	11.18%	2.60
		Marginal (MVMC)	3.76	5.06%	
		Poor (IMC)	3.97	1.30%	
North		Good (VMC)	2.97	16.68%	
		Marginal (MVMC)	3.22	2.00%	
Mixed A		Good (VMC)	2.19	9.74%	
		Marginal (MVMC)	2.32	1.69%	
		Poor (IMC)	2.35	0.38%	
South		Good (VMC)	2.01	28.26%	
		Marginal (MVMC)	2.05	6.81%	
		Poor (IMC)	2.12	2.99%	
Straight South		Good (VMC)	2.93	3.47%	
		Marginal (MVMC)	3.10	1.42%	
		Poor (IMC)	3.23	0.94%	

MSP Capacity Metrics Summary for PAL 3 ADPM Modeled Configurations (Minutes)

Runway Configuration		Weather	Average Total Delay Per Operation	Modeled Annual % In Flow	Average ADPM Delay
Straight North		Good (VMV)	22.71	1.5%	8.26
		Marginal (MVMC)	23.01	0.7%	
		Poor (IMC)	23.55	1.3%	
North		Good (VMC)	8.78	26.3%	
		Marginal (MVMC)	9.64	6.4%	
Mixed A		Good (VMC)	7.10	9.7%	
		Marginal (MVMC)	8.04	1.7%	
		Poor (IMC)	8.08	0.4%	
South		Good (VMC)	5.87	28.6%	
		Marginal (MVMC)	6.26	7.4%	
		Poor (IMC)	6.77	3.5%	
Straight South		Good (VMC)	13.65	3.2%	
		Marginal (MVMC)	15.53	0.8%	
		Poor (IMC)	15.85	0.4%	

Relationship Between Average Delays and Peak Delays: ACRP Report 104 – *Defining and Measuring Aircraft Delay and Airport Capacity Thresholds* (2014)



Industry Guidance On Level Of Service (ACRP 79 – 2012)

The following scale for levels of service was suggested by a DOT report to Congress:

- **4 to 6 minutes of Annual Average Delay (AAD) per operation**
  - Limited peak-hour Visual Flight Rules (VFR-Good Weather) delays
  - Moderate Instrument Flight Rules (IFR-Bad Weather) delays
- **6 to 8 minutes of AAD per operation**
  - High peak hour delays in VFR
  - Consistently high levels of delays throughout the day in IFR
- **8 to 10 minutes of AAD per operation**
  - Delays expand beyond peak hours in VFR
  - Unsustainable delays resulting in multiple cancellation in IFR
- **Over 10 minutes of AAD per operation**
  - Consistently high level of delays throughout the day in VFR
  - Extensive flight cancellations and delays reverberate through other airports in IFR

Maximum Delay Level Chosen For MSP Capacity

- Used Several Sources To Chose 10 Minutes of Average Daily Delay
  - FAA
  - US DOT
  - Airport Cooperative Research Program (ACRP) Studies
- Evaluated 10 Minutes Of Average Delay For The Average Day Of The Year (AAD) And The Average Day Of The Busiest Month (ADPM)

Summary of MSP Capacity

- 10 Minutes of Average Annual Delay Set as Acceptable Capacity Limit for MSP
- Modeling/Simulation Analysis Shows the Existing Airfield Would Be Able to Accommodate the Projected Operations Over The 20 Year Planning Horizon
- During Some of The Busiest Periods (Summer) Delays Will Approach The 10 Minutes Of Average Delay
- A New Runway Is Not Needed

Next Steps

- Long Term Plan will evaluate a number of options for increasing the airfield's efficiency:
  - Modifications to existing airfield geometry
  - Construct additional taxiways
  - Construct additional holding and parking aprons
  - *An additional runway is not being considered within this Long Term Plan*

Personal Introduction
Bill Schmitz

- Project Manager at Kimley-Horn
- Responsible for the Landside Planning in the MSP Long Term Plan

Minneapolis-St. Paul International Airport
Existing Landside Facilities

Roadways
Public Parking
Ground Transportation
Transit / Bicycle

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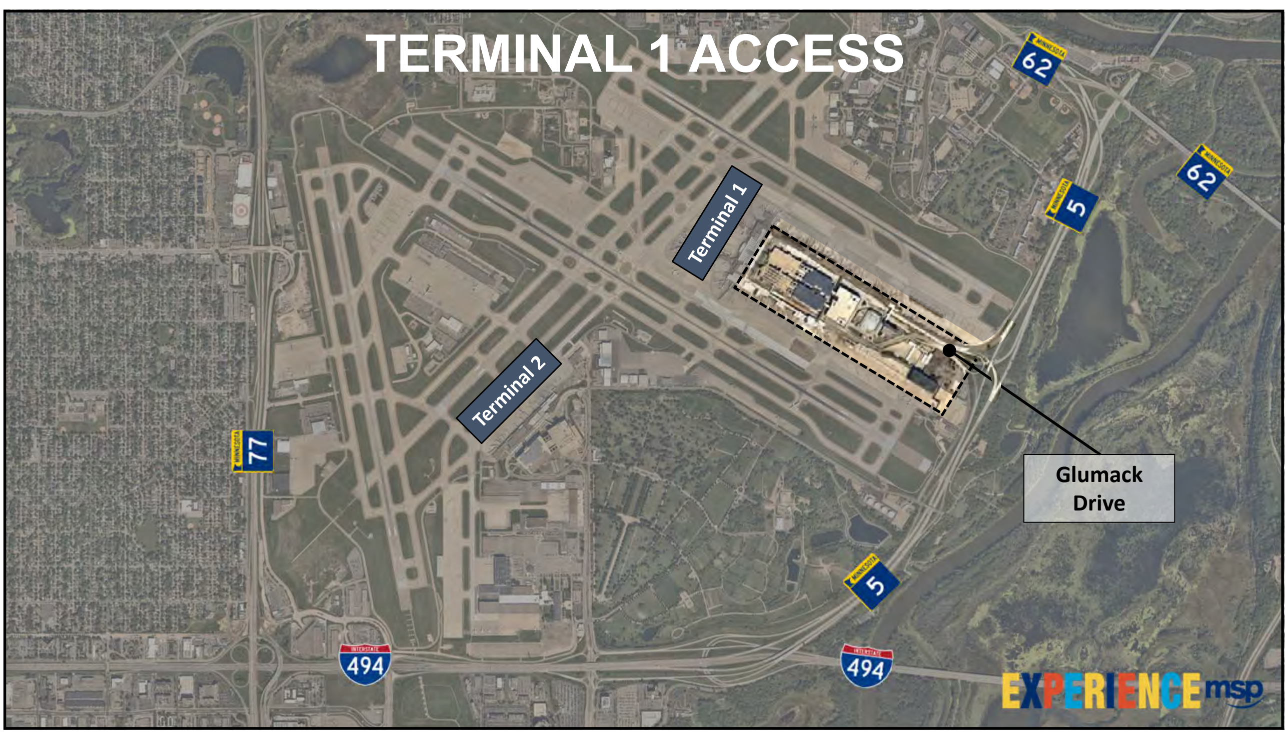
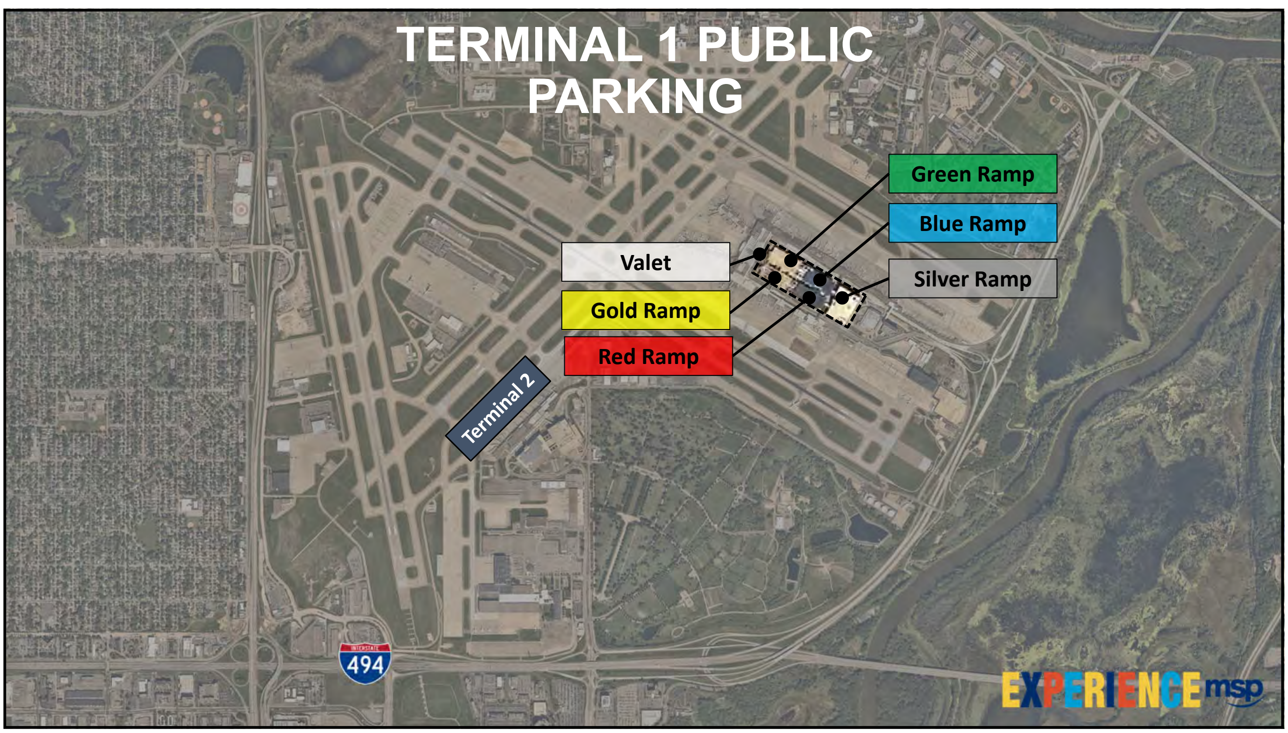
REGIONAL ACCESS
62
62
62
5
5
Terminal 1
Terminal 2
77
494
494
EXPERIENCE msp


TERMINAL 1 ACCESS
62
62
5
5
Terminal 1
Terminal 2
Glumack Drive
77
494
494
EXPERIENCE msp


TERMINAL 1 PASSENGER DROP-OFF AND PICK-UP
Terminal 1
Terminal 2
Drop-off Curb (Upper Roadway)
Pick-up Curb (Lower Roadway)
62
62
5
5
77
494
494
EXPERIENCE msp

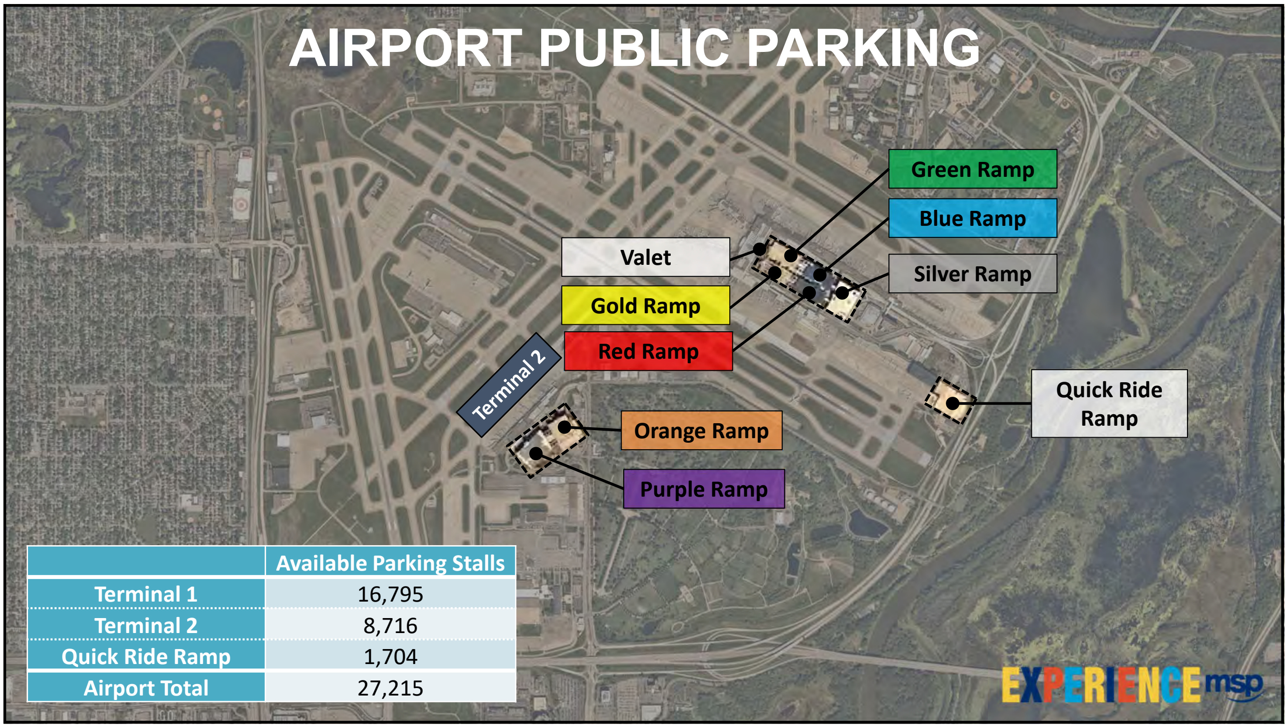

TERMINAL 2 ACCESS
Terminal 1
Terminal 2
34th Avenue South
62
62
5
5
77
494
494
EXPERIENCE msp


TERMINAL 2 PASSENGER DROP-OFF AND PICK-UP
Terminal 1
Terminal 2
Single Level Drop-off and Pick-up Curb
62
5
77
494
EXPERIENCE msp


TERMINAL 1 PUBLIC PARKING
Green Ramp
Blue Ramp
Silver Ramp
Valet
Gold Ramp
Red Ramp
Terminal 2
494
EXPERIENCE msp


TERMINAL 2 PUBLIC PARKING
Terminal 2
Orange Ramp
Purple Ramp
494
EXPERIENCE msp


OTHER AIRPORT PROVIDED PUBLIC PARKING
Terminal 1
Terminal 2
Quick Ride Ramp
494
EXPERIENCE msp



	Available Parking Stalls
Terminal 1	16,795
Terminal 2	8,716
Quick Ride Ramp	1,704
Airport Total	27,215

Ground Transportation

- Rental Cars
- Taxis
- Rideshare Apps (i.e. Uber/Lyft)
- Courtesy Shuttles / Regional Shuttles
- Charter Buses / Transit

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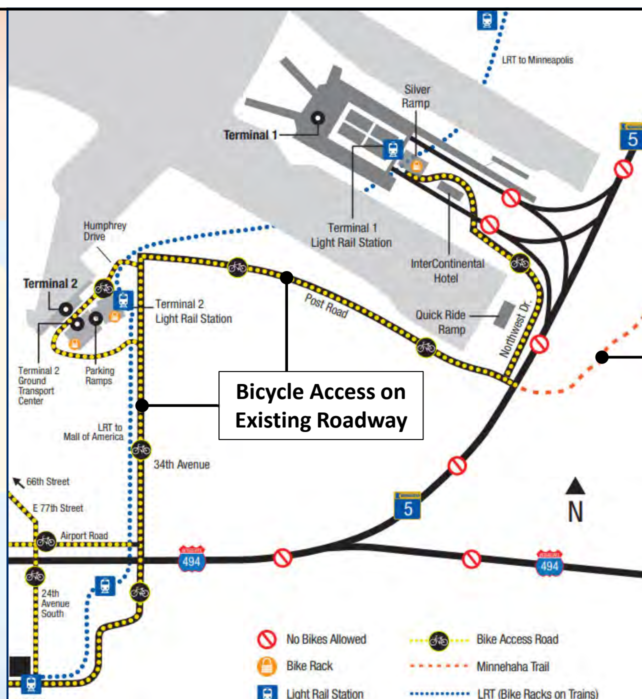
Transit

- Metro Transit
  - – Blue Line LRT
  - – Route 54
- Southwest Transit

Bicycle Access



Source: https://www.mspairport.com/sites/default/files/2021-04/MSP_BikeMap_UPDATE_4_2021.pdf

YOU'RE INVITED TO

EXPERIENCE

EXPERIENCE msp™

Learn how the airport engages with and supports surrounding communities.

- Receive an update on the MSP Airport Long-Term Planning process and how you can participate
- Speak with and learn more about the people who work and volunteer at MSP
- Enjoy light refreshments - bring your own reusable beverage container as this is being planned as a low/no-waste event!

Minneapolis Saint Paul INTERNATIONAL AIRPORT msp™

MINNEAPOLIS SAINT PAUL METROPOLITAN AIRPORTS COMMISSION MAC

DATE:
Tuesday, August 23, 2022

TIME:
4:30 to 7 p.m., long-term planning presentation at 5:30 p.m.

LOCATION:
Metropolitan Airports Commission

Administrative Offices

6040 28th Avenue South
Minneapolis, MN 55450

EXPERIENCE MSP is a series of four events for the public to learn about MSP Airport's long-term planning process and to provide input into that process. The Metropolitan Airports Commission welcomes your interest and input throughout.

Welcome Remarks

Naomi Pesky

Metropolitan Airports Commission (MAC)
Vice President of Strategy and Stakeholder Engagement

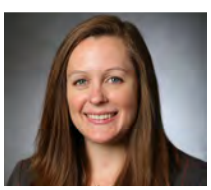
EXPERIENCE msp

Meet the Team

Eric Gilles

Airport Planner
Project Manager

Dana Nelson



Director, Stakeholder Engagement

Ricondo & Associates

Aviation Forecasts + Terminal Planning

Larry Hilton

Joe Chang

HNTB

Airside Planning

Greg Albjerg

Alex Normandin

Kimley-Horn

Landside Planning

Bill Schmitz

Presentation Objectives

- Review the MSP Long-Term Plan (LTP) goals, process and engagement program
- Share progress to-date, to include projected terminal, airside and landside facility requirements and a set of concepts ("alternatives") intended to fulfill projected requirements
- Hear what questions you may have about these alternatives

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Presentation Outline

- **MSP Airport Long-Term Plan Overview and Engagement Program**
  Dana Nelson – MAC Director of Stakeholder Engagement
- **MSP Airport Long-Term Plan Update**
  Eric Gilles, C.M., ACE – MAC Airport Planner
- **Q&A**

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- **Long-Term Plan Overview and Engagement Program**

MSP Long-Term Plan Overview

The plan is:

- A forward-looking planning tool that studies facility and infrastructure needs based on projected 20-year demand levels.
- It will focus on evaluating when facility improvements would be needed to accommodate projected demand in a manner that is safe, efficient, orderly and cost-effective.

The plan does not:

- Authorize construction or improvements to facilities, nor does it serve as a method for studying environmental impacts.

MSP Long-Term Plan Goals

- Plan for future facilities that will meet projected passenger activity levels in a manner that maintains and enhances customer service, while facilitating a seamless passenger experience.
- Produce a development plan that positions the MAC to:
  - meet future demand levels
  - enhance financial strength
  - leverage environmental stewardship, and
  - infuse sustainable thinking
- Conduct the planning process in a manner that includes meaningful stakeholder engagement processes.

MSP Long-Term Plan Process

We are currently on these steps

Baseline Existing Facilities	• Inventory and document existing facilities and aviation activity levels to establish baseline conditions
Forecasts	• Forecast MSP aviation activity levels (passengers, cargo, and aircraft operations) for the milestone years between 2020 and 2040
Facility Requirements (Gap Analysis)	• Determine any facility deficiency gaps between the baseline condition and desired future conditions based on forecasted activity levels
Development Concepts	• Develop and evaluate alternative means to remedy facility deficiencies identified through the process
Proposed Development	• Determine a proposed development program, funding plan, and implementation strategy to present to the community and the MAC board
Environmental Considerations	• Prepare an overview of environmental factors that should be taken into consideration when implementing the plan

LTP Stakeholder Engagement

- Experience MSP public event series
- Stakeholder Advisory Panel
- Project website (mspairport.com/long-term-plan)
- Electronic newsletters with planning updates
- Public surveys and polls
- Updates at MAC committees and commission



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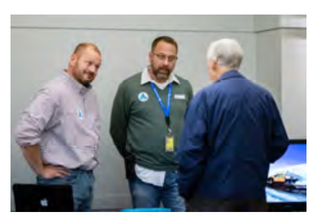
Stay Connected

- **Contact us via email at MSPAirportLongTermPlan@mspmac.org**
- **Visit the project website at www.mspairport.com/long-term-plan**
- **Receive regular updates by signing up for our e-newsletter**

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What We Do With Your Feedback

- We're here to listen to your input, concerns and aspirations and, when possible, make changes
- The Plan may not incorporate all input provided by the public due to other considerations, such as:
  - Maintaining a high level of service
  - Achieving the established goals of the Plan
  - Conforming to design standards
  - Safety
  - Operational feasibility
  - Federal and state policies
  - Project costs

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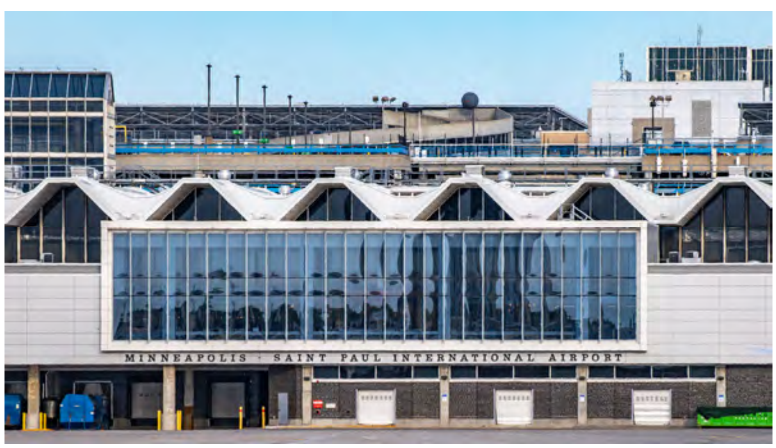

- **MSP Airport Long-Term Plan Update**
  - Long-Term Plan Project Timeline
  - Overview of Facility Requirements
  - Draft Alternatives

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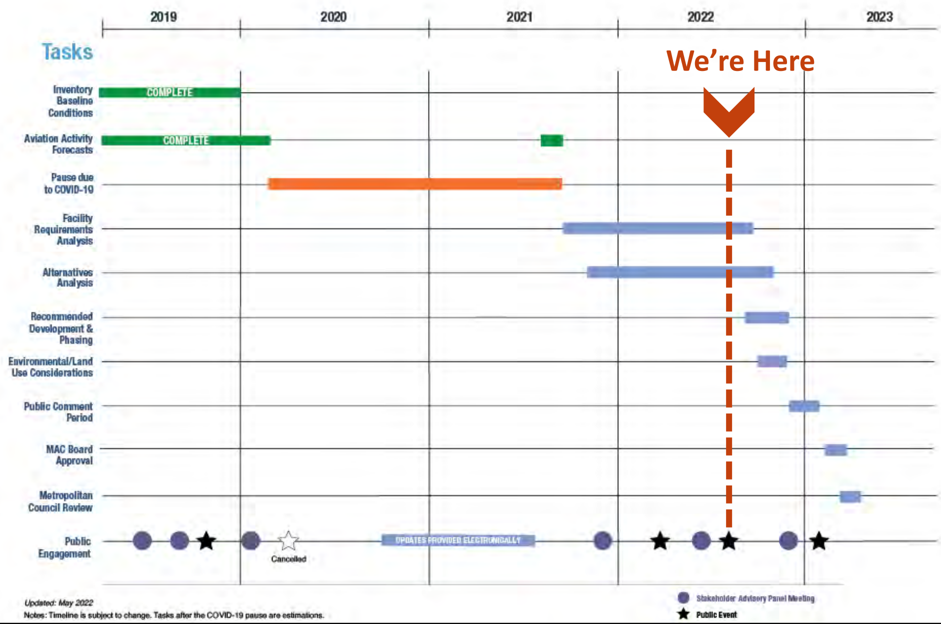
Long-Term Plan (LTP) Project Timeline



Key Terminology

Planning Activity Level (PAL)

- PALs often fluctuate based on actual demand
- PAL 2 = 2030; PAL 3 = 2040

Flight Inspection Services (FIS)

- Secure area in Terminals 1 and 2 used for processing passengers arriving from international locations

Preferential Gating

- Only one airline uses a gate

Common Use Gating

- Multiple airlines share a gate

Summary of Facility Requirements

Terminal Challenges
- Gating requirements and passenger connectivity
- Flight Inspection Services (FIS)

Landside Challenges
- Curbside and roadway congestion
- Address long-term parking needs (private, rental, ride-share)

Airside Challenges
- Maintain airfield efficiency
- Long-term Remain Overnight (RON) aircraft parking needs
- Address airfield design standards

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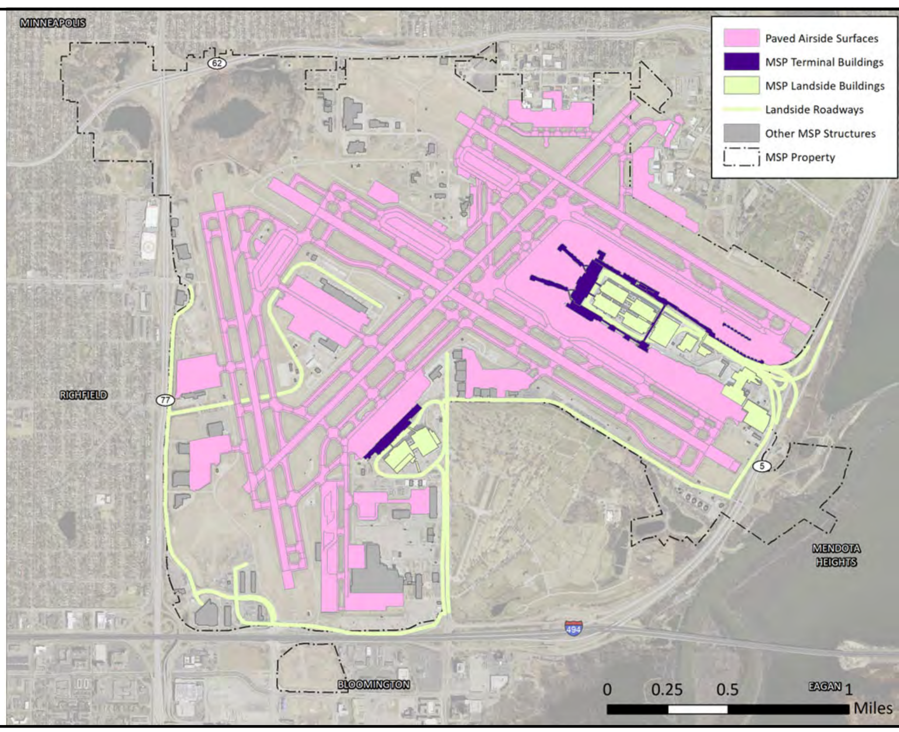


Draft Alternatives

Alternative 1A

- Single Flight Inspection Service (FIS) facility at Terminal 1
- Maximize preferential gating

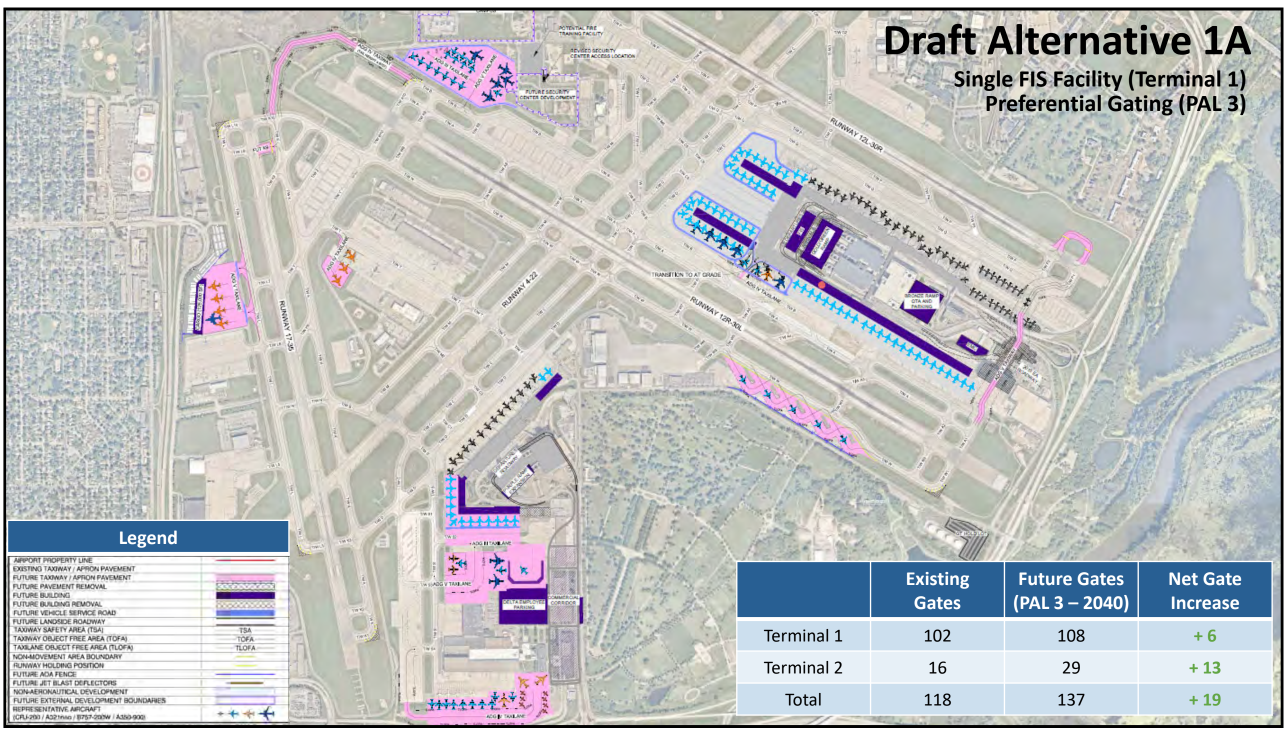
Alternative 2A

- Single FIS at Terminal 2
- Emphasis on common-use gating

Alternative 3A

- Two FIS facilities (Terminal 1 and 2)
- Maximize preferential gating
- How the airport operates today

EXPERIENCE msp

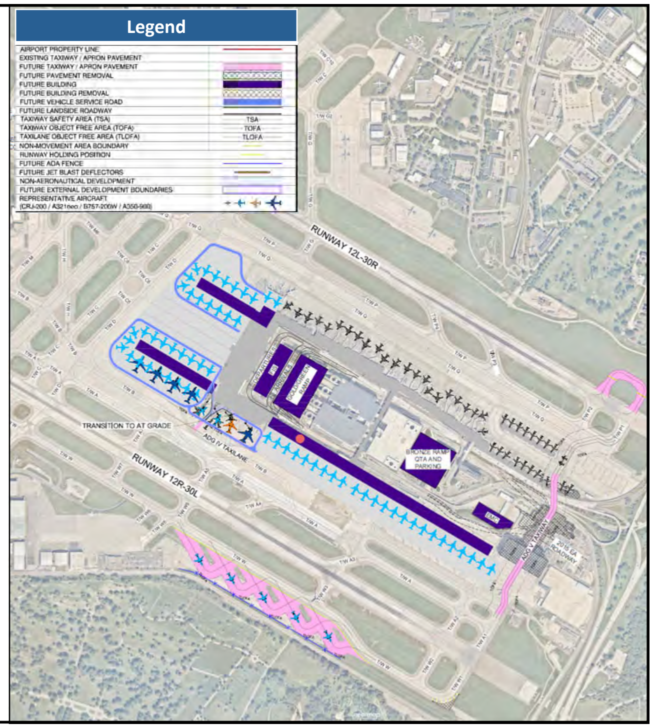


	Existing Gates	Future Gates (PAL 3 – 2040)	Net Gate Increase
Terminal 1	102	108	+ 6
Terminal 2	16	29	+ 13
Total	118	137	+ 19

Draft Alternative 1A

- Terminal
  - Concourse E and F Reconstruction
  - Extend Concourse G
- Airside
  - Crossover Taxiway (RWY 30L & 30R)
  - Relocate RWY 30L Deicing (TWY W)
  - North Partial Parallel Taxiway (RWY 30R)
- Landside
  - Reconstruct Green/Gold Ramps
  - Construct Single FIS Facility (Green/Gold Area)
  - Additional Vehicle Curb Frontage
  - Bronze Ramp/EMC Needs

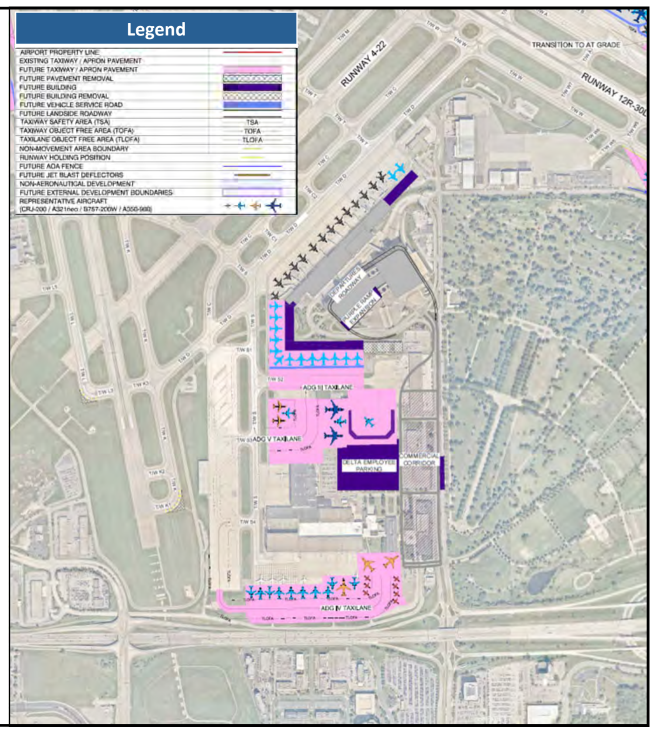
EXPERIENCE msp



Draft Alternative 1A

- Terminal
  - Extend Terminal 2 South and North
- Airside
  - Additional Remain Overnight (RON) Parking for Sun Country (Humphrey Pad) and Delta (Near I-494)
- Landside
  - Purple Ramp Expansion
  - Potential Commercial Development Along 34th
  - Delta Employee Parking Structure

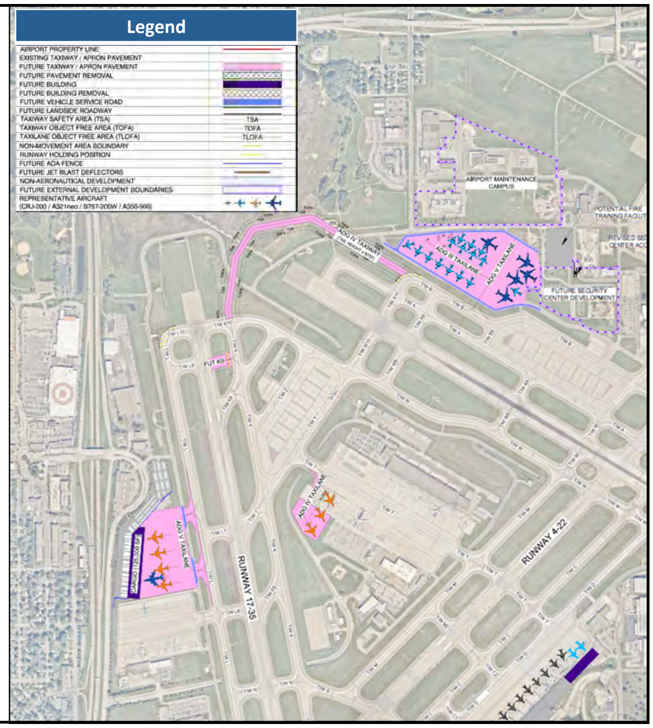
EXPERIENCE msp

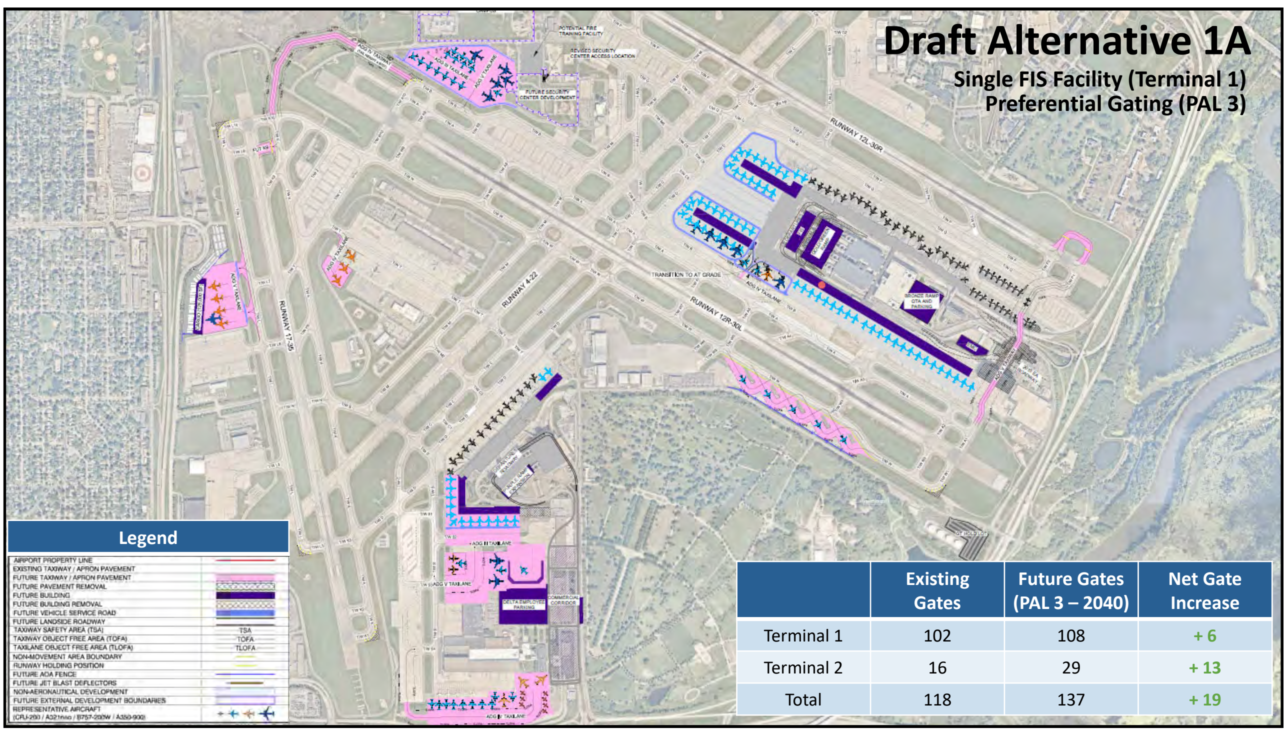


Draft Alternative 1A

- Terminal
  - None in-View
- Airside
  - Additional Remain Overnight (RON) Parking
  - RWY 12R End-Around Taxiway
  - Potential for Small Cargo Expansion
- Landside
  - None in-View

EXPERIENCE msp





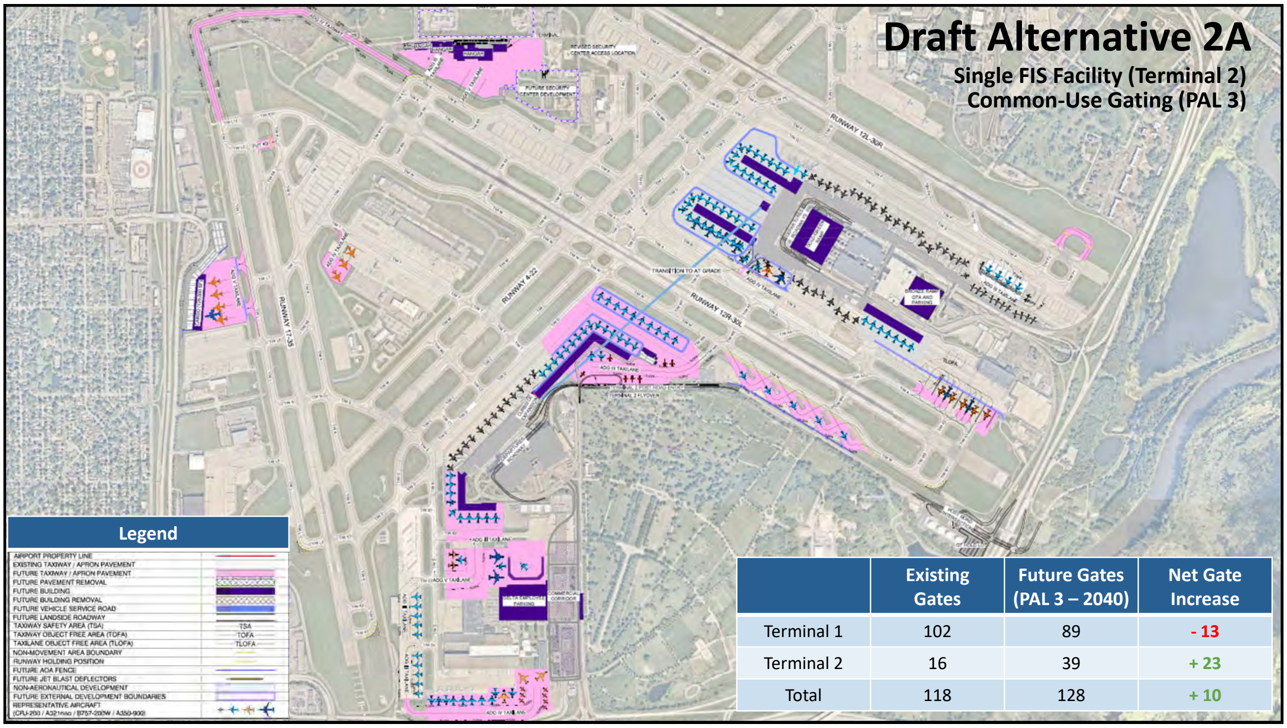
Draft Alternative 1A

Single FIS Facility (Terminal 1)
Preferential Gating (PAL 3)

	Existing Gates	Future Gates (PAL 3 – 2040)	Net Gate Increase
Terminal 1	102	108	+ 6
Terminal 2	16	29	+ 13
Total	118	137	+ 19

Draft Alternative 2A

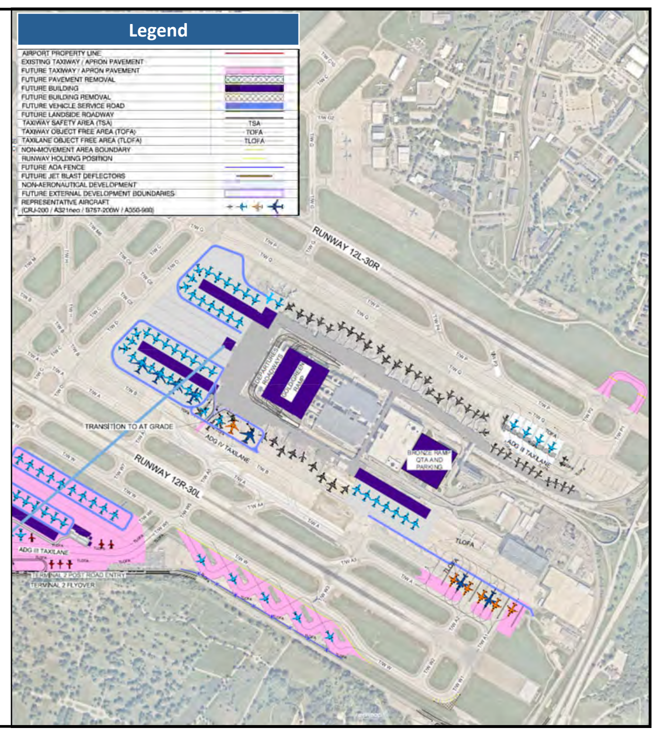
Single FIS Facility (Terminal 2)
Common-Use Gating (PAL 3)



	Existing Gates	Future Gates (PAL 3 – 2040)	Net Gate Increase
Terminal 1	102	89	- 13
Terminal 2	16	39	+ 23
Total	118	128	+ 10

Draft Alternative 2A

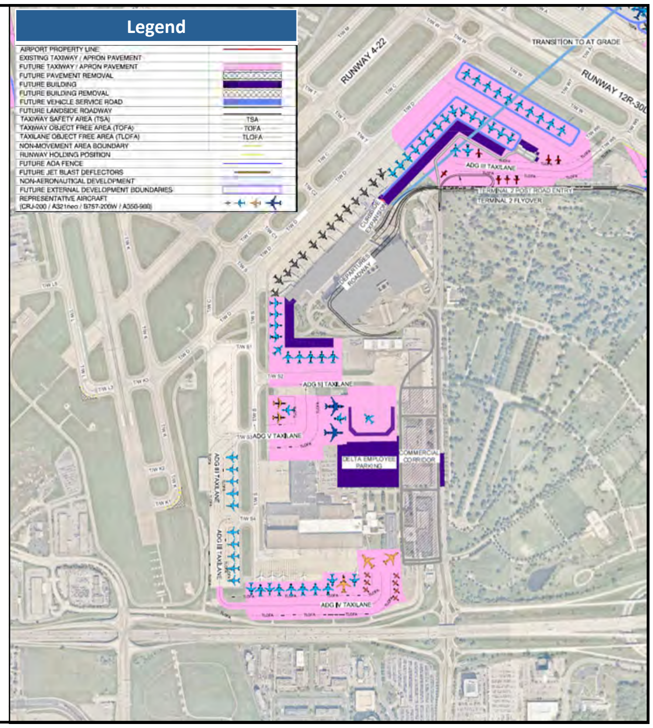
- Terminal
  - Concourse E and F Reconstruction
  - Extend Concourse G
- Airside
  - Cover Vehicle Service Road
  - Expand RWY 30L Deicing (TWYs B and W)
  - North Partial Parallel Taxiway (RWY 30R)
  - Demolish Concourse B; Add Deicing (RWY 30R)
- Landside
  - Reconstruct Green/Gold Ramps
  - Additional Vehicle Curb Frontage
  - Bronze Ramp/EMC Needs



Draft Alternative 2A

- Terminal
  - Extend Terminal 2 South and North
  - Sterile Connection to Terminal 1
- Airside
  - Additional Remain Overnight (RON) Parking for Sun Country (Humphrey Pad) and Delta (Near I-494)
  - RON/Deicing Pad North of Terminal 2
- Landside
  - 34th Flyover; Post-Road Improvements
  - Potential Commercial Development Along 34th
  - Delta Employee Parking Structure

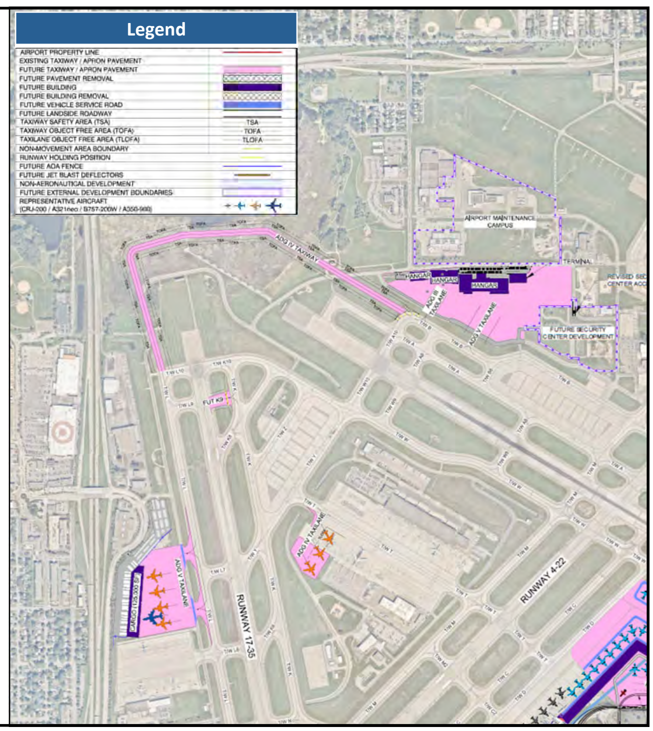
EXPERIENCE msp

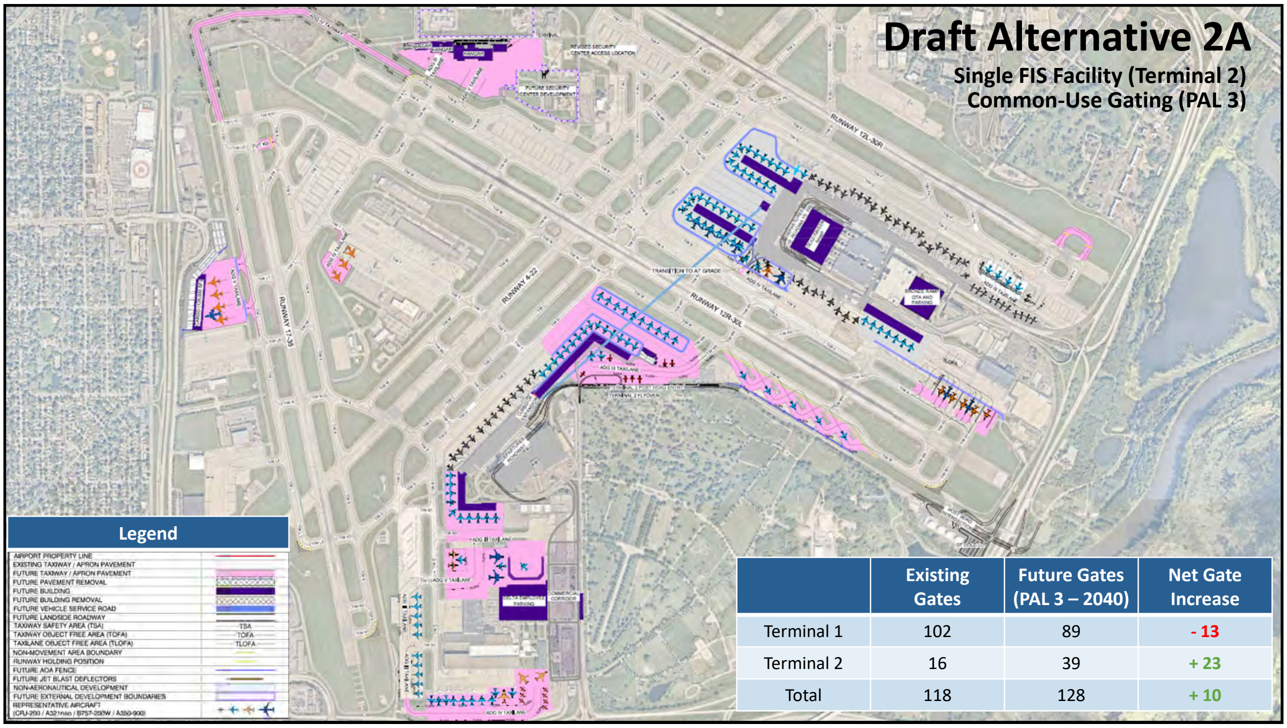


Draft Alternative 2A

- Terminal
  - None in-View
- Airside
  - Additional Remain Overnight (RON) Parking
  - RWY 12R End-Around Taxiway
  - Potential for Small Cargo Expansion
  - Relocated Fixed-Base Operator (FBO)
- Landside
  - None in-View

EXPERIENCE msp

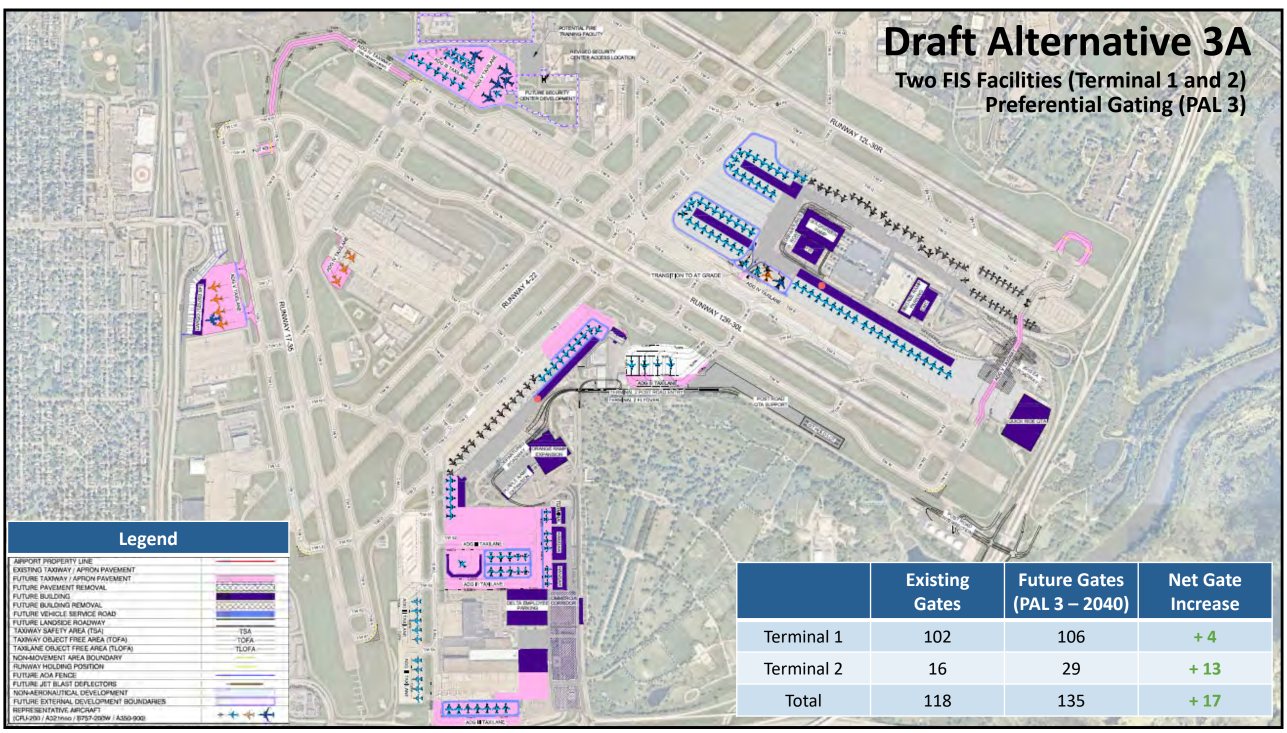




Draft Alternative 2A

Single FIS Facility (Terminal 2)
Common-Use Gating (PAL 3)

	Existing Gates	Future Gates (PAL 3 – 2040)	Net Gate Increase
Terminal 1	102	89	- 13
Terminal 2	16	39	+ 23
Total	118	128	+ 10



Draft Alternative 3A

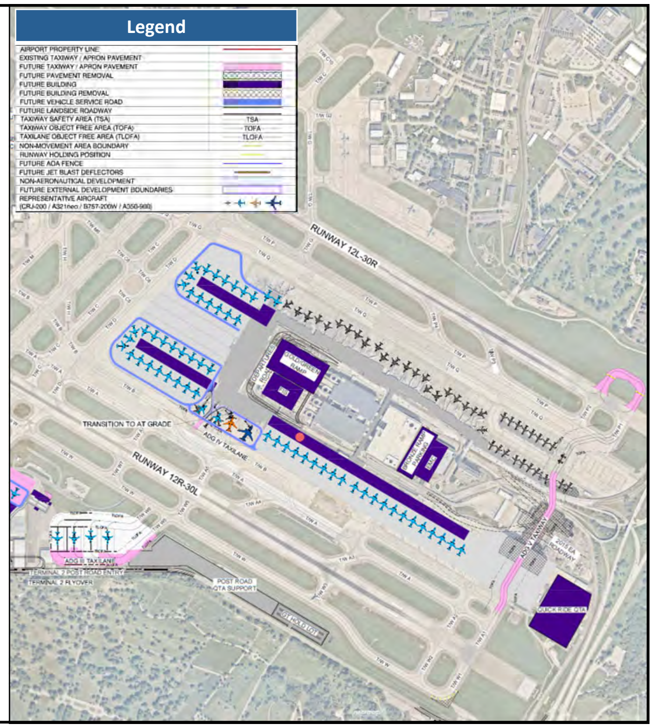
Two FIS Facilities (Terminal 1 and 2)
Preferential Gating (PAL 3)

	Existing Gates	Future Gates (PAL 3 – 2040)	Net Gate Increase
Terminal 1	102	106	+ 4
Terminal 2	16	29	+ 13
Total	118	135	+ 17

Draft Alternative 3A

- Terminal
  - Concourse E and F Reconstruction
  - Extend Concourse G
- Airside
  - Cover Vehicle Service Road
  - Relocate RWY 30L Deicing (Existing FBO)
  - North Partial Parallel Taxiway (RWY 30R)
  - Crossover Taxiway (RWY 30L & 30R)
- Landside
  - Reconstruct Green/Gold Ramps
  - Additional Vehicle Curb Frontage
  - Bronze Ramp/EMC Needs

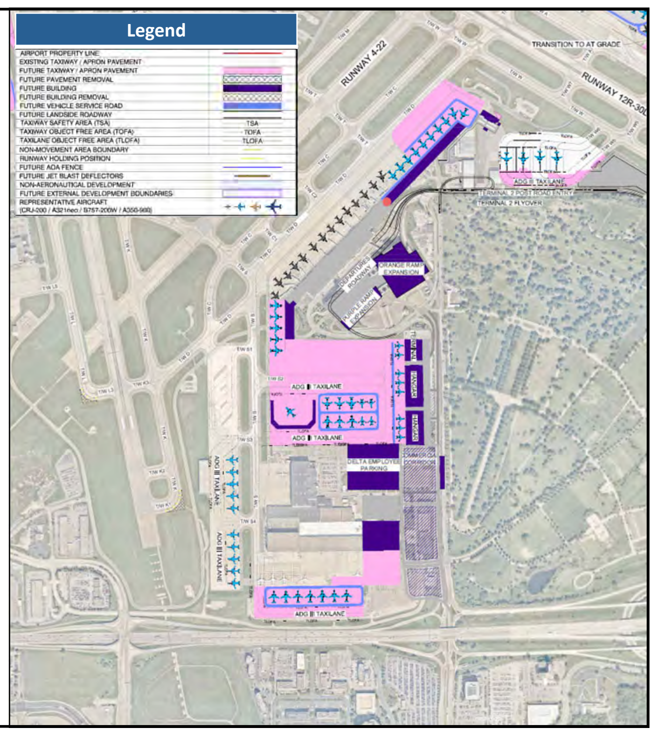
EXPERIENCE msp



Draft Alternative 3A

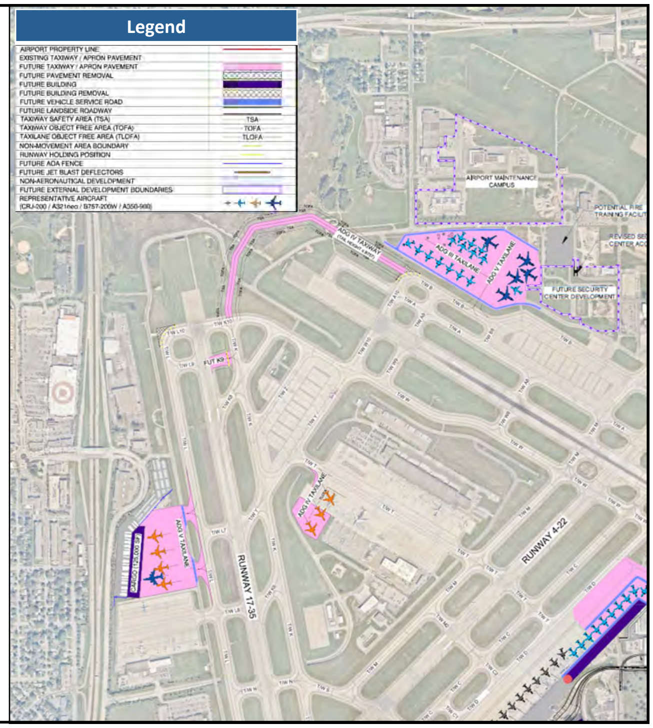
- Terminal
  - Extend Terminal 2 South and North
- Airside
  - Additional Remain Overnight (RON) Parking for Sun Country (Humphrey Pad) and Delta (Near I-494)
  - Relocate FBO Along 34th
- Landside
  - 34th Flyover; Post-Road Improvements
  - Potential Commercial Development Along 34th
  - Delta Employee Parking Structure

EXPERIENCE msp



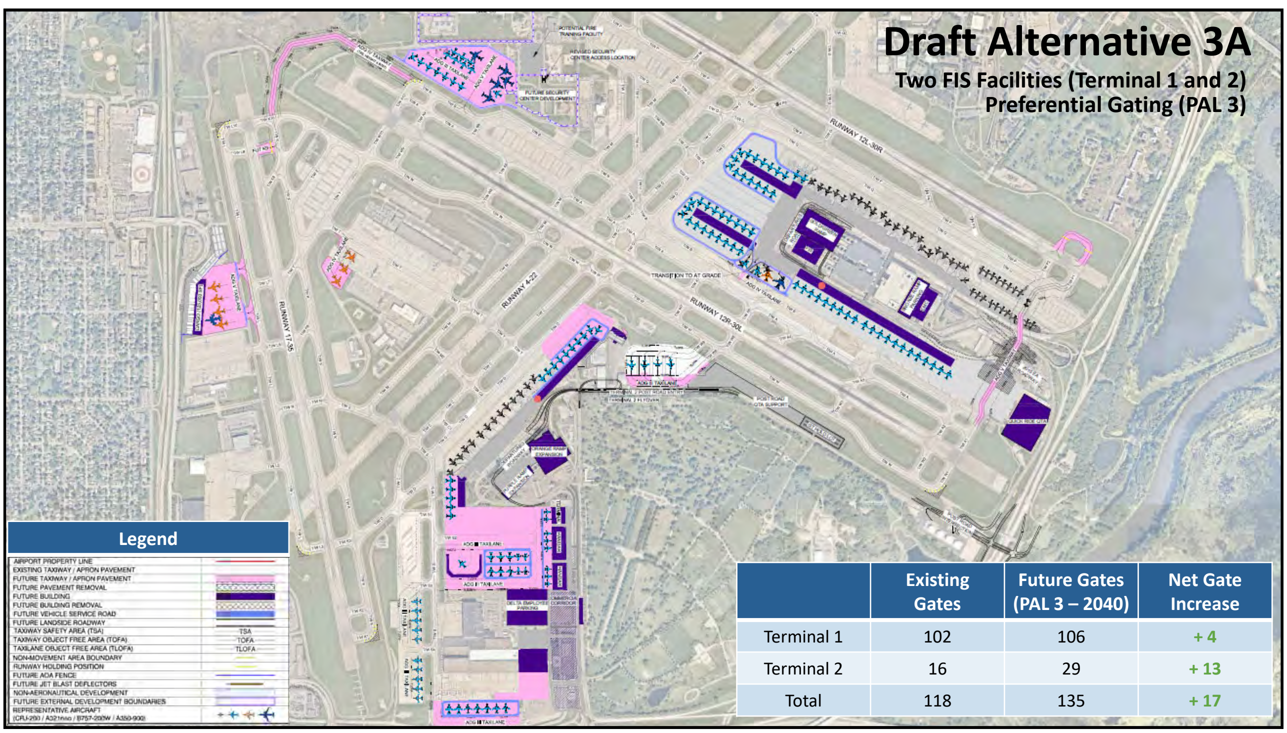
Draft Alternative 3A

- Terminal
  - None in-View
- Airside
  - Additional Remain Overnight (RON) Parking
  - RWY 12R End-Around Taxiway
  - Potential for Small Cargo Expansion
- Landside
  - None in-View



Draft Alternative 3A

Two FIS Facilities (Terminal 1 and 2)
Preferential Gating (PAL 3)



	Existing Gates	Future Gates (PAL 3 – 2040)	Net Gate Increase
Terminal 1	102	106	+ 4
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Total	118	135	+ 17

Q&A

Guidelines

- Each speaker is requested to keep their questions to 2 minutes to allow everyone the opportunity to speak
- The Plan may not incorporate all input provided by the public due to other considerations, such as:
  - Maintaining a high level of service
  - Achieving the established goals of the Plan
  - Conforming to design standards
  - Safety
  - Operational feasibility
  - Federal and state policies
  - Project costs

Meet the Team

Eric Gilles

Airport Planner
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Aviation Forecasts + Terminal Planning

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Joe Chang

HNTB

Airside Planning

Greg Albjerg

Alex Normandin

Kimley-Horn

Landside Planning

Bill Schmitz

Take Our Event Survey

Thank you for joining!

EXPERIENCE msp

June 22, 2023

Contact: Jeff Lea
314-793-4240
jeff.lea@mspmac.org

NOT FOR RELEASE |6-21-23 Draft

MAC Opens 60-Day Public Comment Period for MSP Long-Term Plan

Proposed Plan Accommodates Forecasted Demand Through 2040

MINNEAPOLIS-ST. PAUL– The Metropolitan Airports Commission (MAC) has opened a 60-day public comment period for its draft 2040 Long-Term Plan for Minneapolis-St. Paul International Airport (MSP). Commissioners voted Tuesday to formally post the plan and invite the public to review and submit comments on the draft through Aug. 21.

The MSP long-term plan incorporates comprehensive research on passenger and aircraft trends along with current airport infrastructure capabilities. It also reflects feedback and input gathered through extensive stakeholder and public engagement to determine facility needs through 2040. The Federal Aviation Administration asks airports to update their planning documents every seven to 10 years, which also aligns with the Metropolitan Council's guidelines for airport planning.

"MSP's long-term plan is an important tool to help us prepare for future growth in passengers and air service demand," said Brian Ryks, CEO of the MAC. "Throughout the process, the MAC has remained focused on furthering our award-winning passenger experience while sustaining the highest operational standards in service of travelers and stakeholders."

The draft plan includes projects to improve MSP's terminals, parking facilities and airfield. It incorporates 12 net new gates between Terminals 1 and 2 to accommodate forecasted growth, outlines opportunities to relieve curbside congestion, and recommends reconstructing parking facilities that are reaching the end of their useful life. The plan also includes enhancements to airfield taxiways. No new runways or runway extensions are proposed.

While the draft plan outlines potential airport projects, it does not authorize construction. The MAC will follow the required environmental review process and vote on separate budget actions to formally approve specific projects identified in the plan.

Staff will present the draft long-term plan at its final public Experience MSP event on July 11, 2023, at the Sabathani Community Center in Minneapolis, MN 55409. The event runs from 4:30-8:30 p.m.

The draft MSP 2040 Long-Term Plan is available at https://www.mspairport.com/ltp-60-day-public-comment-period with additional information about the planning process and a link to submit public comments. Written comments will be accepted until 5 p.m. CDT on Monday, Aug. 21.

The Metropolitan Airports Commission (MAC) owns and operates one of the nation's largest airport systems, including Minneapolis-St Paul International (MSP) *and six general aviation airports. The MAC's airports connect the region to the world and showcase Minnesota's extraordinary culture to millions of passengers from around the globe who arrive or depart through MAC airports each year. Though a public corporation of the state of Minnesota, the organization is not funded by income or property taxes. Instead, the MAC's operations are funded by rents and fees generated by users of its airports. For more information, visit www.metroairports.org.*

YOU'RE INVITED TO

EXPERIENCE

EXPERIENCE msp™

An opportunity to learn more about Minneapolis-St. Paul International Airport and how the Metropolitan Airports Commission is planning for its future.

Learn about proposed projects in the MSP Airport Long-Term Plan, submit written comments, hear about sustainability in aviation, experience airport exhibits and kids' aviation-themed activities.

DRAFT PLAN OPEN FOR PUBLIC COMMENT:

- The draft Long-Term Plan is available at http://www.mspairport.com/long-term-plan
- Submit written comments via email to MSPAirportLongTermPlan@mspmac.org or mail to:
  Metropolitan Airports Commission
  Attn: Airport Planner 6040 28th Avenue South, Minneapolis, MN 55450
- Written comments will be accepted until Monday, August 21, 2023 at 5:00 p.m.

DATE:
Tuesday, July 11, 2023

TIME:
4:30 to 8:30 p.m., long-term planning presentation at 5:30 p.m.

LOCATION:
Sabathani Community Center

310 East 38th Street,
Minneapolis, MN 55409

This EXPERIENCE MSP event is the last of the four-part series for the public to learn about the MSP Airport Long-Term Plan and to provide input into that process. The Metropolitan Airports Commission welcomes your interest and input throughout.

Minneapolis Saint Paul INTERNATIONAL AIRPORT msp™

METROPOLITAN AIRPORTS COMMISSION MINNEAPOLIS SAINT PAUL MAC

AFFIDAVIT OF PUBLICATION
STATE OF MINNESOTA
COUNTY OF RAMSEY

Kayla Tsuchiya, being duly sworn on oath, says: that she is, and during all times herein state has been, Inside Sales Representative of Northwest Publication, LLC., Publisher of the newspaper known as the Saint Paul Pioneer Press, a newspaper of General circulation within the City of St. Paul and the surrounding Counties of Minnesota and Wisconsin including Ramsey and Kanabec.

That the notice hereto attached was cut from the columns of said newspaper and was printed and published therein on the following date(s):
Wednesday, June 21, 2023

Newspaper Ref./AD Number#: 71504657

Client/Advertiser: Metropolitan Airports Commission

Kayla Tsuchiya

AFFIANT SIGNATURE

Subscribed and sworn to before me this 21 day of June, 2023

True Lee

NOTARY PUBLIC

Ramsey County, MN
My commission expires January 31, 2025

PUBLIC NOTICE
2040 MINNEAPOLIS-ST. PAUL INTERNATIONAL AIRPORT LONG-TERM PLAN
Public Comment Period Open

The Metropolitan Airports Commission (MAC) has completed a draft version of the 2040 Long-Term Plan for Minneapolis-St. Paul International Airport (MSP). The public is invited to review this document and provide written comments to the MAC.

MSP Airport is a commercial service airport that supports the Minneapolis-St. Paul metropolitan area. MSP Airport is located south of downtown Minneapolis, Minn. and southwest of downtown St. Paul. MSP Airport plays a vital role in helping the metropolitan area thrive and is routinely ranked among North America's best and most efficient airports. MSP Airport supports over 86,000 jobs, serves 39 million passengers each year and contributes $15 billion in total economic output each year.

The MSP Long-Term Plan is a forward-looking planning tool that studies facility needs based on projected 20-year passenger and aircraft demand. It helps the MAC better understand and plan for future facility needs by evaluating when improvements may be needed to accommodate demand. It does not authorize construction or facility improvements, nor does it serve as a basis for determining eligibility for noise mitigation programs.

The Long-Term Plan proposes facility improvements that: 1) will meet projected passenger activity in a manner that maintains and enhances customer service; 2) allows the MAC to meet future demand, leverage environmental stewardship, and infuse sustainable thinking from both an environmental and financial perspective; and 3) incorporates public and stakeholder feedback received throughout the planning process.

The draft Long-Term Plan considers improvements to three segments of the airport: terminal, airside and landside. Improvements are proposed to both Terminals 1 and 2, adding twelve net new gates to accommodate future growth. Airside improvements are proposed to improve traffic flow and accommodate capacity growth. No runway extensions, additions or changes are proposed. Landside improvements include relieving terminal curbside congestion and reconstructing parking facilities that are reaching the end of their useful life.

Copies of the draft Long-Term Plan will be available for distribution and for viewing on the MAC's website beginning Wednesday, June 21, 2023 (web address). Written comments will be accepted until Monday, August 21, 2023, at 5:00 p.m. CDT.

Copies of the draft Long-Term Plan document will also be available for review at the following locations: MAC General Office, 6040 28th Avenue South, Minneapolis; Sabathani Community Center, 310 E 38th Street, Minneapolis; Richfield City Hall, 6700 Portland Avenue, Richfield; Eagan Municipal Center, 3830 Pilot Knob Road, Eagan. A request for a copy may be submitted via the email address below.

Please submit written comments via email to MSPAirportLongTermPlan@mspmac.org, or by mail to Metropolitan Airports Commission, Attn: Airport Planner, 6040 28th Avenue South, Minneapolis, MN 55450.

Members of the public are also invited to attend the fourth and final Experience MSP event. This event provides an opportunity to learn more about the proposed developments included in the MSP Airport Long-Term Plan and to submit written comments. The event will provide an opportunity for one-on-one interaction with MAC staff in an open-house setting at the time and location listed below:

Tuesday, July 11, 2023
4:30 to 8:30 PM
Long-Term Plan Presentation beginning at 5:30 PM

Sabathani Community Center
310 E 38th St
Minneapolis, MN 55409

The event will provide an introduction to the MSP Airport Long-Term Plan process, as well as opportunities to learn about sustainability in aviation and join aviation-themed youth activities.

More information is available on the project website: https://www.mspairport.com/long-term-plan

AFFIDAVIT OF PUBLICATION

STATE OF MINNESOTA)
COUNTY OF HENNEPIN)

StarTribune

650 3rd Ave. S, Suite 1300 | Mineapolis, MN | 55488

Terri Swanson, being first duly sworn, on oath states as follows:

1. (S)He is and during all times herein stated has been an employee of the Star Tribune Media Company LLC, a Delaware limited liability company with offices at 650 Third Ave. S., Suite 1300, Minneapolis, Minnesota 55488, or the publisher's designated agent. I have personal knowledge of the facts stated in this Affidavit, which is made pursuant to Minnesota Statutes §331A.07.

2. The newspaper has complied with all of the requirements to constitute a qualified newspaper under Minnesota law, including those requirements found in Minnesota Statutes §331A.02.

3. The dates of the month and the year and day of the week upon which the public notice attached/copied below was published in the newspaper are as follows:

Dates of Publication		Advertiser	Account #	Order #
StarTribune	06/21/2023	METROPOLITAN AIRPORTS COMMIS	1000018584	461057

4. The publisher's lowest classified rate paid by commercial users for comparable space, as determined pursuant to § 331A.06, is as follows: **$800.80**

5. Mortgage Foreclosure Notices. Pursuant to Minnesota Statutes §580.033 relating to the publication of mortgage foreclosure notices: The newspaper's known office of issue is located in Hennepin County. The newspaper complies with the conditions described in §580.033, subd. 1, clause (1) or (2). If the newspaper's known office of issue is located in a county adjoining the county where the mortgaged premises or some part of the mortgaged premises described in the notice are located, a substantial portion of the newspaper's circulation is in the latter county.

FURTHER YOUR AFFIANT SAITH NOT.

Terri Swanson

Subscribed and sworn to before me on: 06/21/2023

Diane E Rak Kleszyk

DIANE E RAK KLESZYK
Notary Public
Minnesota
My Commission Expires January 31, 2027

Notary Public

StarTribune
Business
Wednesday, June 21, 2023

Ad Number: 0000461057-01
Insertion Number: N/A
Size: 1 Col x 12.58 in
Color Type: 0

Advertiser: Metropolitan Airport Commission
Agency: N/A
Section-Page-Zone(s): D-4-All
Description: PUBLIC NOTICE 2040 MINNEAPOLIS-ST...

CLASSIFIEDS + PUBLIC NOTICES

STARTRIBUNE.COM/CLASSIFIEDS • 612.673.7000 • 800.927.9233

GENERAL POLICIES
Review your ad on the first day of publication. If there are mistakes, notify us immediately. We will make changes for errors and adjust your bill, but only if we receive notice on the first day the ad is published. We limit our liability in this way, and we do not accept liability for any other damages which may result from error or omission in or of an ad. All ad copy must be approved by the newspaper, which reserves the right to request changes, reject or properly classify an ad. The advertiser, and not the newspaper, is responsible for the truthful content of the ad. Advertising is also subject to credit approval.

Legal Notices

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Garage Sales - S. of River Suburbs

NORTHFIELD, Carleton College's Lighten Up Garage Sale at Laird Stadium: June Thurs. 22 7AM-4PM, Fri. 23, 8AM-6PM & Sat. 24, 8AM-2PM. Household items, clothing, books, sports & more! Proceeds to charity.

216 General Announcements

THE MINNESOTA ANTIQUARIAN BOOK FAIR
July 7th - 8th / Fri. 3 - 7 p.m. / Sat. 10 a.m. - 4 p.m.
The University of St. Thomas Arena
www.minnesotabookfair.com
Summer book fair for everyone!

324 Collectibles

PAYING CASH (no check)
for gold/10k, 14k, 18k, 22k & dental, silver, silver coin. sterling flatware, diamonds, Rolex, high-end watches, antique jewelry, collectibles, old comics & baseball cards, etc. We make house calls or our office. 45 yrs bus. BBB-A+/WCCO #1 Appraiser/5 Stars. Call for free advice & appointment. 9am-9pm/ 7 days a week. **Mark & Susan 612-802-9686**

Place a classified ad today.

383 Musical Instruments/Other

Lowry Organ Has been in my family since the 1960's. Minor damage to the finish. $50 obo. 612-724-2277

395 Misc. For Sale & Wanted

FREON WANTED Certified buyer looking to buy R11, R12, R22 & more! Call Xiomara at 312-697-1976. 312-291-9169

Pinball/Arcade Machines Wanted Working or not. Cash paid! 45+ years exp. Will pick up. 612-747-8458

404 Dogs

1/2 Great Pyrenees 1/2 Caucasian Shepherd. LGD. [Russian Bear Dog] 320-760-2708

AUSTRALIAN SHEPHERD STANDARD Registered, vaccinated, M/F. Ready to go in July. **Call/text: 320-212-4542**

Basset Pups, Gorgeous, healthy purebred. Vet checked, vacc. hlth guar. $1295 AND also beautiful, tiny non shed **Teddy Bear Pups.** $895. **Call for pics 608-632-7433.**

Bernedoodles Tri colored, blue merles & blacks www.BouncingBernedoodles.com 507-251-1909 507-251-1909

Bichon-Shih Tzu Puppies Non-Shed, Vet Ck, H Guar, Ready NOW $800up Ardyweb.com 612-760-1096

Bulldogge Olde Olde Bulldogge pups M/F fam rsd, exc quality 800-1200 pet pricing papers av 218-251-6276

Cavapoos, Mini/Petite - Goldendoodles, Whoodles, 1-Bernedoodle, 2-Shihtzus, Cockapoo puppies ready to go! UTD shots/deworm, 2 yr Guarantee. Lic# 484991 Also, we have rescues (We need foster families pls!) we train & we board small-er dogs in our home! Brenda 608-574-7931 Or Dusty 920-210-7441 **SpringGreenPups.com**

Coton De Tulear Purebred AKC Puppies 2M, 1F available now. www.GallantFarm.com 612-715-1238

ENGLISH CREAM GOLDEN RETRIEVER PUPPIES AKC Ready now! Health guarantee. 701-213-3552 FB: Heaven-Sent Golden Retrievers. heavensentgoldenretrievers.com

English Cream Golden Retrievers AKC/OFA 2 males available 6/24/23 1-year health warranty 763-458-6470

English Springer Spaniel Pups AKC Black & White - Males. Ready 06/21. Vet chkd, 1st shots, dewormed, docked & dews. $1,200. 715-497-6891

ENGLISH SPRINGER SPANIEL PUPS AKC Ready 6/20, family/farm rsd w/kids, vet chkd, 1st shots, dewormed, docked & dews. Champ lines on both sides. Parents are both hunters & great family pets. Litter has combination of red/white, black/white, tri & sable. M $1100 + $200 extra for tri & sable, 1 F $1500. 612-710-4861 Scott

English Springer Spaniel Pups AKC Vet chkd, shots, dewrmd, farm & family raised. M: $800. **641-364-2097**

French Bulldogs - 8 weeks old
1 male - 3 females Blue and Blue Pied. AKC, Microchip, 1 year heath guarantee, vet records & vaccination records. 612-707-8586

GERMAN SHEPHERD PUPS
AKC. Exc temp. Genetic guar antee. 715-537-5413. **www.jerland.com**

German Shepherd Pups AKC M/F. Black & tan, vaccinated & wormed. Ready to go! **Call: 715-746-2253**

German Shorthaired Pointer Pups Whelped 5/20/23. Full AKC reg, OFA Cert, vaccinated & wormed. Family raised, excellent. bird dogs. F: $1,200, M $1,000. **218-640-5300.**

GOLDENDOODLE PUPPIES Well socialized, vet checked, dewormed, standard size. $800 218-244-1599

Goldendoodles Beautiful smaller goldendoodles. Vet checked. Call for information. 320-248-7954

Golden Retriever AKC Pups Born 3/23. 1st shots. $800. Great, loyal family dogs. Papers incl. 715-415-0378

Golden Retriever Puppies AKC Dew Claws/shots/wormed/Health Guarantee/fam raised 712-299-1189

Old English Sheepdog AKC puppies avail 6/29 in NE SD. Family dogs. 1st litter shots UTD, tails docked. $1000. 605-868-9209. $1,000 605-868-9209

Pomeranian 2 males litter box trained looking for a new bone very loveable $650 320-874-1425

Poodles Standard AKC, 9 week, M and F, Black/Red/Apricot, Health tested, vet checked. Family raised. Championship bloodline. $1295 Call 507-276-5442

POODLE STANDARD AKC PUPPIES Vet checked & warranty. $1200. 507-456-0275

Shih Tzu Love to play. Vet checked, up to date on worming, vaccinations, and heartworm prevention. WI#412259 Call or text 608-306-3017

YORKIE puppies Ready 6/27. Shots/wormed/socialized. Superior, WI $1300 Call/text Becky 218-491-1364

EQUAL HOUSING OPPORTUNITY

All rental advertising in the Star Tribune is subject to the laws which make it illegal to advertise "any preference, limitation or discrimination based on race, color, national origin, ancestry, religion, creed, sex, marital status, sexual orientation, handicap, disability, familial status or status regarding public assistance or an intention to make any such preference, limitation or discrimination". The Star Tribune will not knowingly accept any advertisements which are in violation of the law. All dwellings advertised in the Star Tribune publications are available on an equal opportunity basis.

Resources:
Mpls. Civil Rights 612-673-3012
MN Human Rights 651-296-5663
Rental Home Line 612-728-5767
HUD 1-800-669-9777

897 MOBILE HOMES/ MISC REAL ESTATE FOR SALE & WANTED

Leech Lake, MN. MOBILE HOME FOR SALE! Seasonal mobile home, privately leased land. Furnished, 2 kitchens, 4 BD, 2 1/2 BA, great fishing! $45k. **Please call: 630-881-7116.**

AUTOS

FORD

FORD F250 2016 XLT Pickup Truck Custom MegaRaptor Wht/Grey Int., 31,256 miles, Automatic $69,995 651-815-5885

VEHICLES WANTED

$$$$$ CASH FOR CARS $$$$$ Repairables or Junkers 612.414.4924

Jobs

CONSTRUCTION MANAGER [GENERAL SUPERINTENDENT]
CHERNE Contracting Corporation has a role in Bloomington, MN. *Construction Manager [General Superintendent] - [CHER-MN22-JASPL]- Manage & direct project staff & scheduling; and determine equipment needs for large scale projects. North America/Int'l travel required 30%. Resume to Kiewit. Recruit@kiewit.com & note Job ID# in the subject line.

Mortgage Foreclosures

STATE OF MINNESOTA
DISTRICT COURT
COUNTY OF HENNEPIN
FOURTH JUDICIAL DISTRICT
CASE TYPE 14: OTHER CIVIL
MORTGAGE FORECLOSURE
COURT FILE NO. 27-CV-23-8224
SUMMONS

Wilmington Savings Fund Society, FSB, not in its individual capacity but solely as owner Trustee of CSMC 2021-RPL8 Trust Plaintiff,
vs.
Michael I. Mann Defendant(s).

THIS SUMMONS IS DIRECTED TO THE ABOVE NAMED DEFENDANTS:
1. YOU ARE BEING SUED. The Plaintiff has started a lawsuit against you. The Plaintiff's Complaint against you is attached to this Summons and is on file in the Office of the Court Administrator of the above-named Court. Do not throw these papers away. They are official papers that affect your rights. You must respond to this lawsuit even though it may not yet be filed with the Court and there may be no court file number on this Summons.
2. YOU MUST REPLY WITHIN 21 DAYS TO PROTECT YOUR RIGHTS. You must give or mail to the person who signed this Summons a written response called an Answer within 21 days of the date on which you received this Summons. You must send a copy of your Answer to the person who signed this Summons located at:
Tracy J. Halliday, Esq.
LOGS Legal Group LLP
1715 Yankee Doodle Road, Suite 210 Eagan, MN 55121
3. YOU MUST RESPOND TO EACH CLAIM. The Answer is your written response to the Plaintiff's Complaint. In your Answer you must state whether you agree or disagree with each paragraph of the Complaint. If you believe the Plaintiff should not be given everything asked for in the Complaint, you must say so in your Answer.
4. YOU WILL LOSE YOUR CASE IF YOU DO NOT SEND A WRITTEN RESPONSE TO THE COMPLAINT TO THE PERSON WHO SIGNED THIS SUMMONS. If you do not answer within 21 days, you will lose this case. You will not get to tell your side of the story, and the Court may decide against you and award the Plaintiff everything asked for in the Complaint. If you do not want to contest the claims stated in the Complaint, you do not need to respond. A default judgment can then be entered against you for the relief requested in the Complaint.
5. LEGAL ASSISTANCE. You may wish to get legal help from a lawyer. If you do not have a lawyer, the Court Administrator may have information about places where you can get legal assistance. Even if you cannot get legal help, you must still provide a written Answer to protect your rights or you may lose the case.
6. ALTERNATIVE DISPUTE RESOLUTION. The parties may agree to or be ordered to participate in an alternative dispute resolution process under Rule 114 of the Minnesota General Rules of Practice. You must still send your written response to the Complaint even if you expect to use alternative means of resolving this dispute.
7. THIS LAWSUIT MAY AFFECT OR BRING INTO QUESTION TITLE TO REAL PROPERTY located in the County of Hennepin, State of Minnesota, legally described as follows:
LOT 4, BLOCK 1, HILLSBOROUGH (hereinafter the "Property").
The object of this action is to judicially foreclose upon the Mortgage filed as Document No. A9569120 which encumbers the above-referenced Property. If you fail to answer the Complaint within the time aforesaid, judgment by default will be taken against you for the relief demanded in said Complaint, together with Plaintiff's costs and disbursements.
IF PART OF THE PROPERTY TO BE SOLD CONTAINS YOUR HOUSE, YOU MAY DESIGNATE AN AREA AS A HOMESTEAD TO BE SOLD AND REDEEMED SEPARATELY.
YOU MAY DESIGNATE THE HOUSE YOU OCCUPY AND ANY AMOUNT OF THE PROPERTY AS A HOMESTEAD. THE DESIGNATED HOMESTEAD PROPERTY MUST CONFORM TO THE LOCAL ZONING ORDINANCES AND BE COMPACT SO THAT IT DOES NOT UNREASONABLY REDUCE THE VALUE OF THE REMAINING PROPERTY.
YOU MUST PROVIDE THE COURT WITH A LEGAL DESCRIPTION OF THE HOMESTEAD YOU HAVE DESIGNATED.
IF THE PROPERTY TO BE SOLD CONTAINS SEPARATE TRACTS, YOU MAY REQUEST THAT THE TRACTS BE SOLD AND REDEEMED SEPARATELY. EACH OF THE SEPARATE TRACTS MUST CONFORM TO LOCAL ZONING ORDINANCES.
YOU MUST PROVIDE THE COURT WITH A COPY OF THE LEGAL DESCRIPTION OF EACH OF THE TRACTS YOU HAVE DESIGNATED TO BE SOLD SEPARATELY.
Dated: May 24, 2023
LOGS LEGAL GROUP LLP
/s/ Tracy J. Halliday
Melissa L.B. Porter – 0337778
Tracy J. Halliday
Attorneys for Plaintiff
1715 Yankee Doodle Road, Suite 210 Eagan, MN 55121
(952) 831-4060
THIS MAY BE DEEMED A COMMUNICATION FROM A DEBT COLLECTOR ATTEMPTING TO COLLECT A DEBT. ANY INFORMATION OBTAINED WILL BE USED FOR THAT PURPOSE.
6/14, 6/21, 6/28/23 Star Tribune

NOTICE OF MORTGAGE FORECLOSURE SALE
THE RIGHT TO VERIFICATION OF THE DEBT AND IDENTITY OF THE ORIGINAL CREDITOR WITHIN THE TIME PROVIDED BY LAW IS NOT AFFECTED BY THIS ACTION.
NOTICE IS HEREBY GIVEN, that default has occurred in the conditions of the following described mortgage:
Mortgagor: James P Miller and Ellen M Miller, Husband and Wife
Mortgagee: TCF National Bank, a national banking association
Dated: May 16, 2003
Filed: June 5, 2003
Ramsey County Registrar of Titles Document No. 1755017 Against Certificate of Title No.: 245922
Assigned To: Bayview Loan Servicing, LLC
Dated: June 19, 2013
Filed September 10, 2013
Ramsey County Registrar of Titles Document No. 2221593 Against Certificate of Title No.: 584867
Assigned To: Bayview Dispositions IIIA, LLC
Dated: March 8, 2016
Filed May 23, 2016
Ramsey County Registrar of Titles Document No. T02558387 Against Certificate of Title No.: 584867
Assigned To: Metropolitan Life Insurance Company
Dated: March 8, 2016
Filed May 23, 2016
Ramsey County Registrar of Titles Document No. T02558388 Against Certificate of Title No.: 584867
Transaction Agent: N/A
Transaction Agent Mortgage Identification Number: N/A
Lender or Broker: TCF National Bank
Residential Mortgage Servicer: Nationstar Mortgage LLC
Mortgage Originator: TCF National Bank
LEGAL DESCRIPTION OF PROPERTY: LOT 20, BLOCK D, NORTHWOOD HEIGHTS ADDITION, ACCORDING TO THE PLAT THEREOF ON FILE AND OF RECORD IN THE OFFICE OF THE REGISTRAR OF TITLES IN AND FOR RAMSEY COUNTY, MINNESOTA
TORRENS PROPERTY CERTIFICATE NO. 245922
TAX KEY NUMBER: 13-29-22-22-0082
This is Registered Property.
TAX PARCEL NO.: 132922220082
ADDRESS OF PROPERTY:
2053 3rd St N
Saint Paul, MN 55109
COUNTY IN WHICH PROPERTY IS LOCATED: Ramsey
ORIGINAL PRINCIPAL AMOUNT OF MORTGAGE: $150,500.00
AMOUNT DUE AND CLAIMED TO BE DUE AS OF DATE OF NOTICE: $86,783.26
That prior to the commencement of this mortgage foreclosure proceeding Mortgagee/Assignee of Mortgagee complied with all notice requirements as required by statute; that no action or proceeding has been instituted at law or otherwise to recover the debt secured by said mortgage, or any part thereof;
PURSUANT to the power of sale contained in said mortgage, the above described property will be sold by the Sheriff of said county as follows:
DATE AND TIME OF SALE: August 4, 2023, 10:00 AM
PLACE OF SALE: Sheriff's Office, Civil Process Unit, 25 W. 4th Street, Suite 150, St. Paul, MN to pay the debt then secured by said Mortgage, and taxes, if any, on said premises, and the costs and disbursements, including attorneys' fees allowed by law subject to redemption within 1 Year from the date of said sale by the mortgagor(s), their personal representatives or assigns.
DATE TO VACATE PROPERTY: The date on or before which the mortgagor must vacate the property if the mortgage is not reinstated under Minnesota Statutes section 580.30 or the property redeemed under Minnesota Statutes section 580.23 is August 4, 2024 at 11:59 p.m. If the foregoing date is a Saturday, Sunday or legal holiday, then the date to vacate is the next business day at 11:59 p.m.
MORTGAGOR(S) RELEASED FROM FINANCIAL OBLIGATION ON MORTGAGE: NONE
THE TIME ALLOWED BY LAW FOR REDEMPTION BY THE MORTGAGOR, THE MORTGAGOR'S PERSONAL REPRESENTATIVES OR ASSIGNS, MAY BE REDUCED TO FIVE WEEKS IF A JUDICIAL ORDER IS ENTERED UNDER MINNESOTA STATUTES SECTION 582.032, DETERMINING, AMONG OTHER THINGS, THAT THE MORTGAGED PREMISES ARE IMPROVED WITH A RESIDENTIAL DWELLING OF LESS THAN FIVE UNITS, ARE NOT PROPERTY USED IN AGRICULTURAL PRODUCTION, AND ARE ABANDONED.
Dated: June 9, 2023
Metropolitan Life Insurance Company, Assignee of Mortgagee
By: HALLIDAY, WATKINS & MANN, P.C.
Attorneys for:
Metropolitan Life Insurance Company, Assignee of Mortgagee
1333 Northland Drive, Suite 205
Mendota Heights, MN 55120
801-355-2886
651-228-1753 (fax)
THIS COMMUNICATION IS FROM A DEBT COLLECTOR ATTEMPTING TO COLLECT A DEBT. ANY INFORMATION OBTAINED WILL BE USED FOR THAT PURPOSE.
MN21083
6/14, 6/21, 6/28, 7/5, 7/12, 7/19/23 Star Tribune

NOTICE OF MORTGAGE FORECLOSURE SALE
THE RIGHT TO VERIFICATION OF THE DEBT AND IDENTITY OF THE ORIGINAL CREDITOR WITHIN THE TIME PROVIDED BY LAW IS NOT AFFECTED BY THIS ACTION.
NOTICE IS HEREBY GIVEN, that default has occurred in the conditions of the following described mortgage:
Mortgagor: Krista M Mitchell and David P Mitchell, Spouses Married To Each Other, As Joint Tenants
Mortgagee: Mortgage Electronic Registration Systems, Inc., as mortgagee, as nominee for American Mortgage & Equity Consultants, Inc., its successors and assigns
Dated: June 16, 2016
Filed: June 23, 2016
Dakota County Registrar of Titles Document No. 762531 Against Certificate of Title No.: 165699
Assigned To: Freedom Mortgage Corporation
Dated: September 26, 2022
Filed September 26, 2022
Dakota County Registrar of Titles Document No. 866999 Against Certificate of Title No.: 165699
Transaction Agent: Mortgage Electronic Registration Systems, Inc.
Transaction Agent Mortgage Identification Number: 100867100000498657
Lender or Broker: American Mortgage & Equity Consultants, Inc., a Corporation
Residential Mortgage Servicer: Freedom Mortgage Corporation
Mortgage Originator: American Mortgage & Equity Consultants, Inc., a Corporation
LEGAL DESCRIPTION OF PROPERTY: The land referred to herein below is situated in the County of Dakota, State of Minnesota, and is described as follows: Lot Twenty-nine (29) except the South Thirty (30) feet thereof and all of Lot Thirty (30) in Block Three (3) of Ravenscroft Park Addition to South St. Paul, Dakota County, Minnesota, according to the plat thereof on file and of record in the office of the Register of Deeds within and for said County and State.
This is Registered Property.
TAX PARCEL NO.: 36-63000-03-300
ADDRESS OF PROPERTY:
301 12th Ave S
South Saint Paul, MN 55075
COUNTY IN WHICH PROPERTY IS LOCATED: Dakota
ORIGINAL PRINCIPAL AMOUNT OF MORTGAGE: $152,192.00
AMOUNT DUE AND CLAIMED TO BE DUE AS OF DATE OF NOTICE: $144,676.73
That prior to the commencement of this mortgage foreclosure proceeding Mortgagee/Assignee of Mortgagee complied with all notice requirements as required by statute; that no action or proceeding has been instituted at law or otherwise to recover the debt secured by said mortgage, or any part thereof;
PURSUANT to the power of sale contained in said mortgage, the above described property will be sold by the Sheriff of said county as follows:
DATE AND TIME OF SALE: July 14, 2023, 10:00 AM
PLACE OF SALE: Lobby of Law Enforcement Center, Dakota County Civil Unit, 1580 Highway 55, Hastings, MN to pay the debt then secured by said Mortgage, and taxes, if any, on said premises, and the costs and disbursements, including attorneys' fees allowed by law subject to redemption within 6 Months from the date of said sale by the mortgagor(s), their personal representatives or assigns.
DATE TO VACATE PROPERTY: The date on or before which the mortgagor must vacate the property if the mortgage is not reinstated under Minnesota Statutes section 580.30 or the property redeemed under Minnesota Statutes section 580.23 is January 14, 2024 at 11:59 p.m. If the foregoing date is a Saturday, Sunday or legal holiday, then the date to vacate is the next business day at 11:59 p.m.
MORTGAGOR(S) RELEASED FROM FINANCIAL OBLIGATION ON MORTGAGE: NONE
THE TIME ALLOWED BY LAW FOR REDEMPTION BY THE MORTGAGOR, THE MORTGAGOR'S PERSONAL REPRESENTATIVES OR ASSIGNS, MAY BE REDUCED TO FIVE WEEKS IF A JUDICIAL ORDER IS ENTERED UNDER MINNESOTA STATUTES SECTION 582.032, DETERMINING, AMONG OTHER THINGS, THAT THE MORTGAGED PREMISES ARE IMPROVED WITH A RESIDENTIAL DWELLING OF LESS THAN FIVE UNITS, ARE NOT PROPERTY USED IN AGRICULTURAL PRODUCTION, AND ARE ABANDONED.
Dated: May 19, 2023
Freedom Mortgage Corporation, Assignee of Mortgagee
By: HALLIDAY, WATKINS & MANN, P.C.
Attorneys for: Freedom Mortgage Corporation, Assignee of Mortgagee
1333 Northland Drive, Suite 205
Mendota Heights, MN 55120
801-355-2886
651-228-1753 (fax)
THIS COMMUNICATION IS FROM A DEBT COLLECTOR ATTEMPTING TO COLLECT A DEBT. ANY INFORMATION OBTAINED WILL BE USED FOR THAT PURPOSE.
MN21608
5/24, 5/31, 6/7, 6/14, 6/21, 6/28/2023 Star Tribune

NOTICE OF MORTGAGE FORECLOSURE SALE
THE RIGHT TO VERIFICATION OF THE DEBT AND IDENTITY OF THE ORIGINAL CREDITOR WITHIN THE TIME PROVIDED BY LAW IS NOT AFFECTED BY THIS ACTION.
NOTICE IS HEREBY GIVEN, that default has occurred in conditions of the following described mortgage:
DATE OF MORTGAGE: August 27, 2021
MORTGAGOR: Ryan Williams, a married man.
MORTGAGEE: Mortgage Electronic Registration Systems, Inc., as mortgagee, as nominee for United Wholesale Mortgage, LLC its successors and assigns.
DATE AND PLACE OF RECORDING: Filed September 9, 2021, Ramsey County Registrar of Titles, Document No. T02711480 on Certificate of Title No. 641659.
ASSIGNMENTS OF MORTGAGE: Assigned to: Carrington Mortgage Services, LLC. Dated May 3, 2023 Filed May 9, 2023, as Document No. T02753651.
Said Mortgage being upon Registered Land.
TRANSACTION AGENT: Mortgage Electronic Registration Systems, Inc.
TRANSACTION AGENT'S MORTGAGE IDENTIFICATION NUMBER ON MORTGAGE: 100032412218311469
LENDER OR BROKER AND MORTGAGE ORIGINATOR STATED ON MORTGAGE: United Wholesale Mortgage, LLC
RESIDENTIAL MORTGAGE SERVICER: Carrington Mortgage Services LLC
MORTGAGED PROPERTY ADDRESS: 1811 Nevada Avenue East, Saint Paul, MN 55119
TAX PARCEL I.D. #: 232922230122
LEGAL DESCRIPTION OF PROPERTY: LOT 43 AND THE W 10 FEET OF LOT 44, ALL IN BLOCK 3, HAYDEN HEIGHTS, RAMSEY COUNTY, MINNESOTA, ACCORDING TO THE PLAT THEREOF ON FILE AND OF RECORD IN THE OFFICE OF THE REGISTRAR OF TITLES, RAMSEY COUNTY, MINNESOTA.
COUNTY IN WHICH PROPERTY IS LOCATED: Ramsey
ORIGINAL PRINCIPAL AMOUNT OF MORTGAGE: $246,568.00
AMOUNT DUE AND CLAIMED TO BE DUE AS OF DATE OF NOTICE, INCLUDING TAXES, IF ANY, PAID BY MORTGAGEE: $244,379.75
That prior to the commencement of this mortgage foreclosure proceeding Mortgagee/Assignee of Mortgagee complied with all notice requirements as required by statute; That no action or proceeding has been instituted at law or otherwise to recover the debt secured by said mortgage, or any part thereof;
PURSUANT to the power of sale contained in said mortgage, the above described property will be sold by the Sheriff of said county as follows:
DATE AND TIME OF SALE: July 11, 2023 at 10:00 AM
PLACE OF SALE: Sheriff's Office, Lowry Building / City Hall Annex, 25 West 4th Street, Suite 150, St. Paul, MN to pay the debt then secured by said Mortgage, and taxes, if any, on said premises, and the costs and disbursements, including attorneys' fees allowed by law subject to redemption within six (6) months from the date of said sale by the mortgagor(s), their personal representatives or assigns unless reduced to Five (5) weeks under MN Stat. §580.07.
TIME AND DATE TO VACATE PROPERTY: If the real estate is an owner-occupied, single-family dwelling, unless otherwise provided by law, the date on or before which the mortgagor(s) must vacate the property if the mortgage is not reinstated under section 580.30 or the property is not redeemed under section 580.23 is 11:59 p.m. on January 11, 2024, unless that date falls on a weekend or legal holiday, in which case it is the next weekday, and unless the redemption period is reduced to 5 weeks under MN Stat. Secs. 580.07 or 582.032.
MORTGAGOR(S) RELEASED FROM FINANCIAL OBLIGATION ON MORTGAGE: None
"THE TIME ALLOWED BY LAW FOR REDEMPTION BY THE MORTGAGOR, THE MORTGAGOR'S PERSONAL REPRESENTATIVES OR ASSIGNS, MAY BE REDUCED TO FIVE WEEKS IF A JUDICIAL ORDER IS ENTERED UNDER MINNESOTA STATUTES, SECTION 582.032, DETERMINING, AMONG OTHER THINGS, THAT THE MORTGAGED PREMISES ARE IMPROVED WITH A RESIDENTIAL DWELLING OF LESS THAN FIVE UNITS, ARE NOT PROPERTY USED IN AGRICULTURAL PRODUCTION, AND ARE ABANDONED."
Dated: May 9, 2023
Carrington Mortgage Services, LLC
Mortgagee/Assignee of Mortgagee
LIEBO, WEINGARDEN, DOBIE & BARBEE, P.L.L.P.
Attorneys for Mortgagee/Assignee of Mortgagee
4500 Park Glen Road #300
Minneapolis, MN 55416
(952) 925-6888
85 - 23-002824 FC
IN THE EVENT REQUIRED BY FEDERAL LAW: THIS IS A COMMUNICATION FROM A DEBT COLLECTOR.
5/17, 5/24, 5/31, 6/7, 6/14, 6/21/23 Star Tribune

NOTICE OF MORTGAGE FORECLOSURE SALE
THE RIGHT TO VERIFICATION OF THE DEBT AND IDENTITY OF THE ORIGINAL CREDITOR WITHIN THE TIME PROVIDED BY LAW IS NOT AFFECTED BY THIS ACTION.a
NOTICE IS HEREBY GIVEN, that default has occurred in conditions of the following described mortgage:
DATE OF MORTGAGE: January 21, 2005
MORTGAGOR: Chanthoeun Hin and Him Noum, wife and husband.
MORTGAGEE: Mortgage Electronic Registration Systems, Inc., as nominee for Lakeland Mortgage Corporation, its successors and assigns.
DATE AND PLACE OF RECORDING: Recorded February 7, 2005 Dakota County Recorder, Document No. 2293521.
ASSIGNMENTS OF MORTGAGE: Assigned to: NewRez LLC d/b/a Shellpoint Mortgage Servicing. Dated November 9, 2021 Recorded November 15, 2021, as Document No. 3505297.
TRANSACTION AGENT: Mortgage Electronic Registration Systems, Inc.
TRANSACTION AGENT'S MORTGAGE IDENTIFICATION NUMBER ON MORTGAGE: 100137510000178253
LENDER OR BROKER AND MORTGAGE ORIGINATOR STATED ON MORTGAGE: Lakeland Mortgage Corporation
RESIDENTIAL MORTGAGE SERVICER: NewRez LLC d/b/a Shellpoint Mortgage Servicing
MORTGAGED PROPERTY ADDRESS: 4769 189th Street West, Farmington, MN 55024
TAX PARCEL I.D. #: 14-47802-03-180
LEGAL DESCRIPTION OF PROPERTY: LOT 18, BLOCK 3, MEADOW CREEK 3RD ADDITION, ACCORDING TO THE RECORDED PLAT THEREOF.
COUNTY IN WHICH PROPERTY IS LOCATED: Dakota
ORIGINAL PRINCIPAL AMOUNT OF MORTGAGE: $317,744.00
AMOUNT DUE AND CLAIMED TO BE DUE AS OF DATE OF NOTICE, INCLUDING TAXES, IF ANY, PAID BY MORTGAGEE: $182,024.02
That prior to the commencement of this mortgage foreclosure proceeding Mortgagee/Assignee of Mortgagee complied with all notice requirements as required by statute; That no action or proceeding has been instituted at law or otherwise to recover the debt secured by said mortgage, or any part thereof;
PURSUANT to the power of sale contained in said mortgage, the above described property will be sold by the Sheriff of said county as follows:
DATE AND TIME OF SALE: August 8, 2023 at 10:00 AM
PLACE OF SALE: Sheriff's Office, Law Enforcement Center, 1580 Hwy 55, Lobby #S-100, Hastings, MN to pay the debt then secured by said Mortgage, and taxes, if any, on said premises, and the costs and disbursements, including attorneys' fees allowed by law subject to redemption within twelve (12) months from the date of said sale by the mortgagor(s), their personal representatives or assigns unless reduced to Five (5) weeks under MN Stat. §580.07.
TIME AND DATE TO VACATE PROPERTY: If the real estate is an owner-occupied, single-family dwelling, unless otherwise provided by law, the date on or before which the mortgagor(s) must vacate the property if the mortgage is not reinstated under section 580.30 or the property is not redeemed under section 58 0.23 is 11:59 p.m. on August 8, 2024, unless that date falls on a weekend or legal holiday, in which case it is the next weekday, and unless the redemption period is reduced to 5 weeks under MN Stat. Secs. 580.07 or 582.032.
MORTGAGOR(S) RELEASED FROM FINANCIAL OBLIGATION ON MORTGAGE: None
"THE TIME ALLOWED BY LAW FOR REDEMPTION BY THE MORTGAGOR, THE MORTGAGOR'S PERSONAL REPRESENTATIVES OR ASSIGNS, MAY BE REDUCED TO FIVE WEEKS IF A JUDICIAL ORDER IS ENTERED UNDER MINNESOTA STATUTES, SECTION 582.032, DETERMINING, AMONG OTHER THINGS, THAT THE MORTGAGED PREMISES ARE IMPROVED WITH A RESIDENTIAL DWELLING OF LESS THAN FIVE UNITS, ARE NOT PROPERTY USED IN AGRICULTURAL PRODUCTION, AND ARE ABANDONED."
Dated: June 5, 2023
NewRez LLC dba Shellpoint Mortgage Servicing
Mortgagee/Assignee of Mortgagee
LIEBO, WEINGARDEN, DOBIE & BARBEE, P.L.L.P.
Attorneys for Mortgagee/Assignee of Mortgagee
4500 Park Glen Road #300
Minneapolis, MN 55416
(952) 925-6888
164 - 23-003466 FC
IN THE EVENT REQUIRED BY FEDERAL LAW: THIS IS A COMMUNICATION FROM A DEBT COLLECTOR.
6/14, 6/21, 6/28, 7/5, 7/12, 7/19/23 Star Tribune

NOTICE OF MORTGAGE FORECLOSURE SALE
THE RIGHT TO VERIFICATION OF THE DEBT AND IDENTITY OF THE ORIGINAL CREDITOR WITHIN THE TIME PROVIDED BY LAW IS NOT AFFECTED BY THIS ACTION.
NOTICE IS HEREBY GIVEN, that default has occurred in conditions of the following described mortgage:
DATE OF MORTGAGE: October 16, 2015
MORTGAGOR: Lawrence Niznick, an unmarried man.
MORTGAGEE: Mortgage Electronic Registration Systems, Inc. as nominee for Home Point Financial Corporation its successors and assigns.
DATE AND PLACE OF RECORDING: Recorded October 27, 2015 Dakota County Recorder, Document No. 3097015 as reformed by Court Order Dated April 11, 2023 Recorded May 11, 2023 as Document No. 3586864.
ASSIGNMENTS OF MORTGAGE: Assigned to: Freedom Mortgage Corporation. Dated November 29, 2022 Recorded November 30, 2022, as Document No. 3568279.
TRANSACTION AGENT: Mortgage Electronic Registration Systems, Inc.
TRANSACTION AGENT'S MORTGAGE IDENTIFICATION NUMBER ON MORTGAGE: 1006611-9000050950-2
LENDER OR BROKER AND MORTGAGE ORIGINATOR STATED ON MORTGAGE: Home Point Financial Corporation
RESIDENTIAL MORTGAGE SERVICER: Freedom Mortgage Corporation
MORTGAGED PROPERTY ADDRESS: 1213 Woodhill Road, Burnsville, MN 55337
TAX PARCEL I.D. #: 028220802010
LEGAL DESCRIPTION OF PROPERTY:
Lot 1, Block 2, Vista View 9th Addition, Dakota County, Minnesota.
COUNTY IN WHICH PROPERTY IS LOCATED: Dakota
ORIGINAL PRINCIPAL AMOUNT OF MORTGAGE: $197,969.00
AMOUNT DUE AND CLAIMED TO BE DUE AS OF DATE OF NOTICE, INCLUDING TAXES, IF ANY, PAID BY MORTGAGEE: $184,658.29
That prior to the commencement of this mortgage foreclosure proceeding Mortgagee/Assignee of Mortgagee complied with all notice requirements as required by statute; That no action or proceeding has been instituted at law or otherwise to recover the debt secured by said mortgage, or any part thereof;
PURSUANT to the power of sale contained in said mortgage, the above described property will be sold by the Sheriff of said county as follows:
DATE AND TIME OF SALE: July 18, 2023 at 10:00 AM
PLACE OF SALE: Sheriff's Office, Law Enforcement Center, 1580 Hwy 55, Lobby #S-100, Hastings, MN to pay the debt then secured by said Mortgage, and taxes, if any, on said premises, and the costs and disbursements, including attorneys' fees allowed by law subject to redemption within six (6) months from the date of said sale by the mortgagor(s), their personal representatives or assigns unless reduced to Five (5) weeks under MN Stat. §580.07.
TIME AND DATE TO VACATE PROPERTY: If the real estate is an owner-occupied, single-family dwelling, unless otherwise provided by law, the date on or before which the mortgagor(s) must vacate the property if the mortgage is not reinstated under section 580.30 or the property is not redeemed under section 58 0.23 is 11:59 p.m. on January 18, 2024, unless that date falls on a weekend or legal holiday, in which case it is the next weekday, and unless the redemption period is reduced to 5 weeks under MN Stat. Secs. 580.07 or 582.032.
MORTGAGOR(S) RELEASED FROM FINANCIAL OBLIGATION ON MORTGAGE: None
"THE TIME ALLOWED BY LAW FOR REDEMPTION BY THE MORTGAGOR, THE MORTGAGOR'S PERSONAL REPRESENTATIVES OR ASSIGNS, MAY BE REDUCED TO FIVE WEEKS IF A JUDICIAL ORDER IS ENTERED UNDER MINNESOTA STATUTES, SECTION 582.032, DETERMINING, AMONG OTHER THINGS, THAT THE MORTGAGED PREMISES ARE IMPROVED WITH A RESIDENTIAL DWELLING OF LESS THAN FIVE UNITS, ARE NOT PROPERTY USED IN AGRICULTURAL PRODUCTION, AND ARE ABANDONED."
Dated: May 15, 2023
Freedom Mortgage Corporation
Mortgagee/Assignee of Mortgagee
LIEBO, WEINGARDEN, DOBIE & BARBEE, P.L.L.P.
Attorneys for Mortgagee/Assignee of Mortgagee
4500 Park Glen Road #300
Minneapolis, MN 55416
(952) 925-6888
46 - 22-006424 FC

Draft Plan Open for Public Comment

The draft MSP Long-Term Plan is available at
mspairport.com/ltp-60-day-public-comment-period or by scanning the QR Code

Submit written comments online, via email to
MSPAirportLongTermPlan@mspmac.org, or mail to:

Metropolitan Airports Commission
Attn: Airport Planner
6040 28th Avenue South
Minneapolis, MN 55450

Written comments will be accepted until Monday, August 21, 2023 at 5:00 p.m.

MAC Glossary of Terms

Federal Inspection Service (FIS):
A facility, also referred to as the international arrivals area. Currently there are two FIS facilities at MSP, one in Terminal 1 and one in Terminal 2.

Remain Overnight (RON) Aircraft Parking: Airside apron areas designated for the parking of aircraft using the terminal that cannot be accommodated at terminal gates.

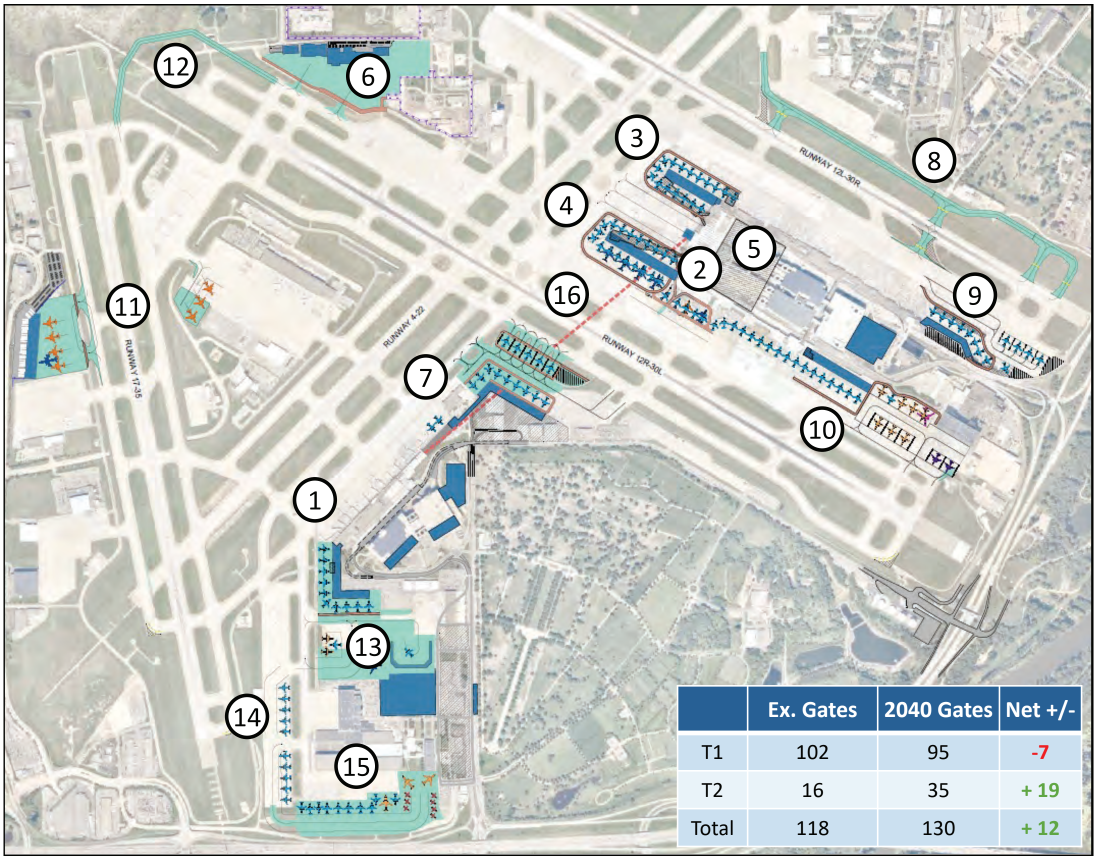
Fixed Base Operator (FBO): A commercial business enterprise located on an airport that provides services to pilots including aircraft rental, training, fueling, maintenance, parking, and the sale of pilot supplies. Also known as a Full Service Commercial Operator.

Taxiway (TWY): A defined path established for the taxiing of aircraft from one part of an airport to another.

Runway (RWY): A defined rectangular area at an airport designated for the landing and takeoff of an aircraft. Runway numbers are determined by their magnetic heading with respect to north (0°). If an airport has two parallel runways, such as Minneapolis-St. Paul International Airport (MSP), the runways are marked Left (L) and Right (R). Three parallel runways would be marked Left (L), Center (C) and Right (R). The existing runways at MSP are 12L/30R, 12R/30L, 17/35, and 4/22.

End-Around Taxiway (EAT): A taxiway around the end of a runway that prevents aircraft from crossing the runway, thereby improving air traffic flow on the ground and mitigating congestion.

Ground Runup Enclosure (GRE): A structure designed to control the environment for aircraft engines to undergo testing and run-up procedures. This facility ensures that engine maintenance and performance checks can be conducted safely and efficiently, minimizing noise impact on surrounding areas.

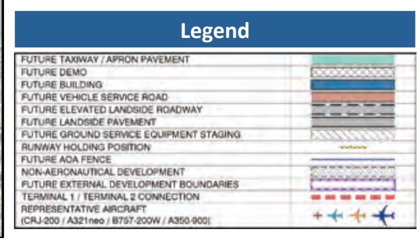


	Ex. Gates	2040 Gates	Net +/-
T1	102	95	-7
T2	16	35	+ 19
Total	118	130	+ 12

Preferred Alternative

Potential Project List:

1. T2 Gate Expansion
2. T1 FIS Improvements (Ex. Site)
3. Reconstruct Concourse E
4. Reconstruct Concourse F
5. Reconstruct Green/Gold Area
6. Relocate Signature FBO
7. T2 Gate Expansion (Maximize)
8. North Parallel TWY (RWY 30R)
9. Reconstruct Concourse A
10. Extend Concourse G
11. Expand Cargo Facilities
12. Construct RWY 12R EAT
13. Relocate GRE/RON Parking
14. T2 Remote Improvements
15. Construct Delta RON Expansion
16. Connect T1 to T2 (Sterile)



MSP AIRPORT
PLANNING AND DEVELOPMENT PROCESS
STEP-BY-STEP

MAC STAFF

1. Research & study refinements to previous Long Term Plan recommendation
2. Engage MAC board, municipal staff & other key stakeholders
3. Draft report with alternatives including a proposed alternative
4. Request formal MAC board approval to publish draft report for public comment

5. **PUBLIC & AGENCIES** — WE ARE HERE — Comment on draft report & proposed preferred alternative

6. **MAC STAFF** — Incorporate public comments & present final LTP to MAC board for approval

7. **MAC BOARD** — For approval

8. **METROPOLITAN COUNCIL** — For reviews

9. **MAC BOARD** — For final adoption

Long-Term Planning process ENDS

10. **MAC STAFF & AGENCIES** — Prepare draft environmental review documents per state & FAA requirements; Prepare & submit Airport Layout Plan to the FAA for review & approval

Environmental review STARTS

11. **PUBLIC** — Comment on draft environmental documents

12. **MAC STAFF & AGENCIES** — Finalize environmental review documents & submit to State & FAA for approvals

Environmental review ENDS

13. **MAC STAFF & AGENCIES** — Develop final funding plan & request federal/state grant funds for project(s)

Funding phase STARTS

14. Local governments and adjacent communities review & comment on MAC annual Capital Improvement Program

15. **AGENCIES** — Project funding programmed by FAA/MnDOT

Funding phase ENDS

16. **MAC STAFF** — Begin engineering & architectural designs
17. Request approval from MAC board to proceed with bidding projects

18. **MAC BOARD** — For approval of bid award

CONSTRUCTION AUTHORIZED

EXPERIENCE msp

MSP Airport Long-Term Plan Presentation – 5:30

Welcome Remarks

Brian Ryks
MAC Executive Director/CEO

Rick King
MAC Chair

EXPERIENCE msp

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Meet the Planning Team

Eric Gilles	Dana Nelson	Larry Hilton	Andrew Blaisdell	Bill Schmitz
				
Senior Airport Planner **Project Manager** MAC	Director, Stakeholder Engagement MAC	Aviation Forecasts & Terminal Planning Ricondo & Associates	Airside Planning HNTB	Landside Planning Kimley-Horn

EXPERIENCE msp

3

Presentation Outline

- Long-Term Plan Introduction
- Planning Process and Key Findings
  - Aviation Activity Forecast
  - Facility Requirements
  - Development Concepts and Preferred Alternative
  - Aircraft Noise Analysis
- Next Steps
- Questions

Scan code to view this presentation

EXPERIENCE msp

4

MSP Airport Long-Term Plan Introduction

5

MSP Long-Term Plan Purpose

- The plan is:
  - A document that records existing and future needs of an airport
  - Focused on a 20-year horizon (2040)
  - Typically updated approximately every 7-10 years
- The plan does not:
  - Authorize construction or improvements to facilities, nor does it serve as a method for studying environmental impacts.

6

MSP Long-Term Plan Goals

- Plan for future facilities that will meet projected passenger activity levels in a manner that maintains and enhances customer service, while facilitating a seamless passenger experience.
- Produce a development plan that positions the MAC to:
  - meet future demand levels
  - enhance financial strength
  - leverage environmental stewardship, and
  - infuse sustainable thinking
- Conduct the planning process in a manner that includes meaningful stakeholder engagement processes.

EXPERIENCE msp

7

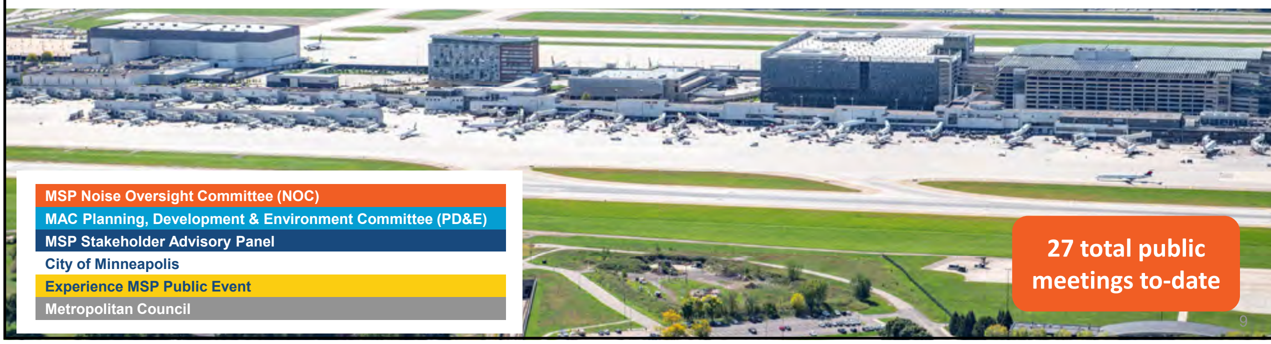
Long-Term Plan (LTP) Project Timeline

8

MSP Long-Term Plan Stakeholder and Public Engagement

START

3.20.2019 | 5.15.2019 | 6.03.2019 | 6.10.2019 | 7.17.2019 | 8.27.2019 | 9.03.2019 | 9.25.2019 | 10.02.2019 | 10.18.2019 | 1.30.2020 | COVID PAUSE | 11.10.2021 | 12.06.2021 | 12.10.2021 | 3.16.2022 | 4.12.2022 | 8.04.2022 | 8.23.2022 | 2.06.2023 | 3.15.2023 | 4.12.2023 | 4.13.2023 | 5.03.2023 | 5.11.2023 | 5.17.2023 | 6.06.2023 | 7.11.2023



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Planning Process and Key Findings

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10

Key Terminology

- Planning Activity Level (PAL)
  - Often fluctuate based on actual demand
    - PAL 1 = 2025
    - PAL 2 = 2030
    - PAL 3 = 2040
- Federal Inspection Services (FIS)
  - Secure area in Terminals 1 and 2 used for processing passengers arriving from international locations
- Preferential Gating
  - Only one airline uses a gate
- Common Use Gating
  - Multiple airlines share a gate
- Passenger Enplanements
  - Number of passengers originating from MSP used for forecasting

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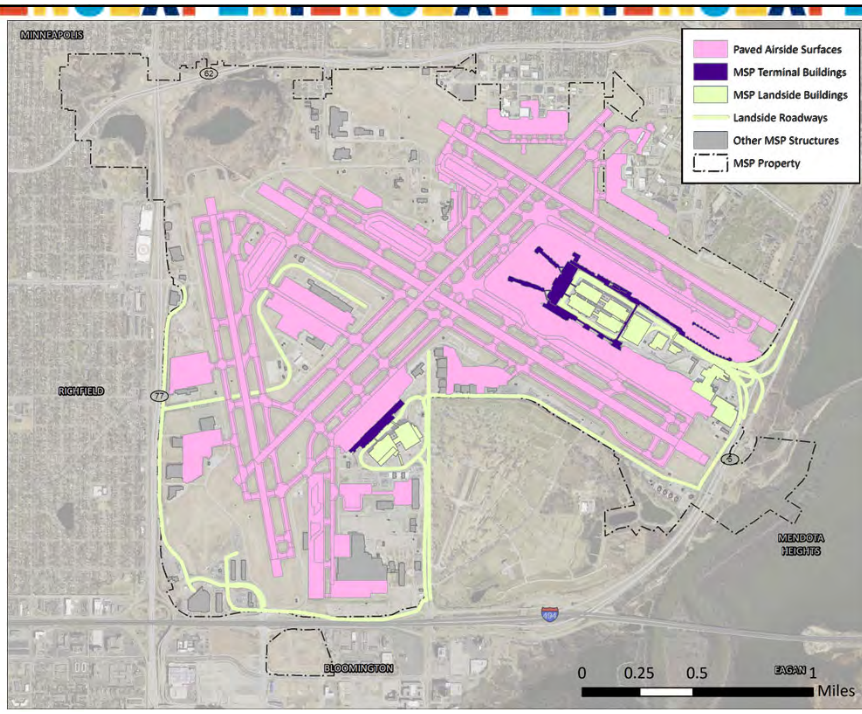
11



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Aviation Activity Forecast

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13

Develop Forecasts

- The 2040 LTP aviation forecast was initially completed in 2019
- In 2021, the forecast was revised to reflect pandemic impacts on:
  - Airline capacity and load factor recovery at MSP, taking into account the markets served by MSP and overall industry trends
  - Economic recovery trends in markets served by MSP

EXPERIENCE msp

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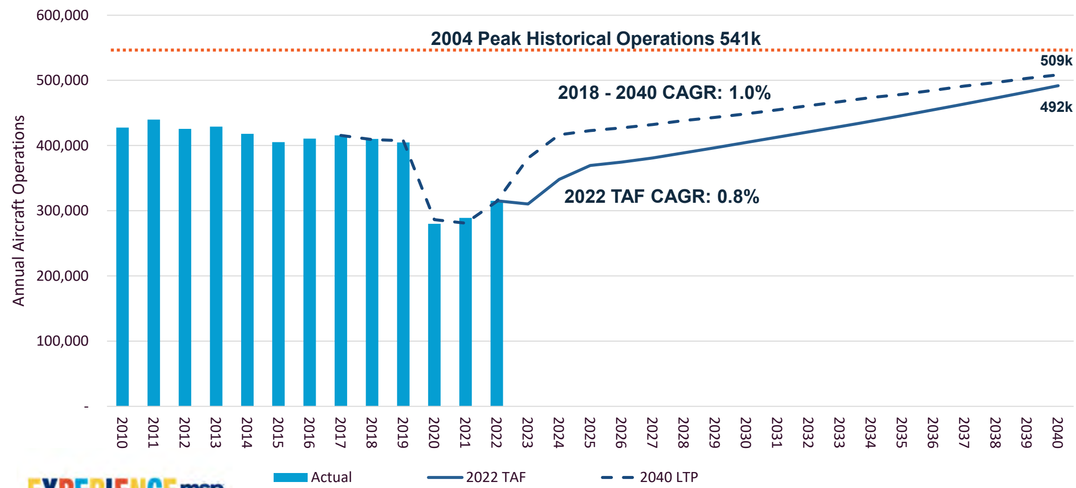
Develop Forecasts



EXPERIENCE msp

Source: MAC Reports (actual); Ricondo (forecast)

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Develop Forecasts

Total Aircraft Operations Forecast

Planning Activity Level	Value	Original Forecast	Revised Forecast
PAL 1	433k	2025	2027
PAL 2	462k	2030	2032
PAL 3	517k	2040	2042

Enplaned Passengers Forecast

Planning Activity Level	Value	Original Forecast	Revised Forecast
PAL 1	22.5m	2025	2026
PAL 2	24.4m	2030	2031
PAL 3	28.1m	2040	2040

Source: Ricondo (forecast)

EXPERIENCE msp

16

Facility Requirements

EXPERIENCE msp

17

Facility Requirements – Terminal

- Evaluated based on existing terminal footprint and operating conditions
- Reviewed operational standards for multiple areas of the terminal
- Gating strategies, passenger connectivity, and international arrival facilities were primary drivers in evaluating potential future terminal layouts

EXPERIENCE msp

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Facility Requirements – Terminal 1 Summary

Terminal 1			
Facility	**PAL 2 (2030)**	**PAL 3 (2040)**	**Notes**
Check-In	✓	✓	More kiosks for proprietary needs (PAL 3)
Security	✓	✗	Remote screening may resolve PAL 3
Bag Inspection	✓	✓	
Bag Claim	✓	✓	
Holdroom Space	✗	✗	All except Concourses C and D
International	✗	✗	Need 7 more inspection booths and 1,700 SF of queue space in PAL 2

Legend	
✓	Existing Layout Meets Future Demand
✗	Existing Layout Does Not Meet Future Demand

EXPERIENCE msp

Facility Requirements – Terminal 2 Summary

Terminal 2			
Facility	**PAL 2 (2030)**	**PAL 3 (2040)**	**Notes**
Check-In	✓	✓	More kiosks for proprietary needs (PAL 3)
Security	✓	✗	Remote screening may resolve PAL 3
Bag Inspection	✗	✗	One additional screening device (PAL 2/3)
Bag Claim	✓	✓	
Holdroom Space	✓	✓	
International	✓	✓	

Legend	
✓	Existing Layout Meets Future Demand
✗	Existing Layout Does Not Meet Future Demand

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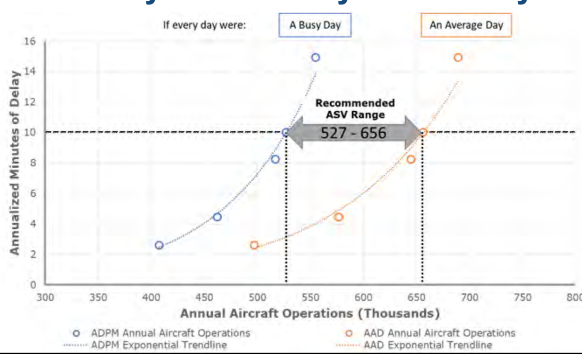
Facility Requirements – Airfield Capacity

- Fast-time simulation used to calculate airfield delay at different demand levels
- Airfield Capacity – Annual Service Volume (ASV) 527,000-656,000 operations
- Conclusion: **No need for any new runways or runway extensions**



PAL 3 forecast includes 509,700 annual operations

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Facility Requirements – Airfield Design Standards

22

Facility Requirements – Airfield Summary

Airfield Campus			
Facility	PAL 2 (2030)	PAL 3 (2040)	Notes
# of Runways	✓	✓	
Runway Length	✓	✓	
Noise Abatement	✓	✓	Continue industry-leading noise abatement and mitigation efforts
Taxiways	✓	✓	Additional taxiways may enhance operational flexibility
NAVAIDs	✓	✓	
Aircraft Parking	✓	✗	Additional Remain Overnight (RON) PAL 3
Aircraft Deicing	✓	✓	
Air Cargo	✓	✓	

Legend	
✓	Existing Layout Meets Future Demand
✗	Existing Layout Does Not Meet Future Demand

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Facility Requirements – Landside Considerations

- Driven by originating and terminating passenger activity at each terminal
- Recommended airport-wide parking, rental car, and commercial vehicle facility requirements
  - Terminal-specific requirements driven by preferred terminal development alternative
- Considered potential influencers/disruptors

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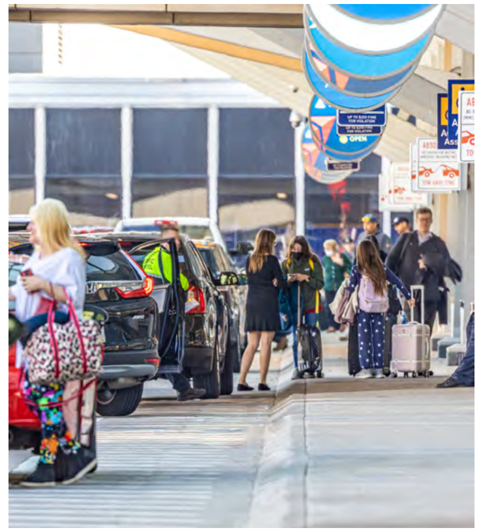
Facility Requirements – Landside

Terminal 1 and Terminal 2			
Facility	PAL 2 (2030)	PAL 3 (2040)	Notes
Private Parking	✓	✗	Green/Gold Ramp; off-airport providers
Curbside	✗	✗	Deficiency exists today
Rental Cars	✗	✗	Deficiency exists today
Commercial	✓	✓	

Legend	
✓	Existing Layout Meets Future Demand
✗	Existing Layout Does Not Meet Future Demand



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Development Concepts and Preferred Alternative

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Process to Identify the Preferred Alternative

Step 1
Preliminary Terminal Concepts

Step 2
Preliminary Airfield and Landside Concepts

Step 3
Draft Concept Families

Step 4
Refinements from feedback

Preferred Alternative

Public and Stakeholder Input

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Alternative Concept Families

- Alternative 1A
  - Single Federal Inspection Service (FIS) facility at Terminal 1
  - Maximize preferential gating
- Alternative 2A
  - Single FIS at Terminal 2
  - Emphasis on common-use gating
- Alternative 3A
  - Two FIS facilities (Terminal 1 and 2)
  - Maximize preferential gating
  - How the airport operates today

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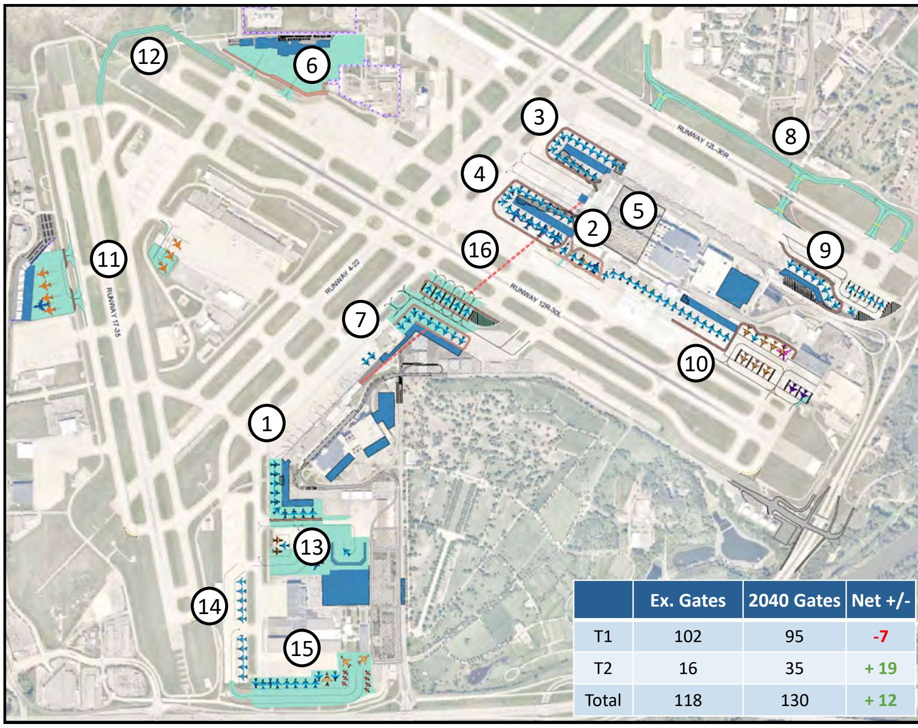

	Ex. Gates	2040 Gates	Net +/-
T1	102	95	-7
T2	16	35	+ 19
Total	118	130	+ 12

Preferred Alt.

Potential Project List:

1. T2 Gate Expansion
2. T1 FIS Improvements (Ex. Site)
3. Reconstruct Concourse E
4. Reconstruct Concourse F
5. Reconstruct Green/Gold Area
6. Relocate Signature FBO
7. T2 Gate Expansion (Maximize)
8. North Parallel TWY (RWY 30R)
9. Reconstruct Concourse A
10. Extend Concourse G
11. Expand Cargo Facilities
12. Construct RWY 12R EAT
13. Relocate GRE/RON Parking
14. T2 Remote Improvements
15. Construct Delta RON Expansion
16. Connect T1 to T2 (Sterile)

Legend

FUTURE TAXIWAY / APRON PAVEMENT
FUTURE DEMO
FUTURE BUILDING
FUTURE VEHICLE SERVICE ROAD
FUTURE ELEVATED LANDSIDE ROADWAY
FUTURE LANDSIDE PAVEMENT
FUTURE GROUND SERVICE EQUIPMENT STAGING
RUNWAY HOLDING POSITION
FUTURE AOA FENCE
NON-AERONAUTICAL DEVELOPMENT
FUTURE EXTERNAL DEVELOPMENT BOUNDARIES
TERMINAL 1 / TERMINAL 2 CONNECTION
REPRESENTATIVE AIRCRAFT (CRJ-200 / A321neo / B757-200W / A350-900)

Aircraft Noise Analysis

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2018 Actual Contour and 2040 Baseline Forecast Comparison

Total Operations

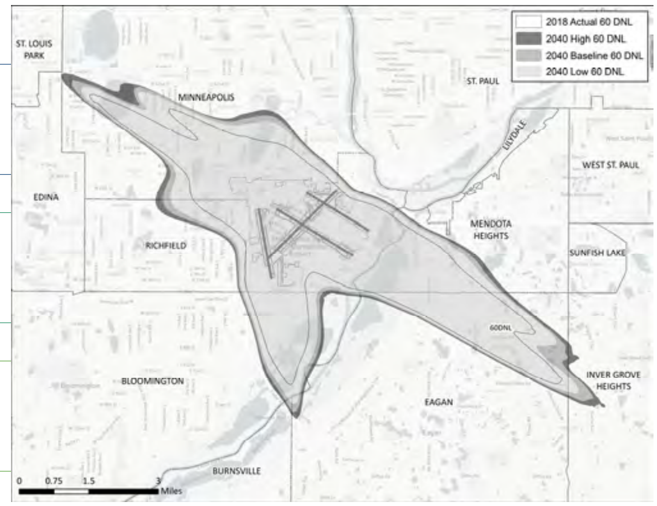
- 2018 – 406,913 Annual Operations
- 2040 – 509,700 Forecast Operations

Nighttime Operations

- 2018 – 10.8% of all operations (120 Average Daily)
- 2040 – 11.5% of all operations (161 Average Daily)

Stage 5 Operations

- 2018 – 211 Average Daily Operations
- 2040 – 874 Average Daily Operations



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Updates in Aircraft Types

Airbus New Engine Option (neo)
A319, A320, A321

- 15 dB below Stage 4 noise standards
- 1.6 average daily operations in 2018
- 273 average daily operations in 2040 forecast

Source: www.airbus.com

Boeing B737 MAX
MAX 7, MAX 8, MAX 9, MAX 10*

- 40% noise reduction from B737-800
- 1.5 average daily operations in 2018
- 30 average daily operations in 2040 forecast

Source: www.boeing.com

**B737 MAX 10 does not have a noise profile in AEDT; the B737 MAX 8 was used as an FAA approved substitute.*

Airbus A220-100 and A220-300

- 50% noise reduction from previous generation
- 0 average daily operations in 2018
- 499 average daily operations in 2040 forecast

Source: www.airbus.com

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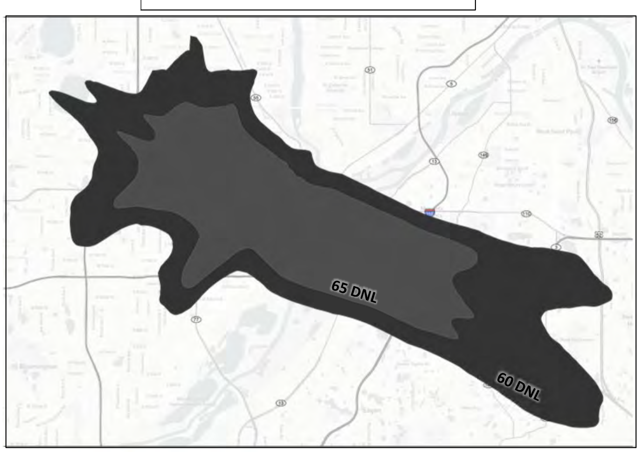
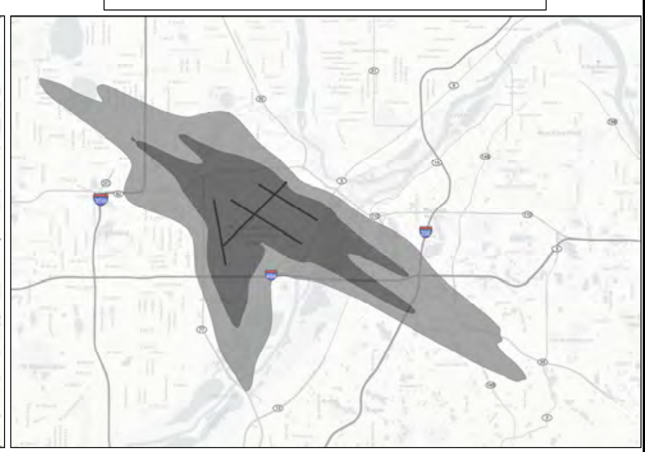
MSP ACTUAL CONTOUR – 1996



MSP BASELINE FORECAST CONTOUR – 2040



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Next Steps

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- Visit www.mspairport.com\long-term-plan or scan the code below to view the draft document
- Written comments may be submitted:
  - By filling out a written comment form tonight
  - Online by visiting the web address above
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  - Mail to: Metropolitan Airports Commission
Attn: Airport Planner
6040 28th Avenue South
Minneapolis, MN 55450

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Questions

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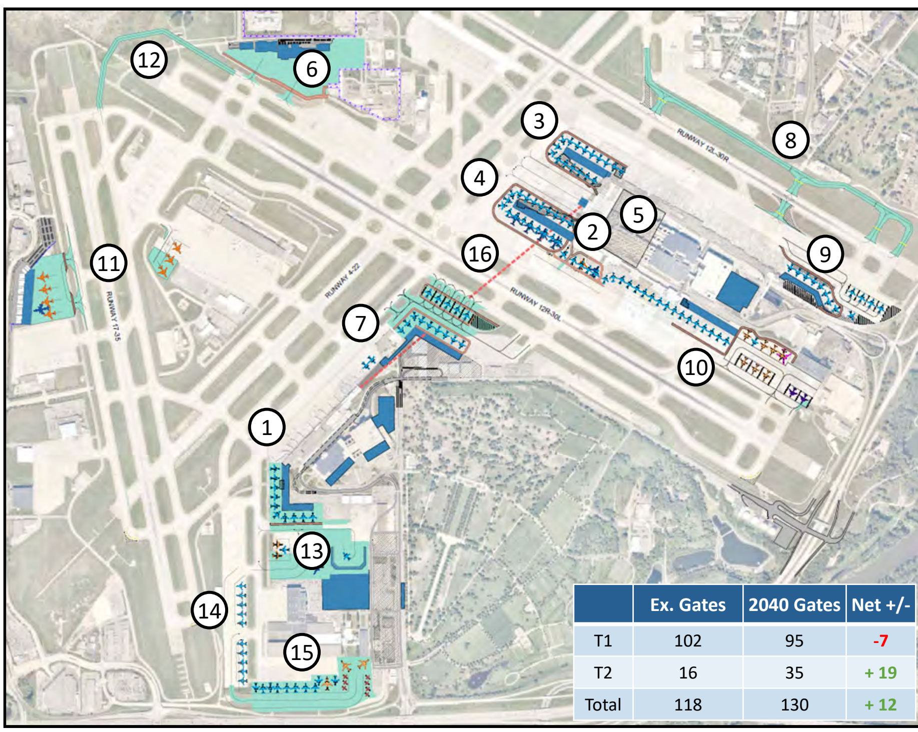

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FUTURE DEMO
FUTURE BUILDING
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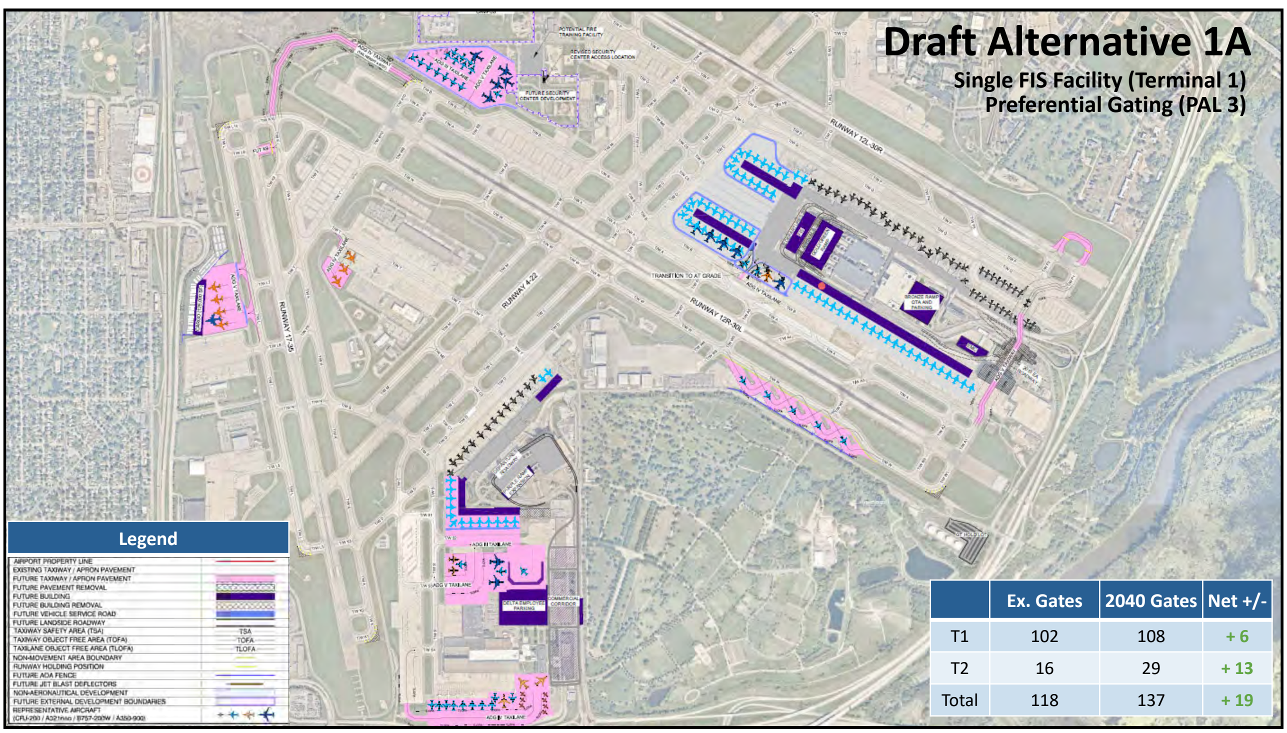

	Ex. Gates	2040 Gates	Net +/-
T1	102	108	+ 6
T2	16	29	+ 13
Total	118	137	+ 19


MAC
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Sustainability in Aviation Presentation – 7:00


Welcome Remarks
Naomi Pesky
MAC Vice President,
Strategy and Stakeholder Engagement
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2

Meet the Panelists

Daniel Lawse	Alan Howell	Ashley Vlasak	Jesse Miers	Dana Nelson
				
Principal & Chief Century Thinker	Senior Airport Architect	Project Manager	Director, Global Sustainability	Director, Stakeholder Engagement
Verdis Group	MAC	MAC	Delta Air Lines	MAC

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Presentation Outline

- MAC Sustainability Program
  - Daniel Lawse – Principal & Chief Century Thinker, Verdis Group
- MAC Airport Development
  - Alan Howell – Senior Airport Architect
  - Ashley Vlasak – Project Manager
- Delta Air Lines Sustainability Program
  - Jesse Miers – Director, Global Sustainability
- Questions

Scan code to view this presentation

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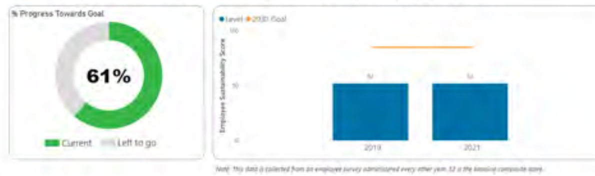
Sustainability Goals

Waste

GOAL: Reduce, reuse, recycle or compost 75% of solid waste.

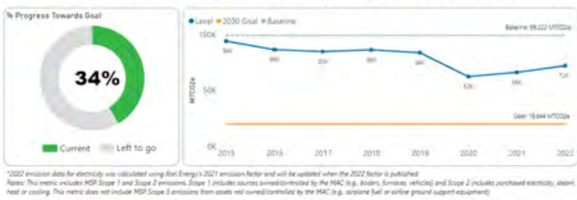
Engagement

GOAL: Achieve an Employee Sustainability Score of 85.



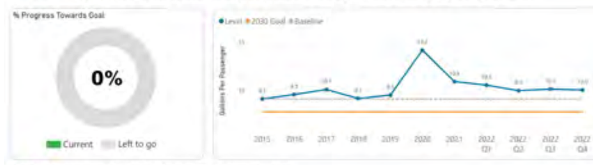
Emissions

GOAL: Reduce total emissions by 80% from a 2014/15 baseline.



Water

GOAL: Reduce water use *per passenger* by 15% from a 2015 baseline.



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Visit https://metroairports.org/about-us/sustainability
for current data and progress reports

5

MAC Sustainability Program

Strong Internal Structure

- Sustainability Department
- Executive Sustainability Committee
- Emissions, Water + Waste Working Groups

11
senior staff and directors serve on ESC

33
members on working groups

Strong Industry Alignment and Leadership

LEED — Leadership in Energy & Environmental Design

airport carbon accreditation — MAPPING | REDUCTION | OPTIMISATION | NEUTRAL

MBOLD — Minnesota: Leading the Way to the Future of Food

Climate RESILIENCE

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6

Flagship Initiatives

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7

Waste Goal Progress

Waste Diversion

MSP's Waste Recycling Program Featured in National Spotlight

metroairports.org • 2 min read

Paper Towel Composting Pilot: Collaborative + Circular Solutions

10%
potential trash reduction

8


Water Goal Progress
Water Aerator Replacement Roll-Out: Expertise + Engagement
WATER RESOURCES UTILITY OF THE FUTURE TODAY
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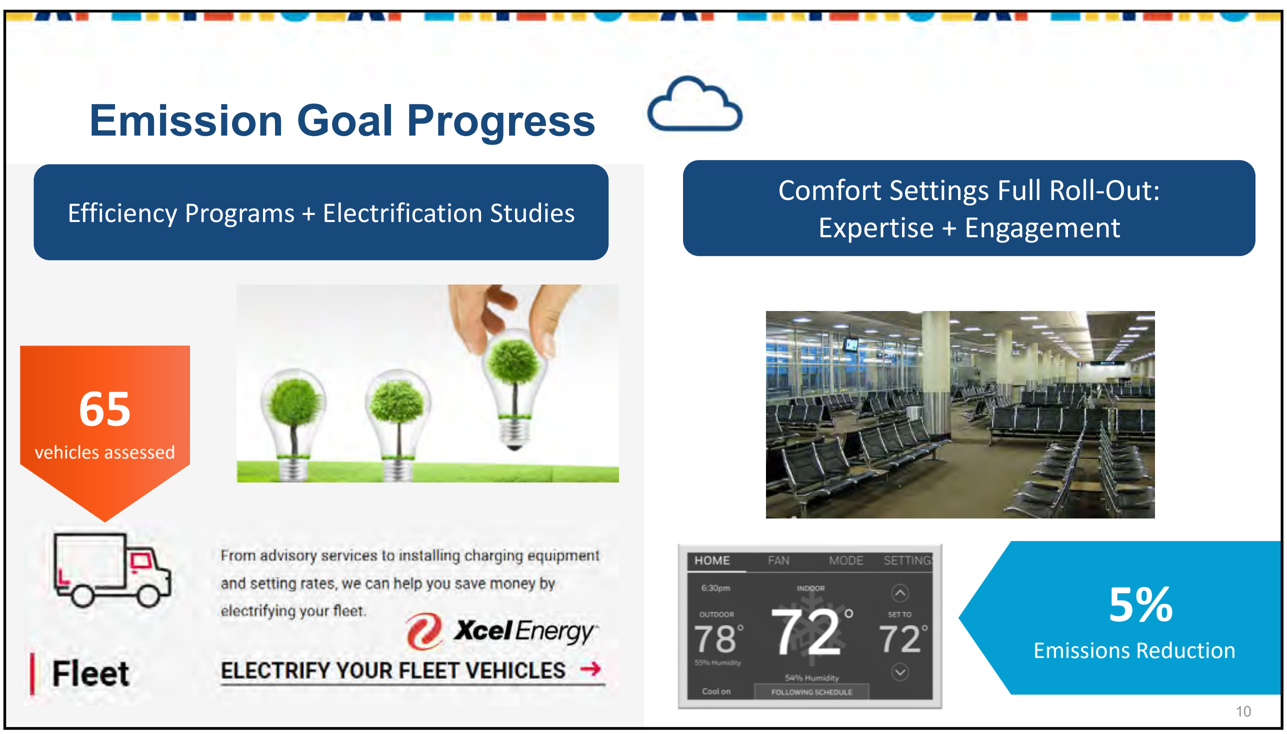
50%
water reduction use in faucets
Inventory of Water Uses and Fixtures: The Power of Data
100%
of potential solutions identified in water audit
3.5 gallons/ flush
1.6 gallons/ flush
9


Emission Goal Progress
Efficiency Programs + Electrification Studies
65
vehicles assessed
From advisory services to installing charging equipment and setting rates, we can help you save money by electrifying your fleet.
Xcel Energy
Fleet
ELECTRIFY YOUR FLEET VEHICLES →
Comfort Settings Full Roll-Out: Expertise + Engagement
HOME FAN MODE SETTING
78° 72° 72°
5%
Emissions Reduction
10

Engagement Goal Progress

Professional Groups + Employee Engagement

AIRPORTS GOING GREEN®

SUSTAINABLE GROWTH COALITION

ACI NORTH AMERICA
AIRPORTS COUNCIL INTERNATIONAL

Sustainability Workshop: Reflection and Communication

92% agree workshop will advance 2030 sustainability goals

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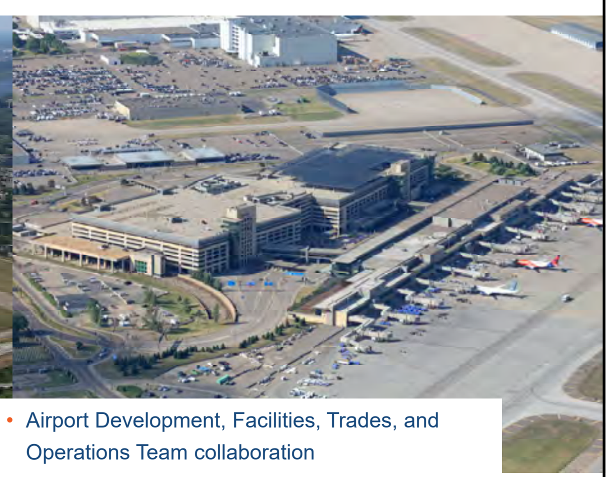
MAC Airport Development



- Airport Development, Facilities, Trades, and Operations Team collaboration
- Capital Improvement Program facilitates replacement, repair, and expansion of facilities

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Reusing Airfield Concrete

- Crush existing airfield concrete and reuse as concrete base for new concrete
- Reduces hauling trips for trucks for disposal
- Reduces carbon footprint of airfield

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Smart Landscaping

- Irrigation system monitors the moisture level in the ground only turn on when needed in specific areas, optimizing water use
- Install low or no irrigation planting areas that use native plants
- Landscaping reduces mowing

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Green Roofs

- Vegetative roof that supports a variety of succulents and grasses
- Reduces heating, cooling needs in spaces below
- Increases the life of the roof membrane
- Reduces heat island effect
- Reduces runoff speed of rainfall

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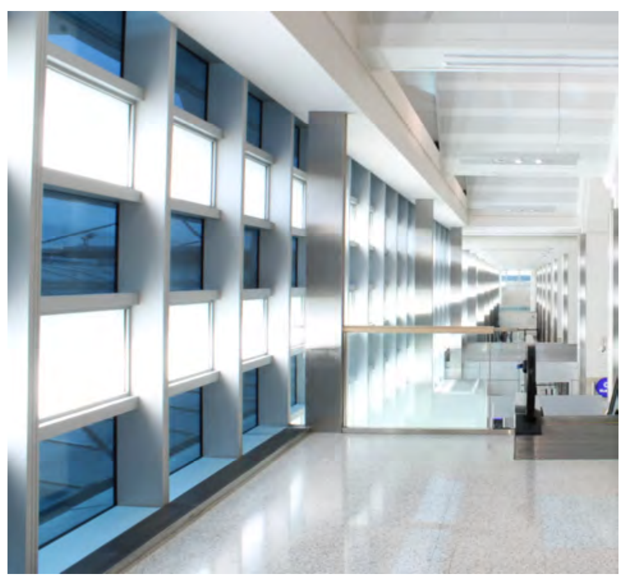
Thermal Performance

- Glazing with high thermal performance
- Smart windows adjust tinting throughout the day
- Reduces glare
- Repairs and improvements to existing systems



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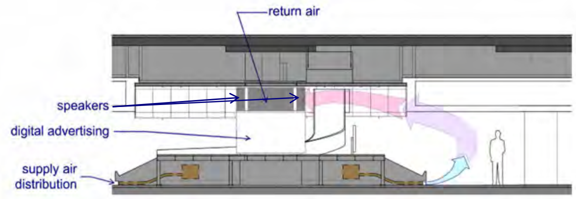
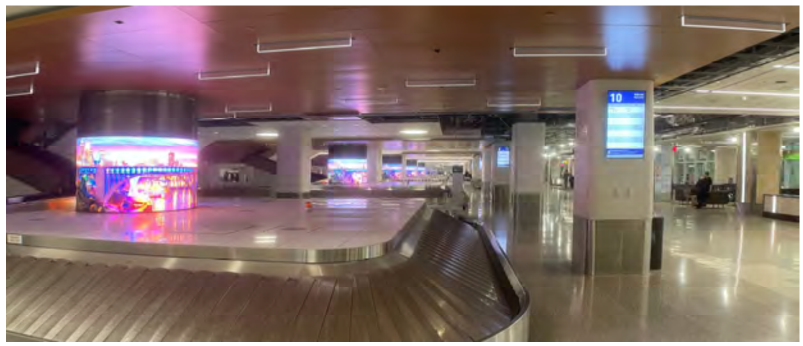
Displacement Ventilation

- Supplying outdoor conditioned air flow at passenger level
- Exhaust high above the use zone
- Increases ventilation efficiency





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Restrooms

- LED lighting
- Displacement ventilation
- Low-flow fixtures for faucets and toilets
- Water metering to reduce water use per passenger
- Interior Finishes
- Acoustics

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18

Metering & Building Automation

- Building Automation monitors heating, cooling, and ventilation needs to ensure buildings are functioning at optimum levels for passenger comfort and efficiency
- Track data and trends on how the airport systems are being used and problem areas
- Metering electrical use allows the airport to determine areas of efficiency and opportunities

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Electric Ground Service Equipment & Passenger Vehicles

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LEED

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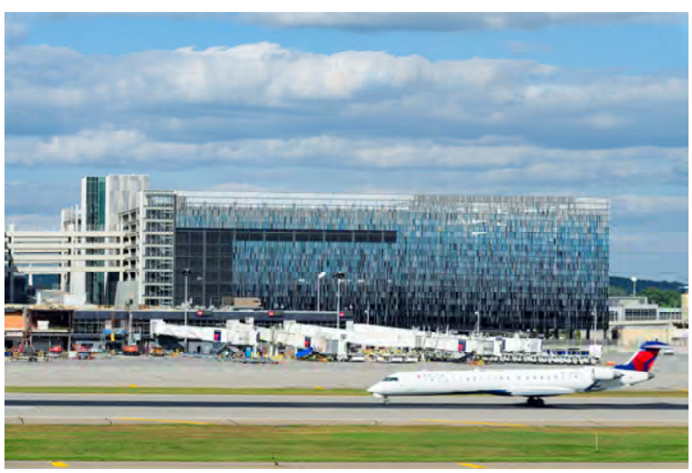
Delta Air Lines Sustainability Program



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BELIEF #1: PROGRESS OVER PERFECTION

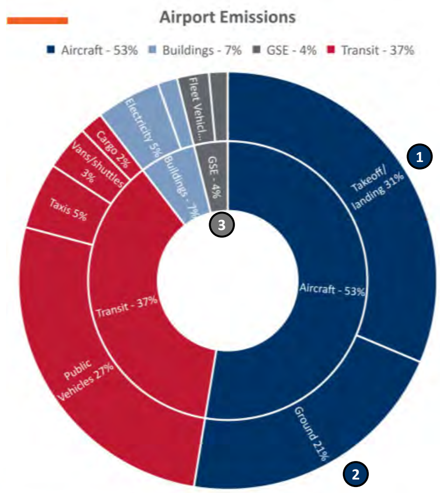
VISION: BETTER CONNECTING THE WORLD MEANS CONNECTING PEOPLE TO A MORE SUSTAINABILE FUTURE OF TRAVEL

NORTH STARS	SUSTAINABLE TRAVEL			NET-ZERO EMISSIONS		
STRATEGIC PILLARS	EMBED SUSTAINABILITY IN EVERYTHING WE DO			ELIMINATE OUR CLIMATE IMPACT FROM FLYING		
FOCUS AREAS	THE TRAVEL EXPERIENCE	GROUND OPS & FACILITIES	SUPPLY CHAIN	EFFICIENT AIRCRAFT OPERATIONS	CLEAN FUEL	REVOLUTIONARY FLEET
MILESTONES 2025	Minimize single-use plastic onboard	50% GSE electrification; 5 hubs at 100% of core[2] fleet	100% of preferred vendors on carbon tracking system	1% fuel burn savings from operational improvements (45M gallons)[4]		10+% fuel efficiency (FE) gains[4]; 5 strategic partner-ships with rev. tech players
2030			100% of preferred vendors with net zero plans		10% SAF usage	
2035	65% waste diversion from landfill[1]	100% of hubs' GSE electrified; renewable energy powering operations		80% reduction of addressable contrails; 3% oper. fuel savings (1.1B cumulative vs. 2019)	35% SAF usage	20+% FE gains[4]; 1st operation of ML rev. tech
2050	100% waste diversion from landfill[1]	100% net zero operations	100% net zero supply chain	100% reduction of addressable contrails[3]; 5% oper. fuel savings	95+% SAF usage	40+% FE gains[4]; 25% rev. aircraft in fleet

1. Relating to our customer onboard and in-airport travel experience; other airline operations (e.g., maintenance) are excluded.
2. Core fleet consists of baggage tractors, belt loaders and aircraft tow tractors
3. Subject to successful completion of MIT contrails study, and provided that contrail avoidance can be done in a way that is consistent with Delta's ops, economic and environmental objectives
4. Compared to 2019

24

Sustainability at Delta Air Lines



MSP Collaboration Success Stories

1. Takeoff/landing
   - Optimized profile descent: ~30k MT CO_2 annually
2. Ground
   - Pre-Conditioned Air units at each gates
   - APU Ambassador – dedicated employees focused on reducing Auxiliary Power Unit (APU) usage
3. Ground Service Equipment Electrification
   - GSE chargers supporting fleet electrification
     - ~50% electrified as of July 2023

Future Collaboration Opportunities

2. Ground
   - APU Reduction via maintenance pad electrification
   - End around taxiways (EAT)
   - Green taxi solutions

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Source: FAA Airport Cooperative Research Program (ACRP) Report 11

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WE CAN'T DO THIS ALONE. COLLABORATION IS ESSENTIAL.

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Questions

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MSP Long-Term Plan (LTP) Next Steps

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AFFIDAVIT OF PUBLICATION
STATE OF MINNESOTA
COUNTY OF RAMSEY

Kayla Tsuchiya, being duly sworn on oath, says: that she is, and during all times herein state has been, Inside Sales Representative of Northwest Publication, LLC., Publisher of the newspaper known as the Saint Paul Pioneer Press, a newspaper of General circulation within the City of St. Paul and the surrounding Counties of Minnesota and Wisconsin including Ramsey and Kanabec.

That the notice hereto attached was cut from the columns of said newspaper and was printed and published therein on the following date(s):
Thursday, July 20, 2023

Newspaper Ref./AD Number#: 71505770

Client/Advertiser:
Metropolitan Airports Commission

Kayla Tsuchiya
Kayla Tsuchiya (Jul 20, 2023 15:47 CDT)

AFFIANT SIGNATURE

Subscribed and sworn to before me this
20th day of July, 2023

True Lee

True Lee (Jul 20, 2023 15:58 CDT)

NOTARY PUBLIC

Ramsey County, MN
My commission expires January 31, 2025

TRUE LEE
NOTARY PUBLIC
STATE OF MINNESOTA
MY COMMISSION EXPIRES
JANUARY 31, 2025

PUBLIC NOTICE
2040 MINNEAPOLIS-ST. PAUL INTERNATIONAL AIRPORT
LONG-TERM PLAN
Public Comment Period Open

The Metropolitan Airports Commission (MAC) has completed a draft version of the 2040 Long-Term Plan for Minneapolis-St. Paul International Airport (MSP). The public is invited to review this document and provide written comments to the MAC.

MSP Airport is a commercial service airport that supports the Minneapolis-St. Paul metropolitan area. MSP Airport is located south of downtown Minneapolis, Minn. and southwest of downtown St. Paul. MSP Airport plays a vital role in helping the metropolitan area thrive and is routinely ranked among North America's best and most efficient airports. MSP Airport supports over 86,000 jobs, serves 39 million passengers each year and contributes $15 billion in total economic output each year.

The MSP Long-Term Plan is a forward-looking planning tool that studies facility needs based on projected 20-year passenger and aircraft demand. It helps the MAC better understand and plan for future facility needs by evaluating when improvements may be needed to accommodate demand. It does not authorize construction or facility improvements, nor does it serve as a basis for determining eligibility for noise mitigation programs.

The Long-Term Plan proposes facility improvements that 1) will meet projected passenger activity in a manner that maintains and enhances customer service; 2) allows the MAC to meet future demand, leverage environmental stewardship, and infuse sustainable thinking from both an environmental and financial perspective; and 3) incorporates public and stakeholder feedback received throughout the planning process.

The draft Long-Term Plan considers improvements to three segments of the airport: terminal, airside and landside. Improvements are proposed to both Terminals 1 and 2, adding twelve net new gates to accommodate future growth. Airside improvements are proposed to improve traffic flow and accommodate capacity growth. No runway extensions, additions or changes are proposed. Landside improvements include relieving terminal curbside congestion and reconstructing parking facilities that are reaching the end of their useful life.

Copies of the draft Long-Term Plan were made available on the MAC's website beginning Wednesday, June 21, 2023 (web address). Written comments will be accepted until Monday, August 21, 2023, at 5:00 p.m. CDT.

A copy of the draft Long-Term Plan document is available for review at the MAC General Office, 6040 28th Avenue South, Minneapolis; Sabathani Community Center, 310 E 38th Street, Minneapolis; Richfield City Hall, 6700 Portland Avenue, Richfield; Eagan Municipal Center, 3830 Pilot Knob Road, Eagan. A request for a copy may be submitted via the email address below.

Please submit written comments via email to MSPAirportLongTermPlan@mspmac.org, or mail written comments to Metropolitan Airports Commission, Attn: Airport Planner, 6040 28th Avenue South, Minneapolis, MN 55450.

AFFIDAVIT OF PUBLICATION

STATE OF MINNESOTA)
COUNTY OF HENNEPIN)

StarTribune

650 3rd Ave. S, Suite 1300 | Mineapolis, MN | 55488

Terri Swanson, being first duly sworn, on oath states as follows:

1. (S)He is and during all times herein stated has been an employee of the Star Tribune Media Company LLC, a Delaware limited liability company with offices at 650 Third Ave. S., Suite 1300, Minneapolis, Minnesota 55488, or the publisher's designated agent. I have personal knowledge of the facts stated in this Affidavit, which is made pursuant to Minnesota Statutes §331A.07.

2. The newspaper has complied with all of the requirements to constitute a qualified newspaper under Minnesota law, including those requirements found in Minnesota Statutes §331A.02.

3. The dates of the month and the year and day of the week upon which the public notice attached/copied below was published in the newspaper are as follows:

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FURTHER YOUR AFFIANT SAITH NOT.

Terri Swanson

Subscribed and sworn to before me on: 07/20/2023

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Notary Public
Minnesota
My Commission Expires January 31, 2027

Notary Public

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StarTribune
Twin Cities
Thursday, July 20, 2023

DA: Corrections officer shooting justified

Law enforcement officers shot and killed Tyler Abel, a Minnesota corrections officer, after a standoff.

By MATT McKINNEY
mckinney@startribune.com

Law enforcement officers were justified in using deadly force against Minnesota corrections officer Tyler Abel when they shot him last month at his Star Prairie, Wis., house after a 16-minute standoff, the St. Croix County District Attorney has found.

Abel, arguing with officers who had been called for a domestic incident, shouted, "Let's get this over with," before walking out of his garage pointing a rifle at the officers, District Attorney Karl E. Anderson wrote in an opinion released Tuesday.

A St. Croix County sheriff's sergeant and a New Richmond, Wis., police officer fired a total of four rounds from their service rifles, striking Abel, who was pronounced dead at the scene. No one else was injured.

Abel, 42, had a wife and two young sons, according to a GoFundMe page set up to support the family.

He worked at the Stillwater prison for a little more than a year after a midlife career change that saw him leave a manufacturing job he held for 20 years at SMC Ltd. in Somerset, Wis., according to a statement from Corrections Department Commissioner Paul Schnell. Abel was a Hudson High School graduate.

A Polk County Sheriff's Office investigation of Abel's death found that at 10:46 p.m. June 3, a woman called 911 from a house in the 1900 block of County Road CC in Star Prairie, about 30 minutes northeast of Stillwater, and said her husband, Abel, was out of control and threatening to "bring out his 'AR.'" Asked if he had been drinking, the woman said she didn't know "what he was on" and that the argument had gotten physical.

The dispatcher could hear Abel in the background expressing disbelief that the woman had called authorities, saying, "I'm going to bring my AR out and I'm going to get shot." While on the phone, the woman said she was able to take an AR-15 away from Abel. She also tried to get her two children, who were sleeping upstairs, but was unable to before she was forced to flee, authorities said.

As police officers arrived at the house, they negotiated with Abel by speaking through the open garage door. Abel was eventually spotted just inside the residence, pointing a rifle at the garage service door as he shouted profanities and said several times that police would have to kill him.

Negotiations continued until Abel said, "Let's get this over with," and came through the service door into the rear of the garage. As he walked toward New Richmond police officer Katie Chevrier and St. Croix County Sheriff Sgt. Chase DuRand, Abel refused commands to drop his weapon. He then pointed his rifle at the officers, and they both fired.

District Attorney Anderson said the officers' weapons and slings blocked the view of their body cameras at the moment Abel was shot. Anderson said he interviewed both of the veteran officers and believed their statements that Abel pointed his rifle at them. Abel's rifle is also visible in the bodycam video moments after the shooting.

Abel was holding a .22 caliber pellet rifle when he was shot. The rifle is potentially lethal, and doesn't change the analysis that the officers believed Abel was holding a firearm and planned to use lethal force against them, Anderson wrote.

Polk County District Attorney Jeffrey L. Kemp also found that the shooting was justified; Anderson wrote that he asked Kemp to provide a second legal opinion on the case "out of an abundance of caution."

Matt McKinney • 612-217-1747

Man gets 270 days in jail for road rage shooting on I-94

ST. CLOUD – A Stearns County judge on Wednesday sentenced a 24-year-old Michigan man to about nine months in jail for shooting at another vehicle and injuring the driver during a road rage incident last fall.

Shannon S. Woods of Inkster, Mich., was charged in Stearns County District Court with one felony count of second-degree assault after he fired a handgun at a vehicle driven by a man from Avon, Minn., at about 7:40 p.m. on Sept. 6 on westbound I-94 between St. Joseph and Avon.

According to court documents, Woods fired from his vehicle as the other man exited the freeway. The bullet hit the Avon man's vehicle near the rear driver's side window, skimmed the man's nose and exited the front passenger side window.

The Avon man told police he became frustrated with Woods while driving because Woods would not let him pass. The man said the two vehicles "went back and forth" and started racing, documents state.

Woods told police the Avon man repeatedly tailgated him and cut him off, and at one point flashed an unknown object at Woods. After the incident, police found a "machete type tool" and multiple knives in the Avon man's car.

Woods told police he "fired two to three shots behind [the man's] car just to scare him off" and that he didn't intend to hit the victim, according to court documents.

Woods pleaded guilty in April as part of a plea deal.

Judge Sarah Hennesy sentenced Woods to three years in prison but stayed the sentence, so Woods will not face prison time unless he violates the terms of his probation. The judge also sentenced him to 270 days in jail staggered over three years. He will be on probation for five years.

JENNY BERG

Inmate gets 18 years for beating security staffer

The assault occurred at Minnesota's sex offender treatment facility.

By PAUL WALSH
paul.walsh@startribune.com

A chronically violent felon has received a term topping 18 years for the beating of a security staffer working in the state's sex offender treatment facility in Moose Lake.

Nicolas L. Aron-Jones, 29, was sentenced Tuesday in Carlton County District Court after pleading guilty to second-degree attempted murder in connection with the unprovoked attack May 1 at the Minnesota Sex Offender Program (MSOP) site.

With credit for time in custody since his arrest, Aron-Jones is expected to serve the first 12 years of his term in prison and the balance on supervised release.

The victim, a 53-year-old security counselor who was making his scheduled rounds at the time, suffered bleeding on the brain and a cut near his right eye during the ambush, the charges read. He was taken by air ambulance to a hospital for treatment. MSOP has not released his identity.

Aron-Jones was committed as a client to the program in 2015 as a sexually dangerous person and was housed in Omega 2, one of Moose Lake's more restrictive units.

Court records show that Aron-Jones has numerous convictions for violent outbursts at the Moose Lake facility: In June 2020, he was handcuffed while he kneed and bit a staff member; in March 2019, he put a hairbrush in a sock and swung it, damaging windows and yelling death threats at staff during a 20-minute tirade; in June 2017, he punched and kicked a security counselor into unconsciousness; in May 2016, he spit at and attacked a security counselor, broke a table and threw a chair at a television.

According to the charges related to the latest assault:

Aron-Jones swung a pillowcase holding a motor for a fan and hit the counselor in the back of the head. The man fell to the floor and Aron-Jones struck him with the motor several more times to the head and elsewhere. Aron-Jones then kicked and stomped on the victim's head.

Other staff intervened, spraying a chemical irritant at Aron-Jones, who retreated to his room and closed the door.

Paul Walsh • 612-673-4482

State high court declines Chauvin's petition for appeal

By PAUL WALSH
paul.walsh@startribune.com

The Minnesota Supreme Court has denied Derek Chauvin's bid to review his conviction for second-degree murder in the killing of George Floyd more than three years ago.

Chief Justice Lorie Gildea said in her one-sentence order filed Tuesday that "based upon all the files, records and proceedings, herein, it is hereby ordered that the petition of Derek Michael Chauvin for further review is denied."

One of Chauvin's attorneys said he will now take Chauvin's case to the U.S. Supreme Court.

Greg Erickson said that just as was the case at the state level, Chauvin intends to argue that "his right to a fair trial" guaranteed under the U.S. Constitution was violated.

The odds of the nation's highest court hearing the case are long. Several thousand cases seek the U.S. Supreme Court's review, and it accepts only a tiny number.

Chauvin, now 47, was sentenced in Hennepin County District Court in June 2021 to 22½ years in prison for Floyd's murder, the killing of a Black man by a white officer captured on a bystander's viral video that ignited sometimes violent unrest in the Twin Cities and around the world and spurred a racial reckoning.

On May 25, 2020, a Cup Foods convenience store clerk reported Floyd on suspicion of passing a counterfeit $20 bill to buy cigarettes. Minutes after police arrived, Floyd was pinned under Chauvin's knee on the pavement, saying he couldn't breathe and begging, along with several bystanders, for his life.

Derek Chauvin was sentenced to 22½ years in June 2021 for the murder of George Floyd.

In July 2022, a federal judge sentenced Chauvin to more than 20 years in prison for violating the civil rights of Floyd and a Black Minneapolis teen for excessive use of force during an encounter in 2017. Chauvin is currently incarcerated in a federal prison in Arizona and serving time that runs concurrent with his state sentence.

Two officers who also physically restrained Floyd and a third who stood guard at the curb are all serving much shorter prison sentences after their convictions in state and federal courts. J. Alexander Kueng, Tou Thao and Thomas Lane were found guilty of federal charges in a jury trial and are serving federal sentences ranging from 2½ to 3½ years.

Lane was sentenced in September to three years in prison after he pleaded guilty in May to aiding and abetting second-degree manslaughter. Kueng in October admitted to the same charge and was sentenced to 3½ years. Both will serve their sentences concurrently with their federal sentences. Thao is scheduled for sentencing next month after a judge found him guilty of aiding and abetting second-degree manslaughter.

Paul Walsh • 612-673-4482

Charges: Pickup driver fled after driving over man

A 24-year-old passenger was killed after jumping out of the bed of the truck.

By LOUIS KRAUSS
louis.krauss@startribune.com

A 21-year-old man was charged Tuesday with failing to stay at the scene after he allegedly drove over and killed a passenger who jumped out of the back of his pickup truck.

Joseph Wesley Schneider of Annandale faces two felonies in Wright County District Court for alleged failure to notify police of a death and not remaining at the scene as the driver.

Officers responded just after 1:30 a.m. Saturday to the crash near Camp Friendship about 6 miles north of Annandale on NW. 108th Street, just north of Clearwater Lake.

Alexander J. Hilsgen, 24, of Clearwater was found and pronounced dead at the scene with "significant trauma from his head to his pelvis," according to the criminal complaint.

A group of counselors from Camp Friendship were drinking at the Rendezvous Bar & Grill in Annandale earlier that night, when Schneider gave them a ride back. Hilsgen was not a counselor but tagged along. He sat in the bed of the pickup along with six others, the charges say.

Hilsgen's hat blew away while they were driving, and a witness said Hilsgen jumped out of the moving truck to try to retrieve it.

Surveillance footage from the camp allegedly shows Schneider driving over Hilsgen, according to the complaint.

"A loud bang is heard on the video and the lights from a white truck change direction," the charges state.

Schneider did not respond to requests for comment.

After the truck enters the parking lot, the footage allegedly shows Schneider get out and run toward the road where the incident happened, before running back to the truck and driving away.

Police identified Schneider as a suspect and went to his residence to find him. Schneider allegedly told police he recalled having three mixed drinks at the bar. He denied hitting anyone with his vehicle.

He was arrested and taken to jail before receiving a conditional release Tuesday, records show. His next court appearance is Aug. 25.

Schneider's driving history in Minnesota includes nine convictions for speeding in the past three years, court records show.

Louis Krauss • 612-673-4667

SUV driver dies in collision with semi in western Minnesota

An SUV driver was killed after colliding with a semitrailer truck at an intersection in western Minnesota, officials said.

The crash occurred about 9:30 a.m. Tuesday about 7 miles east of Benson, the State Patrol said.

The semi was westbound on Hwy. 9 while the SUV driver was heading south on County Road 31 and "failed to stop at the intersection" before the collision, a statement from the patrol said.

The SUV driver was identified by the patrol as Jordan L.R. Kuchera, 35, of Grand Forks, N.D. The semi driver, 64-year-old Jeffrey R. King of Spicer, Minn., was not hurt, according to the patrol.

PAUL WALSH

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Legal Notices

ORDINANCE NO. 23-05

AN ORDINANCE AMENDING A PORTION OF CHAPTER 9 OF THE CITY OF HAM LAKE, COUNTY OF ANOKA, STATE OF MINNESOTA.

The City Council of the City of Ham Lake does hereby ordain as follows, pursuant to Article 9 of the Ham Lake City Code.

That the zoning classification for the following described property situated in the City of Ham Lake, Anoka County, Minnesota is hereby designated R-1 (Single Family Residential) (Toby's Trails).

PID# 15-32-23-14-0004
SE1/4 OF NE1/4 SEC 15 32 23 EX E 657.04 FT OF S 663 FT OF SD 1/4,1/4, ALSO EX E 373 FT OF N 320 FT OF S 983 FT OF SD 1/4,1/4, (ALL DIST AS MEAS ALG & PRLL/W S & E LINES THEREOF); ALSO EX RD; SUBJ TO EASE OF REC

Presented to the Ham Lake City Council on July 5, 2023 and adopted by a unanimous vote this 17th day of July, 2023.

Brian Kirkham, Mayor
Denise Webster, City Clerk

PUBLIC NOTICE
2040 MINNEAPOLIS-ST. PAUL INTERNATIONAL AIRPORT LONG-TERM PLAN
Public Comment Period Open

The Metropolitan Airports Commission (MAC) has completed a draft version of the 2040 Long-Term Plan for Minneapolis-St. Paul International Airport (MSP). The public is invited to review this document and provide written comments to the MAC.

MSP Airport is a commercial service airport that supports the Minneapolis-St. Paul metropolitan area. MSP Airport is located south of downtown Minneapolis, Minn. and southwest of downtown St. Paul. MSP Airport plays a vital role in helping the metropolitan area thrive and is routinely ranked among North America's best and most efficient airports. MSP Airport supports over 86,000 jobs, serves 39 million passengers each year and contributes $15 billion in total economic output each year.

The MSP Long-Term Plan is a forward-looking planning tool that studies facility needs based on projected 20-year passenger and aircraft demand. It helps the MAC better understand and plan for future facility needs by evaluating when improvements may be needed to accommodate demand. It does not authorize construction or facility improvements, nor does it serve as a basis for determining eligibility for noise mitigation programs.

The Long-Term Plan proposes facility improvements that 1) will meet projected passenger activity in a manner that maintains and enhances customer service; 2) allows the MAC to meet future demand, leverage environmental stewardship, and infuse sustainable thinking from both an environmental and financial perspective; and 3) incorporates public and stakeholder feedback received throughout the planning process.

The draft Long-Term Plan considers improvements to three segments of the airport: terminal, airside and landside. Improvements are proposed to both Terminals 1 and 2, adding twelve net new gates to accommodate future growth. Airside improvements are proposed to improve traffic flow and accommodate capacity growth. No runway extensions, additions or changes are proposed. Landside improvements include relieving terminal curbside congestion and reconstructing parking facilities that are reaching the end of their useful life.

Copies of the draft Long-Term Plan were made available on the MAC's website beginning Wednesday, June 21, 2023 (web address). Written comments will be accepted until Monday, August 21, 2023, at 5:00 p.m. CDT.

A copy of the draft Long-Term Plan document is available for review at the MAC General Office, 6040 28th Avenue South, Minneapolis; Sabathani Community Center, 310 E 38th Street, Minneapolis; Richfield City Hall, 6700 Portland Avenue, Richfield; Eagan Municipal Center, 3830 Pilot Knob Road, Eagan. A request for a copy may be submitted via the email address below.

Please submit written comments via email to MSPAirportLongTermPlan@mspmac.org, or mail written comments to Metropolitan Airports Commission, Attn: Airport Planner, 6040 28th Avenue South, Minneapolis, MN 55450.

Certificates of Assumed Name

Certificate of Assumed Name

State of Minnesota, Pursuant to the Chapter 333 Minnesota Statutes: the undersigned, who is or will be conducting business in the State of Minnesota under an assumed name, hereby certifies:
1. State the exact assumed name under which the business is or will be conducted: Grown Brilliance
2. State the address of the principal place of business. 4900 Highway 169 N, Suite 307, New Hope, MN 55428
3. List the name and complete street address of all persons conducting business under the above Assumed Name. AJS Creations, Inc., 4900 Highway 169 N, Suite 307, New Hope, MN 55428
4. I certify that I am authorized to sign this certificate and I further certify that I understand that by signing this certificate, I am subject to the penalties of perjury as set forth in Minnesota Statutes section 609.48 as if I had signed this certificate under oath.
5. This certificate is an amendment of Certificate of Assumed Name File Number: 1354480200028 originally filed on 12/07/2022
Richard W. Grohmann, Esq.,
General Counsel
07/12/2023
richard.grohmann@grownbrilliance.com

Certificate of Assumed Name

State of Minnesota, Pursuant to the Chapter 333 Minnesota Statutes: the undersigned, who is or will be conducting business in the State of Minnesota under an assumed name, hereby certifies:
1. State the exact assumed name under which the business is or will be conducted: The ReallyRare
2. State the address of the principal place of business. 4900 Highway 169 N, Suite 307, New Hope, MN 55428
3. List the name and complete street address of all persons conducting business under the above Assumed Name. AJS Creations, Inc., 4900 Highway 169 N, Suite 307, New Hope, MN 55428
4. I certify that I am authorized to sign this certificate and I further certify that I understand that by signing this certificate, I am subject to the penalties of perjury as set forth in Minnesota Statutes section 609.48 as if I had signed this certificate under oath.
5. This certificate is an amendment of Certificate of Assumed Name File Number: 1388601900026 originally filed on 04/26/2023
Richard W. Grohmann, Esq.,
General Counsel
07/12/2023
richard.grohmann@grownbrilliance.com

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State of Minnesota, Pursuant to the Chapter 333 Minnesota Statutes: the undersigned, who is or will be conducting business in the State of Minnesota under an assumed name, hereby certifies:
1. State the exact assumed name under which the business is or will be conducted: Bespoke Jewels
2. State the address of the principal place of business. 4900 Highway 169 N, Suite 307, New Hope, MN 55428
3. List the name and complete street address of all persons conducting business under the above Assumed Name. AJS Creations, Inc., 4900 Highway 169 N, Suite 307, New Hope, MN 55428
4. I certify that I am authorized to sign this certificate and I further certify that I understand that by signing this certificate, I am subject to the penalties of perjury as set forth in Minnesota Statutes section 609.48 as if I had signed this certificate under oath.
5. This certificate is an amendment of Certificate of Assumed Name File Number: 1390683800025 originally filed on 05/09/2023
Richard W. Grohmann, Esq.,
General Counsel
07/12/2023
richard.grohmann@grownbrilliance.com

Certificate of Assumed Name

State of Minnesota, Pursuant to the Chapter 333 Minnesota Statutes: the undersigned, who is or will be conducting business in the State of Minnesota under an assumed name, hereby certifies:
1. State the exact assumed name under which the business is or will be conducted: Remi Rhode
2. State the address of the principal place of business. 4900 Highway 169 N, Suite 307, New Hope, MN 55428
3. List the name and complete street address of all persons conducting business under the above Assumed Name. AJS Creations, Inc., 4900 Highway 169 N, Suite 307, New Hope, MN 55428
4. I certify that I am authorized to sign this certificate and I further certify that I understand that by signing this certificate, I am subject to the penalties of perjury as set forth in Minnesota Statutes section 609.48 as if I had signed this certificate under oath.
5. This certificate is an amendment of Certificate of Assumed Name File Number: 1392365000021 originally filed on 05/19/2023
Richard W. Grohmann, Esq.,
General Counsel
07/12/2023
richard.grohmann@grownbrilliance.com

Appendix G: Public Comments and Responses

MSP Airport 2040 Long-Term Plan Public Comments and Responses

Introduction

A 60-day public comment period began on June 21, 2023 and ended on August 21, 2023. Three weeks into the comment period, the fourth and final public Experience MSP event was held to present the draft LTP findings and preferred development alternative to the public. A total of 90 people attended the event.

A total of 139 public comments were received during the public comment period and ranged in a variety of topics, of which the pronounced areas of public comments included noise, terminal, landside, and MAC communications. Of the comments, 137 were from members of the public and two from municipality/agency representatives.

Metropolitan Council submitted a letter on August 18, 2023, with technical comments and considerations about the surrounding roadway network, transit, environmental, regional parks and trails, wastewater, forecasts and general considerations.

The City of Minneapolis submitted a letter on August 21, 2023, with comments about the growth in flight operations, aircraft fleet mix, noise impacts, environmental and health impacts and facility needs.

Municipality and agency written responses and comment letters are provided after the general responses to public comments.

Responses to Public Comments
General responses were developed to address questions and concerns that were consistent among the comments received. Specific responses to comments received from municipalities and agencies are provided in the next section.

The following topics are covered by the suite of general responses:

1. Purpose of the MSP 2040 Long-Term Plan
2. Roles and responsibilities in airport planning and operations
3. Roadway congestion on the arrival/departure curbs
4. Safety on the light rail between the terminals
5. General concerns about aircraft noise
6. Aircraft noise mitigation program eligibility
7. Noise abatement measures
8. Limiting airport operations to reduce noise
9. Airline incentives for using quieter aircraft
10. Altitudes of aircraft

11. Runway use
12. Relocating the airport
13. Sustainability efforts

All written comments received from members of the public are reproduced in their entirety at the end of this appendix.

General responses #1 through #13 follow.

1. Purpose of the MSP 2040 Long-Term Plan

The Metropolitan Council (Met Council) is the regional planning authority and provider of essential services in the Twin Cities metro area. The Met Council adopted guidelines that require regular updates to the MSP Airport Long-Term Plan (LTP) to integrate pertinent information regarding the planning, development and operation of the region's airports for compatibility with the surrounding areas. There are three primary objectives of the MSP 2040 LTP:

- **Objective 1:** Plan for future facilities that will meet forecast Planning Activity Levels (PALs) in a manner that maintains and enhances customer service, while facilitating a seamless "one-journey" experience.
- **Objective 2:** Produce a development plan that positions the MAC to meet future demand levels, enhances financial strength, leverages environmental stewardship and infuses sustainable thinking.
- **Objective 3:** Conduct the planning process in a manner that includes meaningful stakeholder engagement processes.

The 2040 LTP is a forward-looking planning tool that studies on-airport facility and infrastructure needs based on projected 20-year passenger demand and aircraft operations. The LTP is a conceptual plan to establish when facility improvements are needed to accommodate projected demand. The LTP does not authorize construction, nor does it serve as an environmental review or a basis for determining noise mitigation. Following the adoption of this LTP, the MAC will study off-airport environmental impacts in the appropriate state- and federal-level environmental review, in accordance with the National Environmental Policy Act (NEPA) and Minnesota Environmental Policy Act (MEPA). Subsequently, design-level planning will be developed as potential project(s) in the LTP become an identified need.

2. Roles and responsibilities in airport management and operations

Numerous organizations have a role to play in the safe, efficient operation and planning for the MSP Airport. The MAC owns and maintains seven airports in the area: MSP and six general aviation reliever airports. The purpose of the general aviation reliever airports is to relieve general aviation activity from MSP, which primarily services air carrier operations.

The MAC can be viewed as the landlord of the airport with airlines, air cargo companies, airport restaurants and stores and car rental companies as tenants to the MAC. The MAC is responsible for the long-term planning, environmental review and design and maintenance of airport facilities. As a public corporation of the state, the MAC generates the revenues it needs to operate through rents and user fees, not general tax appropriations.

The Federal Aviation Administration (FAA), a branch of the U.S. Department of Transportation, is responsible for the safe, efficient movement of aircraft through the MSP Airport and National Airspace System. The FAA has broad legislative authority to create and enforce federal regulations for airports, pilots and airlines. The top priority for the FAA Air Traffic Control (ATC) is the safe and efficient movement of aircraft. Controllers adhere to a set of separation standards that define the minimum distance allowed between aircraft.

Decisions about which runways aircraft use at MSP are made by FAA officials. Airport authorities like the MAC do not have authority to dictate where or how airplanes fly.

Airlines and air cargo companies schedule flights and maintain aircraft. Many of the decisions made by airlines and cargo companies are based on passenger and/or customer demand, including: which destinations will be served; which type of aircraft will operate at an airport; what time of day a flight will occur; and how frequently a flight will occur.

3. Roadway congestion on the arrival/departure curbs

The 2040 LTP has evaluated and considered curbfront congestion issues in front of both Terminals 1 and 2. As passenger demand grows at MSP, existing facilities may not meet future demand or an acceptable level of service. Specifically, curbside congestion is a key concern that was discussed throughout the LTP. The LTP recommends further study be conducted to provide a preliminary design-level concept to address the congestion, as both are directly tied to long-range planning needs such as reconstructing the Terminal 1 Green and Gold parking ramps. As the landside projects become closer to construction, holistic improvements to landside accessibility will be considered.

4. Safety on the light rail between terminals

There has been an increase in police throughout 2023. MAC will continue partnering with Metro Transit officials to increase the safety and security on their Light Rail Vehicles to reduce crime and improve cleanliness for the passengers and employees traveling between terminals.

5. General concerns about aircraft noise

There are no additional runways proposed in the LTP. However, the LTP does indicate a forecasted increase in the number of flights at MSP in the future based on market demands and an associated increase in the noise environment around MSP.

To address the noise associated with the airport, the MAC has implemented a robust noise mitigation program. The MAC has a long history of collaborating with stakeholders, including neighboring communities, to reduce noise. These efforts date back to before 1970 and include operational noise abatement and land use measures.

The MAC has established noise abatement efforts that air traffic control utilizes to reduce aircraft overflying residential areas when feasible. More information about noise abatement practices is available at: metroairports.org/msp-noise-abatement-efforts. Additionally, the MAC's Airport Noise Mitigation Program is the most unique and expansive airport sound insulation program in the country. This program provides eligible homes with sound insulation mitigation and has invested over $500 million in communities around the airport. Furthermore, aircraft technology continues to result in quieter operations and the fleet of aircraft operating in and out of MSP continue to be updated.

The FAA controls the airspace around MSP and all operations that arrive in to, and depart from, the airport. The MAC, with assistance from the MSP Noise Oversight Committee (NOC), remains committed to working with the FAA to address airport noise concerns from an operational perspective when feasible. Requests for analyses and reports on current airport activity are best made through the NOC for inclusion in a future work plan. More information about the NOC is available at https://metroairports.org/noc.

Although the NOC and the MAC continue to explore new and innovative ways to reduce noise impacts around MSP, there remain many circumstances when the impacts from the airport simply cannot be abated. Federal grant dollar provisions require that the airport be operated in a manner that is neither discriminatory nor poses an undue burden on interstate commerce.

More information on the MAC's noise programs, including initiatives to reduce noise and participating in the NOC process, are available at https://metroairports.org/community-connection/aircraft-noise.

6. Aircraft noise mitigation program eligibility

The 2040 Forecast scenarios noise contours and analysis contained in the LTP do not qualify homes for MAC's noise mitigation program. Eligibility for noise relief provided by the MAC is determined annually, based upon actual MSP noise contours developed for the preceding calendar year.

In 1992 the MAC began its first residential noise mitigation program. The MAC's work in this area is the most expansive in the country and represents the most direct form of tangible relief to neighbors most affected by aircraft noise from MSP air traffic. Between 1992 through January 2023, the MAC's noise mitigation program has provided noise relief to almost 20,000 single- and multi-family homes and 19 schools around MSP at a total cost of over $513 million.

In 2021, the MAC committed to continue providing noise mitigation relief to qualifying homes through 2032. This commitment effectively extends one of the most robust and encompassing sound insulation efforts around any U.S. airport. For a home to qualify, it must be located, for a period of three consecutive years in the actual 60 DNL aircraft noise contour published in an annual noise contour report, and, be located within a higher noise impact area when compared to the home's status under a previous phase of the program. More information is available at: metroairports.org/noise-mitigation-program.

Eligibility for the MAC's Airport Noise Mitigation Program is based on a home's location within a calculated annual aircraft noise exposure area of 60 dB DNL or greater and "block-intersect" inclusion. When the qualifying noise contour intersects any parcel on any city block, the entire city block is included in the noise contour. The annual MSP noise contour analysis is published every year by March 1st and considers the number and types of aircraft that arrived and departed on each runway during the year, as well as the time of day those flights occurred. To participate in the program, a residence must be located, for a period of three consecutive years in the actual 60 DNL aircraft noise contour published in an annual noise contour report, and, be located within a higher noise impact area when compared to the home's status under a previous phase of the program.

The assessment process, calculation tool, and data inputs for annual noise contours are prescribed by the FAA. The FAA requires the use of the Aviation Environmental Design Tool (AEDT) to determine and analyze aircraft noise exposure around U.S. airports. Additionally, the MAC collects actual noise measurements at 39 locations around MSP airport and reports this information as a component to the annual contour reports. However, these data are not used to determine mitigation eligibility per FAA requirements.

Due to federal regulations, the MAC is not able to provide noise mitigation products, services or reimbursements for ineligible residences. Additionally, the MAC is not able to address aging mitigation products.

7. Noise abatement measures

The MAC has a long history of working with community stakeholders, airport users, the FAA, and other government entities to address aircraft noise issues. These efforts date back to before 1970 and include flight procedures aimed at reducing noise impacts. These are called noise abatement measures.

Noise abatement measures are those that affect the shape and size of the noise contours. A voluntary Noise Abatement Plan is in place to promote aircraft operating procedures that help reduce aircraft noise and overflights for residents living near MSP. There are a total of 12 voluntary noise abatement procedures in place at MSP. A description of these efforts is available at metroairports.org/msp-noise-abatement-efforts.

One measure is the use of an established preferential Runway Use System (RUS). The RUS prioritizes the order in which air traffic controllers assign runways for arrivals and departures during times of the day when safety and air traffic demand allow flexibility to promote flight activity over less-populated residential areas.

The Eagan-Mendota Heights Departure Corridor is another noise abatement measure that has been used for decades to direct aircraft, as much as possible, over noise-compatible industrial land use areas in Eagan and Mendota Heights, southeast of MSP. This corridor is utilized when conditions allow ATC to direct departing jet aircraft to use Runways 12L and 12R so that they will overfly the corridor and climb as much as possible within the corridor boundaries. The corridor extends about three miles from the departure ends of Runways 12L and 12R. At the end of the three miles, ATC directs aircraft to turn toward the route that will lead them out of the local airspace and eventually on course to their final destination.

For Runway 17, there is a 2.5 Nautical Mile Turn Point Departure procedure, reported to the NOC and in monthly reports as the Runway 17 Departure Procedure. Using this procedure, air traffic control direct westbound aircraft departing from Runway 17 to fly runway heading (heading 170) until reaching 2.5 nautical miles (NM) from the start of take-off roll. Compliance with this procedure is typically at or above 99% most months.

Noise abatement measures are voluntary and applied by air traffic personnel, as appropriate, using federal standards. There may be times when air traffic controllers are not able to use noise abatement measures due to safety factors or operational conditions. These practices do not restrict air traffic control from utilizing any flight procedures at MSP that they deem appropriate.

8. Limiting airport operations to reduce noise

Federal regulations dictate that the MAC cannot impose airport use restrictions during any time of the day or night. The 1990 Airport Noise and Capacity Act (ANCA) limits the ability of airports to impose access or use restrictions based on aircraft noise. ANCA establishes a process for airports to propose any noise or operational access restriction at an airport, such as a nighttime curfew. Airports must conduct a comprehensive technical and legal analysis, called a Federal Aviation Regulation (FAR) Part 161 Study. FAR Part 161 broadly defines “noise or access restriction” to include any restriction – including airport lease provisions, like differential landing fees – that affects the operation of aircraft for the purposes of noise reduction.

The result is that it is extremely difficult to restrict aircraft operations at an airport to control noise. The final authority to approve or deny the findings of a Part 161 study rests with the FAA. To date, the FAA has not approved any access restriction requests by and airport. The access or use restrictions designed for noise control that currently exist at some U.S. airports pre-date the 1990 ANCA and were grandfathered by an act of Congress. Additionally, federal grant dollar provisions require that the airport be operated in a manner that is neither discriminatory nor poses an undue burden on interstate commerce.

Therefore, MSP is open and available for use 24-hours a day, similar to a highway or any other transportation resource and the MAC is not able to restrict use of the airport based on time of day or type of operation, including cargo and military operations.

MSP is a joint civil-military airport and is home to the 934th Airlift Wing of the US Air Force Reserve and the 133rd Airlift Wing of the Minnesota Air National Guard. These facilities follow Department of Defense regulations and are not subject to FAA regulations. They complete missions, operations, and training for national defense purposes and are required to train 24/7 to be ready at a moment’s notice. However, efforts are underway to reduce engine noise from the aircraft operated by these facilities, the C-130 Hercules. The C-130 propellers are in the process of being replaced with quieter, more efficient units.

While the MAC is not able to restrict nighttime operations, the activity is monitored and reported annually as part of the NOC Work Plan.

9. Airline incentives for using quieter aircraft

Due to the 1990 ANCA (described above), the MAC does not have unilateral authority to offer financial incentives to airlines in an effort to reduce noise. Likewise, financial and/or operational penalties for operating certain types of aircraft or at certain times to reduce noise are also prohibited.

The NOC has recommended the FAA accelerate technology advancements designed to reduce the noise level emitted by aircraft to benefit residents, airports and operators. Fortunately, over the course of the next 20 years, the MAC's forecast shows the use of quieter ("Stage 5") aircraft. Aircraft operating with Stage 5 noise certification is anticipated to increase by 663 daily operations on an average day. Stage 5 noise certification standards are 17 decibels Effective Perceived Noise Level (EPNL) from Stage 3 aircraft, which are the loudest types operating today. Currently, the FAA requires newly manufactured jet aircraft to meet Stage 5 noise standards.

Airlines will increasingly include these newer and quieter aircraft types into their fleets. Examples of these quieter aircraft types include: Airbus New Engine Options (NEOs), Airbus A220s and Boeing 737 MAX. According to Airbus, the Airbus NEO aircraft family are 15 decibels quieter Stage 4 noise standards and the A220 aircraft have a 50% noise reduction compared to previous generation aircraft. Boeing reports that the 737 MAX aircraft are 40% quieter than the B737-800. All of these aircraft types are narrowbody aircraft and yet are measured to be quieter than previous generation narrowbodies and, in some cases, regional jet aircraft.

10. Altitude of aircraft

Several factors contribute to the altitude at which an aircraft operates as well as the altitude at which aircraft are perceived to operate.

Aircraft departing in warmer weather do so at lower rates of climb than during periods of cooler weather. During heat waves, the air has lower density which increases the runway length aircraft need during take-off, and decreases climb rates and therefore how much altitude an aircraft can gain departing the airport. This can result in aircraft operating at lower altitudes than during cool weather. As weather conditions continue to warm with longer and hotter heat waves, lower departure altitudes could occur more frequently and be noticeable to residents on the ground.

Aircraft arriving to MSP use precision instruments and guidance tools to navigate to the runway threshold. The standard vertical descent guidance is set at a 3-degree glideslope, which helps each arriving aircraft have a safe and stable approach. There are no plans to change the glideslope and therefore change the altitude at which aircraft approach the airport.

Additionally, there has been a shift in the types of aircraft that airlines are flying in and out of MSP. Airlines are using aircraft with more seats per flight across their route networks, resulting in more passengers flying with fewer operations. Replacing older, smaller aircraft with newer and larger planes is more fuel efficient and equates to less overall aircraft noise and carbon emissions due to quieter and newer engine technology and fewer operations. However, these larger aircraft could appear to be at lower altitudes from the ground than their smaller counterparts.

11. Runway use

Runway use at an airport describes how many times aircraft use each runway for arrivals and departures. There are variables that affect runway selection. The primary factor is the prevailing wind. FAA air traffic controllers assign runways that provide the greatest amount of headwind for aircraft takeoffs and landings, especially when wind speeds exceed 10 miles per hour. Additional factors contributing to runway selection include weather conditions, aircraft type, performance capabilities, aircraft origination and destination and aircraft weight.

At MSP, air traffic control assigns a heading to all departing aircraft. A heading is the direction an aircraft is pointed and is expressed in degrees from North. Pilots to not navigate using landmarks on the ground, such as roads or rivers. Air traffic control provides a first heading and then continues to direct aircraft on course to their final destination using additional headings and navigational waypoints.

Like runway selection, the first departure heading assigned by air traffic control is based on many factors, some of which include the flight destination, navigational waypoints and airspace considerations such as altitude, spacing, and speed of other aircraft, restricted airspaces, as well as weather conditions such as severe weather avoidance. This results in dispersion, also known as fanning, of aircraft departing from these runways. As aircraft leave the area, they follow point-to-point navigation for a safe and expeditious flight into the arrival airport environment.

12. Relocating the airport

The possibility of moving the airport to an alternate location was assessed in the 1990s. The Minnesota legislature passed the Metropolitan Airport Planning Act in 1989, establishing the Dual Track Airport Planning Process. Conducted by the MAC and the Metropolitan Council, the seven-year planning process explored options for providing needed air service capacity and facilities for the region at the current location as well as at other locations around the metro.

Ultimately, the Minnesota Legislature determined the airport should remain in its historic location and prohibited the MAC from constructing, equipping, or acquiring land for a major new airport to replace the existing Minneapolis-St. Paul International Airport. (Minnesota Statues 1996, 473.608). Following that decision, the legislature directed the MAC to implement the MSP 2010 Long-Term Comprehensive Plan. Given this determination and subsequent investment, there are no plans to move the airport.

13. Sustainability efforts

In early 2020 the MAC adopted 2030 sustainability goals and pledged to reduce its emissions and water use, divert more of its waste stream by either consuming less or reusing, recycling or composting what is used, and increase employee engagement and understanding of sustainability.

One of these sustainability goals is to reduce emissions by 80% by 2030. As an invested member of the global community, the MAC recognizes the importance of both reducing and managing the environmental impacts of its operations. Responsible carbon management strategies that target energy efficiency, renewable energy and ultimately reductions in carbon emissions, are a critical component of these efforts.

In 2016, the MAC joined the Airport Carbon Accreditation (ACA) program, a multi-level certification program that encourages and supports airports in developing management plans to reduce their carbon footprint. To date, the MAC has achieved Level 1 certification by mapping emissions from sources that it owns and controls at Minneapolis-St. Paul International Airport (MSP), and Level 2 by showing evidence of effective carbon management procedures. The MAC is committed to achieving ACA Level 3 by 2025 through expanded mapping of emissions beyond MAC ownership and control, such as passenger travel to/from the airport and aircraft landing and take-off cycles. Level 3 will also involve engaging airport stakeholders to reduce emissions.

In 2022, the MAC began optimizing indoor air temperatures to reduce energy usage at MSP Airport during different times of the day and throughout the year. The building automation system is now programmed to automatically promote sustainable and efficient facility management - a change that is anticipated to deliver 5% of the reduction needed to meet the MAC's emissions goal.

To accelerate achieving its emissions reduction goal, in 2022 the MAC also invested in replacing old lighting units with energy-saving LED bulbs. Since 2014, the MAC has been updating lighting on roadways and other exterior areas with LEDs. The new LEDs are 40% more efficient than older bulbs. LED lighting also provides better light quality, which can have the bonus of enhancing people's airport experience. In 2023, the MAC will begin replacing MSP Airport's indoor terminal lights.

Recognizing the importance of renewable energy, the MAC installed a 3-megawatt solar energy facility in 2016 – hailed as the first major expansion of solar in Minnesota – atop MSP Terminal 1 parking ramps. The next year, it added another 1.3-megawatt installation atop Terminal 2 parking ramps. In 2022, the MSP solar arrays generated enough electricity to power 550 homes for one year.

Going forward, the focus is on Sustainable Aviation Fuel (SAF). In 2023, a new, first-of-its-kind SAF Hub has been established by Greater MSP in partnership with Delta, Ecolab, Excel Energy, Bank of America and others. SAF is a safe, fully certified jet fuel that can reduce the lifecycle carbon emissions of flying by more than 80%. The mission of this multi-industry coalition is to accelerate and scale-up the production of SAF in Minnesota to meet the ambitious goal to reach net zero carbon emissions in commercial aviation by 2050.

Responses to Municipal/Agency Comments

This section contains responses to comments received from municipalities and agencies about the Draft MSP 2040 LTP.

Commenter	ID	Subject	Response
Metropolitan Council, Letter dated August 18, 2023	1	The Plan includes many complicated acronyms and other technical terminology. In order for the Plan to be more accessible to the general public, the Council staff recommend adding a glossary of terms used in the Plan to aid in general understanding.	A glossary of terms and acronyms has been added as Appendix H to the final draft document.
Metropolitan Council, Letter dated August 18, 2023	2	Please include more details on engagement activities including a list of panel members on the Stakeholder Advisory Panel, persons engaged through the planning process, takeaways from public events, and a summary of how input was received and incorporated.	Greater detail on engagement activities has been added to Chapter 8 of the final draft document. Additionally, Appendix G was added to document the engagement materials, summaries and input.
Metropolitan Council, Letter dated August 18, 2023	3	Council staff agree that EVs should see a rapid uptake through the life of the Plan and appreciate MAC's commitment to aiding the state in reaching its ambitious goals for EV adoption by planning EV compatible facilities for both employees and airport users.	Comment noted.
Metropolitan Council, Letter dated August 18, 2023	4	Council staff appreciate MAC's commitment to sustainability efforts and to the sustainability goals set for the MSP Airport. In the most recent legislative session, the MAC's MSP sustainability goals have been codified into state law. Council staff recommend including and acknowledging that in the Plan.	Comment noted.
Metropolitan Council, Letter dated August 18, 2023	5	Exhibit 1-12: Support Facilities only displays a blank base map. The map needs to show the intended information.	This has been corrected in the final draft document.
Metropolitan Council, Letter dated August 18, 2023	6	Exhibit 3-10: Airfield Standards Review cuts off the aerial image where the runway protection zone extends south into Bloomington. Please update the imagery to include the full background image.	This has been corrected in the final draft document.

Commenter	ID	Subject	Response
Metropolitan Council, Letter dated August 18, 2023	7	Table 3-67: Theoretical Capacity for Legacy Carriers contains an error with the UPS estimated throughput column, which appears to combine both FedEx and UPS amounts.	This has been corrected in the final draft document.
Metropolitan Council, Letter dated August 18, 2023	8	Exhibit 4-75: Long-Term Preferred Development Alternative 3.1A misidentifies Project 3-8, shown as 34th/70th intersection reconstruction which is described as Project 1-9 on page 114. Please confirm that all maps match labels and project lists consistently.	This has been corrected in the final draft document.
Metropolitan Council, Letter dated August 18, 2023	9	East 77th Street has recently been constructed and now connects the City of Richfield to 24th Avenue South. This new connection also connects to Airport Lane, then to 34th Avenue South and, finally to Terminal 2. It is possible that this new connection can be utilized by Terminal 2 users as an alternative route when I-494 experiences congestion delays, which could impact operations at the 34th Avenue/Airport Lane intersection. This project also included ramp improvements at the TH-77 / I-494 interchange. Council staff recommend the MAC to acknowledge this project and consider this new connection in assessing future traffic impacts.	Comment noted. Holistic review of accessibility to Terminal 2 is a recommendation from this plan to be considered beyond this LTP effort, as we bring conceptual plans closer to preliminary design efforts. There are some coordination efforts required between MnDOT and the MAC as we get closer to reconstructing some of the airport intersections.
Metropolitan Council, Letter dated August 18, 2023	10	Project 2-12 describes the reconstruction of the TH-5 and Post Road interchange. This project presents numerous opportunities to improve multimodal circulation to and from MSP. If Post Road is elected to serve as the new primary entrance for Terminal 2 as is considered in the Plan, this will require additional analysis and review for impacts on the regional highway system by the Council.	Comment noted. MAC understands there will be additional coordination required with MnDOT in order to enable this project. Further study will be required of Project 3-8 as well as they are connected and aim to improve T2 connectivity.
Metropolitan Council, Letter dated August 18, 2023	11	The Plan references the Metropolitan Council Transportation Improvement Program (TIP). This reference is out of date and related to a project completed in 2015. Therefore, it should be updated or removed. In the ‘23-‘26 TIP, there is an I-494 project that will construct an EZPass lane on I-494 from the Mississippi River west to TH-169 and include bridge preservation work within Bloomington. Council staff advise the MAC to acknowledge this project and	This reference was removed in the final draft document.

Commenter	ID	Subject	Response
		consider any future traffic impacts from the construction of this project and the additional capacity on I-494.	
Metropolitan Council, Letter dated August 18, 2023	12	Project 2-6 describes the relocation of the fixed-base operator facility from the existing location to a new location on the north end of the airport. This facility will be accessed via 28th Avenue and TH-62 and could present a potentially significant increase in traffic on 28th Avenue and the interchange with TH-62. Council staff recommend that prior to more advanced planning of this new facility, a traffic impact study be performed to understand any traffic impacts and mitigation needed from this project.	Comment noted. This was discussed during the Long-Term Plan process and concluded there is not a significant amount of traffic to the FBO as it exists today. The MAC will monitor traffic output for future consideration and growth of the FBO if it were to be relocated. The assumption of the FBO relocation effort is in-kind replacement of facilities that exist today based on the site constraints of Project 2-6
Metropolitan Council, Letter dated August 18, 2023	13	The Council supports efforts to better integrate the MSP airport into the non-motorized transportation system. Currently, Post Road/70th Street is identified as a Regional Bicycle Transportation Network (RBTN) alignment (https://metrocouncil.maps.arcgis.com/apps/webappviewer/index.html?id=0b0735b3407f49ceb347fc30c9b83bda). The Plan identifies improvements for Post Road/70th Street and the Post Road interchange, which present an opportunity to implement non-motorized connections to both Terminals 1 and 2 as studied by Hennepin County. Council staff recommend further coordination between MAC, Hennepin County, and the Council to better support safe and adequate non-motorized access to both Terminals and other support facilities at the MSP.	The MAC continues to consider mobility to and from both Terminals 1 and 2 at MSP. As the proposed landside projects move from this LTP conceptual layout into more focus in design-level planning, non-motorized transportation connections will continue to be considered.
Metropolitan Council, Letter dated August 18, 2023	14	In light of the forecasted parking needs documented in this Plan, and regional and statewide climate goals regarding VMT reduction. Council staff advise the MAC to initiate a Transportation Demand Management Plan for the MSP Airport.	Comment noted. The MAC is open to continued conversations about transportation accessibility improvements in the future.

Commenter	ID	Subject	Response
Metropolitan Council, Letter dated August 18, 2023	15	Project 1-7 describes an expansion of the Orange Ramp to the north and east of the existing Blue Line Terminal 2 LRT station. This project will need to be coordinated with Metro Transit and consider potential impacts or improvements to the LRT station.	Comment noted. We agree with this and will coordinate appropriately with Metro Transit as this project becomes closer to being initiated.
Metropolitan Council, Letter dated August 18, 2023	16	Project 3-5 describes an automated people mover connection between the secure section of the two terminals. This project is justified when considering increased passenger movements planned between the two terminals for connection purposes. The project will affect the Metro Transit LRT service between the airport terminals, necessitating coordination with Metro Transit in the planning stages.	Comment noted. We agree with this and will coordinate appropriately with Metro Transit as this project becomes closer to being initiated.
Metropolitan Council, Letter dated August 18, 2023	17	Currently, the Riverview Corridor is being planned as a modern streetcar which will interline with the Blue Line at Fort Snelling and will utilize existing Blue Line LRT stations. If an Arterial BRT option is chosen for this corridor, the upgraded route will materially replace the 54 and include improved stations. Council staff recommend that the LTCP acknowledge planned transit improvements to the MSP. If an Arterial BRT is chosen for the Riverview Corridor, it is anticipated that the new airport Transit Center will require only minimal facility changes for the Arterial BRT operations.	Comment noted. The intent of the LTP is to focus on facility planning needs. The MAC will continue to coordinate appropriately with other agencies for continued focus on the airport's concurrent use of terminal connectivity as it relates to the Blue Line. The MSP 2040 LTP does not focus on ridership of the Blue Line LRT in terms of passenger connectivity because we do not have a major operational use for it yet (airline transfers between T1 and T2 are not common, so the only minor use right now is for parking connectivity when T1 fills up parking spaces).
Metropolitan Council, Letter dated August 18, 2023	18	Proposed projects appear to increase impervious surfaces, support additional passenger activity, and generate additional traffic. While most forecasts do not envision more activity than previous documents, Council staff request additional clarification that subsequent studies for proposed projects will further examine environmental impacts from outlined projects in the Plan.	The intent of the LTP is to focus on facility planning needs. The MAC follows all state and federal environmental regulations and project review processes according to the Clean Air Act, National Environmental Policy Act and Minnesota Environmental Policy Act. The anticipated 2025 state- and federal-level environmental review will further examine environmental impacts from proposed projects.

Commenter	ID	Subject	Response
Metropolitan Council, Letter dated August 18, 2023	19	Table 5-5 does not appear to account for many multi-family units in the City of Bloomington. Bloomington numbers will likely be significantly higher than 157 multi-family units within the 60 Day Night Average Sound Level (DNL) contour line. At least 300 units are new in the South Loop area since 2018, in addition to the existing Reflections condo towers, 5 Apple Tree Square condos, and the multi-family units south of the Mall of America. It is also likely that the South Loop area will continue to grow and significantly add to this total. It appears that the Minneapolis and Richfield numbers appropriately account for future multi-family growth expected for those cities. Forecasted multi-family units within noise contours need to be re-examined.	This has been corrected in the final draft document.
Metropolitan Council, Letter dated August 18, 2023	20	It should be noted that the Federal Aviation Administration (FAA) is currently reviewing noise policy guidelines and may update them with additional metrics. If any changes are made, it will require an update of noise contours and a reconsideration of noise impacts depending on new metrics from the FAA.	Comment noted. The contours provided in this LTP effort are for planning purposes only. The MAC will continue to produce annual noise contours aside from this LTP effort and will be used for ongoing noise mitigation efforts.
Metropolitan Council, Letter dated August 18, 2023	21	Council staff appreciate the MAC's acknowledgment of Fort Snelling State Park, Minnesota Valley Wildlife Refuge, and many other parks in the area in the draft Plan (1.6.1 Environment Around the Airport), as well as in the 2020 Improvements EA/EAW that has been integrated into the draft Plan (Chapter 4: Affected Environment). Though regional parks are referenced generally, no regional parks are specifically called out. Council staff encourage the MAC to specifically acknowledge the regional parks and trails that are proximate to, or potentially impacted by, the airport, lower elevation flight paths, the noise generated as a result of the airport, and other airport-related influences, including Crosby Farm, Hidden Falls, Minnehaha, Mississippi Gorge, and Nokomis-Hiawatha regional parks, and Big Rivers, Minnehaha Parkway, Minnesota River Greenway, Nine Mile	Comment noted. The intent of the LTP is to focus on facility planning needs. The MAC follows all state and federal environmental regulations and project review processes according to the Clean Air Act, National Environmental Policy Act and Minnesota Environmental Policy Act. The anticipated 2025 state- and federal-level environmental review will further examine environmental impacts to regional parks and trails from proposed projects.

Commenter	ID	Subject	Response
		Creek, and the Nokomis-Minnesota River regional trails.	
Metropolitan Council, Letter dated August 18, 2023	22	Given the airport's proximity to Fort Snelling State Park, Pike Island, the confluence of the Mississippi and Minnesota Rivers, and Bdote, Council staff encourage the MAC to consider how plans for the airport may specifically impact the lands and waters considered sacred to tribal nations. The 2020 Improvements EA/EAW references inviting the Lower Sioux, Mendota Mdewakanton Dakota, and Shakopee Mdewakanton Sioux Tribes to become consulting parties, along with the State of Minnesota Indian Affairs Council. Council staff encourage acknowledgement of the indigenous people who still consider spaces proximate to the airport as sacred and part of both their ancestral and contemporary homelands, and continued or renewed consultation opportunities with these same parties, now and into the future.	Comment noted. The intent of the LTP is to focus on facility planning needs. The MAC follows all state and federal environmental regulations and project review processes according to the Clean Air Act, National Environmental Policy Act and Minnesota Environmental Policy Act. The anticipated 2025 state- and federal-level environmental review will further examine environmental impacts from proposed projects. The MAC will develop a robust engagement program to include tribes, communities, stakeholders, and appropriate agencies in future environmental review efforts.
Metropolitan Council, Letter dated August 18, 2023	23	The construction of any new or updating of existing runways or any other construction projects may have an impact on multiple Metropolitan Council Interceptors in multiple locations. To assess the potential impacts to our interceptor system, prior to initiating any projects, preliminary plans should be sent to Tim Wedin, Interceptor Engineering Assistant Manager (651-602-4571) at the Metropolitan Council Environmental Services.	Comment noted. Proposed future projects in the LTP will remain at the conceptual layout until warranted by demand. As the MAC progresses closer to a demand-based approach in programming elements of the preferred alternative layout, the MAC will review proposed projects from a design-level perspective and will coordinate with appropriate agencies regarding wastewater or other potential off-airport impacts.
Metropolitan Council, Letter dated August 18, 2023	24	Please include updated actual wastewater flows for 2020 and projected wastewater flows for 2030 and 2040, if available.	The original intent of the LTP was to focus on long-range planning and high-level concepts. As the MAC approaches demand for a particular project in the preferred alternative, wastewater will come into focus during

Commenter	ID	Subject	Response
			the appropriate level of state and federal environmental review according to National Environmental Policy Act and Minnesota Environmental Policy Act.
Metropolitan Council, Letter dated August 18, 2023	25	Tables 2-3: Comparative Socioeconomic Projections (20-Year CAGR), and 2-16: Comparison of Socioeconomic Forecast Inputs are represented as regional economic projections for 2020-2040. The source note references Metropolitan Council forecasts from 2017 and 2021. The Council revises the macroeconomic forecast biannually, most recently in 2023. Council staff advise against using the outdated economic analyses, for the reasons discussed in the Plan. The Council's 2023 forecast is substantially revised (https://metrocouncil.org/Data-and-Maps/Research-and-Data/Thrive-2040-Forecasts.aspx).	Comment noted. For planning purposes of an airport LTP, data captured at the onset of the study is used and considered as a baseline. The MAC will continue to monitor updates in economic and statistical information as projects move up from planning/conceptual level and closer to the design and implementation phase.
City of Minneapolis, Letter dated August 21, 2023	26	Forecasts prepared for the 2040 Long-Term Plan (LTP) show growth in the number of operations at MSP with a baseline estimate of 517,000 annual operations. While this is fewer than peak operations in 2004, it's much higher than recent years. In 2018, the number of operations was 407,000. MAC's website lists annual operations back to 2009 and the highest number of operations was 437,000 in 2010. If 517,000 annual operations did manifest, we would expect a substantial impact on the city, the environment, and our residents.	The 2040 LTP forecast was revised to reflect COVID-related impacts, where the 2040 total operations are forecasted to be 509,000 annually (Exhibit 2-39). For the FAA to determine an acceptable forecasting analysis, and to determine consistency with the FAA's Terminal Area Forecast (TAF), Large-Hub forecasts must differ by less than 15% in the 10-20 year forecast timeframe. The current FAA TAF shows a 2040 forecast of 491,820 and equates to a 3.4% deviation, which is within the 15% tolerance required by the FAA. The 2020 Improvements Environmental Assessment/Environmental Assessment Worksheet (EA/EAW) forecasted aviation activity in 2025 to be 526,040 operations, and used the 2010 baseline of 437,075 annual operations. This environmental document was approved by the FAA on January 7, 2013 with a Finding of No Significant Impact (FONSI)/Record of Decision for this plan. Based on this environmental clearance, the 2040 LTP forecast estimates lower activity levels than what was depicted in the

Commenter	ID	Subject	Response
			last environmental document. The MAC follows all state and federal environmental regulations and project review processes according to the National Environmental Policy Act and Minnesota Environmental Policy Act. The anticipated 2025 state- and federal-level environmental review will further examine environmental impacts from proposed projects. The MAC will continue to partner with surrounding communities and appropriate agencies in the environmental review process as part of its stakeholder and public engagement process.
City of Minneapolis, Letter dated August 21, 2023	27	We recognize that MAC cannot restrict the number of planes, but it will be critical for MAC to use all tools that are available to it, to prevent, manage and mitigate impacts. This includes utilization of the Runway Use System and other noise abatement techniques in collaboration with the FAA. While the LTP does reference existing noise abatement procedures, we would like to see MAC go further for planning purposes and address whether existing procedures are expected to be available, adequate, or appropriate to address projected conditions.	The MAC will continue working on aircraft noise reduction opportunities with the MSP Noise Oversight Committee (NOC), the advisory board appointed to address aircraft noise issues. The NOC's mission includes identifying and studying airport noise issues and solutions and providing policy recommendations to the MAC Planning, Development and Environment Committee. This framework, along with close collaboration with the Federal Aviation Administration, has proven to be successful in developing a robust and thoughtful noise reduction strategy around MSP Airport and has become an industry model for airports. The continued collaboration, innovation and good-faith efforts from the NOC, MAC and FAA will assist in the identification and evaluation of new noise reduction strategies over the duration of this plan.
City of Minneapolis, Letter dated August 21, 2023	28	Airplanes in the fleet at MSP are getting larger and that trend is expected to continue. The top two aircraft types in 2018 were regional jets (Bombardier CRJ-200 and CRJ-900) and the top two aircraft types in 2040 are projected to be narrow body (Airbus A220-100 and Airbus A319-NEO). The noise signatures of narrow body aircraft are generally larger than regional jets. For this reason, the LTP anticipates that larger planes will contribute to an expansion of noise contours. The	In 2021, the MAC committed to continue providing noise mitigation relief to qualifying homes through 2032. This commitment effectively extends one of the most robust and encompassing sound insulation efforts around any U.S. airport. For a home to qualify, it must be located, for a period of three consecutive years in the actual 60 DNL aircraft noise contour published in an annual noise contour report, and, be located within a higher noise impact area when compared to

Commenter	ID	Subject	Response
		forecast also expects an increase in departures with longer stage-lengths. The implication is that planes carrying more fuel are slower to climb and have greater noise impact.	the home's status under a previous phase of the program. To-date, the MAC's noise mitigation program has provided noise relief to almost 20,000 homes and 19 schools around the airport at a total cost of over $513 million.
City of Minneapolis, Letter dated August 21, 2023	29	According to the LTP, the acreage affected by noise at 60 dB DNL or more is predicted to increase by 39.3% and will encompass a total of 15,775 single-family homes. This is the baseline estimate. A vast majority of these homes are in Minneapolis. In addition to a higher number of operations and larger planes, a key contributor to bigger noise contours is an expected increase in nighttime flights. The city is very concerned about the heath and livability impacts of nighttime noise. While airports do not have the authority to restrict when planes can fly, airports can seek to prevent and mitigate impacts with tools such as providing effective noise mitigation to homes and maintaining strong support for policies to avoid flying over the most populated areas at night.	In 2021, the MAC committed to continue providing noise mitigation relief to qualifying homes through 2032. This commitment effectively extends one of the most robust and encompassing sound insulation efforts around any U.S. airport. For a home to qualify, it must be located, for a period of three consecutive years in the actual 60 DNL aircraft noise contour published in an annual noise contour report, and, be located within a higher noise impact area when compared to the home's status under a previous phase of the program. To-date, the MAC's noise mitigation program has provided noise relief to almost 20,000 homes and 19 schools around the airport at a total cost of over $513 million.
City of Minneapolis, Letter dated August 21, 2023	30	While research is underway to improve airplane efficiency and advance fuel alternatives, aviation continues to be dominated by carbon combustion with impacts for the environment and human health. Health impacts include asthma, heart disease, and premature death. According to a recent study from the University of Washington, particulate matter from aviation is different from other transportation sources due to a higher concentration of ultra-fine particulates (UFP). UFPs are considered particularly toxic due to their small size and ability to enter deep into the lungs and penetrate the blood stream.	One of the MAC's sustainability goals is to reduce emissions by 80% by 2030. The MAC continues to invest in assets and activities that reduce emissions and UFPs. Accomplishments toward reducing emissions include: solar panels installed at both terminals that generate enough electricity to power 550 homes for one year; transitioning to electric ground support equipment for aircraft; participation in the Airport Carbon Accreditation program; arrival procedures incorporating Optimized Profile Decent (OPD) calculated to reduce carbon emissions by 28,465 metric tons each year. Going forward, the focus is on Sustainable Aviation Fuel (SAF). In 2023, a new, first-of-its-kind SAF Hub has been established by Greater MSP in partnership with Delta,

Commenter	ID	Subject	Response
			Ecolab, Excel Energy, Bank of America and others. SAF is a safe, fully certified jet fuel that can reduce the lifecycle carbon emissions of flying by more than 80%. The mission of this multi-industry coalition is to accelerate and scale-up the production of SAF in Minnesota to meet the ambitious goal to reach net zero carbon emissions in commercial aviation by 2050.
City of Minneapolis, Letter dated August 21, 2023	31	The LTP refers to an air quality study prepared more than 10 years ago based on data that is even older. Those data did not include a quantitative analysis of ozone, particulate matter, nitrogen dioxide, or sulfur dioxide. Being in attainment as a region with federal air quality standards is not informative about airport-specific impacts. MAC should quantify the specific impacts of aircraft emissions and airport operations.	The intent of the LTP is to focus on facility planning needs. The MAC follows all state and federal environmental regulations and project review processes according to the Clean Air Act, National Environmental Policy Act and Minnesota Environmental Policy Act. This includes compliance with mandatory air quality permits and reporting, as well as voluntary air emissions reduction efforts through participation in the Airport Carbon Accreditation (ACA) program. The anticipated 2025 state- and federal-level environmental review will consider on- and off-airport environmental impacts, including National Ambient Air Quality Standards as prescribed by federal and state requirements.
City of Minneapolis, Letter dated August 21, 2023	32	We recognize that MAC alone cannot change the aviation industry, however there are steps that can be taken with minimizing local impacts in mind. We urge MSP to continue its work in the Airport Carbon Accreditation program and to reduce emissions from buildings and ground- transportation, actively encourage biking and transit access to the airport, work with industry to bring the most fuel-efficient planes into the fleet, encourage the use of sustainable aviation fuels, and participate in research that advances knowledge about the health impacts of aviation if given the opportunity.	Comment noted. See response to comment 30 above.

Commenter	ID	Subject	Response
City of Minneapolis, Letter dated August 21, 2023	33	Regarding the facility needs that are anticipated in 2040, we will engage as projects are considered for MAC's capital program and will be keenly interested in information about projects that have potential to impact noise, health, or the environment. We will be interested in new or expanded taxiways, for example, to ensure they will not increase noise or vibration. Also, while we understand that some projects have appeared in prior planning documents and have undergone environmental review, there may be circumstances where a new analysis is warranted. Some projects were last reviewed more than 10 years ago.	The MAC will continue to include surrounding communities, stakeholders, and appropriate agencies in future environmental projects. The MAC will follow all state and federal environmental regulations and project review processes according to the National Environmental Policy Act and Minnesota Environmental Policy Act.

METROPOLITAN
COUNCIL

August 18, 2023

Eric Gilles, Senior Airport Planner
Metropolitan Airports Commission
6040 28th Avenue South
Minneapolis, MN 55450

RE: Metropolitan Airports Commission – Draft Minneapolis-St. Paul International Airport 2040 Long Term Comprehensive Plan
Metropolitan Council Review File No. 22883-1
Metropolitan Council District 5

Dear Mr. Gilles:

The Metropolitan Council received the draft Minneapolis-St. Paul (MSP) International Airport 2040 Long Term Comprehensive Plan (Plan) on July 6, 2023. The Council reviews and comments on Airport Long Term Comprehensive Plans for conformance to regional systems, including the *Transportation Policy Plan*, and consistency with *Thrive MSP 2040* and other Council policies. This Plan updates the airport's long term investment plan to 2040 from the previous 2030 planning horizon. This review will serve as the preliminary review of the Plan, but this Plan will still be required to undergo a formal consistency review and approval by the Council at a later date.

The Plan's preferred alternative does not change the classification of the airport. Long term aviation forecasts indicate that passenger and aircraft activity will increase, from 2018 to 2040, but aircraft operations will remain well below previous peaks seen at MSP and are lower than forecasts from the 2030 Plan. As operations are not anticipated to eclipse previous peaks during the planning horizon, the preferred alternative indicates that minimal projects will be needed on the airside, limited to new and expanded auxiliary taxiways, expanded de-icing pads, expanded cargo terminals and remain overnight aircraft storage space to increase operation efficiency of the airport. There are no new or expanded runways planned. The preferred alternative plans various improvements to both terminals including a major expansion of Terminal 2 and reworking of gate-space at Terminal 1. The preferred alternative plans to increase the parking capacity at the terminals significantly, with new and expanded parking ramps at both terminals, and will reconstruct and redesign landside terminal access for both terminals.

Additionally, the Plan calls for expansion of cargo facilities, relocation of the fixed base operator facility, reconstruction of the Post Road and Trunk Highway 5 interchange, and the construction of a sterile connection between terminals. It is anticipated that some of these projects will have an impact on the regional transportation system and should be coordinated further with regional partners as planning and project development on these proposed projects advance.

Council staff offer the following technical comments for your consideration:

Office of Mayor Jacob Frey
350 S. Fifth St. - Room 331
Minneapolis, MN 55415
TEL 612.673.2100

www.minneapolismn.gov

August 21, 2023

Brian Ryks
Executive Director/CEO
Metropolitan Airports Commission
6040 28th Avenue South
Minneapolis, MN 55450

Dear Mr. Ryks,

Please accept the attached comments regarding the 2040 Long-Term Plan for Minneapolis-St. Paul International Airport. Our comments focus on the importance of managing airport impacts. We believe this is essential to having a successful airport in 2040 and that the city brings unique perspective to these issues.

The airport and surrounding communities are in a symbiotic relationship and the key to success is thriving together. The city and our residents highly value what the airport brings to our city and state. We appreciate the communication and collaboration between our agencies and look forward to continuing to work in partnership.

Yours Truly,

Mayor Jacob Frey
City of Minneapolis

Cc: Rick King, Chair, Metropolitan Airports Commission
Leili Fatehi, Commissioner, Metropolitan Airports Commission
Naomi Pesky, VP Strategy & Stakeholder Engagement, Metropolitan Airports Commission
Dana Nelson, Director, Stakeholder Engagement, Metropolitan Airports Commission
Eric Giles, Airport Planner, Planning and Development, Metropolitan Airports Commission
Joseph Widing, Senior Transportation Planner, Metropolitan Council

City of Minneapolis Comment on 2040 Long-Term Plan for Minneapolis-St. Paul International Airport

Minneapolis-St. Paul International Airport (MSP) is a critical asset to the state and region; it supports a successful business climate, is essential to leisure travel and the movement of goods and is a significant provider of jobs. Surrounding communities benefit tremendously from MSP. Likewise, the airport benefits when surrounding communities are a desirable place to live, visit, and do business. Ensuring that both the airport *and* adjacent communities can thrive is the key to success for both.

When the Metropolitan Airports Commission (MAC) was established, the Legislature recognized the importance of developing and operating the system of airports “in such a manner as to assure the residents of the metropolitan area of the minimum environmental impact…” is “essential to the development of air navigation and transportation in and through this state…” Minn. Stat. § 473.655.

The Legislature required that development of the system be consistent with the transportation chapter of the Metropolitan Council’s Development Guide which says that “planning, development and operation of the region’s aviation facilities should be conducted to minimize impacts upon the cultural and natural environment, regional systems and airport communities.” Thus, airport plans are required to include elements including a “description of recommended air, water and noise control plans…” Our comments focus on these issues.

Growth in Operations

Forecasts prepared for the 2040 Long-Term Plan (LTP) show growth in the number of operations at MSP with a baseline estimate of 517,000 annual operations. While this is fewer than peak operations in 2004, it’s much higher than recent years. In 2018, the number of operations was 407,000. MAC’s website lists annual operations back to 2009 and the highest number of operations was 437,000 in 2010. If 517,000 annual operations did manifest, we would expect a substantial impact on the city, the environment, and our residents.

We recognize that MAC cannot restrict the number of planes, but it will be critical for MAC to use all tools that *are* available to it, to prevent, manage and mitigate impacts. This includes utilization of the Runway Use System and other noise abatement techniques in collaboration with the FAA. While the LTP does reference existing noise abatement procedures, we would like to see MAC go further for planning purposes and address whether existing procedures are expected to be available, adequate, or appropriate to address projected conditions.

Fleet Mix

Airplanes in the fleet at MSP are getting larger and that trend is expected to continue. The top two aircraft types in 2018 were regional jets (Bombardier CRJ-200 and CRJ-900) and the top two aircraft types in 2040 are projected to be narrow body (Airbus A220-100 and Airbus A319-NEO). The noise signatures of narrow body aircraft are generally larger than regional jets. For this reason, the LTP anticipates that larger planes will contribute to an expansion of noise contours. The forecast also expects an increase in departures with longer stage-lengths. The implication is that planes carrying more fuel are slower to climb and have greater noise impact.

Noise Impacts

According to the LTP, the acreage affected by noise at 60 dB DNL or more is predicted to increase by 39.3% and will encompass a total of 15,775 single-family homes. This is the baseline estimate. A vast majority of these homes are in Minneapolis. In addition to a higher number of operations and larger planes, a key contributor to bigger noise contours is an expected increase in nighttime flights. The city is very concerned about the heath and livability impacts of nighttime noise. While airports do not have the authority to restrict when planes can fly, airports can seek to prevent and mitigate impacts with tools such as providing effective noise mitigation to homes and maintaining strong support for policies to avoid flying over the most populated areas at night.

Environmental and Health Impacts

While research is underway to improve airplane efficiency and advance fuel alternatives, aviation continues to be dominated by carbon combustion with impacts for the environment and human health. Health impacts include asthma, heart disease, and premature death. According to a recent study from the University of Washington, particulate matter from aviation is different from other transportation sources due to a higher concentration of ultra-fine particulates (UFP). UFPs are considered particularly toxic due to their small size and ability to enter deep into the lungs and penetrate the blood stream.

The LTP refers to an air quality study prepared more than 10 years ago based on data that is even older. Those data did not include a quantitative analysis of ozone, particulate matter, nitrogen dioxide, or sulfur dioxide. Being in attainment as a region with federal air quality standards is not informative about airport-specific impacts. MAC should quantify the specific impacts of aircraft emissions and airport operations.

We recognize that MAC alone cannot change the aviation industry, however there are steps that can be taken with minimizing local impacts in mind. We urge MSP to continue its work in the Airport Carbon Accreditation program and to reduce emissions from buildings and ground- transportation, actively encourage biking and transit access to the airport, work with industry to bring the most fuel-efficient planes into the fleet, encourage the use of sustainable aviation fuels, and participate in research that advances knowledge about the health impacts of aviation if given the opportunity.

Facility Needs

Regarding the facility needs that are anticipated in 2040, we will engage as projects are considered for MAC's capital program and will be keenly interested in information about projects that have potential to impact noise, health, or the environment. We will be interested in new or expanded taxiways, for example, to ensure they will not increase noise or vibration. Also, while we understand that some projects have appeared in prior planning documents and have undergone environmental review, there may be circumstances where a new analysis is warranted. Some projects were last reviewed more than 10 years ago.

We look forward to continuing to work in partnership to ensure the airport and adjacent communities will thrive together.

Transportation/Aviation (Joe Widing, 651-602-1822)

General Considerations

- The Plan includes many complicated acronyms and other technical terminology. In order for the Plan to be more accessible to the general public, the Council staff recommend adding a glossary of terms used in the Plan to aid in general understanding.
- Please include more details on engagement activities including a list of panel members on the Stakeholder Advisory Panel, persons engaged through the planning process, takeaways from public events, and a summary of how input was received and incorporated.
- Council staff agree that EVs should see a rapid uptake through the life of the Plan and appreciate MAC's commitment to aiding the state in reaching its ambitious goals for EV adoption by planning EV compatible facilities for both employees and airport users.
- Council staff appreciate MAC's commitment to sustainability efforts and to the sustainability goals set for the MSP Airport. In the most recent legislative session, the MAC's MSP sustainability goals have been codified into state law. Council staff recommend including and acknowledging that in the Plan.
- Exhibit 1-12: Support Facilities only displays a blank basemap. The map needs to show the intended information.
- Exhibit 3-10: Airfield Standards Review cuts off the aerial image where the runway protection zone extends south into Bloomington. Please update the imagery to include the full background image.
- Table 3-67: Theoretical Capacity for Legacy Carriers contains an error with the UPS estimated throughput column, which appears to combine both FedEx and UPS amounts.
- Exhibit 4-75: Long-Term Preferred Development Alternative 3.1A misidentifies Project 3-8, shown as 34th/70th intersection reconstruction which is described as Project 1-9 on page 114. Please confirm that all maps match labels and project lists consistently.

Surrounding Roadway Network Considerations

- East 77th Street has recently been constructed and now connects the City of Richfield to 24th Avenue South. This new connection also connects to Airport Lane, then to 34th Avenue South and, finally to Terminal 2. It is possible that this new connection can be utilized by Terminal 2 users as an alternative route when I-494 experiences congestion delays, which could impact operations at the 34th Avenue/Airport Lane intersection. This project also included ramp improvements at the TH-77 / I-494 interchange. Council staff recommend the MAC to acknowledge this project and consider this new connection in assessing future traffic impacts.
- Project 2-12 describes the reconstruction of the TH-5 and Post Road interchange. This project presents numerous opportunities to improve multimodal circulation to and from MSP. If Post Road is elected to serve as the new primary entrance for Terminal 2 as is considered in the Plan, this will require additional analysis and review for impacts on the regional highway system by the Council.
- The Plan references the Metropolitan Council Transportation Improvement Program (TIP). This reference is out of date and related to a project completed in 2015. Therefore, it should be updated or removed. In the '23-'26 TIP, there is an I-494 project that will construct an EZPass lane on I-494 from the Mississippi River west to TH-169 and include bridge preservation work within Bloomington. Council staff advise the MAC to acknowledge this project and consider any future traffic impacts from the construction of this project and the additional capacity on I-494.

- Project 2-6 describes the relocation of the fixed-base operator facility from the existing location to a new location on the north end of the airport. This facility will be accessed via 28th Avenue and TH-62 and could present a potentially significant increase in traffic on 28th Avenue and the interchange with TH-62. Council staff recommend that prior to more advanced planning of this new facility, a traffic impact study be performed to understand any traffic impacts and mitigation needed from this project.

Transit And Other Transportation Considerations

- The Council supports efforts to better integrate the MSP airport into the non-motorized transportation system. Currently, Post Road/70th Street is identified as a Regional Bicycle Transportation Network (RBTN) alignment (https://metrocouncil.maps.arcgis.com/apps/webappviewer/index.html?id=0b0735b3407f49ceb347fc30c9b83bda). The Plan identifies improvements for Post Road/70th Street and the Post Road interchange, which present an opportunity to implement non-motorized connections to both Terminals 1 and 2 as studied by Hennepin County. Council staff recommend further coordination between MAC, Hennepin County, and the Council to better support safe and adequate non-motorized access to both Terminals and other support facilities at the MSP.
- In light of the forecasted parking needs documented in this Plan, and regional and statewide climate goals regarding VMT reduction. Council staff advise the MAC to initiate a Transportation Demand Management Plan for the MSP Airport.
- Project 1-7 describes an expansion of the Orange Ramp to the north and east of the existing Blue Line Terminal 2 LRT station. This project will need to be coordinated with Metro Transit and consider potential impacts or improvements to the LRT station.
- Project 3-5 describes an automated people mover connection between the secure section of the two terminals. This project is justified when considering increased passenger movements planned between the two terminals for connection purposes. The project will affect the Metro Transit LRT service between the airport terminals, necessitating coordination with Metro Transit in the planning stages.
- Currently, the Riverview Corridor is being planned as a modern streetcar which will interline with the Blue Line at Fort Snelling and will utilize existing Blue Line LRT stations. If an Arterial BRT option is chosen for this corridor, the upgraded route will materially replace the 54 and include improved stations. Council staff recommend that the LTCP acknowledge planned transit improvements to the MSP. If an Arterial BRT is chosen for the Riverview Corridor, it is anticipated that the new airport Transit Center will require only minimal facility changes for the Arterial BRT operations.

Environmental Considerations

- Proposed projects appear to increase impervious surfaces, support additional passenger activity, and generate additional traffic. While most forecasts do not envision more activity than previous documents, Council staff request additional clarification that subsequent studies for proposed projects will further examine environmental impacts from outlined projects in the Plan.
- Table 5-5 does not appear to account for many multi-family units in the City of Bloomington. Bloomington numbers will likely be significantly higher than 157 multi-family units within the 60 Day Night Average Sound Level (DNL) contour line. At least 300 units are new in the South Loop area since 2018, in addition to the existing Reflections condo towers, 5 Apple Tree Square condos, and the multi-family units south of the Mall of America. It is also likely that the South Loop area will continue to grow and significantly add to this total. It appears that the

Minneapolis and Richfield numbers appropriately account for future multi-family growth expected for those cities. Forecasted multi-family units within noise contours need to be re-examined.

- It should be noted that the Federal Aviation Administration (FAA) is currently reviewing noise policy guidelines and may update them with additional metrics. If any changes are made, it will require an update of noise contours and a reconsideration of noise impacts depending on new metrics from the FAA.

Regional Parks and Trails (Colin Kelly, 651-602-1361)

- Council staff appreciate the MAC's acknowledgment of Fort Snelling State Park, Minnesota Valley Wildlife Refuge, and many other parks in the area in the draft Plan (1.6.1 Environment Around the Airport), as well as in the 2020 Improvements EA/EAW that has been integrated into the draft Plan (Chapter 4: Affected Environment). Though regional parks are referenced generally, no regional parks are specifically called out. Council staff encourage the MAC to specifically acknowledge the regional parks and trails that are proximate to, or potentially impacted by, the airport, lower elevation flight paths, the noise generated as a result of the airport, and other airport-related influences, including Crosby Farm, Hidden Falls, Minnehaha, Mississippi Gorge, and Nokomis-Hiawatha regional parks, and Big Rivers, Minnehaha Parkway, Minnesota River Greenway, Nine Mile Creek, and the Nokomis-Minnesota River regional trails.
- Given the airport's proximity to Fort Snelling State Park, Pike Island, the confluence of the Mississippi and Minnesota Rivers, and Bdote, Council staff encourage the MAC to consider how plans for the airport may specifically impact the lands and waters considered sacred to tribal nations. The 2020 Improvements EA/EAW references inviting the Lower Sioux, Mendota Mdewakanton Dakota, and Shakopee Mdewakanton Sioux Tribes to become consulting parties, along with the State of Minnesota Indian Affairs Council. Council staff encourage acknowledgement of the indigenous people who still consider spaces proximate to the airport as sacred and part of both their ancestral and contemporary homelands, and continued or renewed consultation opportunities with these same parties, now and into the future.

Wastewater (Roger Janzig, roger.janzig@metc.state.mn.us)

- The construction of any new or updating of existing runways or any other construction projects may have an impact on multiple Metropolitan Council Interceptors in multiple locations. To assess the potential impacts to our interceptor system, prior to initiating any projects, preliminary plans should be sent to Tim Wedin, Interceptor Engineering Assistant Manager (651-602-4571) at the Metropolitan Council Environmental Services.
- Please include updated actual wastewater flows for 2020 and projected wastewater flows for 2030 and 2040, if available.

Forecasts (Todd Graham, 651-602-1322)

Tables 2-3: Comparative Socioeconomic Projections (20-Year CAGR), and 2-16: Comparison of Socioeconomic Forecast Inputs are represented as regional economic projections for 2020-2040. The source note references Metropolitan Council forecasts from 2017 and 2021. The Council revises the macroeconomic forecast biannually, most recently in 2023. Council staff advise against using the outdated economic analyses, for the reasons discussed in the Plan. The Council's 2023 forecast is substantially revised (*https://metrocouncil.org/Data-and-Maps/Research-and-Data/Thrive-2040-Forecasts.aspx*).

This will conclude the Council's preliminary review of the draft MSP 2040 LTCP. The Council will not take formal action on the Plan at this time. If you have any questions or need further information, please contact Joe Widing, Principal Reviewer, at 651-602-1822 or via email at joseph.widing@metc.state.mn.us.

Sincerely,

Raya Esmaeili for:

Angela Torres, AICP, Senior Manager
Local Planning Assistance

CC: John Pacheco Jr., Metropolitan Council District 5
Michael Larson, Sector Representative
Joseph Widing, Principal Reviewer
Reviews Coordinator

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Appendix H: Glossary of Terms

Content	Page

MAC GLOSSARY OF TERMS

In addition to the below glossary, the Federal Aviation Administration has a list of acronyms and abbreviations for various operations, lines of business, and programs available at https://www.faa.gov/jobs/abbreviations/.

A-Weighted Decibels (dBA): A measure of noise levels adjusted relative to the frequencies most audible to the human ear.

Above Ground Level (AGL): A height above the ground as opposed to above Mean Sea Level (MSL).

Advisory Circular: External publications issued by the FAA consisting of non-regulatory material providing for recommendations relative to policy, guidance, and information relative to a specific aviation subject.

Aircraft Approach Category (AAC): An alphabetic classification of aircraft based upon 1.3 times the stall speed in a landing configuration at their maximum certified landing weight. The categories are as follows:

- Category A: Approach speed less than 91 knots
- Category B: Approach speed 91 knots or more but less than 121 knots
- Category C: Approach speed 121 knots or more but less than 141 knots
- Category D: Approach speed 141 knots or more but less than 166 knots
- Category E: Approach speed 166 knots or more

Airplane Design Group (ADG): A classification of aircraft based on wingspan and tail height. The groups are as follows:

- Group I: Wingspan up to but not including 49 feet or tail height up to but not including 20 feet
- Group II: Wingspan 49 feet up to but not including 79 feet or tail height from 20 feet up to but not including 30 feet
- Group III: Wingspan 79 feet up to but not including 118 feet or tail height from 30 feet up to but not including 45 feet
- Group IV: Wingspan 118 feet up to but not including 171 feet or tail height from 45 feet up to but not including 60 feet
- Group V: Wingspan 171 feet up to but not including 214 feet or tail height from 60 feet up to but not including 66 feet
- Group VI: Wingspan 214 feet up to but not including 262 feet or tail height from 66 feet up to but not including 80 feet

Aircraft Operation: An aircraft landing or takeoff, or touch-and-go procedure on a runway at an airport. A touch and go is counted as two aircraft operations: one takeoff, and one landing.

Air Route Traffic Control Center (ARTCC or "Center"): A facility established to provide air traffic control service to aircraft operating on Instrument Flight Rule (IFR) flight plans within controlled airspace and principally during the enroute phase of flight (i.e., those aircraft that are not landing or taking off). The Minneapolis ARTCC has jurisdiction of enroute traffic over portions of Minnesota, South Dakota, North Dakota, Wisconsin, Michigan, Nebraska, Kansas, Iowa and Missouri.

Air Traffic Control (ATC): A service provided for the purpose of promoting the safe, orderly, and expeditious flow of air traffic, including airport surface, approach, departure and en-route air traffic control services.

Air Traffic Control Tower (ATCT): A structure from which air traffic control personnel control the movement of aircraft in the immediate vicinity of an airport, ensuring the safe and efficient flow of aircraft. Controllers are responsible for separating aircraft in the air and on the ground, in addition to providing weather information and route clearance to pilots.

Airport Elevation: The highest point of an airfield's usable landing area measured in feet above Mean Sea Level (MSL).

Airport Layout Plan (ALP): A scaled drawing of the existing and planned land and facilities necessary for the operation and development of an airport.

Airport Surveillance Radar 9 (ASR-9): An airport surveillance radar system used by the Federal Aviation Administration to monitor air traffic within the United States.
Airside: Taxiways, runways, aircraft parking areas. This is required to meet FAA airport design standards.

Annual Service Volume (ASV): The maximum number of annual operations that can be reasonably expected to occur at an airport based on a given level of delay.

Approach Lighting System (ALS): The combination of lights that allow pilots to identify the airport and runway environment at night or in poor visibility.

Approach Visibility Minimums: A set of conditions specified for operations of aircraft during Instrument Flight Rule (IFR) weather conditions.

Apron: A specified portion of an airfield used for aircraft parking and the refueling, maintenance, servicing, and loading/unloading of aircraft.

Area Navigation (RNAV): A method of navigation that permits aircraft operations on any desired course within the coverage of station-referenced navigation signals.

Automated Weather Observation System (AWOS): Equipment that takes and broadcasts automated weather readings at an airport.

Average Day Peak Month (ADPM): Defined as peak month passengers or operations divided by the number of days in the month.

Aviation Environmental Design Tool (AEDT): A computer software application that models aircraft performance in space and time to estimate fuel consumption, emissions, noise, and air quality consequences.

Categorical Exclusion (CatEx): A federal action may be "categorically excluded" from a detailed environmental analysis if the federal action does not, "individually or cumulatively have significant effect on the human environment."

Circling Approach: A maneuver initiated by a pilot to align the aircraft with a runway for landing when a straight-in landing from an instrument approach is not possible or is not desirable.

Civil Aviation: Non-military aviation including both scheduled air transport and general aviation.

Clear Zone: As defined by MnDOT Aeronautics, Clear Zones off runway ends are intended to enhance operational safety of aircraft and to protect life and property in runway approach areas. The MnDOT Clear Zones have a similar function too, but are not always the same dimensions as the FAA Runway Protection Zone (RPZ).

Common Use Gating: Aircraft gates that are shared across multiple airlines. Currently, MSP Terminal 2 and Gates E1, E3 and B15 in Terminal 1 are common use.

Crosswind Runway: An additional runway at an airport that compensates for primary runways that provide less wind coverage than desired.

Customer service Building (CSB): the location of car rental counters, on Level 1 of the Sliver vehicle parking ramp.

Day-Night Average Sound Level (DNL): The predicted average sound effect on an area near the airport for a typical 24-hour period. A weighting factor equivalent to a penalty of 10 decibels is applied to aircraft operations occurring between 10:00 PM and 7:00 AM.

Decibel (dB): A unit used to measure the intensity of a sound or the power level of an electrical signal by comparing it with a given level on a logarithmic scale.

Design Aircraft: An aircraft with characteristics that determine the application of airport design standards for a specific runway, taxiway, apron, or other facility. This aircraft can be a specific aircraft model or a composite of several aircraft using, expected, or intended to use the airport or part of the airport (also called critical aircraft or critical design aircraft).

Dual Wheel Gear (DW): The configuration of an aircraft landing gear where two wheels are used at each wheel position to support the aircraft load.

Energy Management Center (EMC): A facility operated by the MAC for heating and cooling the MSP Airport terminals and buildings.

Federal Aviation Administration (FAA): The federal agency responsible for the safety and efficiency of the United States' airspace and air transportation system.

Federal Aviation Regulations (FAR): The general and permanent rules established by the executive departments and agencies of the federal government for aviation, which are published in the Federal Register. These are the aviation subset of the Code of Federal Regulations.

Fixed Base Operator (FBO): A commercial business enterprise located on an airport that provides services to pilots including aircraft rental, training, fueling, maintenance, parking, and the sale of pilot supplies. Also known as a Full Service Commercial Operator.

Fleet Mix: A collective term generally used to describe the proportions of aircraft types operating at an airport.

Flight Inspection Service (FIS): A facility, also referred to as the international arrivals area. Currently there are two FIS facilities at MSP, one in Terminal 1 and one in Terminal 2.

Flight Service Station (FSS): Air traffic facilities that provide pilot briefings, flight plan processing, inflight radio communications, search and rescue (SAR) services, and assistance to lost aircraft and aircraft in emergency situations.

General Aviation (GA): The segment of aviation that encompasses all aspects of civil aviation except for certified air carriers and other commercial operators such as air cargo.

Glideslope: The proper vertical path of descent for an aircraft preparing to land to ensure the aircraft stays free of obstacles and touches down on the runway threshold. A standard glide slope is 3°. A Glideslope Antenna (GS) transmits this information to the aircraft cockpit.

Global Positioning System (GPS): A satellite based navigation system that provides signals in the cockpit of aircraft defining aircraft position in terms of latitude, longitude, and altitude.

Ground Transportation Center (GTC): the area of the airport that provides ground transportation services such as taxis, limousines, Quick Ride Ramp shuttles, hotel and regional shuttles.

High Intensity Runway Edge Lights (HIRLs): Lights that are located along the edge of a runway to assist pilots in identifying the edge of the surface available for takeoffs and landings.

Instrument Flight Rules (IFR): Procedures for the conduct of flight in weather conditions below Visual Meteorological Conditions (VMC). The term IFR is often used to define weather conditions and the type of flight plan under which an aircraft is operating.

Instrument Landing System (ILS): A precision runway approach aid based on two radio beams which together provide pilots with both vertical (Glideslope) and horizontal (Localizer) guidance during an approach to land.

Instrument Meteorological Conditions (IMC): Meteorological conditions expressed in terms of specific visibility and ceiling conditions that are less than the minimums specified for Visual Meteorological Conditions (VMC). The term IFR is often used interchangeably with IMC.

Joint Airport Zoning Board (JAZB): A Joint Airport Zoning Board is comprised of the authority that owns or controls an airport along with surrounding municipalities within which an airport hazard area may be located. Once formed, the Joint Airport Zoning Board has the power to adopt, administer, and enforce airport zoning regulations applicable to the airport hazard areas in its jurisdiction.

Knots: Nautical miles per hour, equal to 1.15 statute miles per hour.

Landside: Vehicle parking, roadways, curbside drop off areas.

Lateral Navigation (LNAV): Horizontal navigation without positive vertical guidance. This type of navigation is associated with non-precision approach procedures.

Level of Service (LOS): an analysis to understand a measure of the comfort and convenience experienced by airport users when the facility is operating at the various possible levels of design and service volumes.

Localizer (LOC): The lateral component of the Instrument Landing System (ILS). A localizer antenna (LOC) transmits this information to the aircraft cockpit.

Long-Term Plan (LTP): A long-term planning process and document that shares long-term development concepts and ideas for use of an airport's land and facilities.

MACNOMS: The Metropolitan Airports Commission Noise and Operations Monitoring System collects and processes aircraft noise data and runway use data for MAC-owned airports. The system also collects flight track data for aircraft activity in an area approximately 40 miles around MSP, up to 20,000 feet.

Mean Sea Level (MSL): A measure used in aviation for pilots to identify the flight or airfield elevation above sea level as opposed to above ground level (AGL).

Metropolitan Airports Commission (MAC): The Metropolitan Airports Commission was created in 1943 by the Minnesota Legislature to promote air transportation in the seven-county metropolitan area. MAC owns and oversees the operation of seven airports in the twin cities area: Minneapolis-St. Paul International Airport (MSP), Airlake Airport, Anoka County-Blaine Airport, Crystal Airport, Flying Cloud Airport, Lake Elmo Airport and St. Paul Downtown Airport.

Microjet: A category of small jet aircraft approved for single-pilot operation, typically seating 4-8 people, with a maximum takeoff weight of under 10,000 pounds. Also referred to as very light jets or personal jets.

Minnesota Air National Guard (MNANG): supports the U.S. Airforce branch of the military and operates C-130 Hercules aircraft out of the MSP Airport and provides worldwide deployment of people, cargo and services.

Modification to Design Standards (MOS): Any approved nonconformance to FAA standards applicable to an airport design, construction, or equipment procurement project that is necessary to accommodate an unusual local condition for a specific project on a case-by-case basis while maintaining an acceptable level of safety.

Movement Area: The runways, taxiways, and other areas of an airport that are used for taxiing or hover taxiing, takeoff, and landing of aircraft including helicopters, exclusive of aprons and aircraft parking areas.

MSP: Minneapolis-St. Paul International Airport.

MSP Airport 2040 LTP: Minneapolis-St. Paul International Airport 2040 Long-Term Plan.

National Airspace System (NAS): A network of both controlled and uncontrolled airspace, both domestic and oceanic. It includes: air navigation facilities, equipment and services; airports and landing areas; aeronautical charts, information and services; rule and regulations; procedures and technical information; and manpower and material.

National Plan of Integrated Airport Systems (NPIAS): The national airport system plan developed by the Secretary of Transportation on a biannual basis for the development of public-use airports to meet national air transportation needs.

Navigational Aid (NAVAID): A visual or electronic facility or device designated for use for air navigation.

Noise Contour: A depiction of calculated aircraft noise exposure for a geographical area surrounding an airport. The standard level of noise depicted in noise contour maps is 65 dB Day-Night Level (DNL), but maps may include noise contours for other levels such as 60 dB DNL and 70 dB DNL. Noise contours are calculated using the Aviation Environmental Design Tool (AEDT) and considers data inputs such as runway use, flight track use, aircraft fleet mix, aircraft performance and thrust settings, topography, and atmospheric conditions.

Non-Directional Beacon (NDB): A general purpose, low-frequency radio beacon that can be used by a pilot to determine a bearing from the transmitter.

Non-Precision Approach: A straight-in instrument approach procedure that provides course guidance, without vertical path guidance, with visibility minimums no lower than ¾ mile.

Object Free Area (OFA): An area on the ground centered on a runway, taxiway, or taxilane centerline provided to enhance the safety of aircraft operations by remaining clear of objects except for objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes.

Obstacle Free Zone (OFZ): The OFZ is the three-dimensional airspace along the runway and extended runway centerline that is required to be clear of obstacles for protection for aircraft landing or taking off from the runway and for missed approaches.

Part 77: Regulations for the protection of airspace around a public-use civilian or military airport are specified in 14 CFR Part 77 *Safe, Efficient Use, and Preservation of the Navigable Airspace*. These defined surfaces are used by the FAA to identify obstructions to airspace around an airport facility. Part 77 surfaces are comprised of primary, approach, transitional, horizontal and conical three-dimensional imaginary surfaces.

Pavement Condition Index (PCI): PCI evaluation includes a visual inspection of pavements and assignment of a numerical indicator that reflects the structural and operational condition of the pavement including the type, severity, and quantity of pavement distress.

Planning Activity Level (PAL): Levels intended to represent thresholds to gauge when specific facilities may be required. Because forecasting future activity is not a perfect science, the use of Planning Activity Levels allows development and construction phasing to be designed to respond to activity trends and not simply to a year. If forecasted growth does not occur as quickly as anticipated, development can be delayed. Conversely, if growth accelerates beyond what was expected, future facilities may need to be developed sooner to accommodate the traffic.

For the purposes of this Long-Term Plan, PAL2 is about 2030 and PAL3 is about 2040, but will fluctuate based on actual demand.

Precision Approach: An instrument approach procedure that provides course and vertical path guidance with visibility below ¾ mile.

Precision Approach Path Indicator (PAPI): A lighting system that provides visual approach slope information to the touchdown zone of the runway.

Preferential Gating: Aircraft gates that are operated by a specific airline. Currently, most of MSP Terminal 1 is preferential gating.

Primary Runway: A runway constructed to meet airport capacity needs. The design objective for a primary runway is to provide a runway length that will not result in operational weight restrictions.

Primary Surface: An imaginary obstruction limiting surface defined in 14 CFR Part 77 that is specified as a rectangular surface longitudinally centered about a runway (see Figure 1 on Page 5).

Propeller-driven Aircraft: Aircraft powered by propeller engines on the exterior of the aircraft. Such aircraft often use 100LL type fuel. Turboprop aircraft are a notable exception.

Quick Turn Around (QTA) Facility: the area of the airport where car rental companies clean, fuel and ready recently returned vehicles for future rentals.

Regular Use: Regular use is defined by the FAA as at least 500 or more annual itinerant and local operations on the runway by the critical design aircraft, excluding touch-and-go operations.

Reliever Airport: General Aviation airports in major metropolitan areas that provide pilots with attractive alternatives to using congested hub airports. To be eligible for reliever designation, an airport must be open to the public, have 100 or more based aircraft, or have 25,000 or more annual itinerant operations.

Remain Overnight (RON) Aircraft Parking: Airside apron areas designated for the parking of aircraft using the terminal that cannot be accommodated at terminal gates.

Remote Transmitter/Receiver (RTR): An air-to-ground communications system having transmitters and/or receivers and other ancillary equipment. These on-airport facilities allow radio communications between a pilot and ATCT and are usually located at airports without an ATCT.

Responsible Government Unit (RGU): Any state agency and any general or special purpose unit of government in the state that is responsible for preparation and review of environmental documents.

Runway: A defined rectangular area at an airport designated for the landing and takeoff of an aircraft. Runway numbers are determined by their magnetic heading with respect to north (0°). If an airport has two parallel runways, such as Minneapolis-St. Paul International Airport (MSP), the runways are marked Left (L) and Right (R). Three parallel runways would be marked Left (L), Center (C) and Right (R). The existing runways at MSP are 12L/30R, 12R/30L, 17/35, and 4/22.

Runway Centerline Lights: in-pavement lights along runway centerlines for all runways at MSP Airport, except Runway 4/22.

Runway Design Code (RDC): The selected AAC, ADG, and desired approach visibility minimums (in feet of runway visual range) are combined to form the Runway Design Code (RDC) for a particular runway. The RDC is used to determine the standards that apply to a specific runway and parallel taxiway to allow unrestricted operations by the design aircraft under defined meteorological conditions.

Runway Guard Lights (RGL): both above-ground and in-pavement lighting intended to reduce the likelihood of a runway incursion by indicating to pilots the presence of a runway.

Runway End Identifier Lights (REIL): Two synchronized flashing lights, one on each side of a runway threshold that provide positive identification of the runway approach end.

Runway Object Free Area (ROFA): An area on the ground centered on a runway centerline provided to enhance the safety of aircraft operations by remaining clear of objects, except for objects that need to be located in the ROFA for air navigation or aircraft ground maneuvering purposes.

Runway Obstacle Free Zone (ROFZ): The ROFZ is the three-dimensional airspace along the runway and extended runway centerline that is required to be clear of obstacles for protection for aircraft landing or taking off from the runway and for missed approaches.

Runway Protection Zone (RPZ): An area at ground level prior to the threshold or beyond the runway end to enhance the safety and protection of people and property on the ground.

Runway Safety Area (RSA): A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to aircraft in the event of an undershoot, overshoot, or excursion from the runway.

Runway Status Lights (RWSLs): lights that indicate when it is safe to enter or cross a runway.

Runway Visual Range (RVR): An estimate of the maximum distance at which the runway, or the specified lights or markers delineating it, can be seen from a position above a specific point on the extended runway centerline.

Single Wheel Gear (SW): The configuration of an aircraft landing gear where a single wheel is used at each wheel position to distribute the aircraft load.

Small Aircraft: An aircraft with a maximum certificated takeoff weight of 12,500 pounds or less.

State Aviation System Plan (SASP): The primary objective of the Minnesota State Aviation System Plan is to provide the state with excellent planning tools to assist in making informed decisions guiding the development of Minnesota's system of airports and expending funds in a cost-effective manner.

T-Hangar: A linear structure with nested interior bays that are of a “T” shape and provide shelter for aircraft.

Taxilane: A surface used by aircraft for low speed and precise taxiing. Taxilanes are usually, but not always, located outside the movement area, providing access from taxiways to aircraft parking positions and other terminal areas.

Taxiway: A defined path established for the taxiing of aircraft from one part of an airport to another.

Taxiway Design Group (TDG): A classification of airplanes based on outer-to-outer main landing gear width and cockpit to main gear distance.

Terminal: Buildings that include passenger services and amenities such as airline ticketing, baggage claim, security checkpoints, concessions, restrooms and aircraft gate hold areas. At MSP, there are two terminals, Terminal 1 and Terminal 2.

Terminal Radar Approach Control (TRACON): provides radar approach an departure control as well as other air traffic control services to aircraft flying in the terminal airspace. Jurisdiction over airspace in the Minneapolis-Saint Paul region is given to the Minneapolis TRACON.

Threshold: The beginning of the portion of the runway available for landing. In some cases, the threshold may not be at the physical end of the runway.

Transportation Network Company (TNC): a business model that offers prearranged rides or car rentals for a fee, using an online app to connect passengers with drivers/car owners. Common examples are Uber and Lyft.

Transportation Security Administration (TSA): the federal government agency that is responsible for air travel safety. One of the activities performed by TSA includes providing security screening at airports.

Turbine-Powered Aircraft: Aircraft powered by turbine engines including turbojets and turboprops but excluding turbo-shaft, rotary-wing aircraft. Such aircraft normally use Jet-A type fuel.

Useful Load: The aircraft maximum takeoff weight minus the aircraft empty weight. An aircraft's useful load can be used to transport either fuel or payload (passengers, baggage, and/or cargo).

Very High Frequency Omnidirectional Radio Range (VOR): A ground-based aircraft navigation system that is being phased out as part of the FAA's continual upgrade of the nation's navigation infrastructure.

Visual Flight Rules (VFR): Procedures for the conduct of flights in weather conditions above Visual Meteorological Conditions (VMC). The term VFR is often used to define weather conditions and the type of flight plan under which an aircraft is operating.

Visual Meteorological Conditions (VMC): Meteorological conditions expressed in terms of specific visibility and ceiling conditions that are equal to or greater than the threshold values for instrument meteorological conditions.

Visual Runway: A runway without an existing or planned straight-in instrument approach procedure.

VOR Minimum Operational Network (MON): An FAA program to reduce the number of VORs to only retain those that: a) support international oceanic routes and coverage above 5,000 feet; and b) ensure aircraft can perform Instrument Landing System, Localizer or VOR approaches to suitable airports; and c) those required for military use.