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2014
ANNUAL REPORT
TO THE
LEGISLATURE

PREPARED BY THE METROPOLITAN AIRPORTS COMMISSION
MARCH 2015

MINNEAPOLIS SAINT PAUL
METROPOLITAN AIRPORTS COMMISSION
MAC

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1. INTRODUCTION

1.1 OVERVIEW

The Metropolitan Airports Commission (MAC) was created in 1943 by the Minnesota Legislature to promote air transportation in the seven-county metropolitan area. The MAC's 15-member board of commissioners, which sets the MAC's policies, consists of 13 appointments by Minnesota's Governor and one appointment each by the mayors of Minneapolis and St. Paul. The MAC's policies are implemented by the MAC's Executive Director/Chief Executive Officer and staff.

The MAC airport system is comprised of seven airports: Minneapolis-St. Paul International Airport (MSP) and six reliever airports. The reliever airports include Airlake, Anoka County-Blaine, Crystal, Flying Cloud, Lake Elmo and St. Paul Downtown. **Figure 1-1** shows each MAC airport location.

In 1989, the Minnesota Legislature adopted the Metropolitan Airport Planning Act. This legislation required the MAC and the Metropolitan 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 expanding MSP at its current site with the option of building a new airport elsewhere.

The analysis, known as the Dual-Track Airport Planning Process, was completed in March 1996. On April 2, 1996, legislation was passed by both the House and Senate and signed by Governor Arne Carlson that terminated further study of a new airport and directed the MAC to implement the MSP 2010 Long Term Comprehensive Plan.

This same legislation requires the MAC to prepare an Annual Report to the Legislature that describes recent MSP activity, current and anticipated capacity and delay for its airfield and terminals, and technological developments that could improve airport efficiency. In 2006, the 1996 legislation was amended to require the MAC to include an update on the six reliever airports in the annual report and to submit the report to the Legislature by March 30 each year.

The 2014 Annual Report to the Legislature is divided into three sections:
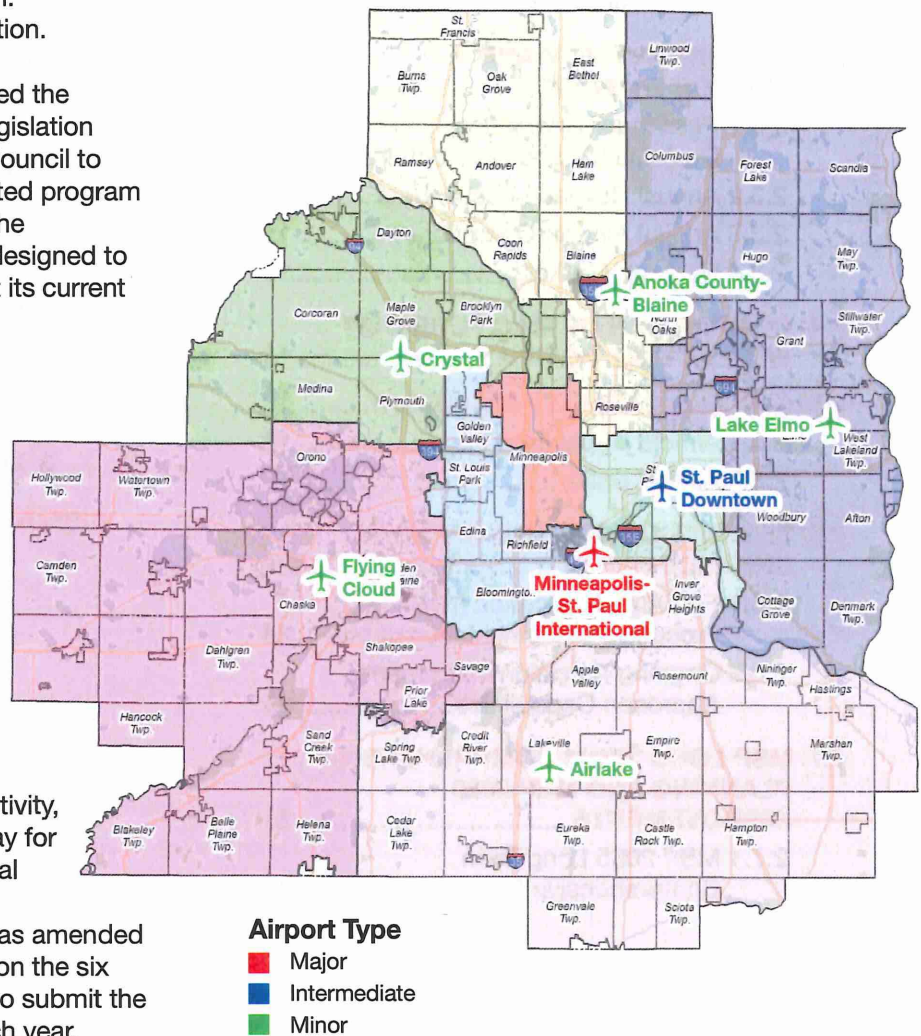
1. Introduction

2. Minneapolis-St. Paul International Airport (MSP)

3. Reliever Airports

These sections are further subdivided into sub-sections pertinent to the various facilities.

METROPOLITAN AIRPORTS COMMISSION AIRPORTS IN THE SEVEN-COUNTY TWIN CITIES METROPOLITAN AREA
Figure 1-1

Airport Type
- Major
- Intermediate
- Minor

1.2 METROPOLITAN AIRPORTS COMMISSION (MAC) STRATEGIC PLAN

The MAC's core mission is to provide and promote safe, convenient, environmentally-sound and cost-competitive aviation services for its customers. The organization's strategic plan provides a framework for fulfilling that mission and for progressing toward the MAC's vision of giving its customers the best airport experience in North America.

SEVEN KEY STRATEGIES DRIVE THE 2015-2017 STRATEGIC PLAN:

1. **Assure Financial Viability**
   Ensure the MAC has the financial resources necessary to operate its airports system, meet all debt service obligations in any scenario and maintain its existing bond ratings.

2. **Provide a Great Customer Experience**
   Ensure all the MAC's customers can enjoy the best airport experience in North America.

3. **Develop Employee Talent**
   Have the right people with the right skills and experience in the right place to fulfill the MAC's mission and achieve its vision.

4. **Enhance Air Service at MSP**
   Provide airlines and the traveling public with expanded alternatives by enhancing domestic, regional and international air service at MSP.

5. **Leverage Resources and Technology**
   Take full advantage of resources and technology to improve performance, increase productivity and deliver cost-effective services.

6. **Strengthen Partnerships and Relationships**
   Expand effectiveness through internal teamwork and strengthened external relationships and partnerships with tenants, concessionaires, airlines, neighboring communities, regional businesses and governmental entities.

7. **Integrate Sustainability into our Culture**
   Formally incorporate sustainability into the way the MAC does business.

   While strategies tend to remain consistent from year to year, the seventh strategy, "Integrate Sustainability into our Culture," is new in the 2015-2017 strategic plan. The added strategy reflects the MAC's commitment to developing and operating its airports in a socially, environmentally and economically sustainable manner. In 2014, the MAC hired its first sustainability manager and launched an effort to develop the organization's first Sustainability Management Plan (SMP) by 2016.

The strategic plan includes dozens of key initiatives to support its strategies as well as three "Wildly Important Goals" (WIGs), crafted in keeping with Franklin Covey's Four Disciplines of Execution. Those goals include:

1. Maintain MSP's "overall Satisfaction with the Airport" Airport Service Quality score (based on customer surveys) at 4.28 or better as we redesign and enhance the MSP customer experience through 2017.

2. Use implementation of Microsoft SharePoint to improve internal MAC communications and collaboration and foster a single-enterprise culture by December 2017.

3. Support the long-term financial viability of the reliever airports system by increasing new tenant aeronautical and non-aeronautical investments a minimum of $6 million by December 2017.

The 2015-2017 MAC Strategic Plan is available on the MAC's Web site, www.metroairports.org.

2. MINNEAPOLIS-ST. PAUL INTERNATIONAL AIRPORT (MSP)

(2.1) OVERVIEW

MSP is the only large hub airport in Minnesota, drawing heavily from a five-state region that includes Iowa, North Dakota, South Dakota and Wisconsin as well as Minnesota. The MAC funds operations of MSP and the entire system of MAC airports through rents and fees paid by airport users; the MAC receives no appropriation from the State's General Fund. Although the MAC has authority to issue property taxes in the seven-county metropolitan area, it has not done so since 1969.

Economic Impact

The 2013 Minneapolis-St. Paul International Airport (MSP) Economic Impact Study[1] found that MSP generates more than $10.1 billion annually for the Twin Cities economy and supports more than 76,000 jobs, including nearly 20,000 jobs related directly to MSP operations and development. The average salary among the dozens of businesses and organizations operating at MSP is more than $66,000 a year, well above Minnesota's median household income.

Visitors arriving via MSP spend $1.9 billion in the local economy per year, generating 24,500 direct jobs. The airport also contributes significant funding for federal, state and local government programs by producing more than $600 million a year in tax revenues.

Noteworthy Accomplishments

The Terminal 1-Lindbergh international arrivals facility was expanded in 2014, providing more queue and primary inspection space and larger bag carousels to accommodate multiple international arrivals simultaneously. Automated Passport Control kiosks were installed to speed processing of eligible arrivals to the United States. A viewing space for regionally produced short films was created on Concourse C, and work commenced on lactation rooms for new mothers and an improved indoor pet relief area.

In October 2014, the MAC launched a major new solar energy generation and energy conservation project in the Terminal 1-Lindbergh parking facilities. The 3-megawatt solar installation, when operating at peak capacity, will generate nearly 20 percent of MSP's total power supply. The project also involves replacing 7,700 light fixtures in the Terminal 1-Lindbergh parking ramps with energy-saving LED technology and installing four additional electric vehicle chargers, which are offered for use at no charge to MSP's parking customers.
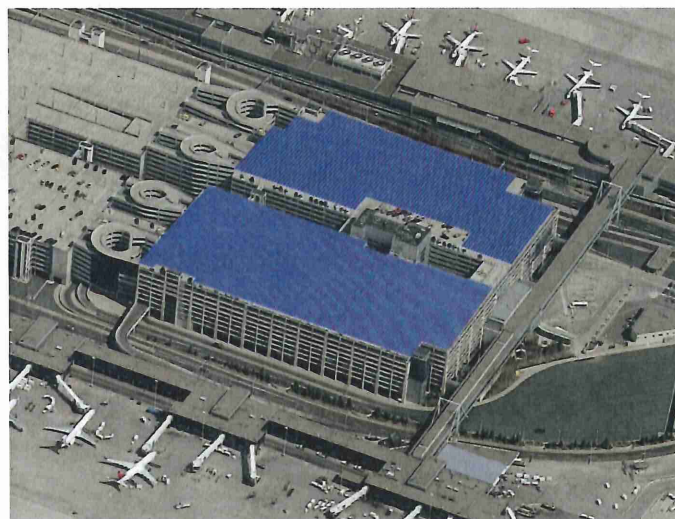
Solar Energy installation at Terminal 1-Lindbergh's parking facility

At Terminal 2-Humphrey in 2014, a new, bright and expansive rental auto customer service and quick-turnaround facility was added, increasing the efficiency of auto rental operations and providing a first-rate customer experience. Inside the terminal, seating was expanded at Gates 1 and 2, and a new Minnesota Wild hockey-themed full-service restaurant opened. A Holiday gas and convenience station was built near the intersection of 34th Avenue and Interstate 494, providing additional non-aeronautical revenues for the MAC.

Air Service Development

In 2014, passenger levels at MSP increased by 3.7 percent, while aircraft operations decreased by 4.6 percent.[2] Passenger levels increased despite decreased operations due to airlines operating larger aircraft and increased load factors from 2013.

Three airlines, Spirit Airlines, Frontier Airlines and United Airlines, added service to new destinations in 2014 that were not served by the airline in 2013. Spirit added service to Baltimore, MD (BWI); Detroit, MI (DTW); and Houston, TX (IAH). Frontier added service to Trenton, NJ (TTN) and Washington D.C. (IAD). United added service to Los Angeles, CA (LAX).

In June 2014, German airline Condor added service between MSP and Frankfurt, Germany (FRA) on a summer-seasonal basis. This represented the first time since 1996 that MSP had nonstop air service to Frankfurt.

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[1] The Minneapolis-St. Paul International Airport Economic Impact Study was prepared and published by InterVISTAS (March 15, 2013)
[2] MSP aircraft operations data used for this report were obtained from the Federal Aviation Administration OPSNET.

Other Achievements

As airlines have scaled back services to customers in the terminal, the MAC has filled the service gap, offering porter services to help travelers get bags to their vehicles and queue management services to increase efficiency and provide enhanced customer support in the ticketing lobby.

The MAC also completed the noise mitigation program agreed to in the 2007 Consent Decree. In total, the MAC has invested nearly $500 million in noise mitigation around MSP, administering the most extensive noise abatement program in the nation.

In October 2014, the MAC began live streaming and offering on-demand video viewing of board and committee meetings. Available at www.metroairports.org, the videos are linked to agenda items, making it easy for members of the public to watch the debate regarding issues of particular interest to them from their home or office. In addition, in December 2014, the MAC launched a news and notification subscription service through which members of the public can receive information on a variety of MAC, MSP and general aviation topics via email. The new services are designed to keep the public informed and to bring enhanced transparency to MAC policy discussions and activities.

MSP continues to win national and international awards for capital improvements, facilities and passenger service offerings. In 2014 U.S. ANNIE Airport Awards recognized MSP for adding air service to the most new destinations; Airport Revenue News (ARN) named MSP as having the best overall concessions program of any large U.S. airport; the National Terrazzo and Mosaic Association honored MSP with an award for Job of the Year for Fine Terrazzo;

the American Council of Engineering Consultants (ACEC) awarded MSP for the I-494/34th Avenue diverging diamond interchange and Terminal 1- Lindbergh restroom upgrades; and USA TODAY noted that its readers chose MSP as the third best airport for a layover.

The following sections of this report highlight various aspects of MSP.

2.2 MSP AIRPORT FACILITIES

2.2.1 Airfield

The MSP airfield is approximately 3,400 acres in size and consists of two parallel runways, one north-south runway and one crosswind runway. Runway 4-22 is 11,006 feet long; 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. **Figure 2-1** shows MSP's current layout, and **Table 2-1** summarizes the major airport components.
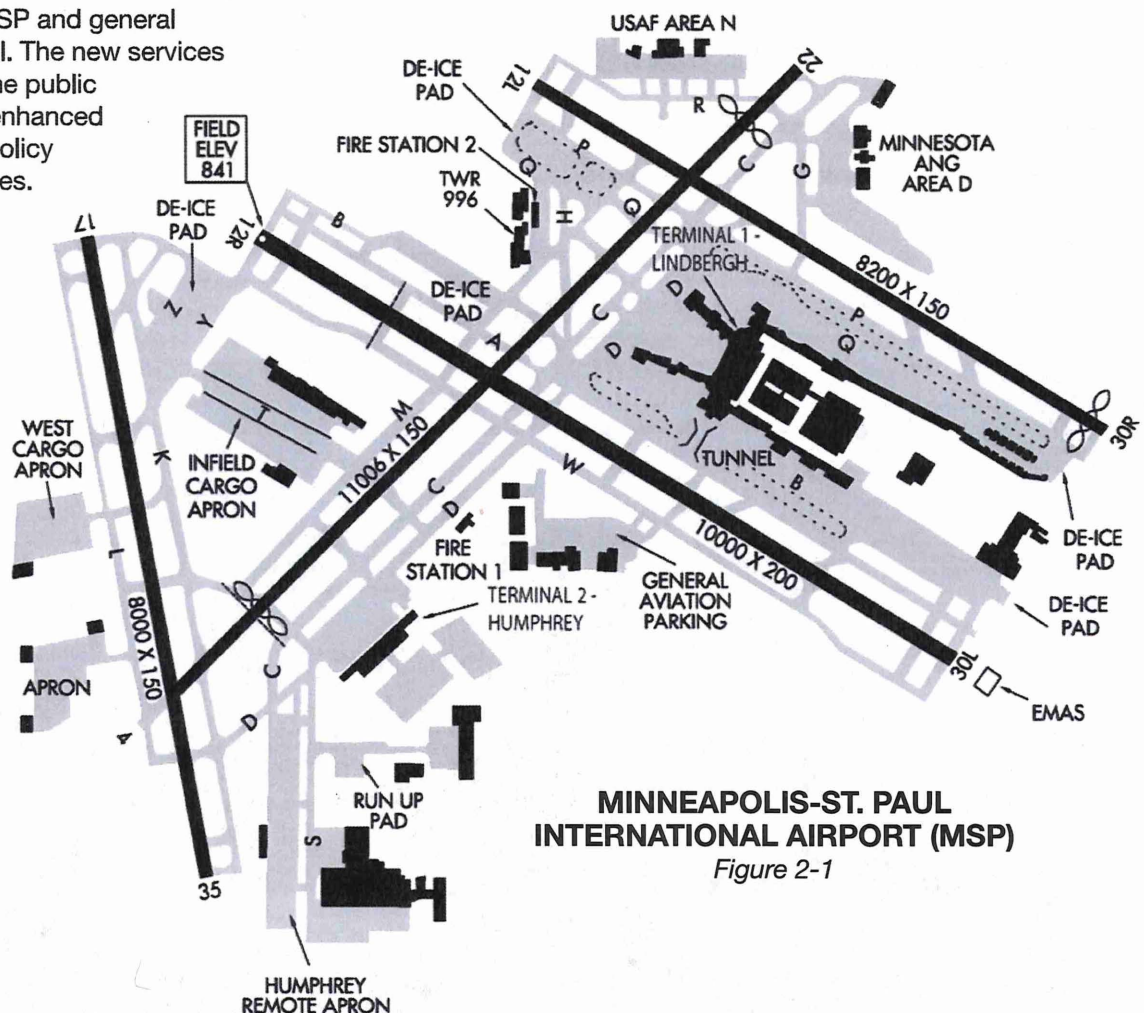
MINNEAPOLIS-ST. PAUL INTERNATIONAL AIRPORT (MSP)
Figure 2-1

TABLE 2-1 EXISTING AIRPORT FACILITIES

Airport Components	Quantity
Runways	
East-West Parallel (Runways 12L-30R and 12R-30L)	2
North-South (Runway 17-35)	1
Crosswind (Runway 4-22)	1
Total Runways:	**4**
Terminal Building Facilities	
Terminal 1-Lindbergh million sq. ft.	2.8
Terminal 2-Humphrey million sq. ft.	0.5
Total Terminal Square Footage (millions):	**3.2**
Public Auto Parking	
Terminal 1-Lindbergh	13,136
Terminal 2-Humphrey	8,861
Total Public Auto Parking Spaces:[3]	**21,997**

Deicing pads are located at the ends of each parallel runway and Runway 17-35 has a seven-position deicing pad on its north end to accommodate departures to the south as current operating restrictions normally preclude departures to the north over Minneapolis from that runway. The deicing pads have facilities nearby for recharging deicing trucks and for providing a rest area for deicing crews. A combined operations and maintenance facility adjacent to the Runway 12L deicing pad serves to coordinate deicing operations on all pads.

There are two cargo aprons (50 acres total) located at MSP: Infield Cargo Apron and West Cargo Apron. The Infield Cargo Apron is situated between Runway 12R-30L and Runway 17-35 and supports a FedEx cargo sort facility and a UPS facility. The West Cargo Apron accommodates a multi-tenant cargo facility. Three aircraft maintenance hangars are located on an apron on the western edge of the airfield.

Airfield improvements in 2014 included apron concrete pavement rehabilitation and pavement joint sealing.

[3] Data provided by the MAC for revenue-control equipped public parking. In March 2015, a new Quick Ride parking ramp will add about 1,400 additional revenue-producing public parking spaces.
Source: Data provided by the Metropolitan Airports Commission

TERMINAL 1-LINDBERGH

Figure 2-2
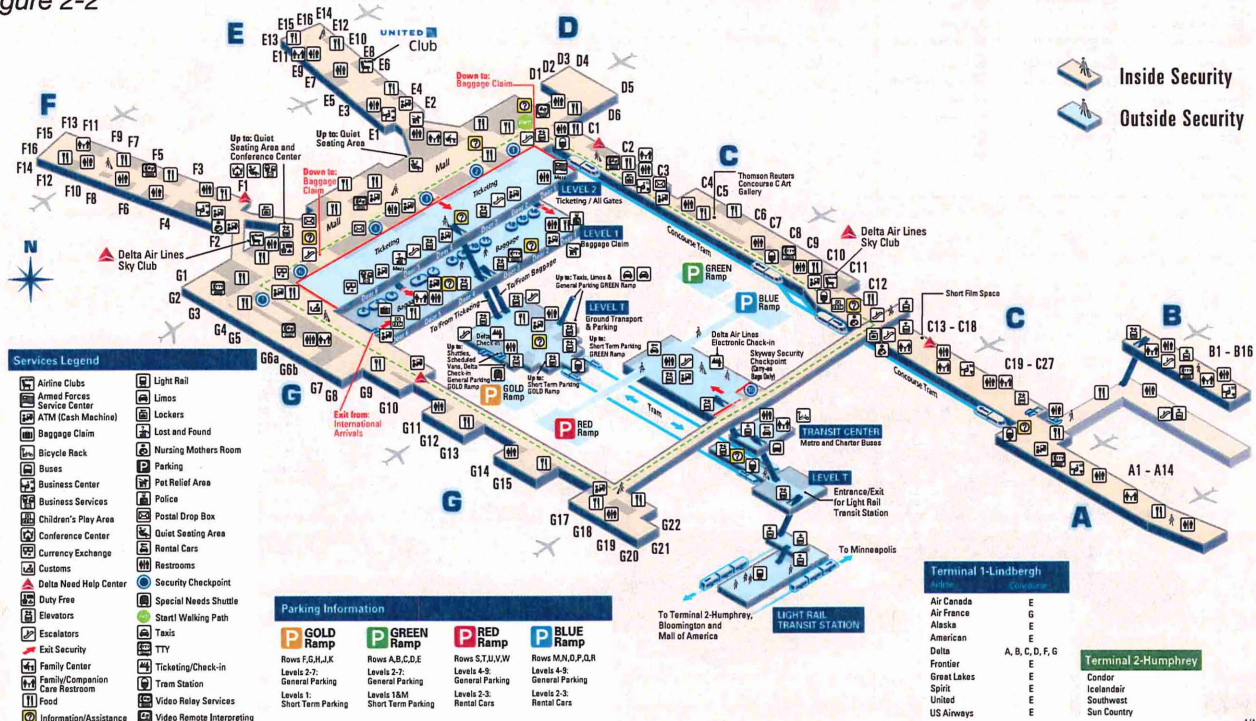
2.2.2 Terminal 1-Lindbergh

Terminal 1-Lindbergh is the largest terminal at MSP. It opened in 1962 and was named the Charles A. Lindbergh Terminal in 1985. Since 2010 this terminal is referred to as Terminal 1-Lindbergh (Terminal 1).

Terminal 1 is located between the north and south parallel runways, east of the crosswind runway. **Figure 2-2** displays a layout of the facilities, which house single-loaded and double-loaded concourses and 114 gates. Ten of those gates support international arrivals into the International Arrival Facility. Improvements to this facility in 2014 provided additional baggage claim conveyor length and automated passport kiosks to speed processing of eligible arrivals to the United States.

Nine airlines operated out of Terminal 1 in 2014: Air Canada, Air France, Alaska Airlines, American Airlines, Delta Air Lines, Frontier Airlines, Great Lakes Airlines, United Airlines and US Airways.

A number of enhancements were made to the Terminal 1 passenger experience recently that include updated terminal seating with convenient access to power, updated restroom facilities with expanded accommodations for nursing mothers, public spaces for short films and art displays, installation of electric chargers for ground service equipment and new relief areas for pets.

Terminal 1 vehicle parking revenue exceeded $71 million in 2014, which is an increase of 1.7 percent compared to 2013.

2.2.3 Terminal 2-Humphrey

Terminal 2-Humphrey originally opened in 1977 with four gates and was named for Hubert H. Humphrey. A new terminal replaced the original terminal in 2001. Since 2010 this terminal is referred to as Terminal 2-Humphrey (Terminal 2). The building layout of Terminal 2 is depicted in **Figure 2-3**, and includes an International Arrival Facility.

Terminal 2 is located southwest of the parallel runways and consists of 10 common-use gates that were used by six airlines in 2014: AirTran Airways, Condor, Icelandair, Southwest Airlines, Sun Country Airlines and Spirit Airlines.[4]

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[4] Spirit Airlines relocated to Terminal 1 in January 2015 and Southwest Airlines finalized its acquisition of AirTran Airways in 2014.
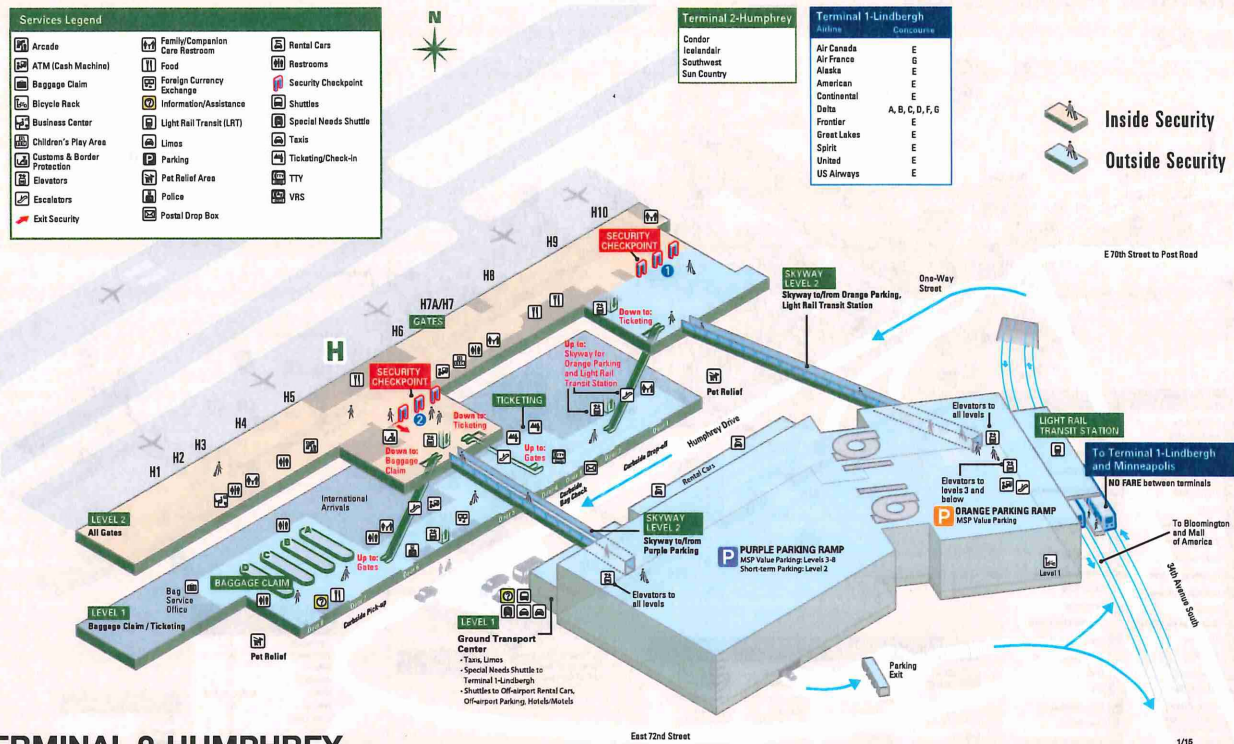
TERMINAL 2-HUMPHREY

Figure 2-3

The H1/H2 gate hold area at Terminal 2 was expanded in 2014, and extensive improvements were completed to the rental car facilities, including a new customer service building, a new Ready-Return facility and a new quick-turn-around (QTA) facility for washing and refueling rental car inventory.

Terminal 2 vehicle parking is provided in the Orange and Purple Ramps, which include access to the terminal building and Light Rail Station through elevated, temperature-regulated skyways. Vehicle parking revenue for Terminal 2 exceeded $17.4 million in 2014, which is an increase of 23.5 percent compared to 2013.

Terminal 2 accommodated more than 4.7 million passengers and over 40,000 aircraft operations in 2014. This activity was largely generated by competitive, low-fare air service by Southwest Airlines, Minnesota-based Sun Country Airlines and ultra-low-fare carrier Spirit Airlines.

2.2.4 Light Rail and Bus Transit

The Metro Transit METRO Blue Line provides a light rail transit (LRT) option for MSP travelers and visitors commuting between terminals and off-airport locations from Target Field in downtown Minneapolis to the Mall of America in Bloomington, MN.

The Terminal 1 Station at MSP is located below ground at the south end of the Terminal 1 parking complex, and the Terminal 2 Station is located directly east of Terminal 2. Free service is provided for travel between the two airport LRT stations. A bus station at ground level above the Terminal 1 Station provides additional transit service and connectivity between the LRT and bus systems.

Metro Transit estimates daily average rides at MSP in 2014 decreased slightly from activity in 2013. There were approximately 4,746 daily boardings in 2014 at MSP compared with 5,000 in 2013.

2.3 AIRPORT ACTIVITY AND SERVICE TRENDS

This section highlights an overview of the airline and passenger activity, and aircraft operations trends at MSP in 2014.

The airline industry experienced another solid and profitable year in 2014. MSP's passenger total increased to 35,152,460, a 3.7 percent increase over the 2013 passenger total of 33,892,074. This represents the fifth consecutive year MSP's total passenger activity has grown over the previous year. However, MSP's 2014 total passenger activity was about 7 percent lower than its peak year 2005, when 37,663,664 total passengers utilized MSP.

DELTA

Delta Air Lines is the largest air service provider at MSP and operates out of Terminal 1. Delta Air Lines and its regional partners averaged approximately 400 flights per day from MSP to more than 130 destinations worldwide in 2014. Delta's market share of MSP passengers in 2014 was 74 percent, slightly less than its market share of 75 percent of MSP passengers in 2013. In 2014, Delta did not add any new destinations that were not served in 2013. Delta grew existing service to New York, NY (JFK); Houston, TX (IAH); Fort Lauderdale, FL (FLL); and Washington D.C. (DCA).

sun country airlines

Sun Country Airlines continues to expand its services from Terminal 2. In 2014, Sun Country operated approximately 20 flights per day at MSP and served more than 20 year-round and seasonal destinations. Sun Country experienced significant passenger growth in 2014, serving 10 percent more passengers than in 2013. Sun Country increased existing service to many destinations, including New York, NY (JFK); San Francisco, CA (SFO); Boston, MA (BOS); Seattle, WA (SEA); Los Angeles, CA (LAX); Cancun, MX (CUN); and Puerto Vallarta, MX (PVR).

spirit
LESS MONEY. MORE GO.

Spirit Airlines experienced tremendous growth in 2014, serving a total of 996,858 MSP passengers and 13 destinations. This represents 63 percent growth over the 612,438 total passengers served in 2013. Spirit plans to continue its growth at MSP in 2015.

FRONTIER AIRLINES

Frontier Airlines also experienced notable growth in 2014; it served 29 percent more total passengers than the number of passengers it served in 2013. Frontier expanded its low-fare service to Trenton-Mercer Airport (TTN), in Ewing, NJ and to the Washington D.C. area via Washington-Dulles (IAD) in 2014. Frontier is the only airline providing scheduled service out of Trenton-Mercer Airport, the gateway to New Jersey's state capital and all of central New Jersey and Southeast Pennsylvania, including metro Philadelphia.

American Airlines
U·S AIRWAYS

The American Airlines/US Airways merger resulted in the loss of nonstop service by the new American Airlines from MSP to Washington-National (DCA) and New York LaGuardia (LGA) in 2014. As part of its settlement with the Department of Justice in 2013, the new American Airlines relinquished slot pairs at both airports. MSP is one of 17 destinations to lose Washington-National service. Other markets losing Washington-National service include Montreal, Quebec; Omaha, NE; and San Diego, CA. MSP is one of three destinations to lose New York-LaGuardia service by the merged airline, in addition to Atlanta, GA and Cleveland, OH.

Great Lakes Airlines eliminated service to six Essential Air Service (EAS) markets in 2014, citing the ongoing impacts of a pilot shortage it is experiencing. The pilot shortage is the result of federal regulatory changes enacted to Airline Transport Pilot (ATP) certification requirements. The markets eliminated in 2014 were Devils Lake, ND (DVL); Jamestown, ND (JMS); Huron, SD (HON); Ironwood, MI (IWD); Mason City, IA (MCW); and Fort Dodge, IA (FOD). Great Lakes continues to provide service via EAS contracts to Thief River Falls, MN (TVF) and Watertown, SD (ATY).

Tables 2-2 and 2-3 depict the revenue passenger activity comparison for all air carriers serving MSP markets in 2014.

TABLE 2-2 MSP REVENUE PASSENGER SUMMARY

Rank	Airline	2012	2013	2014	Gain/Loss 2012-2014	% Change 2012-2014
1	Spirit	217,192	612,438	996,858	779,666	358.98%
2	Delta	24,525,492	24,502,530	25,216,478	690,986	2.82%
3	Sun Country	1,231,655	1,515,394	1,672,881	441,226	35.82%
4	Southwest/AirTran	1,787,448	1,810,118	1,885,779	98,331	5.50%
5	Frontier	375,524	354,257	456,105	80,581	21.46%
6	Air France	0	45,739	41,957	41,957	--
7	Alaska Airlines	170,964	189,928	185,017	14,053	8.22%
8	Condor	0	-	9,825	9,825	---
9	Air Canada	60,960	70,010	63,503	2,543	4.17%
10	Icelandair	42,115	40,657	40,263	(1,852)	-4.40%
11	American/US Airways	2,217,087	2,329,063	2,188,969	(28,118)	-1.27%
12	Great Lakes	48,444	50,045	11,462	(36,982)	-76.34%
13	United/Continental	1,376,606	1,238,473	1,297,274	(79,332)	-5.76%
	Total	32,053,487	32,758,652	34,066,371	2,012,884	6.28%

Source: MAC Operations Reports

TABLE 2-3 MSP REVENUE PASSENGER MARKET SHARE

Rank	Airline	2012	2013	2014	Gain/Loss 2012-2014	% Change 2012-2014
1	Delta	76.51%	75.06%	74.02%	-2.49%	-3.26%
2	American/US Airways	6.92%	7.11%	6.43%	-0.49%	-7.10%
3	Southwest/AirTran	5.58%	5.53%	5.54%	-0.04%	-0.73%
4	Sun Country	3.84%	4.63%	4.91%	1.07%	27.80%
5	United/Continental	4.29%	3.52%	3.81%	-0.49%	-11.33%
6	Spirit	0.68%	1.87%	2.93%	2.25%	331.86%
7	Frontier	1.17%	1.08%	1.34%	0.17%	14.28%
8	Alaska Airlines	0.53%	0.58%	0.54%	0.01%	1.83%
9	Air Canada	0.19%	0.21%	0.19%	0.00%	-1.98%
10	Air France	0.00%	0.14%	0.12%	0.12%	---
11	Icelandair	0.13%	0.12%	0.12%	-0.01%	-10.05%
12	Great Lakes	0.15%	0.15%	0.03%	-0.12%	-77.74%
13	Condor	0.00%	0.00%	0.03%	0.03%	---

Source: MAC Operations Reports

MSP PASSENGER ORIGINATIONS/DESTINATIONS *Figure 2-4*
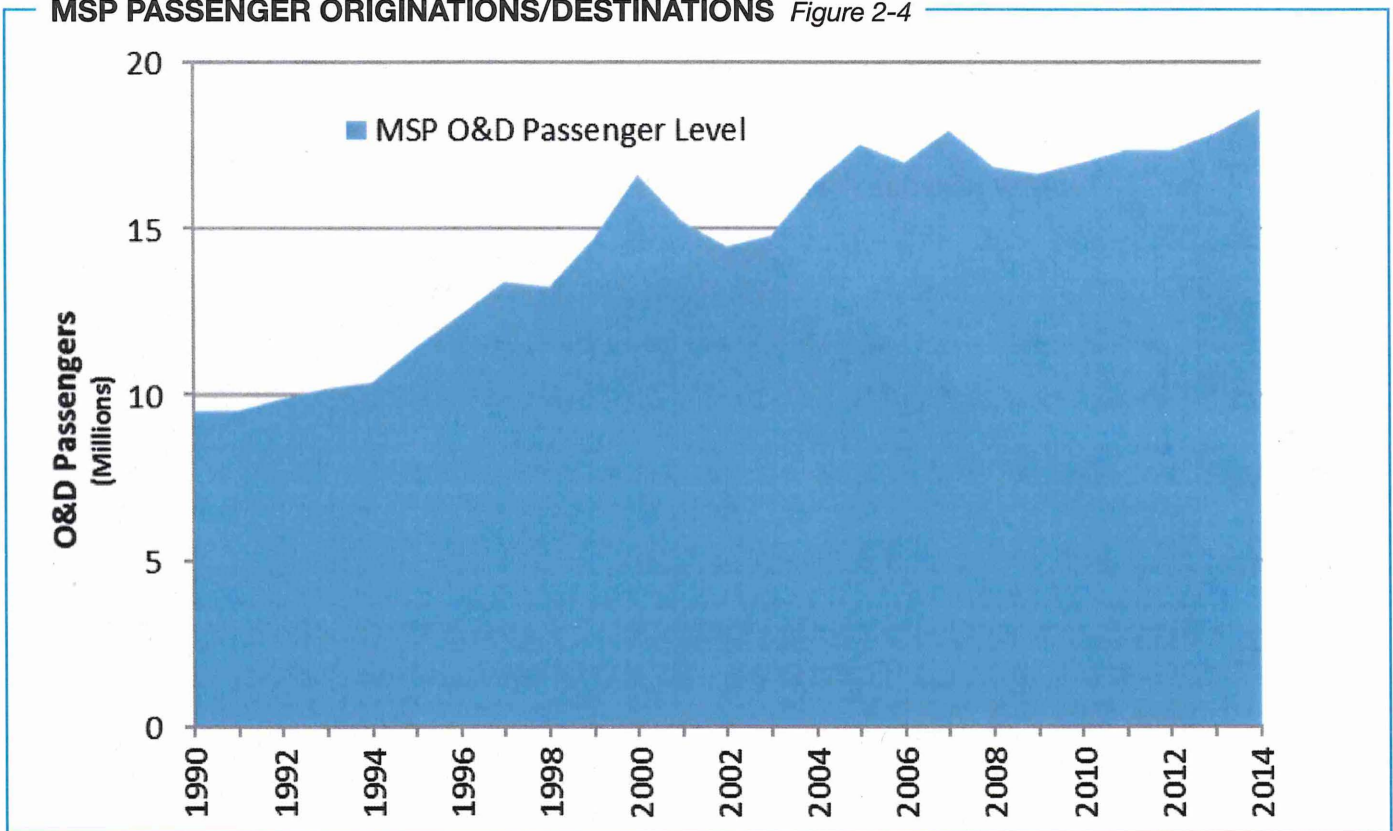
2.3.1 Passenger Originations/Destinations and Connections

Figure 2-4 depicts the annual historical passenger originations/destinations (O&D) data for MSP for the years 1990 through 2014. O&D passengers are those who begin or end their trip at MSP. O&D passenger demand is driven primarily by local socioeconomic factors.

The following information details MSP O&D and connecting passenger data for 2014:

- There were 18,587,428 O&D passengers in 2014, which is approximately 4.1 percent higher than the 2013 O&D passenger level of 17,859,448.[5]

- Between 1990 and 2014, O&D passengers at MSP rose from 9.5 million to over 18 million, which represents an estimated annual compounded growth rate of 2.84 percent.

Connecting passengers are those who travel through the airport enroute to another destination. There were 15,418,190 connecting passengers at MSP in 2014, which is approximately 3.6 percent more than the connecting passenger level of 14,880,428 in 2013.

2.3.2 Annual Revenue Passengers

The revenue passenger level at MSP reported by the airlines in 2014 reached 34,066,371, which is 4.0 percent higher than the level in 2013. The number of passengers flying on major airlines rose nearly 6.6 percent in 2014 while the number of passengers using regional airlines decreased by more than 2.3 percent.

Total annual revenue passenger levels are shown in **Figure 2-5** and include O&D and connecting passengers. Between 1990 and 2014, total annual revenue passengers grew from 19.2 million to 34.1 million, an annual compounded growth rate of 2.42 percent. MSP revenue passenger levels peaked at 36.7 million in 2005 then declined to 31.3 million in 2009. Since 2009 revenue passengers levels have been increasing steadily.

Airports Council International reports that globally passengers increased by 4.9 percent in 2014 when compared to 2013. The level of domestic passengers in 2014 increased 4.3 percent in the U.S. and the level of international passengers rose nearly 5.8 percent compared to 2013.[6]

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[5] Because of prior Detroit Metro Airport comparison requirements, the data from 1990-2008 were obtained from the U.S. DOT and HNTB analysis. The airport comparison is no longer required in this report; therefore, the 2009 through 2014 numbers were derived from Metropolitan Airports Commission year-end reports, which are updated monthly and provide the most accurate MSP-specific statistics.

[6] Airport Council International (ACI) Table 1: Summary Worldwide Traffic Results, October 2014, published December 2014.

MSP REVENUE PASSENGERS *Figure 2-5*

Chart showing MSP Revenue Passenger Levels (Millions) from 1990 to 2014, Y-axis Revenue Passengers (Millions) 0–40.
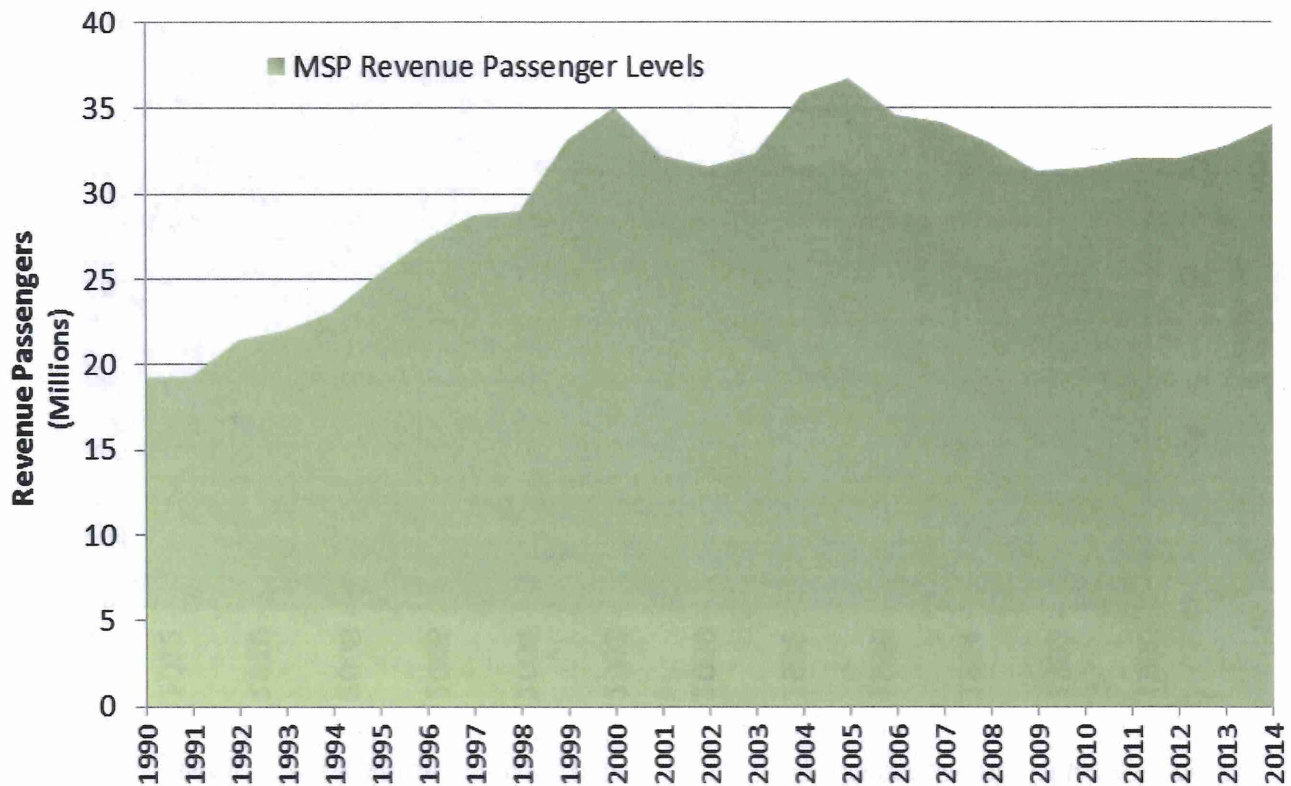
2.3.3 Annual Aircraft Operations

The FAA reported aircraft operations at MSP decreased 4.6 percent in 2014 compared to 2013. According to the FAA's air traffic counts, there were 411,760 arrivals and departures at MSP in 2014, down from 431,573 in 2013. Annual MSP aircraft operations are presented in **Figure 2-6**.

Total annual aircraft operations at MSP generally increased between 1990 – 2001 before declining as a result of the terrorist attacks on September 11, 2001. The year 2001 ended with 501,252 total operations at MSP. In 2002 and 2003 operations rose approximately 1.2 percent over the level in 2001, but then jumped 6.0 percent in 2004. Total operations at MSP peaked in 2004 at 540,727.

The years that followed 2004 were challenging for the aviation industry with increasing fuel prices and an overall struggling economy, which contributed to a fairly steady decline in aircraft operations at MSP between 2004 and 2009. During that timeframe operations at MSP dropped from 540,727 to 432,604; many airlines reduced their

scheduled flights and thinned out their fleets to lower operating costs, and several airlines raised ticket prices and initiated fees for traditionally "no-charge" passenger services (e.g., baggage fees, ticket counter customer service, in-flight food and beverages, etc.) to generate additional revenue. In addition, several large air carriers merged their business operations and other air carriers went through bankruptcy proceedings.
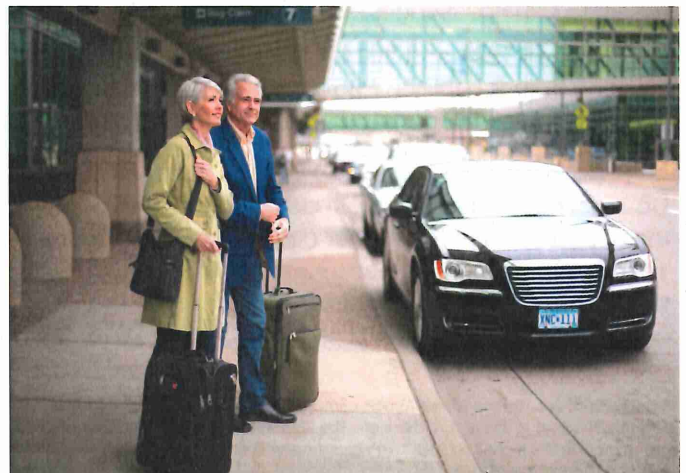
MSP AIRCRAFT OPERATIONS *Figure 2-6*

Total Aircraft Operations (Thousands), MSP, 1990–2014:

Year	Operations
1990	~385
1991	~388
1992	~418
1993	~440
1994	~460
1995	~470
1996	~487
1997	~492
1998	~485
1999	~510
2000	~522
2001	~502
2002	~509
2003	~513
2004	~543
2005	~533
2006	~477
2007	~455
2008	~452
2009	~434
2010	~437
2011	~437
2012	~427
2013	~433
2014	~412

2.3.4   Nonstop Markets

Figure 2-7 shows the number of nonstop domestic and international (including Canadian) markets served from MSP from 2004 through 2014. The domestic markets included in these totals are those that are served by an annual average of at least five weekly nonstop flights. The international markets include those that are served by an annual average of at least one weekly nonstop flight. Some of these markets are served only seasonally.

Based on airline schedule data obtained through Innovata, LLC (via Diio Mi), there were 133 nonstop markets served by MSP in 2014—112 domestic and 21 international—that met the above criteria.

MSP NONSTOP MARKETS *Figure 2-7*

Number of Destinations:

Year	Domestic	International
2004	116	15
2005	122	15
2006	122	20
2007	123	21
2008	123	21
2009	113	21
2010	114	21
2011	118	20
2012	114	20
2013	118	20
2014	112	21
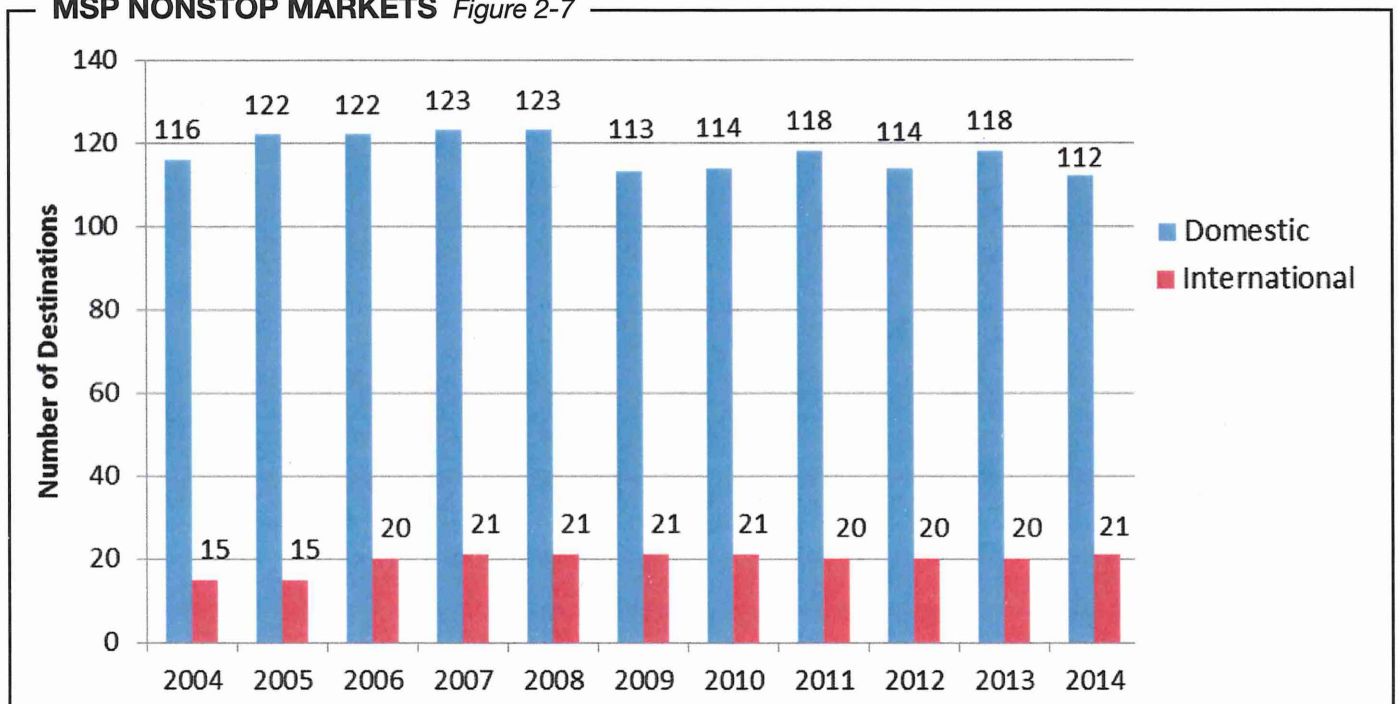
Figure 2-8 summarizes the use of various types of aircraft that serve MSP's nonstop markets. In 2014, approximately 22.6 percent of the nonstop markets were served exclusively by air carrier jets (e.g., A320, B757, etc.) compared with 21.7 percent in 2013. The percentage of nonstop markets served by regional air carrier aircraft (e.g., CRJ, E170, etc.) was 28.6 percent in 2014 compared with 33.3 percent in 2013. Turboprop aircraft utilizing MSP (e.g., Beechcraft 1900, etc.) accounted for 0.8 percent of nonstop markets in 2014, down from 5.8 percent in 2013.

Some nonstop markets are flexible and utilize aircraft types based upon market demand and seasonal fluctuations; 48.1 percent of MSP nonstop markets were served by a mixture of air carrier jets and regional-type aircraft in 2014. In 2013, 39.1 percent of MSP nonstop markets were served by mixed aircraft types.

MSP NONSTOP DOMESTIC AIRCRAFT FLEET MIX
Figure 2-8

Air Carrier Service, 22.6%

Regional, 28.6%

Turboprop, 0.8%

Mixed Air Carrier & Regional, 48.1%

Table 2-4 ranks Minneapolis-St. Paul among other major metropolitan areas in terms of population and compares the number of nonstop markets served by each airport.
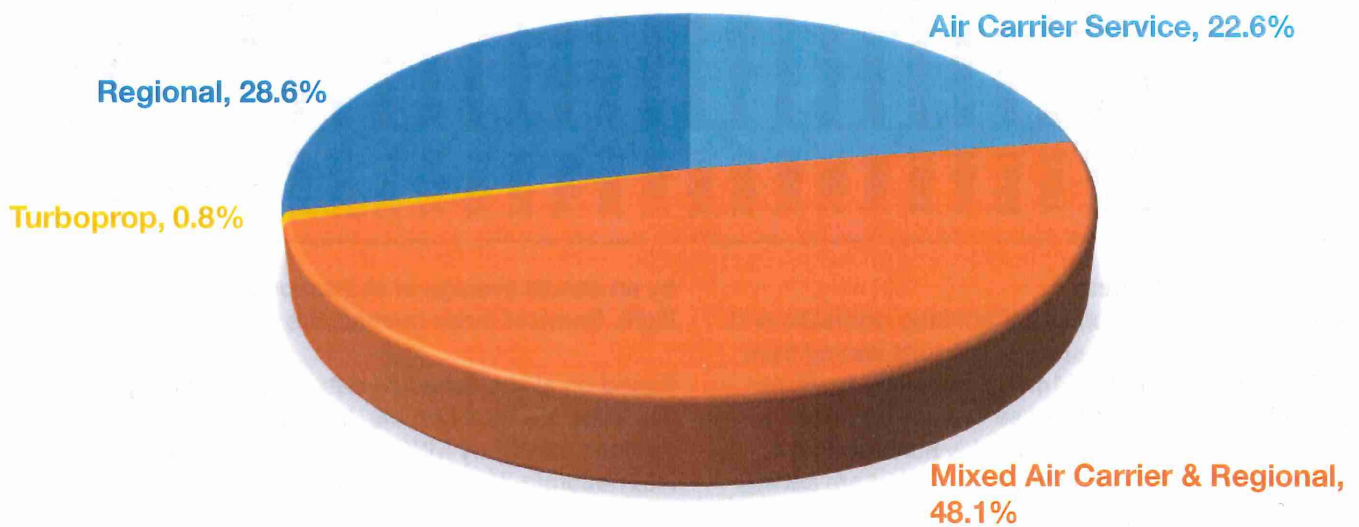
TABLE 2-4 NONSTOP MARKET BY METROPOLITAN AREA 2014

Rank	Name	Populations (millions)[1]	Nonstop Markets [2] [3]	Markets/ Population (millions) Ratio
1	New York	23.48	229	9.8
2	Los Angeles	18.35	148	8.1
3	Chicago	9.91	223	22.5
4	Washington D.C - Baltimore	9.44	155	16.4
5	San Francisco - Oakland	8.47	108	12.8
6	Boston	8.04	102	12.7
7	Dallas - Ft. Worth	7.21	183	25.4
8	Philadelphia	7.15	123	17.2
9	Houston	6.51	175	26.9
10	Miami - Fort Lauderdale	6.45	163	25.3
11	Atlanta	6.16	216	35.1
12	Detroit	5.31	128	24.1
13	Seattle	4.46	94	21.1
14	Phoenix	4.40	95	21.6
15	Minneapolis - St. Paul	3.80	133	35.0
16	Cleveland	3.50	51	14.6
17	Denver	3.28	159	48.5
18	San Diego	3.21	51	15.9
19	Portland	3.02	53	17.5
20	Orlando	2.98	98	32.9
21	St. Louis	2.91	56	19.3
22	Tampa-St. Petersburg	2.87	61	21.3
23	Pittsburgh	2.66	36	13.5
24	Charlotte	2.49	144	57.8
25	Sacramento	2.48	26	10.5
26	Kansas City	2.39	42	17.5
27	Salt Lake City	2.39	90	37.7
28	Columbus	2.37	30	12.7
29	Indianapolis	2.34	33	14.1
30	Las Vegas	2.27	95	41.8
31	Cincinnati	2.20	42	19.1
32	Milwaukee	2.04	29	14.2

[1] U.S. Census Bureau; Annual Estimates of Population of Metropolitan and Micropolitan Statistical Areas: April 1, 2010 - July 1, 2013 (CBSA-EST2013-01); Annual Estimates of the Population of Combined Statistical Areas: April 1, 2010 to July 1, 2013 (CBSA-EST2013-02)

[2] Metropolitan areas served by more than one airport are counted once.

[3] Markets include those receiving an average of at least five weekly nonstop domestic flights or one weekly nonstop international flight during CY 2014.

Sources: US Census Bureau, Innovata CY2014, MAC analysis

2.4 COMPARISON OF MAC FORECAST WITH ACTUAL ACTIVITY

As part of the MAC update to the Long Term Comprehensive Plan (LTCP) for MSP in 2010, revised forecasts were approved and published. The forecasts were updated once again in May 2012 as part of the MSP 2020 Improvements Environmental Assessment/ Environmental Assessment Worksheet (EA/EAW) process. Updated forecasts are being prepared as part of the 2035 MSP LTCP, but were not complete at the time this Annual Report to the Legislature was prepared.

Therefore, the EA/EAW forecast was used for this comparison as the most up-to-date statistics on forecast operations levels at MSP.

The 2012 forecast analysis provides the annual activity forecast levels at MSP for the years 2010-2030. The EA/EAW analysis of future environmental effects from the proposed development focused on 2020 (year of project implementation) and 2025 (providing additional assessment of the forecast effects five years beyond project implementation).

## THE GENERAL FORECAST ASSUMPTIONS THAT WERE USED IN THIS FORECAST INCLUDE:

- There are sufficient MSP airfield, terminal, and landside facilities at the airport to accommodate all commercial aviation activity.

- No return to airline regulation, as occurred prior to 1979; market conditions will dictate the airline services provided and associated fares/fees.

- No major economic downturn, such as the economic depression that occurred during the 1930s.

- No major international conflicts that would disrupt aviation.

- No major trade wars or embargoes that would restrict flow of commerce and travel.

- Security requirements are still evolving as a result of terrorist activity. These requirements affect passenger demand by increasing the cost of travel, delays, and inconvenience. It was assumed that the Transportation Security Administration will maintain a 10-minute limit for security-related delays.

- The real cost of fuel was assumed to increase from 2011 levels. It was assumed that there would be no major disruptions (e.g., similar to what occurred in the 1970s).

- No major changes in the physical environment were assumed. It was assumed that global climate changes would not be sufficient to force restrictions on the burning of hydrocarbons or result in major fuel tax increases.

- It was assumed that the FAA would implement any required changes and improvements for the national airspace system to accommodate unconstrained aviation demand.

- It was assumed that government regulations and labor union resistance would prevent any major airline consolidation beyond the mergers of United/ Continental and Southwest/Air Tran. It was also assumed that some minor airline consolidation could continue to occur.

- It was assumed that new entrants would attempt to establish service at MSP by 2015. Southwest Airlines was assumed to expand at MSP. It was also assumed that new airlines might attempt to become established during the forecast period; however, it was not possible to predict the names and characteristics of new airlines.

- It was assumed that the SkyTeam alliance would continue with its current members (Delta, Air France, KLM, Alitalia, Korean, Aeromexico, Aeroflot, China Southern, Air Europa, Kenya Airways, TAROM, Vietnam Airlines, and CSA Czech Airlines).

- It was assumed that Delta Air Lines and Sun Country Airlines would continue to operate as hub carriers at MSP. Further, these hub carriers were not assumed to either add or delete major hubs elsewhere in the United States, and the connecting percentage was assumed to remain similar to the percentages from 1992-2010.

A comparison of actual 2014 activity and forecasted activity for the Origination and Destination (O&D) passengers, revenue passenger enplanements, and aircraft operations is provided in **Figure 2-9** through **Figure 2-11**. A historical comparison of forecasted activity is provided in **Figure 2-9**. This figure shows the 2014 forecasted O&D passenger levels from the MSP 2020 Improvements EA/EAW and the forecasted activity published in the 1993 Revised Activity Forecasts prepared in association with the Dual Track Airport Planning process.[7]

- **Figure 2-9** shows a comparison of actual and forecasted O&D passengers. Actual O&D passengers in 2014 were approximately 18.6 million, which is 6.7 percent above the 2014 forecast level of 17.4 million O&D passengers.

- **Figure 2-10** shows a comparison of the actual revenue passenger level of 34.1 million in 2014 and the 2014 forecasted level of 34.5 million. The actual number of revenue passengers in 2014 is 1.3 percent lower than the forecasted level.

- **Figure 2-11** compares the actual number of aircraft operations as counted by the Federal Aviation Administration of 411,760 in 2014 with the forecasted level of 440,961. The level of actual operations is approximately 6.6 percent lower than the forecasted level.

MSP FORECAST O & D COMPARISON *Figure 2-9*
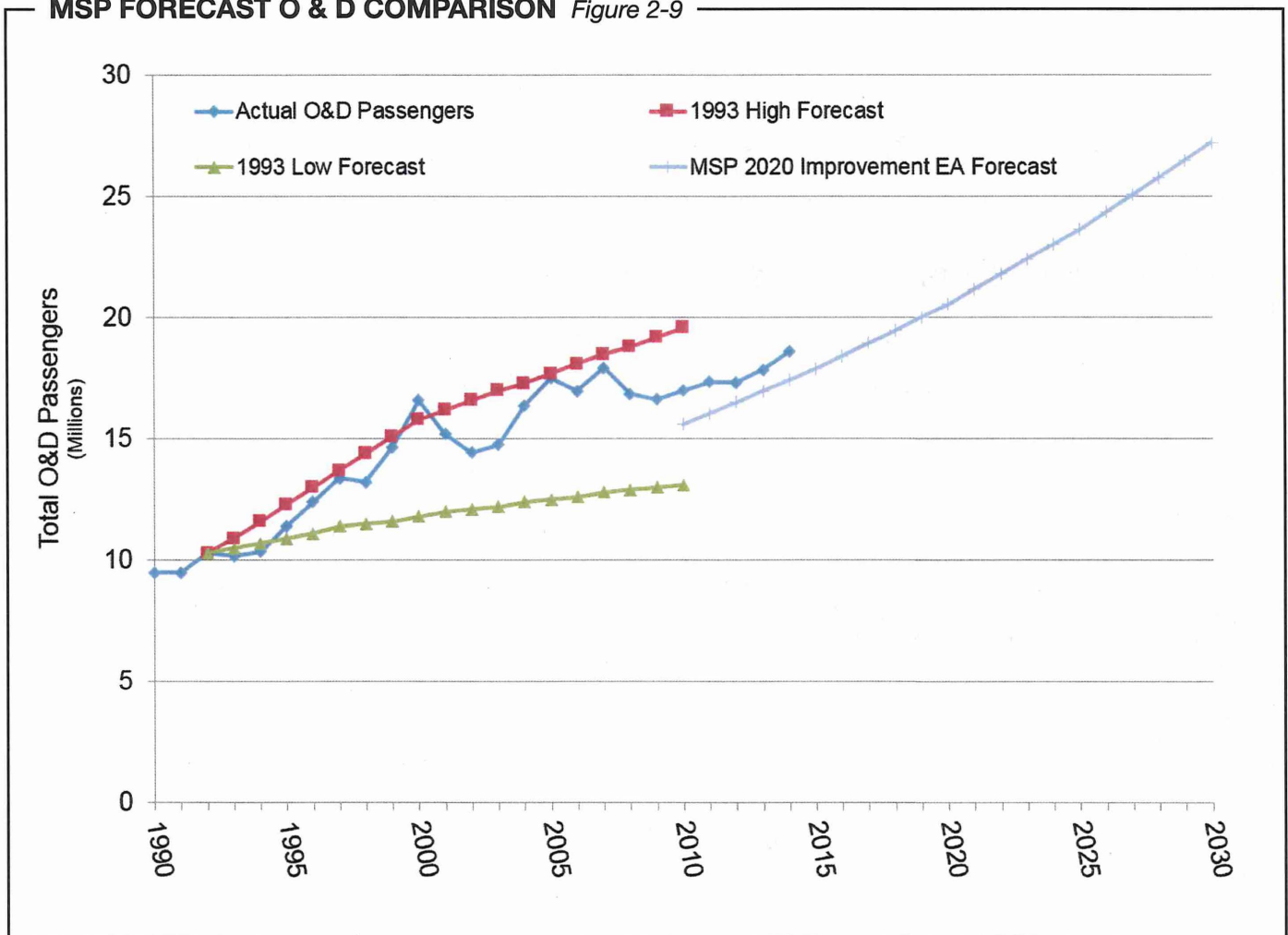
[7]Data were obtained from the MSP 2020 Improvements EA/EAW Aviation Activity Forecast 2012, Metropolitan Airports Commission records, Federal Aviation Administration Opsnet, and HNTB analysis.

MSP FORECAST REVENUE PASSENGER LEVEL COMPARISON *Figure 2-10*

Legend:
- Actual Revenue Passengers
- 1993 MSP LTCP High
- 1993 MSP LTCP Low
- MSP 2020 Improvements EA Forecast

Y-axis: Total Revenue Passengers (Millions)
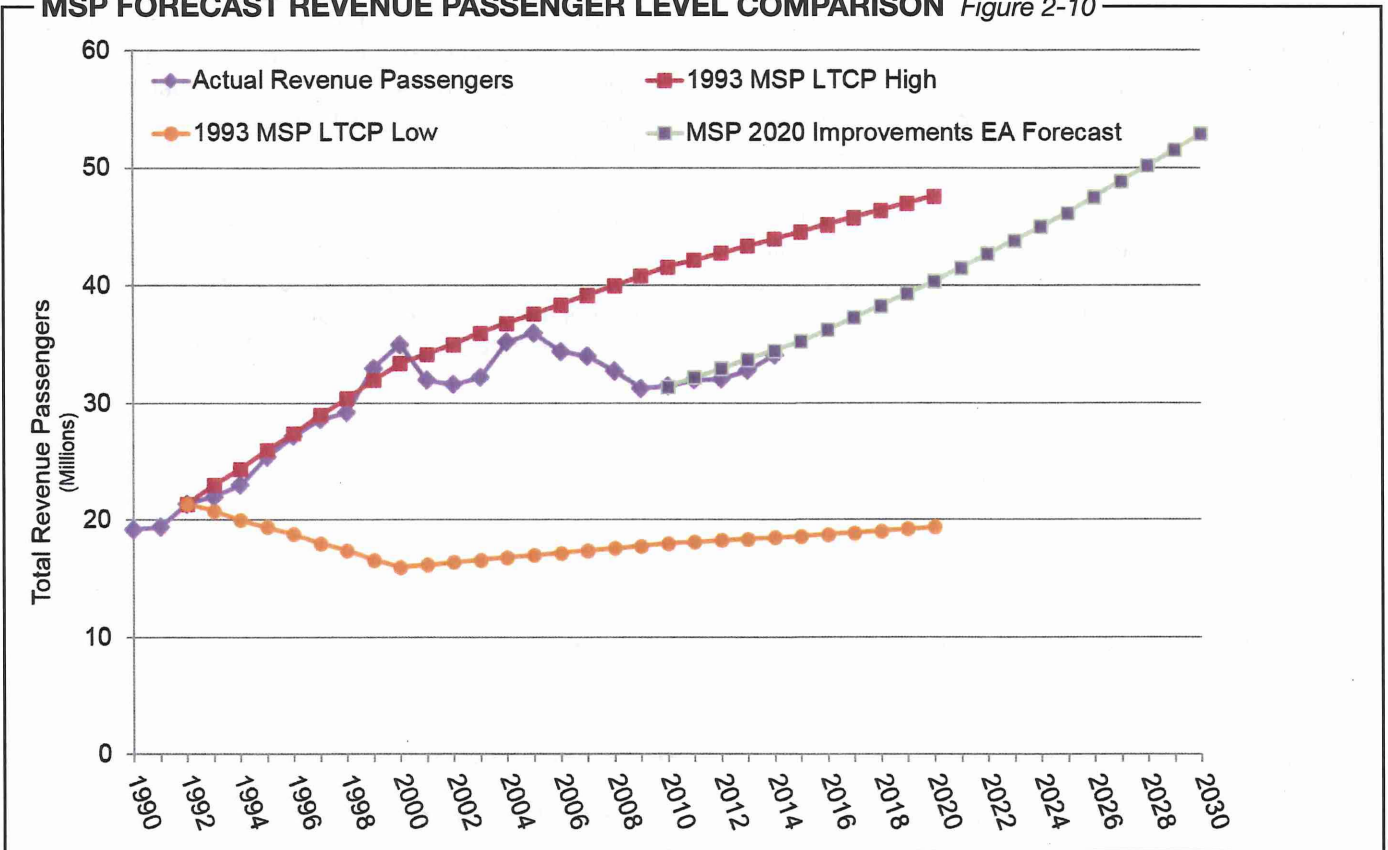
MSP FORECAST OPERATIONS LEVEL COMPARISON *Figure 2-11*

Legend:
- Actual Aircraft Operations
- 1993 MSP LTCP High
- 1993 MSP LTCP Low
- MSP 2020 Improvements EA Forecast

Y-axis: Total Aircraft Operations (Thousands)
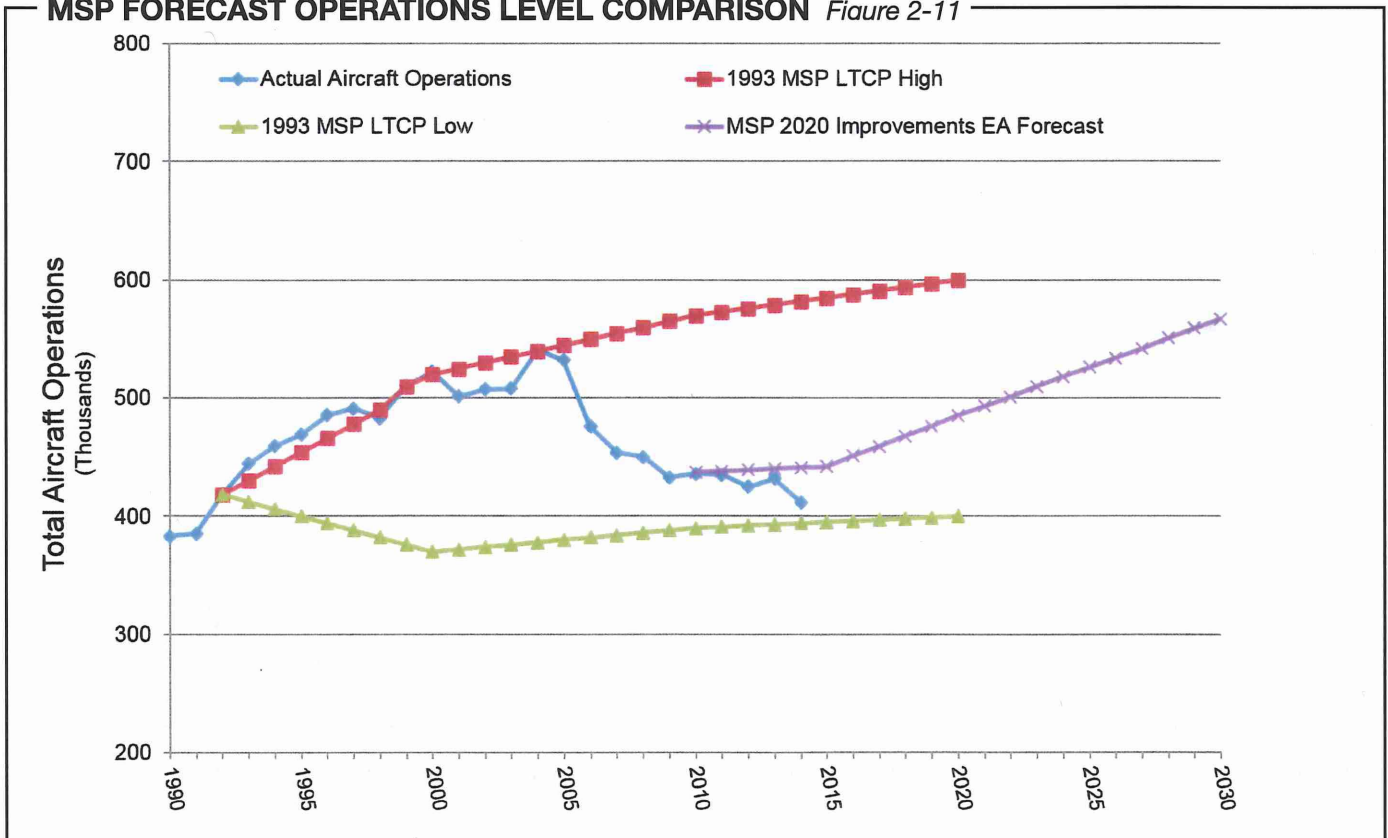
2.5 AIRFIELD CAPACITY AND DELAY

This section describes the airfield capacity at MSP. Aircraft delay analysis is also provided.

2.5.1 Airfield Capacity

Airfield capacity is typically described in terms of hourly capacity and annual capacity under good and poor weather conditions. **Table 2-5** shows existing hourly capacity for MSP in optimum conditions, marginal conditions, and poor weather conditions.

As shown in **Table 2-5**, existing hourly capacity at MSP is about 150 operations in optimum weather conditions and 120 operations in poor weather, when instrument flight rules (IFR) are being used for spacing and aircraft operations through low-level, heavy cloud cover and/or low visibility. Forecasted aircraft operations developed for the MSP 2020 Improvements EA/EAW (see Section 2.4) project total aircraft operations will increase to a level of 526,040 by the year 2025. MSP's current airfield location and configuration is expected to meet projected demand through 2030 with the existing runway capacity.

TABLE 2-5
EXISTING MSP AIRFIELD CAPACITY

Hourly Airfield Capacity	Operations per hour
Optimum Rate [1]	150
Marginal Rate [2]	142
IFR Rate [3]	120

Source: Federal Aviation Administration (FAA) Air Traffic Control Tower Analysis

[1] Cloud ceiling and visibility above minima for visual approaches.
[2] Below visual approach minima but better than instrument conditions.
[3] Instrument conditions (cloud ceiling less than 1,000 feet or visibility less than 3 miles).

2.5.2 Airfield Delay

Delay can be measured in several ways. This section reviews various delay measures as they are reported by the FAA and apply to MSP.

Number of Delayed Flights as Reported by the FAA

The FAA Air Traffic Operations Network (OPSNET) database counts flights that were reported by Air Traffic Control (ATC) to be delayed for more than 15 minutes. Delays of fewer than 15 minutes are not counted, nor are delays not initiated by ATC. In addition, since delays are reported by each airport facility, a flight that was delayed by 13 minutes at one airport facility and 12 minutes by another airport facility (for a total delay of 25 minutes) was not included in the OPSNET database prior to October 1, 2008. These data limitations should be kept in mind when reviewing OPSNET delay data.

In 2008, the FAA made significant modifications to its reporting rules that affect historical data comparisons. The FAA now combines arrival and enroute delays into one category, and now reports delays for aircraft that accumulate 15 minutes or more holding delay at each facility throughout the entire route of flight.

Figure 2-12 below depicts the number of MSP flights delayed by ATC. In 2007, the closure of Runway 12R-30L for two months due to reconstruction contributed to the highest level of reported delays during the past 10 years. The second highest level of recorded delayed flights occurred in 2009 with the closure of Runway 12L-30R for two months while it was being reconstructed. There were 1,625 delayed flights in 2014, which is approximately 48 percent greater than the level of delayed flights in 2013. The increase in 2014 is largely attributed to storm events that occurred in January, June, and November.
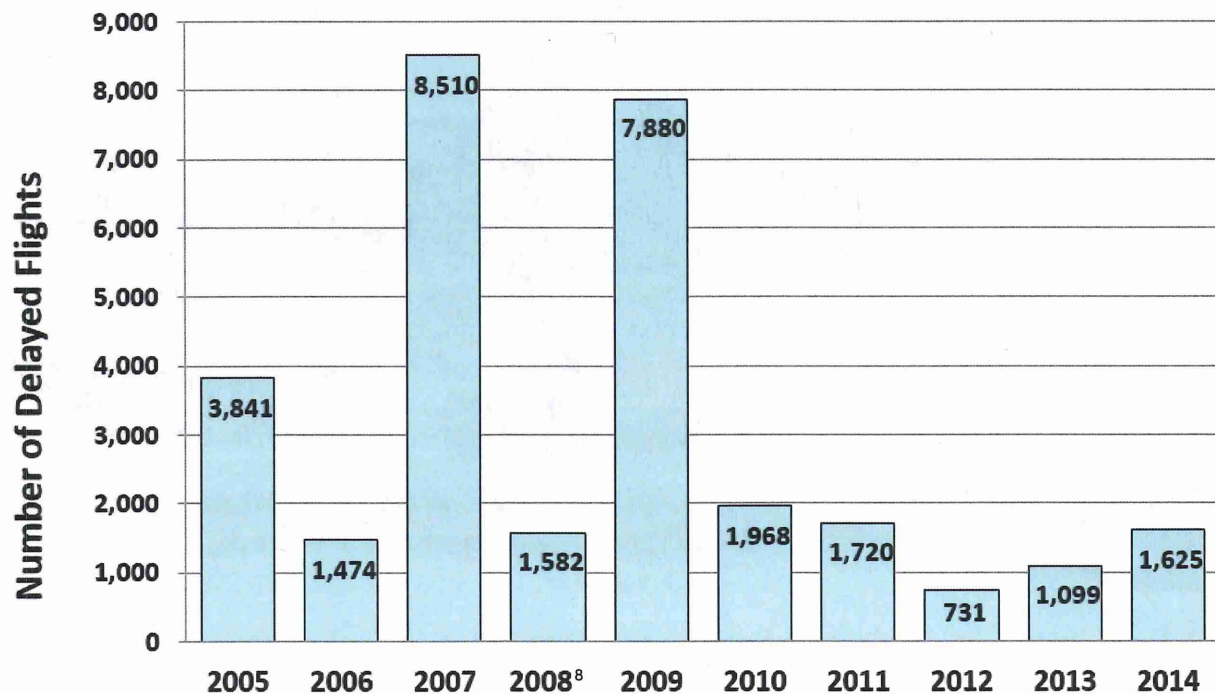
Percentage of Flights Arriving On-time

The data series used to calculate on-time performance for arrivals is the FAA's Aviation System Performance Metrics (ASPM) database. Within this data set, aircraft must be airborne enroute to their scheduled destination in order for them to be considered delayed; therefore, canceled and/or diverted flights are not considered late in this system. Scheduled flight times typically include some cushion for delay, especially for arrivals operating during peak periods. Factors that can cause a flight to be delayed may be related to mechanical problems, lack of crew, weather or airfield capacity constraints.

Figure 2-13 shows average on-time gate arrival performance for domestic air carrier flights at MSP. Data used to calculate delay are extracted from the FAA ASPM database. The top graph compares MSP's moving 12-month average for on-time performance with the national average. The bottom graph provides a comparison of monthly on-time gate arrivals and percent of good weather.
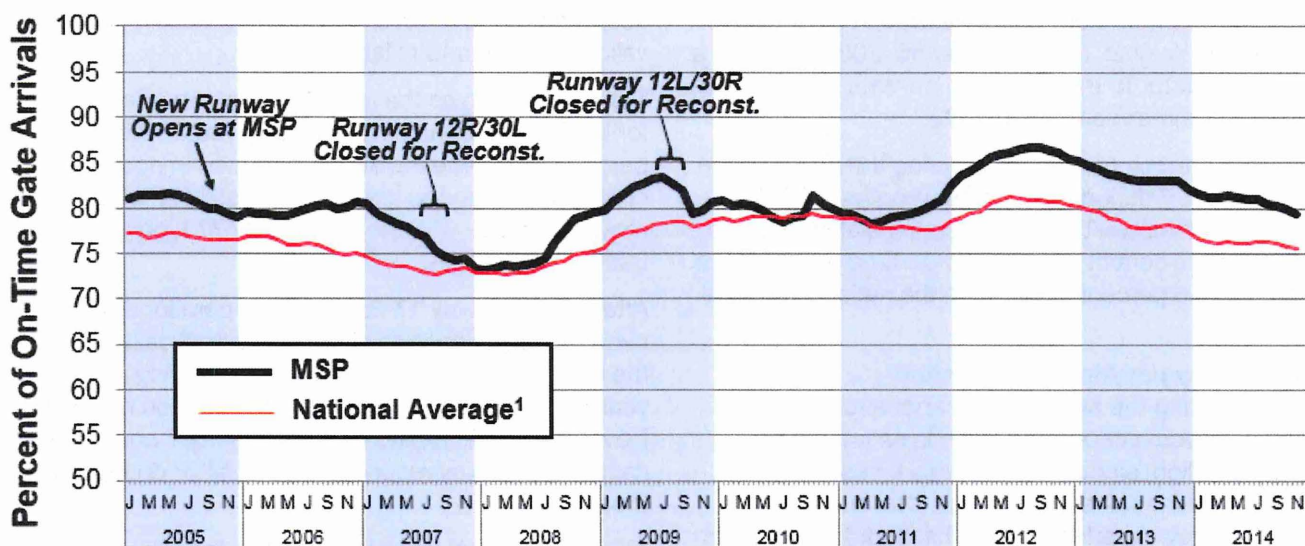
[8] The total is reported differently in 2008 due to FAA adjusting the way air traffic control calculates delays for arriving and departing flights.

MSP FLIGHTS DELAYED BY AIR TRAFFIC CONTROL 2005-2014 *Figure 2-12*

ON-TIME GATE ARRIVALS, MSP VS. NATIONAL AVERAGE[1] *(12-MONTH MOVING AVERAGE)*

Figure 2-13

Chart title: Percent of On-Time Gate Arrivals (y-axis, 50 to 100), years 2005–2014 (x-axis)

Annotations: New Runway Opens at MSP; Runway 12R/30L Closed for Reconst.; Runway 12L/30R Closed for Reconst.

Legend:
— MSP
— National Average[1]

COMPARISON OF MSP MONTHLY ON-TIME GATE ARRIVALS[2] AND PERCENT OF GOOD WEATHER[3]

Chart: Percent of On-Time Gate Arrivals (y-axis, 30 to 100), years 2005–2014 (x-axis)

Annotations: New Runway Opens at MSP; Runway 12R/30L Closed for Reconst.; Runway 12L/30R Closed for Reconst.

Legend:
— MSP On-Time Arrivals
— Pct. Good Weather[3]
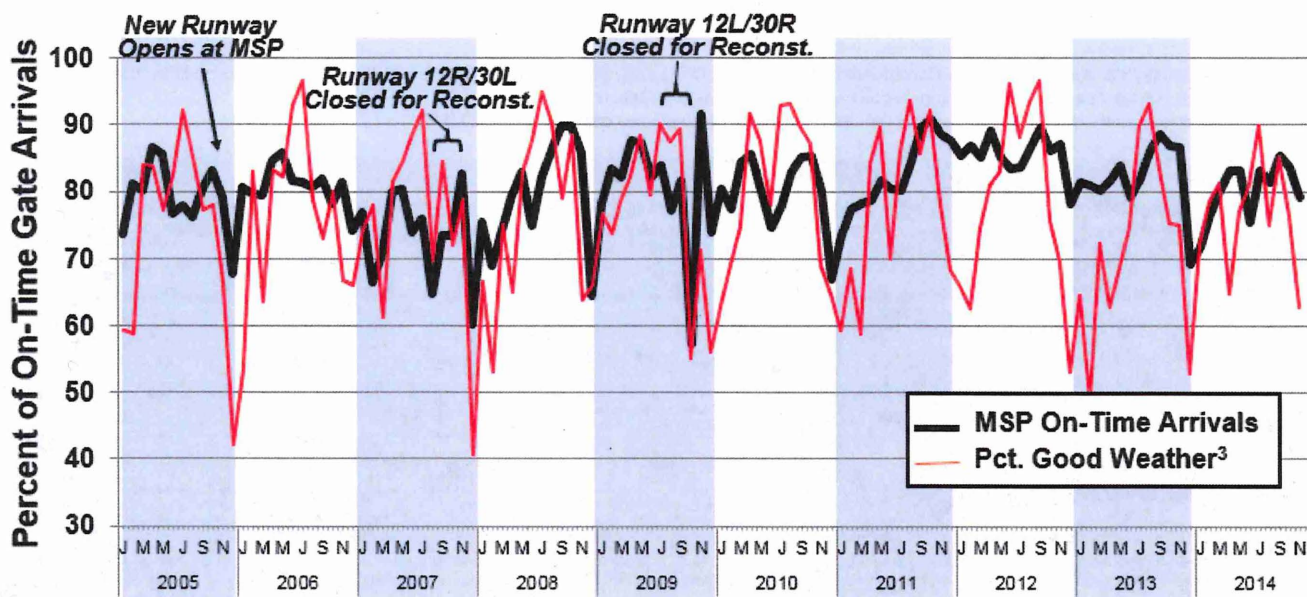
[1] National average consists of the top 77 airports.
[2] Percentage of flights arriving within 15 minutes of scheduled arrival time.
[3] Good weather is defined as when conditions may allow visual approaches; actual separation standards used at time of observation are not available in ASPM database.

Sources: FAA Aviation System Performance Metrics (ASPM) database.

MSP saw its on-time performance decline to a low of 73 percent due to reconstruction of Runway 12R-30L from August 13, 2007 to October 18, 2007 and poor weather at MSP in December 2007. Reconstruction of Runway 12L-30R from August 18 to October 30, 2009 also was a contributing factor to the decline in on-time performance during late summer/early fall in 2009.

The highest on-time performance during the past decade occurred at MSP during the summer months in 2012, the year with the lowest level of operations at MSP since 1993 before the current year. MSP's on-time performance tracked about 6 percent higher than the national average in 2014.

Average Delay per Aircraft Operation

When calculating the average delay per aircraft operation, airport-attributable delay is estimated by comparing a flight's actual air and taxi times with estimated unconstrained times. The total cumulative amount of delay experienced by all scheduled flights in the database is then divided by the total number of flights in the database for the same time period. The output is usually expressed in minutes of delay per operation.

The current industry standard for estimating delay relies on the FAA's Aviation System Performance Metrics (ASPM) data, which provide a comprehensive analysis of airport delay and capacity; the FAA uses ASPM results to create performance benchmarks for airports each year. Since 2005, use of ASPM data has been a well-supported methodology to calculate aircraft delays, accepted by both government and industry, as the most valid, accurate and reliable metric.[9]

Figure 2-14 shows the average delay per operation for MSP and compares it month-by-month with the percentage of time the airport operated in poor weather conditions.[10] The top graph compares MSP's 12-month moving average with the average for 77 high-delay airports tracked by the FAA.

After MSP Runway 17-35 became operational in 2005 average delay began to decrease dramatically from the level of delay experienced at MSP during previous years. Delays reached a low of 3.97 average minutes in November 2012. Delays occurring in 2007 and 2009 were caused by runway reconstruction at MSP during each of those years.

MSP exceeded the national average for delay per operation throughout most of 2013 and 2014, peaking in January 2014 at 5.21 minutes of delay, before declining to below the national average in September 2014.

When compared to other large hub U.S. airports as shown in **Table 2-6** MSP ranked 16th overall in 2014 in terms of highest average minutes of delay per operation.

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[9] Prior to 2005, the industry standard was the FAA's Consolidated Operations and Delay Analysis System (CODAS); the U.S. Department of Transportation (DOT) Airline Service Quality Performance (ASQP) data were used to compare optimal versus actual taxi and flight times for MSP.

[10] Historically, weather and wind - while not the only causes of delay - are some of the primary causes of delay at MSP.

MSP AVERAGE DELAY PER AIRCRAFT OPERATION[1] COMPARED TO NATIONAL AVERAGE[2] (12-MONTH MOVING AVERAGE)

Figure 2-14
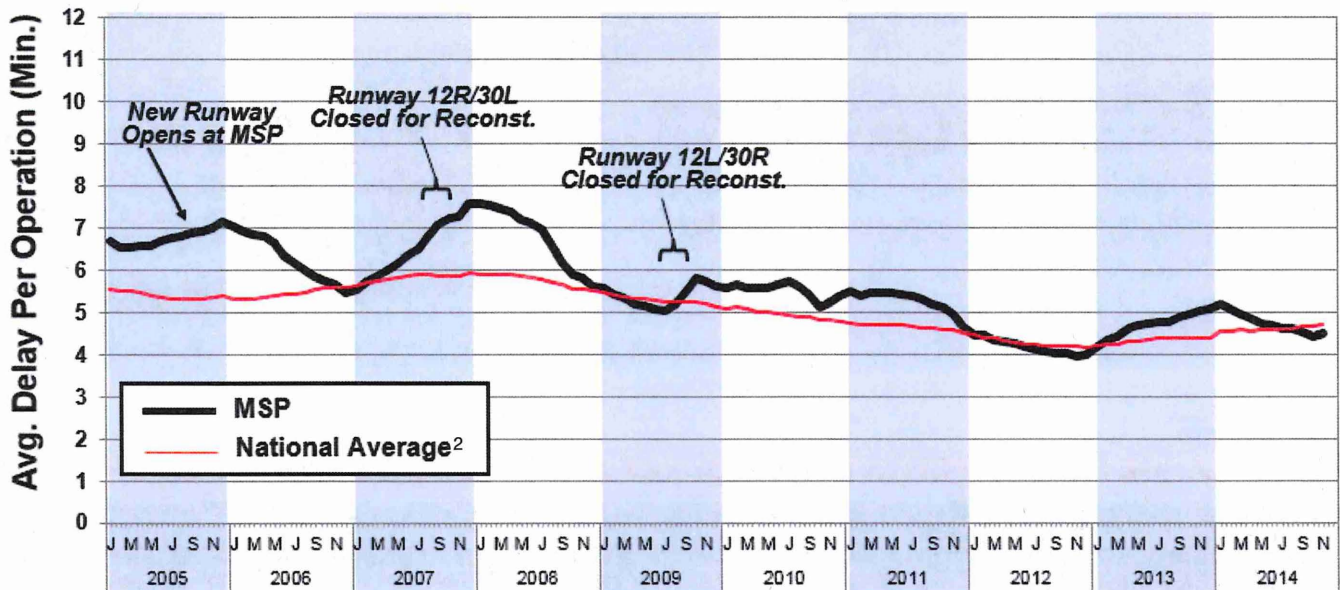
COMPARISON OF MSP AVERAGE DELAY PER AIRCRAFT OPERATION AND PERCENT POOR WEATHER[3]
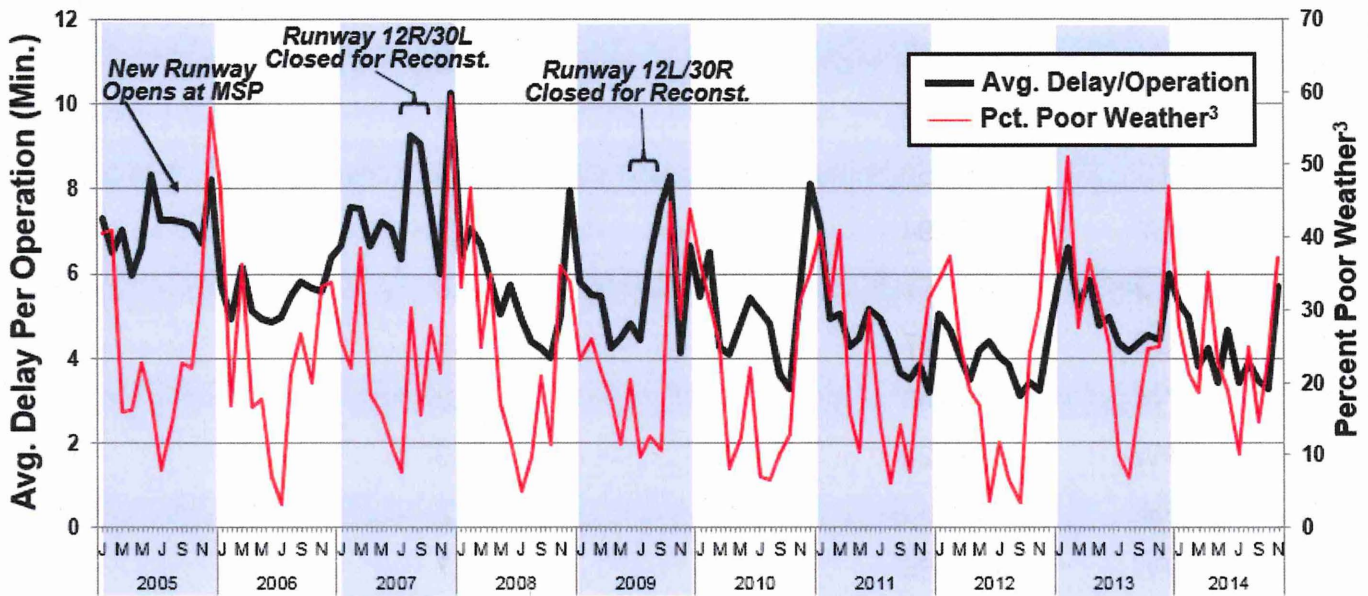
[1] An operation is either a landing or a takeoff.

[2] National average consists of top 77 airports in ASPM database.

[3] Poor weather is defined as when aircraft must make instrument approaches; actual separation standards used at time of observation are not available in ASPM database.

Sources: FAA Aviation System Performance Metrics (ASPM) database.

TABLE 2-6
TOP 16 LARGE HUB AIRPORTS WITH HIGHEST AVERAGE TOTAL DELAY PER OPERATION

Rank	Airport	2014 Total Airport Operations	2014 Average Minutes of Delay per Operation	2013 Average Minutes of Delay per Operation	2013 Rank	Change from 2013 to 2014
1	LGA	370,012	9.4	9.3	1	0.2
2	EWR	402,281	7.7	7.2	3	0.4
3	JFK	431,236	7.7	7.6	2	0.1
4	PHL	419,253	6.5	6.2	4	0.3
5	ORD	881,933	6.0	5.7	5	0.3
6	ATL	868,359	5.8	5.3	8	0.5
7	CLT	545,294	5.4	5.7	7	-0.3
8	SFO	431,966	5.3	4.6	13	0.6
9	BOS	368,307	5.2	5.1	9	0.1
10	LAX	636,706	5.2	4.8	12	0.3
11	DFW	679,820	4.9	4.9	11	-0.1
12	IAH	508,940	4.7	4.2	19	0.5
13	DTW	392,635	4.7	5.7	6	-1.0
14	DCA	287,422	4.6	4.6	14	0.0
15	PHX	430,461	4.6	4.4	16	0.2
16	MSP	411,760	4.5	5.1	10	-0.5

Source: FAA OPSNET for airport operations data, FAA Aviation Performance Metrics for average minutes of delay per operation (taxi-in, taxi-out, and airborne delay).

2.6 TECHNOLOGICAL AND CAPACITY ENHANCEMENTS

The FAA continuously explores potential capacity-enhancing development/technology in an effort to increase airport efficiency and reduce delay. When advances are identified, efforts are made to implement the technology at the busiest airports. This section describes these efforts as they apply to MSP.

- Installation of Airport Surface Detection Equipment/ Model X (ASDE-X) at MSP was completed in 2009, which provides seamless coverage for complete aircraft identification information, and allows for future implementation and upgrade to Next Generation (NextGen) navigation technology (Automatic Dependence Surveillance – Broadcast, "ADS-B"). Use of ADS-B, which uses GPS to determine a precise location and on-board equipment to transmit aircraft information, is anticipated at MSP by 2020.

- Federal policy requires aircraft operating in capacity-constrained airspace, at capacity-constrained airports or in any other airspace deemed appropriate by the FAA, to be equipped with Automatic Dependent Surveillance-Broadcast/Cockpit Display of Traffic Information (ADS-B/CDTI) technology by 2020. ADS-B identifies the location of other aircraft and displays their position in the cockpit. Aircraft operating at MSP and equipped with this technology use it to maintain safe operating separation more precisely. The ADS-B system requires equipment to be installed in aircraft to facilitate the transfer of air traffic information from ground-based sensors at MSP to aircraft going to or from MSP runways. The ground-based sensors and equipment were installed at MSP in September 2010.

- Installation of a Runway Status Light System (RWSL) was completed at MSP in 2013 and commissioned in 2014. This technology is intended to prevent inadvertent runway crossing with indicators at the runway hold-short demarcation. Indicators will flash to alert pilots and surface vehicle operators of the presence of an aircraft or vehicle using the runway.

2.6.1 FAA Area Navigation (RNAV) Procedure Implementation at MSP

In 2014 the FAA continued to focus efforts on implementing available advanced aircraft navigation technology at MSP in the form of airspace-wide Performance Based Navigation (PBN)/Area Navigation (RNAV). The following provides a chronology of the public discussions related to the FAA's RNAV implementation efforts at MSP.

In August 2012 the FAA finalized the package of draft RNAV departure and arrival procedure tracks. At the September 19, 2012 MSP Noise Oversight Committee (NOC) meeting the FAA presented the procedures, highlighting the considerations given to NOC procedure noise design criteria. Additionally, the FAA requested an accelerated process that would provide the MAC's support for the procedures by the end of November 2012. By a unanimous vote, the NOC directed MAC staff to move forward with a public information program, including two public open houses to be conducted in early- to mid-November 2012.

NOC-sponsored PBN/RNAV informational open houses were held on November 8, 2012 in Minneapolis and November 13, 2012 in Eagan. Information about the procedures and open houses was published on the MAC's Noise Program Office website and given coverage by local print and television news media. The FAA and MAC staff conducted briefings with several communities as requested, including the city councils of Richfield, Eagan and Mendota Heights; with Minneapolis policy makers; with Apple Valley and Burnsville city staffs; with participants at the fourth quarter 2012 NOC Public Input Meeting; and with multiple individual residents.

Depending on where people lived, feedback on the proposed RNAV procedures ranged from positive to very concerned. The predominant concern was with the concentration of departures over certain residential areas. The FAA's implementation of the procedures was placed on the November 19, 2012 MAC Board of Commissioners meeting agenda in an attempt to meet the FAA's deadline for MAC support by the end of November 2012.

Prior to the November 19 Commission meeting, a large volume of communication was received from residents and elected officials expressing concern about concentrating departure flights over certain residential areas in South Minneapolis and Edina, the speed of the process and other matters.

Based on that input, the MAC Board of Commissioners took action during its meeting on November 19, 2012 to support only partial implementation of the FAA's proposed procedures, withholding support for the departure procedures proposed for Runways 30L and 30R, which would direct departure operations over areas of South Minneapolis, Richfield and Edina. As a result, the FAA indicated it would need to study the safety implications of partially implementing the federal RNAV plan for the airport.

On February 19, 2014, the results of the FAA's safety risk management evaluation concluded partial implementation of RNAV departures introduces unsafe risk factors. Specifically, moving forward with implementation of RNAV departure procedures for

Runways 12L, 12R and 17 without implementation of RNAV departure procedures on Runways 30L and 30R was determined unsafe.

Therefore, the FAA will not be moving forward with the implementation of RNAV departure procedures at MSP at this time. However, the FAA will move forward with the approved RNAV arrival procedures incorporating Optimized Profile Descents (OPD) to the runways at MSP.

In response to the FAA's safety analysis findings, on March 6, 2014 the NOC passed Resolution 01-2014 regarding future RNAV standard departure procedure design and implementation efforts at MSP. On March 17, 2014 the MAC Board of Commissioners took unanimous action supporting NOC Resolution 01-2014 and forwarded it to the FAA. Given the contentious nature of the discussions leading up to this action, and the varying degree of stakeholder perspectives and positions on the issue, the NOC's PBN/RNAV Resolution ranks among one of the most significant accomplishments by the Committee in its existence. This accomplishment provides a position, supported by all stakeholders, detailing local expectations for the FAA in its future PBN/RNAV design and implementation efforts at MSP, while also providing a unanimous position by all stakeholders supporting the implementation of RNAV arrivals at MSP. This was accomplished in a manner informed by past experiences and provides reassurance to stakeholders that circumstances like those currently unfolding at Phoenix Sky Harbor International Airport will not occur at MSP in the future.

Since 2007, the NOC has been actively engaged, in a leadership role, in evaluating and advancing the use of aircraft navigation technology at MSP to reduce noise impacts. As a result of these efforts, in March 2015 RNAV arrivals incorporating OPD operations will begin at MSP. Required Navigation Performance arrival procedures with OPD are planned for implementation in April 2015.

2.6.2 Ongoing Precision Instrument Approach Capabilities

In addition to runway separation and configuration, airfield capacity can be affected greatly by how the runways are equipped for inclement weather. A number of precision instrument approaches continue to be available at MSP as summarized in **Table 2-7**.

(2.7) MSP LONG TERM COMPREHENSIVE PLANNING AND MSP 2020 IMPROVEMENTS

Periodic planning assessments are conducted by the MAC for MSP airfield, landside, and roadway facilities in the form of a Long Term Comprehensive Plan (LTCP). The most recent MSP LTCP was completed and approved by the MAC's Board of Commissioners in July 2010.

Preparation of the 2035 LTCP is ongoing and anticipated to be complete in 2015.

The 2010 LTCP detailed future development activities at MSP and specifically determined that the airfield capacity at MSP is adequate to sustain aircraft operations to the year 2030. The 2010 LTCP analysis concluded that substantial landside and terminal building improvements are needed to achieve the following goals:

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

TABLE 2-7
PRECISION INSTRUMENT APPROACHES

MSP	CAT I	CAT II	CAT III
Runways	30R	30L	12L
			12R
			35

Notes: The term decision height is defined as the height at which a decision must be made during a precision approach to either continue the landing maneuver or execute a missed approach.

Precision approaches are categorized based on decision height and the horizontal visibility that a pilot has along the runway. Visibility values are expressed in statute miles or in terms of runway visual range (RVR) if RVR measuring equipment is installed at an airport.

The different classes of precision instrument approaches are:
i. Category I (CAT I) – provides approaches to a decision height down to 200 feet and a basic visibility of ¾ statute miles or as low as 1,800 feet RVR.

ii. Category II (CAT II) – provides approaches to a decision height down to 100 feet and an RVR down to 1,200 feet.

iii. Category IIIa (CAT IIIa) – provides approaches without a decision height (down to the ground) or a decision height below 100 feet and an RVR down to 700 feet.

iv. Category IIIb (CAT IIIb) – provides approaches without a decision height or a decision height below 50 feet and an RVR down to 150 feet.

v. Category IIIc (CAT IIIc) – provides approaches without a decision height and RVR. This will permit landings in "0/0 conditions," that is, weather conditions with no ceiling and visibility as during periods of heavy fog.

Source: MSP Airfield Operations, FAA

Based on existing conditions and the capacity demands placed on the facility as passenger numbers grow, the 2010 LTCP determined that development activities that

focus on the enhancement of the arrival curb, passenger processing facilities, parking and international arrival facilities at Terminal 1, and gate capacity at Terminal 2 to accommodate existing seasonal demand and new carrier entrants at MSP, would be necessary. In general, the 2010 LTCP also determined that the terminal environment at MSP will need enhancement in the form of gates, ticket counters, passenger check-in areas, security screening checkpoints and baggage claim areas.

Environmental analyses associated with the MSP 2020 Improvements were conducted in compliance with both the National Environmental Policy Act (NEPA) and the Minnesota Environmental Policy Act (MEPA). Guidance was provided by the FAA's policies and procedures for considering environmental impacts: FAA Order 5050.4B, "NEPA Implementing Instructions for Airport Actions" and FAA Order 1050.1E, "Environmental Impacts, Policies and Procedures" and MEPA's Minnesota Environmental Review Program.

Preparation of a federal Environmental Assessment (EA) and state Environmental Assessment Worksheet (EAW) began in September 2010 and was concluded in March 2013 with a Finding of No Significant Impact/Record of Decision (FONSI/ROD) by the FAA and in April 2013 with a Negative Declaration on the need for an Environmental Impact Statement (EIS) by the MAC.

Three development options were evaluated: the No Action Alternative, Alternative 1 - Airlines Remain; and Alternative 2 - Airlines Relocate.

Alternative 2 - Airlines Relocate was the Preferred Alternative that best meets the purpose and need for enhanced airport services and outlines projected improvements needed through 2020, presuming that the non-SkyTeam airlines currently located in Terminal 1 are relocated to Terminal 2. This alternative was conceived in recognition of the fact that MSP's two-terminal system could be utilized more efficiently by relocating all airlines other than Delta and its SkyTeam partners from Terminal 1 to Terminal 2. This would relieve some of the capacity constraints at Terminal 1 while balancing the mix of passengers who are beginning and ending their trips at MSP between the two facilities.

The improvements included in Alternative 2 are listed in **Table 2-8**, and an illustration of the Alternative 2 concept is presented in **Figure 2-15**.

2.7.1 MSP 2035 Long Term Comprehensive Plan
In January 2015, the MAC began work on a 2035 Long Term Comprehensive Plan for MSP. The LTCP will include the following: an inventory of existing landside and airside facilities; base forecast assumptions; forecasts of passenger enplanements and aircraft operations; forecast facility requirements; alternative forecast terminal and airfield projects; environmental considerations including 2014 base-case and 2035 forecasted aircraft noise contour maps; land use compatibility; and facility implementation and cost estimates.

MSP 2020 IMPROVEMENTS EA/EAW ALTERNATIVE 2-AIRLINES RELOCATE *Figure 2-15*
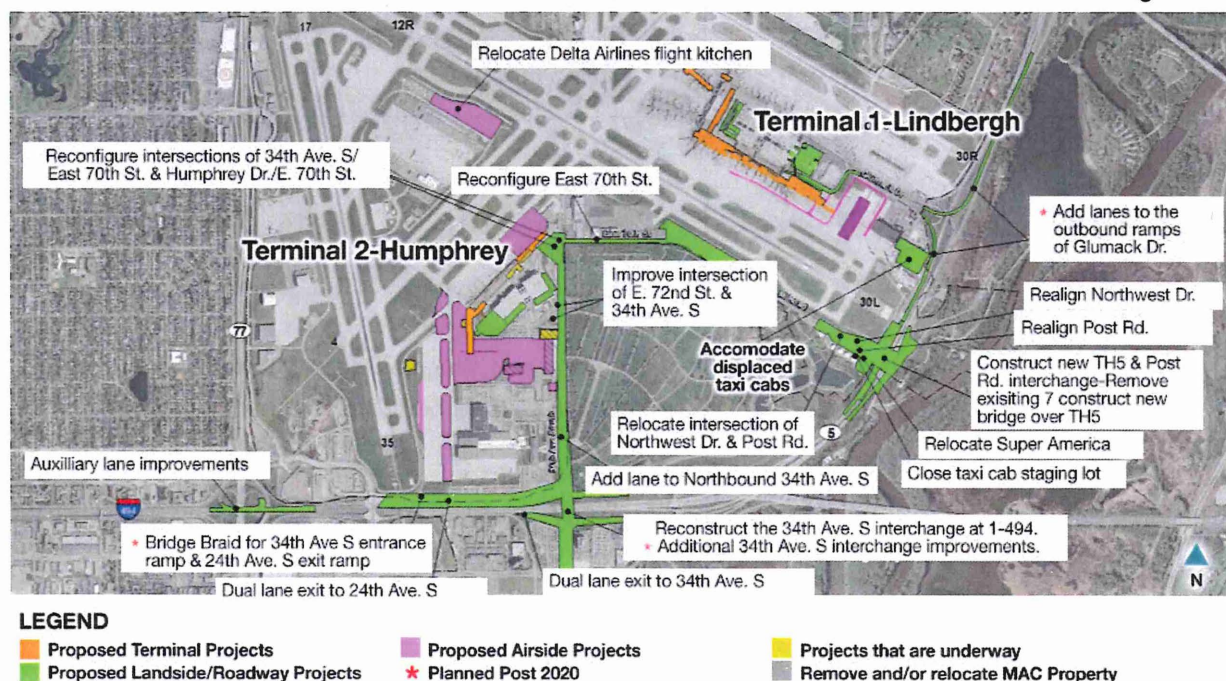
TABLE 2-8
ALTERNATIVE 2-AIRLINES RELOCATE

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
 • Expand terminal arrivals curb and relocate commercial Ground Transportation Center
 • Construct a new parking ramp
    - Relocate portions of Glumack Drive
    - Extend underground hub tram tunnel
	Landside / Roadway
	 • 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 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

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 Ground Service Equipment facility

Source: MSP 2020 Improvements EA/EAW

2.8 AIRCRAFT NOISE MITIGATION PROGRAM DEVELOPMENT

The issue of noise at MSP includes a long history of local efforts to quantify and mitigate noise impacts in a manner responsive to concerns raised by the communities around the airport and consistent with federal policy. In 1992, the Metropolitan Airports Commission (MAC) embarked on a 14 CFR Part 150 Program at MSP, which included a noise mitigation program for single-family and multi-family residences and schools, as well as property acquisition and relocation based on mitigation eligibility defined by the 1996 forecast 65 Day-Night Average Sound Level (DNL) noise contour. When the original Part 150 Program was completed in 2006, noise mitigation had been provided to over 7,800 single-family homes, 1,327 multi-family units, 18 schools and 437 residential properties were acquired around MSP at a cost of approximately $385.6 million.

In 1999 the MAC began an update to the Part 150 Program at MSP. The resulting program used 2007 forecast operations to produce a 2007 forecast noise contour (a 2005 forecast noise contour was also developed as part of this process but was ultimately not used due to the length of the planning process and associated changes in forecasting variables). One of the largest discussion items in the Part 150 Update process focused on the mitigation program the MAC would offer in the 2007 64 to 60 DNL noise contour area. Expansion of noise mitigation efforts beyond the federally-recognized level of 65 DNL was outlined as part of the Dual-Track Airport Planning Process. Through the Part 150 Update, the MAC detailed a specific mitigation package to be offered in the 64 to 60 DNL noise contour area, proposing central air-conditioning to single-family homes that did not have it, with a homeowner co-pay based on the degree of noise impact.

Airport Noise Litigation and the Consent Decree
The cities located around MSP expressed dissatisfaction with the Part 150 Update 64 to 60 DNL noise mitigation proposal in the context of the Dual-Track Airport Planning Process discussions. In early 2005, the Cities of Minneapolis, Eagan, and Richfield and the Minneapolis Public Housing Authority filed suit in Hennepin County District Court against the MAC on the grounds that the MAC violated environmental quality standards and the Minnesota Environmental Rights Act by failing to provide a 5-decibel noise reduction package (as was provided in the 1996 65 DNL noise contour) 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.

In 2007, the MAC and the Cities of Minneapolis, Eagan, and Richfield and the Minneapolis Public Housing Authority entered into a Consent Decree that settled the cities and class action litigation. The 2007 Consent Decree provided the 5-decibel noise mitigation package to single-family homes in the 2007 forecast 63+ DNL noise contours and lesser noise mitigation package options to single family-homes located in the 2007 forecast 62 to 60 DNL noise contours, with a noise mitigation reimbursement option for single-family homes located between the forecast 2007 and 2005 60 DNL noise contours. Multi-family structures were offered a uniform package in the 2007 forecast 60+ DNL noise contours.

All phases of the 2007 Consent Decree noise mitigation program have been completed at a cost of approximately $95 million. Completion of the 2007 Consent Decree increased the total number of single-family homes that have received noise mitigation around MSP to over 15,000, and multi-family units to 3,303. The total cost of the MAC's noise mitigation programs to date is over $480 million.

MSP 2020 Improvements EA/EAW
In January 2013, the MAC published the Final MSP 2020 Improvements Environmental Assessment/Environmental Assessment Worksheet (EA/EAW), which reviewed the potential and cumulative environmental impacts of MSP terminal and landside developments needed through the year 2020. A new noise mitigation plan was proposed in the EA/EAW leading to an amendment to the 2007 Consent Decree.

First Amendment to the 2007 Consent Decree
The First Amendment to the 2007 Consent Decree establishes noise mitigation eligibility based on actual noise contours that the MAC prepares for MSP on an annual basis. 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 eligibility area when compared to its status relative to the 2007 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 is based on the block intersect methodology. Homes will be mitigated in the year following their eligibility determination. The First Amendment mitigation program eligibility assessment began with the 2013 actual noise contour. In 2014, an additional chapter was added to the 2013 Annual Noise Contour Analysis to assess the mitigation area and eligibility per the amended

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[11] The federally-established threshold for mitigating aircraft noise impacts is 65 dB DNL according to 14 CFR Part 150.

2007 Consent Decree. The 2014 Annual Noise Contour Analysis marks the second consecutive year of noise mitigation eligibility analysis under the terms of the First Amendment to the 2007 Consent Decree in the context of the 2014 actual noise contour.

Noise Mitigation Eligibility Status under the First Amendment to the 2007 Consent Decree

Based on the 411,760 total operations at MSP in 2014, the actual 60 DNL contour is approximately 44.2 percent smaller than the 2007 forecast contour and the 65 DNL contour is approximately 51.9 percent smaller than the 2007 forecast contour. The predominant contraction in the contours from the 2007 forecast to the 2014 actual noise contour scenario is driven largely by fleet mix changes, including a 99.9 percent reduction in Modified – "Hushkit" – Stage 3 aircraft operations and a 29.3 percent reduction in total aircraft operations. However, there is a small area in South Minneapolis where the 2014 actual noise contours extend beyond the 2007 forecast noise contours establishing first, and in some cases second consecutive, year impacts in certain residential areas above their noise mitigation eligibility impact levels under the terms of the 2007 Consent Decree. This small expansion of noise impacts can largely be attributed to nighttime runway use variances between what was forecasted for 2007 and what actually occurred in 2014, particularly an increase of the nighttime arrival operations on Runway 12R. This same trend existed in 2013, although to a lesser degree.

In the second year of actual noise contour mapping, as established by the terms of the First Amendment to the 2007 Consent Decree, there are a total of 285 single-family homes that meet the first-year eligibility criteria of the three consecutive year higher noise impact mitigation eligibility requirement. Of the 285 single-family homes, 39 were previously eligible for the homeowner reimbursement noise mitigation program (located between the 2007 and 2005 forecast 60 DNL contours) and another 126 homes were outside the program, under the terms of the 2007 Consent Decree. These homes are now within the 2014 actual 60-62 DNL noise contour. If these homes remain within the actual 60-62 DNL noise contour for three consecutive years, they will be eligible for one of two mitigation options, as detailed in Section 9.5(b) of the First Amendment to the 2007 Consent Decree. Additionally, there are 120 single-family homes previously in the 60-62 DNL contour under the terms of the 2007 Consent Decree that meet the first year eligibility criteria of the three consecutive year higher noise impact mitigation eligibility requirement within the 63 DNL contour. If these homes remain within the actual 63+ DNL noise contour for three consecutive years, they will be eligible for mitigation upgrades necessary to achieve the 5-decibel noise reduction package.

All single-family and multi-family units that met the first year of the three consecutive year higher noise impact mitigation eligibility requirement by virtue of the 2013 actual noise contour achieve a second year of consecutive increased noise impact with the 2014 actual noise contour. There are a total of 137 single-family homes and 89 multi-family units that meet the second consecutive year of higher noise impact. Of the 137 single-family homes, 119 homes were previously eligible for the homeowner reimbursement noise mitigation program (located between the 2007 and 2005 forecast 60 DNL contours) and another 18 homes were previously outside the program and are now within the 2014 60-62 DNL noise contour. If these single-family homes remain within the 60-62 DNL actual noise contour for another year, they will be eligible for one of two mitigation options, as detailed in Section 9.5(b) of the First Amendment to the 2007 Consent Decree. Additionally, there are 89 multi-family units which were not included in the 2007 Consent Decree noise mitigation program that are located within the 2014 actual 60-64 DNL contours establishing their second consecutive year at a higher noise impact mitigation eligibility level. If these multi-family units remain within the actual 60-64 DNL noise contour for one more year, they will be eligible for the Multi-Family Home Mitigation Package as defined in Section 9.6 of the First Amendment to the Consent Decree.

The Annual Noise Contour Analysis Reports may be found at: www.macnoise.com/tools-reports/annual-reports.

Homeowners are able to establish their home's location within the first-year and second-year eligibility map by reviewing the 2014 Annual Noise Contour Analysis report or contacting the MAC's Noise Program Office at 612-726-9411.

2.9 2014 ENVIRONMENTAL ACCOMPLISHMENTS

The MAC is a leader in responding proactively to environmental concerns across a wide spectrum, ranging from a standard-setting noise program to the preservation of Minnesota's natural resources. These ongoing efforts have grown from the organization's commitment to the community and the environment through responsiveness to environmental concerns, leadership in environmental management, and promotion of open and honest communication with stakeholders.

In 2013, the MAC's stewardship commitment was reinforced through increased internal alignment around the organization's growing commitment to reducing its impacts on the environment. This discussion was grounded in a focus on the impacts the organization's and/or individuals' activities have on natural resources and the environment, and the associated need to continue to seek opportunities to implement measures that reduce pollution and resource consumption and waste, while raising awareness of the importance of sustainable practices.

The above acted as an important consideration in ongoing, and new, environmental activities in 2014 and the organization-wide involvement and support for the development of a formal and comprehensive sustainability program at the MAC. The 2014 environmental activities and the associated accomplishments were advanced in keeping with the MACs environmental stewardship commitment, and its growing appetite for infusing sustainability into all facets of the enterprise. As detailed below (See Appendix A for greater detail), the activities and associated accomplishments are grouped into six categories: energy use and emissions reduction; recycling, organics composting and waste reduction; water quality and conservation; noise; environmental program management systems; and sustainability program development.

Energy Use and Emissions Reduction Efforts

- The Energy Conservation Program was continued in 2014 and additional energy-saving equipment updates and projects were implemented.
- Construction of a 3-megawatt solar energy facility began in 2014 atop the Blue and Red Parking Ramps at Terminal 1-Lindbergh.
- The MAC continued its efforts to reduce the use of petroleum-based fuels through its continued focus on the use of E85.
- A new electric Ground Service Equipment (GSE) charging station was installed in 2014 at Terminal 1-Lindbergh, providing eight charging ports.

- In 2014, the MAC completed its sixth voluntary Minneapolis-St. Paul International Airport (MSP) Greenhouse Gas (GHG) Inventory and Initiatives Report since 2007.
- As a result of significant local efforts (NOC Resolution 01-2014), in 2014 airport and community stakeholders endorsed the FAA's implementation of RNAV/RNP Standard Terminal Arrival Routes incorporating Optimized Profile Descent (OPD) at MSP.
- The MAC contributed to industry efforts in 2014 targeting emissions reductions through participation in Airport Cooperative Research Program (ACRP) efforts to evaluate alternative aircraft-taxi systems.

Recycling, Organics Composting and Waste Reduction

- The MAC continued its robust recycling program in 2014 and laid the foundation for expansion of its Organics Composting Program to Terminal 2-Humphery, which occurred in January 2015.
- The MAC was recognized in 2014 by external stakeholders for its organics composting program and its hazardous waste management activities.
- In 2014, the MAC installed two water bottle filling stations, one in Terminal 1-Lindbergh and one in Terminal 2-Humphery, increasing the total number of water bottle filling stations on the MSP campus to 10.

Water Quality and Conservation

- The MAC strengthened the operation of its stormwater monitoring and management program in 2014 with continued and enhanced coordination with National Pollutant Discharge Elimination System (NPDES) permit co-permittees.
- A green roof design for the Terminal 2-Humphrey gate expansion was completed in 2014.
- A new parking ramp cleaning process was implemented in 2014, significantly reducing the water used in the cleaning process.

- The MAC contributed to industry efforts in 2014 targeting water quality through leadership roles on the Airport Council International – North America (ACI-NA) Environmental Affairs Committee and through participation, as a case study airport, in an ACRP project targeting the development of resources to assist airports with water conservation activities.

Noise

- The MSP Annual Noise Contour Analysis was revised in 2014, implementing the noise mitigation eligibility provisions of the First Amendment to the 2007 Consent Decree.
- In 2014, Noise Oversight Committee (NOC) Resolution 01-2014 "Regarding Future FAA Performance-Based Navigation (PBN)/Area Navigation (RNAV) Standard Departure Procedure Design and Implementation Efforts at Minneapolis-St. Paul International Airport (MSP)" was passed by the NOC and endorsed by the MAC Full Commission.
- The Edina and St. Louis Park Noise Monitoring Study was completed in 2014 in consultation with residents, community leaders and state lawmakers.
- The FAA's use of the Runway Use System (RUS) at MSP was analyzed in 2014 and collaborative efforts on behalf of all stakeholders resulted in an effort to address community concerns.
- The MAC contributed to industry efforts in 2014 targeting the FAA's implementation of NextGen through participation in ACRP projects to determine the airport's role in PBN implementation and develop NextGen resource materials for airports executives, airport practitioners and the general public.

2.10 MAC SUSTAINABILITY PROGRAM

In early 2013 the MAC began the process of developing a scope and plan for a comprehensive Sustainability Management Plan (SMP), including an evaluation of the resources required to complete the planning process. To secure the needed resources for this project, a Letter of Interest (LOI) was submitted to the FAA for Airport Improvement Program (AIP) funding through the FAA's emerging Sustainable Master/Management Planning Program. The MAC received an FAA grant to help fund the project.

The SMP planning process began in April 2014 and is anticipated to be complete by 2016.

In addition, the MAC hired its first Sustainability Manager in 2014. This new management position oversees and develops ongoing sustainability program implementation and improvement across the organization, which includes: building a foundation for the formal integration of sustainability into the MAC's organizational culture; providing a coordinated and accountable approach to establishing metrics, goals and strategies; and assessing improvement frameworks that address long-term social, environmental and economic needs.

More detail about the MAC's sustainability efforts is included in Appendix A: 2014 Environmental Accomplishments.

3. RELIEVER AIRPORTS

3.1 OVERVIEW

The Metropolitan Airports Commission (MAC) owns and operates six reliever airports throughout the metropolitan area that surrounds Minneapolis-St. Paul International Airport (MSP). Reliever airports are defined by the Federal Aviation Administration (FAA) as airports designated to relieve congestion at commercial service airports and to provide improved general aviation access to the overall community. This system of airports generates an estimated $1.4 billion annually for the Twin Cities economy while reducing general aviation operations at MSP.[12] The reliever airports are Airlake, Anoka County-Blaine, Crystal, Flying Cloud, Lake Elmo and St. Paul Downtown.

3.2 RELIEVER AIRPORT FACILITIES

According to the Metropolitan Council 2040 Transportation Policy Plan, adopted January 14, 2015, all but one of the MAC reliever airports are classified as minor airports. This means that primary runway lengths are between 2,500 and 5,000 feet. St. Paul Downtown is classified as an intermediate airport with a primary runway between 5,000 and 8,000 feet long.

Airport users at the MAC reliever airports include air taxi, business aviation, general aviation, flight training, recreational aviation and military aviation. Each of the reliever airports is open for public use 24 hours per day, in keeping with federal regulations. The following sections outline the existing airport facilities at each location.

3.2.1 Airlake Airport (LVN)

Airlake Airport (LVN) consists of approximately 595 acres, and the airfield includes one northwest-southeast runway and one full-length parallel taxiway. Runway 12-30 is 4,098 feet long by 75 feet wide. The airport has a precision instrument approach to Runway 30 and a non-precision approach to Runway 12. **Figure 3-1** shows the general airport layout and facilities. One Fixed Base Operator (FBO) at the airport provides fueling and aircraft maintenance services. The airport had 129 based aircraft in 2014; an estimated level of 33,178 aircraft operations occurred at LVN in 2014, up 5.8 percent from the operations level in 2013. There is no Air Traffic Control Tower located at the airport. Aircraft operators utilize common traffic advisory procedures while flying to and from the airport.

Airlake Airport (LVN) Figure 3-1

[12] Metropolitan Airports Commission, Economic Impact Analysis of the Reliever Airport System, Wilder Research, October 2005

Anoka County-Blaine Airport (ANE)
Figure 3-2

3.2.2 Anoka County-Blaine Airport (ANE)

Anoka County-Blaine Airport (ANE), also known as Janes Field, consists of approximately 1,900 acres, and the airfield includes one east-west runway and one north-south runway. Both runways have full-length parallel taxiways. Runway 9-27 is 5,000 feet long by 100 feet wide and Runway 18-36 is 4,855 feet long by 100 feet wide. The airport has a precision instrument approach to Runway 27 and non-precision instrument approaches to Runways 9, 18 and 27. **Figure 3-2** shows the general airport layout and facilities. Two FBOs at the airport provide fueling, flight training and aircraft maintenance services for aircraft and helicopters. The airport had 403 based aircraft in 2014; 68,157 aircraft operations occurred at ANE in 2014, down 11.2 percent from the operations level in 2013.[13] A non-federal Air Traffic Control Tower is located at the airport and operates each day in the winter from 7 am to 9 pm, and 7 am to 10 pm in the summer. The change in operating hours coincides with daylight saving time.

Crystal Airport (MIC) *Figure 3-3*

3.2.3 Crystal Airport (MIC)

Crystal Airport (MIC) consists of approximately 436 acres and includes two northwest-southeast runways and two southwest-northeast runways. Runway 12R-32L has a

full-length parallel taxiway. Runway 14L-32R is 3,263 feet long by 75 feet wide, Runway 12R-32L is 3,266 feet long by 75 feet wide and Runway 6-24R is 2,499 feet long by 75 feet wide. The turf runway (6R-24L) is 2,122 feet long by 150 feet wide, and is closed during the winter months. The airport has two non-precision instrument approaches. **Figure 3-3** shows the general airport layout and facilities. Two FBOs at the airport provide fueling, flight training and aircraft maintenance services. The airport had 185 based aircraft in 2014; 41,117 aircraft operations occurred at MIC in 2014, down 2.8 percent from the operations level in 2013.[14] An FAA-operated Air Traffic Control Tower is located at the airport and operates each day in the winter from 7 am to 9 pm, and 7 am to 10 pm in the summer. The change in operating hours coincides with daylight saving time.

Flying Cloud Airport (FCM) *Figure 3-4*

3.2.4 Flying Cloud Airport (FCM)

Flying Cloud Airport (FCM) consists of approximately 860 acres and includes two east-west runways and one north-south runway. All runways have full-length parallel taxiways. Runway 10R-28L was extended to 5,000 feet long and widened to 100 feet in 2009; Runway 10L-28R was extended to 3,900 feet in 2008 and is 75 feet wide; and Runway 18-36 is 2,691 feet long by 75 feet wide. The airport has a precision instrument approach to Runway 10R and non-precision instrument approaches to Runways 10L, 28L, 28R and 36. It also has a published precision instrument approach procedure for helicopters. **Figure 3-4** shows the general airport layout and facilities. Six FBOs at the airport provide fueling, flight training and aircraft maintenance services for aircraft and helicopters. The airport had approximately 363 based aircraft; 73,634 aircraft operations occurred at FCM in 2014, down 7.4 percent from the operations level in 2013.[15] An FAA-operated Air Traffic Control Tower is located at the airport; beginning in December 2013 the Tower revised its operating hours to 6 am to 9 pm.

[13][14][15] The FAA Air Traffic Control Tower revised the methodology used to count aircraft operations in 2013, therefore adjustments were applied to historical counts as necessary.

Lake Elmo Airport (21D) *Figure 3-5*

3.2.5   Lake Elmo Airport (21D)

Lake Elmo Airport (21D) consists of approximately 640 acres and includes one northwest-southeast runway and one southwest-northeast runway. Both runways have full-length parallel taxiways. Runway 14-32 is 2,850 feet long by 75 feet wide, and Runway 4-22 is 2,497 feet long by 75 feet wide. The airport has two non-precision instrument approaches to the airport. **Figure 3-5** shows the general airport layout and facilities. One FBO at the airport provides fueling, flight training and aircraft maintenance services. The airport had 195 based aircraft; an estimated 25,727 aircraft operations occurred at 21D in 2014, down 22.6 percent from the level of aircraft operations in 2013. There is no Air Traffic Control Tower located at the airport. Aircraft operators utilize common traffic advisory procedures while flying to and from the airport.

3.2.6   St. Paul Downtown Airport (STP)

St. Paul Downtown Airport (STP) is commonly referred to as Holman Field. The land area measures approximately 576 acres, and the airfield consists of two northwest-southeast runways and one east-west runway. Runway 14-32 has a full-length parallel taxiway. Both of the other runways have partial parallel taxiways. Runway 14-32 is 6,491 feet long by 150 feet wide; Runway 13-31 is 4,004 feet long by 150 feet wide; and Runway 9-27 is 3,642 feet long by 100 feet wide. The airport has precision instrument approaches to Runways 14 and 32 and non-precision instrument approaches to Runways 14, 31 and 32. It also has a published precision instrument approach procedure for helicopters. **Figure 3-6** shows the general airport layout and facilities. Two FBOs at the airport

St. Paul Downtown Airport (STP)
Figure 3-6

provide fueling, flight training and aircraft maintenance services for aircraft. The airport had 100 based aircraft in 2014; 64,539 aircraft operations occurred at STP in 2014, down 6.8 percent from the level of operations in 2013.[16] An FAA-operated Air Traffic Control Tower is located at the airport and operates from 7 am to 10 pm on weekends and 6 am to 10 pm on weekdays.

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[16] The FAA Air Traffic Control Tower revised the methodology used to count aircraft operations in 2013, therefore adjustments were applied to historical counts as necessary.

3.3 HISTORIC AND FORECAST ACTIVITY LEVELS

Aircraft operators must choose an airport at which to base their aircraft. Airports in Minnesota are required to submit to the State a report that identifies the aircraft based at their facilities for 180 days or more. **Figure 3-7** shows historical based aircraft trend for the MAC reliever airports from 2005 through 2014. Total based aircraft peaked at 1,864 aircraft in 1999, then declined steadily to 1,586 in 2007. While the general trend continues to decline, based aircraft totals fluctuate each year. In 2014 the total number of based aircraft at MAC reliever airports was 1,375, up slightly from the level in 2013.

The data in **Table 3-1** are the best available historical totals for based aircraft, but these data should be viewed purely as estimates. Numbers that remained unchanged over periods of several years suggest that data limitations were likely and that updated information may not be available.

Historically, the total number of aircraft based at MAC reliever airports has accounted for less than one percent of the U.S. active fleet.

Historical data on aircraft operations at the reliever airports are presented in **Table 3.2**. An operation is either an arrival or a departure. Therefore, one arrival and one departure together equal two operations. Aircraft operations totals reported for each airport are generally obtained from the Air Traffic Control Towers located at each airport. Of the six reliever airports, ANE, FCM, MIC and STP have control towers. However, aircraft operations are counted only while the towers at those airports are operational. It should be noted that these airports are open 24 hours per day, but the control towers are closed during late night and early morning hours. The aircraft operations totals in **Table 3-2** do not include operations that occurred while the towers were closed.

At airports where there is no air traffic control tower, such as LVN and 21D, the operations totals are estimated through various methods and available data. The operations totals presented for LVN and 21D are airport staff estimations calculated from actual aircraft operations counts completed in 2014.

The combined total for aircraft operations estimated at the reliever airports in 2014 is 306,352.[17] This total represents a decrease of 7.8 percent when compared with a total operations level of 308,473 in 2013. **Figure 3.2** shows the historical operations trend for MAC reliever airports from 2005-2014.

TOTAL BASED AIRCRAFT AT MAC RELIEVER AIRPORTS 2005-2014 *Figure 3-7*

■ Total Based Aircraft
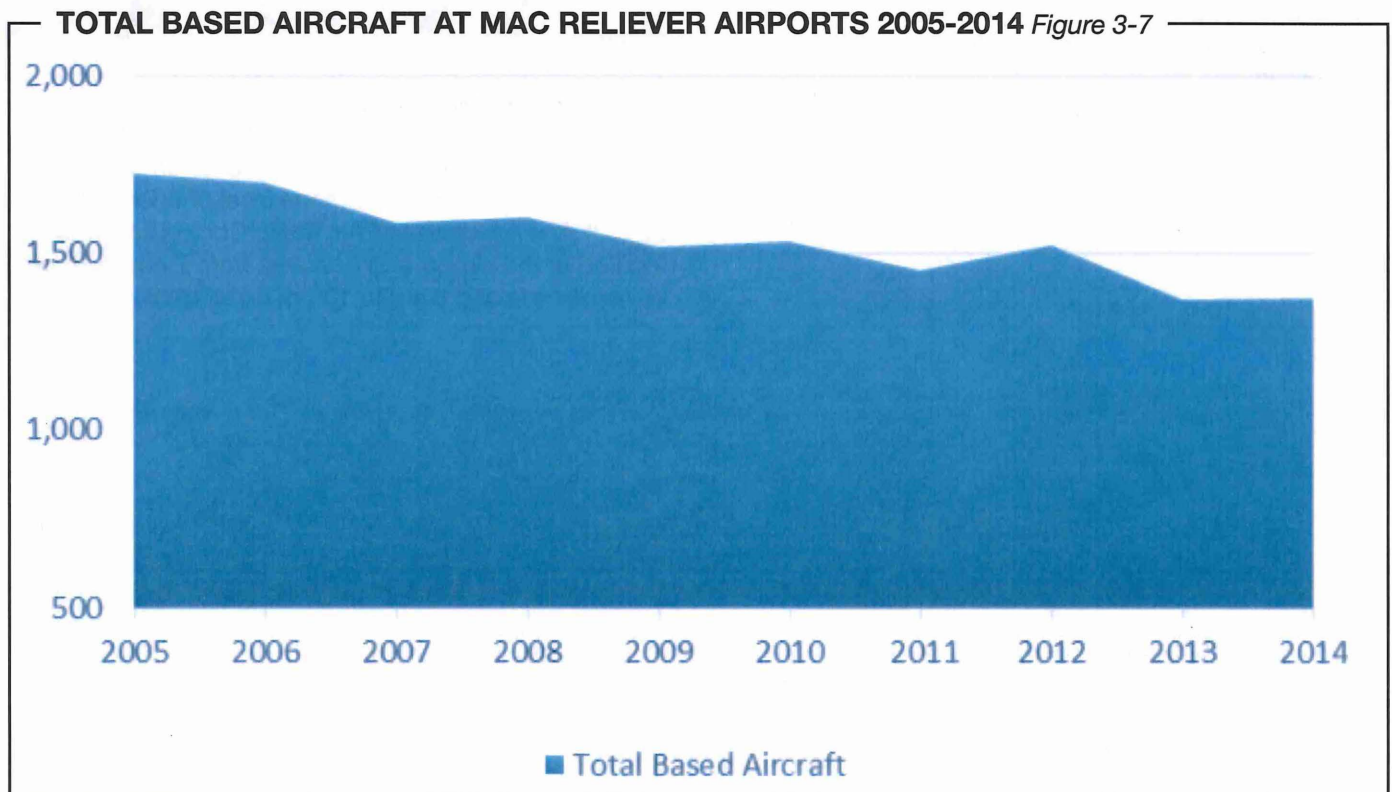
[17]The methodology for counting air traffic operations at FCM was changed in 2013. The methodology used at the other MAC-owned reliever airports was not changed.

TABLE 3-1
HISTORICAL VIEW OF BASED AIRCRAFT AT MAC RELIEVER AIRPORTS

Year	Airlake (LVN)	Anoka Cty-Blaine (ANE)	Crystal (MIC)	Flying Cloud (FCM)	Lake Elmo (21D)	St. Paul Downtown (STP)	Total Based Aircraft
1980	N/A	353	315	582	170	190	1,610
1981	N/A	360	297	580	220	205	1,662
1982	N/A	384	337	608	238	181	1,748
1983	N/A	362	327	615	236	164	1,704
1984	61	361	352	568	244	165	1,751
1985	63	390	338	568	145	147	1,651
1986	93	412	333	560	145	160	1,703
1987	153	408	345	565	150	168	1,789
1988	153	384	325	492	149	181	1,684
1989	140	405	320	485	171	188	1,709
1990	140	411	324	485	177	191	1,728
1991	140	414	327	487	179	193	1,740
1992	165	408	327	482	189	198	1,769
1993	179	408	327	482	189	198	1,783
1994	179	415	327	482	198	198	1,799
1995	179	415	327	482	198	198	1,799
1996	179	431	327	482	205	198	1,822
1997	179	441	327	482	210	203	1,842
1998	179	451	327	482	210	180	1,829
1999	178	472	309	509	250	146	1,864
2000	175	454	296	485	245	137	1,792
2001	170	447	280	461	235	131	1,724
2002	170	464	278	473	237	130	1,752
2003	190	490	288	463	237	124	1,792
2004	177	488	263	456	236	124	1,744
2005	163	482	265	451	239	124	1,724
2006	159	475	261	447	233	124	1,699
2007	162	437	244	421	229	93	1,586
2008	158	439	238	413	230	124	1,602
2009	147	433	219	403	229	89	1,520
2010	147	433	219	403	229	100	1,531
2011	131	423	199	389	216	94	1,452
2012	147	433	219	403	229	94	1,525
2013	127	405	189	357	192	100	1,370
2014	129	403	185	363	195	100	1,375

Source: Metropolitan Airports Commission Reliever Airports

TABLE 3-2
HISTORICAL VIEW OF AIRCRAFT OPERATIONS AT MAC RELIEVER AIRPORTS

Year	Airlake (LVN)	Anoka Cty-Blaine (ANE)	Crystal (MIC)	Flying Cloud (FCM)	Lake Elmo (21D)	St. Paul Downtown (STP)	Aircraft Operations
1980	N/A	190,000	183,840	218,975	100,000	134,286	827,101
1981	N/A	150,000	154,436	194,229	90,000	107,305	695,970
1982	N/A	150,000	123,577	145,718	90,000	77,509	586,804
1983	20,000	140,000	136,314	166,266	90,000	97,118	649,698
1984	23,000	145,000	140,704	165,542	92,000	103,118	669,364
1985	35,000	160,000	143,665	176,246	82,000	112,019	708,930
1986	40,000	165,000	152,773	191,350	70,000	124,786	743,909
1987	52,000	180,000	165,367	209,423	63,000	135,397	805,187
1988	64,000	200,000	172,074	186,699	65,000	151,869	839,642
1989	66,000	212,000	177,679	207,661	65,000	166,436	894,776
1990	67,980	215,000	189,910	227,410	66,950	190,507	957,757
1991	74,745	195,650	173,150	186,503	69,650	168,450	868,148
1992	81,087	195,650	179,546	198,306	69,650	152,378	876,617
1993	81,087	195,650	183,554	218,643	69,950	131,388	880,272
1994	82,500	199,000	185,991	239,038	71,000	146,839	924,368
1995	75,397	181,866	171,478	216,309	64,887	133,686	843,623
1996	75,397	192,600	187,957	212,695	68,400	139,056	876,105
1997	72,382	143,063	175,728	198,199	65,664	135,079	790,115
1998	76,725	143,981	179,186	210,908	69,604	158,705	839,109
1999	76,725	149,769	178,342	192,746	70,996	158,808	827,386
2000	76,418	156,546	176,554	186,078	70,687	158,216	824,499
2001	70,229	136,892	156,801	185,593	64,962	142,794	757,271
2002	69,176	138,935	127,095	176,408	64,529	171,628	747,771
2003	58,108	132,145	98,612	155,837	54,205	131,794	630,701
2004	53,309	109,853	75,023	159,648	49,855	127,478	575,166
2005	51,678	101,272	72,205	157,710	48,329	131,708	562,902
2006	48,014	92,947	65,528	144,178	44,903	135,156	530,726
2007	41,292	80,517	53,038	118,178	38,617	117,977	449,619
2008	39,021	69,403	49,244	119,139	37,612	109,512	423,931
2009	35,802	68,534	42,311	117,180	34,509	91,507	389,843
2010	35,662	79,589	44,229	94,244	34,374	88,995	377,093
2011	34,270	73,292	43,986	114,574	33,032	87,229	386,383
2012	34,560	79,190	48,220	88,663	33,319	79,238	363,190
2013	31,346	76,721	42,308	79,511	33,220	69,277	332,383
2014*	33,178	68,157	41,117	73,634	25,727	64,539	306,352

*The MAC revised the methodology used to calculate estimated operations at LVN and 21D to use flight tracking system data for 2014 operations.
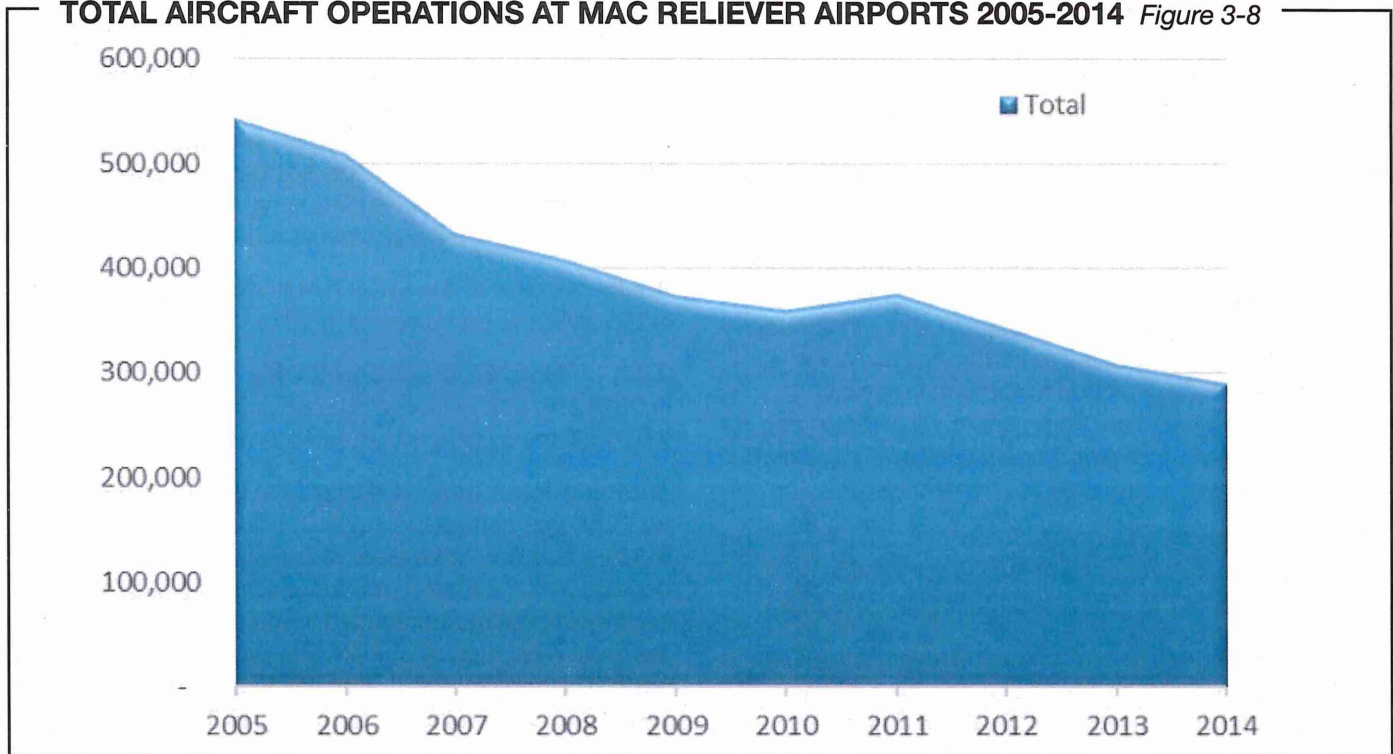Source: Metropolitan Airports Commission Reliever Airports

TOTAL AIRCRAFT OPERATIONS AT MAC RELIEVER AIRPORTS 2005-2014 *Figure 3-8*

Table 3-3 and Table 3-4 show forecasts for based aircraft and operations at the six MAC reliever airports through 2035. These totals were derived from the analyses of forecasted based aircraft and forecasted operations done as part of the 2013 Long Term Comprehensive Plan (LTCP) reliever airports activity forecast updates.

TABLE 3-3
SUMMARY OF BASED AIRCRAFT FORECASTS AT MAC RELIEVER AIRPORTS 2020-2035

Year	Airlake (LVN)	Anoka Cty-Blaine (ANE)	Crystal (MIC)	Flying Cloud (FCM)	Lake Elmo (21D)	St. Paul Downtown (STP)	Total
2020	156	412	205	423	218	116	1,530
2025	153	404	200	423	209	121	1,510
2030	156	401	199	433	211	122	1,522
2035	156	400	195	445	208	122	1,526

Source: HNTB Reliever Airports Activity Forecasts (2013), Base Case Scenarios

TABLE 3-4
SUMMARY OF FORECAST OPERATIONS AT MAC RELIEVER AIRPORTS 2020-2035

Year	Airlake (LVN)	Anoka Cty-Blaine (ANE)	Crystal (MIC)	Flying Cloud (FCM)	Lake Elmo (21D)	St. Paul Downtown (STP)	Total
2020	26,408	72,651	44,094	74,126	24,232	65,913	307,424
2025	26,955	75,172	44,259	76,344	23,908	67,367	314,005
2030	28,783	77,791	46,159	78,634	25,200	68,869	325,436
2035	30,661	80,506	47,682	81,002	26,138	70,420	336,409

Source: HNTB Reliever Airports Activity Forecasts (2013), Base Case Scenarios for LVN, MIC, 21D

3.4 DEVELOPMENT PROGRAMS

This section outlines the status of major development programs at each of the reliever airports. It is important to note that the MAC is investigating revenue-generating development at the reliever airports as a way to help make the reliever airport system as financially self-sustaining as possible.

The MAC has an ongoing program to rehabilitate aircraft operational areas (runways, taxiways, aprons) through bituminous overlays and seal coats; in some instances, reconstruction is necessary to restore the surfaces to a smooth, even condition for optimum operating conditions. Projects vary from year to year, depending on available funding and airport needs. In 2014, pavement rehabilitation was completed at STP and MIC.

3.4.1 Airlake Airport (LVN)

The only project completed at LVN in 2014 involved improvements to the MAC Field Maintenance facility.

The LVN 2008 Long Term Comprehensive Plan (LTCP) update recommends that the airfield's only runway (Runway 12-30) be extended to 5,000 feet at some point in the future to coincide with industrial/commercial development in Lakeville and potentially in Eureka Township. The runway extension shown in the plan requires relocation of a portion of Cedar Avenue. In 2010 the MAC completed a Draft Scoping Decision Document and a Draft Environmental Assessment Worksheet (EAW) for the proposed development activity. An Environmental Impact Statement (EIS) is required before the project can begin. The MAC will continue to work with Dakota County and other agencies as appropriate on the runway extension and roadway realignment. Another update to the LTCP for LVN is currently underway.

3.4.2 Anoka County-Blaine Airport (ANE)

The only project completed at ANE in 2014 involved grooving Runway 9-27, the 5,000-foot bituminous runway. Applying grooves to the runway surface improves traction and facilitates run-off to prevent standing water.

A Long Term Comprehensive Plan (LTCP) update was completed in 2010 for ANE. This plan analyzed existing facilities, forecasted future activity, and outlined development needed to meet the projected demand. Based upon the forecasts and existing airfield configuration, no airside or landside expansions are proposed in the LTCP. Currently, there is no demonstrated need for longer runway lengths, additional runways or additional hangar areas.

3.4.3 Crystal Airport (MIC)

In addition to pavement reconstruction and rehabilitation, the MAC completed repair to some of the MAC Field Maintenance facilities at MIC in 2014.

The MAC completed the Long Term Comprehensive Plan (LTCP) update for MIC in 2008. The adopted LTCP recommends that two runways be closed to "right-size" the airport. The LTCP for MIC suggests keeping the original paved runway and one paved crosswind runway intact. The MAC is evaluating the process for implementing the runway closure recommendations.

Another update to the LTCP for MIC is currently underway and planned to be complete in 2015.

3.4.4 Flying Cloud Airport (FCM)

In 2014, the MAC completed grooving of Runway 28L-10R, the 5,000-foot bituminous runway at FCM.

The Long Term Comprehensive Plan (LTCP) update for FCM was completed in 2010. This plan analyzed existing facilities, forecasted future activity, and outlined development needed to meet projected demands. The primary project recommended in the plan involved shifting the crosswind runway at FCM (Runway 18-36) to the north. This project was completed in 2013 and provides a fully compliant runway safety area at FCM.

3.4.5 Lake Elmo Airport (21D)

There were no development projects completed at 21D in 2014.

The Long Term Comprehensive Plan (LTCP) for 21D was completed in 2008. The plan recommends that a new hangar area be constructed in the near future. The LTCP also recommends that the crosswind runway be reconstructed and extended from 2,497 feet to 3,200 feet to better accommodate the existing aircraft at the airport.

An update to the LTCP for 21D is currently underway and planned to be complete in 2015. It is anticipated that the updated plan may include new recommendations for providing an extended runway length.

3.4.6 St. Paul Downtown Airport (STP)

Two projects were completed at STP in 2014: taxiway pavements were reconstructed, and updates to the MAC Field Maintenance facilities and electrical vault building were completed.

The Long Term Comprehensive Plan (LTCP) update for STP was completed in 2010. This plan analyzed existing facilities, forecasted future activity and outlined development needs in order to meet projected demand. Based upon the forecasts and existing airfield configuration, no airside or landside expansions are proposed in the LTCP. There is currently no demonstrated need for longer runways, additional runways or additional hangar areas.

APPENDIX A
2014 Environmental Accomplishments

Metropolitan Airports Commission (MAC)
2014 Environmental Accomplishments

This document details the MAC's 2014 Environmental Accomplishments in the areas of energy use and emissions reduction; recycling, organics composting and waste reduction; water quality and conservation; noise; environmental program management systems; and sustainability program development.

1. Energy Use and Emissions Reductions

The MAC has a long history of operating in a manner that considers the air quality and emission impacts that result from its operation. Over the years this commitment has evolved from innovative facility enhancements as part of the MSP 2010 Plan to a formal energy conservation program, annual greenhouse gas reporting, leadership in alternative energy development, and processes facilitating the implementation of efficient aircraft operations. The following provides details on the advancement of existing programs and new initiatives in 2014.

a. Energy Conservation Program

Since 2000 the MAC has been dedicating a portion of Capital Improvement Program (CIP) funds to specific projects that reduce energy use.

In the 2014 CIP $2 million was specifically dedicated to the MAC's Energy Conservation Program (MECP). Additionally, there were efforts to incorporate energy efficiencies in certain 2014 CIP projects when possible. Specific 2014 energy conservation activities included projects focused on mechanical systems, electrical retrofits of variable speed drives and motors, lighting upgrades and control system integration, installation of moving walk and escalator motor efficiency controllers, and a building envelope air leakage evaluation at Terminal 1-Lindbergh Concourses C, D, E, and F.

The 2014 MECP projects are anticipated to produce efficiencies that reduce natural gas consumption by 44,045 therms/yr and result in projected utility cost reductions of $42,283 per year at today's gas rates. Also, the program and project efficiencies are anticipated to reduce electrical consumption by 288 MWH/yr and result in projected utility cost reductions of $20,126.75 per year at today's electrical rates. The MAC is estimated to receive utility company rebates of approximately $23,811.46.

The U.S. Environmental Protection Agency (EPA) reported that in 2012 the electricity economic sector was the largest source of U.S. greenhouse gas emissions, accounting for 32% of the U.S. total. Not surprisingly, efforts to reduce energy consumption will remain an important component of the MAC's environmental performance.

b. *Renewable Energy*

In October 2014, in partnership with Ameresco, the MAC began construction of a $25.4 million, three-megawatt solar energy facility atop the Blue and Red parking ramps at Terminal 1-Lindbergh. The project includes the replacement of 7,700 metal halide light fixtures in the parking ramps with energy-saving LED lights and the addition of four electric vehicle charging stations, increasing the total number of electric vehicle charging stations in the MSP parking ramps to 18. When complete, the solar energy facility will be capable of generating up to 20% of MSP's peak-load energy capacity and will increase Minnesota's total solar energy output by 20%. The system will eliminate 6,831 metric tons of greenhouse gases annually – the equivalent of eliminating the emissions of 1,434 passenger vehicles.

c. *Vehicles and Fuels*

Currently, the MAC has 96 flex-fuel engine vehicles (three were added in 2014), three electric vehicles and two hybrid vehicles. With the MAC's continued focus on the use of E85, unleaded fuel usage was reduced by 46% in 2014 compared to fiscal year 2005.[1] Field Maintenance continues to expand the purchase of E85 vehicles and efforts continue to encourage staff use of E85 in compatible vehicles.

d. *Alternative Fuels Vehicle Support Infrastructure*

In 2014 the MAC installed a charging station (providing eight ports) for electric Ground Support Equipment (GSE). This fast, energy-efficient charging station allows for simultaneous charging, adjustable charging rates, and automatic shut-off when the GSE are fully charged or when overheating occurs. The charging station was installed at Terminal 1-Lindbergh for use by Delta GSE. (Currently, Delta has five pieces of electric GSE equipment at MSP using the station). This project fits into the proposed long-term goal of converting all Delta GSE to electric power, thereby reducing overall air emissions from fossil fuel-burning GSE.

Currently, $6.4 million is programed in the CIP out to 2019 to support the build out of this program.

e. *Voluntary Greenhouse Gas Reporting*

In 2014 the MAC completed its sixth voluntary Minneapolis-St. Paul International Airport (MSP) Greenhouse Gas (GHG) Inventory and Initiatives Report since 2007. As in previous reports, the GHG report established that, in 2013, MAC-controlled sources accounted for a very small portion (1%) of the total MSP carbon dioxide equivalent (CO_2e) emissions. The major source of emissions associated with MSP is attributed to fuel combustion from aircraft operations (95%); the rest is non-aircraft airport tenant activities. Of the total MSP emissions, 83% are generated by aircraft landing and takeoff cycles above 3,000 feet (12% are below 3,000 feet). The MSP CO_2e emissions in 2013 were down by 21.7% from 2005.[2]

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[1] The Governor's Executive Order 11-13 establishes a goal of 50% reduction in gasoline usage in on-road vehicles by 2015 using 2005 as a baseline for state agencies.
[2] The Minnesota Next Generation Energy Act of 2007 established statewide GHG reduction goals from a 2005 baseline of 15% by 2015, 30% by 2025 and 80% by 2050.

f. *Aircraft Operations – Performance-Based Navigation (PBN)/Area Navigation (RNAV) Standard Terminal Arrival Routes (STARs) Incorporating Optimized Profile Descent (OPD)*

Since 2007, the MSP Noise Oversight Committee (NOC) has been actively engaged, in a leadership role, in evaluating and advancing the use of aircraft navigation technology at MSP to reduce noise impacts. As a result of these efforts, in March 2015 RNAV STARs incorporating OPD operations will begin at MSP. Required Navigation Performance (RNP) STARs with OPD are planned for implementation in April 2015.

As detailed above, of the total CO_2e emissions resulting from MSP, 83% are generated by aircraft landing and takeoff cycles above 3,000 feet – the primary phase of arrival flight targeted by the RNAV/RNP STARs. These procedures will support more efficient use of the airspace and provide for the integration of constant rate descents at near-idle power settings, which has been documented to reduce fuel consumption by as much as 353 pounds and CO_2 emissions by 500 kg per arrival operation.

There have been great efforts over the years to reduce overall CO_2e emissions at MSP. However, this achievement is likely to provide one of the greatest reductions in CO_2e emissions to-date.

g. *Contributions to Industry Efforts Targeting Emissions Reductions*

The Airport Cooperative Research Program (ACRP) has determined that:

"Research is needed to develop a comprehensive list of existing and near-term alternative aircraft-taxi systems and evaluate the potential net cost, energy, and environmental benefits of these systems through the consideration of fuel burn, emissions, and noise effects, and to consider the potential future challenges of implementing this technology for aircraft and airport infrastructure."

As a result, ACRP is conducting research on alternative aircraft-taxi systems. ACRP Project 02-50 "Deriving Benefit from Alternative Aircraft Taxi Systems" is currently underway to:

"...develop a resource guide for airport practitioners in three sections that includes: (1) Section 1–an introduction to existing and near-term alternative aircraft-taxi systems; (2) Section 2–a compendium of defensible benefits, impacts, and considerations related to each system; and (3) Section 3–a summary and vision to maximize future potential of these systems given anticipated advances in technology, equipage, and infrastructure."

Through internal teamwork and collaboration, MAC staff is contributing to this work in multiple ways. Mr. Paul Sichko, Assistant Director of Field Maintenance/Airside Operations, is a member on the ACRP 02-50 project team, bringing operational expertise and insights to the panel's work. Additionally, through collaboration between the Airside Operations and Environment Departments, MSP is acting as a case study airport providing data and analysis frameworks in support of the emissions analysis being conducted as part of this ACRP project.

Aircraft taxi operations account for approximately 35% of the CO_2e emissions that contribute to the local MSP footprint (<3,000 feet AGL). Efforts like ACRP Project 02-50 are important to help pave the way for future technological advancements that will contribute in significant ways to aircraft/airport emission reductions.

2. Recycling, Organics Composting and Waste Reduction

The MAC has a long history of operating a comprehensive program targeting recycling and waste reduction practices. As detailed below, this program performed well, and was enhanced, in 2014 with positive recognition from external stakeholders.

a. *Recycling and Organics Compositing Program*

In 2014, the MAC continued its recycling/composting programs with increased performance and expanded its Organics Composting Program at MSP. Moreover, the programs were acknowledged by various stakeholders for exemplary performance.

Specifically, in 2014 the MAC:

- recycled 1,603 tons of non-regulated material (e.g., scrap metal, baled cardboard, comingled recyclables, and wood pallets) resulting in avoided disposal costs totaling $152,789 (increased by 6.7% from the 1,502 tons of material recycled in 2013);
- recycled 133 tons of regulated waste (e.g., paints, tires, batteries, etc.);
- continued the Organics Composting Program in all 67 food concessionaires in Terminal 1-Lindbergh; diverted over 432 tons of organic waste from the solid waste stream and delivered it to a compost site (increased by 62.4% from the 266 tons in 2013); and
- began the planning process for the expansion of the Organic Composting Program to all food and beverage establishments in Terminal 2-Humphrey. In January 2015 this program expansion was completed and all eight Terminal 2-Humphrey concessionaires are participating in the program.

i. Hennepin County Partnership – Recycling Program Recognition

In 2014, Hennepin County recognized 40 businesses for their leading efforts to recycle and divert organics waste from the municipal solid waste stream.

The MAC was selected to be highlighted through the County's Business Recognition Program. Businesses selected for this honor are featured on the County's website at:
http://hennepin.maps.arcgis.com/apps/MapTour/index.html?appid=d5f203cee4c74d06ba9ca7ebe7f9c06f&webmap=08aba0deb230451bbd25bf062925934d#.

The MAC joins a notable group recognized by Hennepin County including, among others, the University of Minnesota Medical Center – West and East Banks, Minnesota Twins, Fairview Southdale Hospital, and the Bakken Museum.

ii. 2014 Hennepin County Hazardous Waste Inspection Findings

All licensed hazardous waste generators are subject to site inspection by Hennepin County at random intervals. In 2014, the MAC had a random, unannounced inspection conducted by the County; it had been four years since the last inspection.

The walk-through inspection included all areas where regulated waste materials are generated and stored including the MAC paint, electric and equipment maintenance shops. No violations were discovered and the inspector provided no recommendations for improvement. The MAC was complimented on the good housekeeping and the great work that the shop crews do maintaining a violation-free environment.

b. *Waste Reduction*

In 2014, the MAC installed two water bottle fill stations, one in Terminal 1-Lindbergh on the G Concourse and one at the Terminal 2-Humphrey Checked Baggage Inspection System. This brings the total bottled water filling stations on the MSP campus up to 10. Plans going forward include installation of drinking fountain/bottle filling stations with restroom projects.

These stations deliver a clean, quick water bottle fill while helping to minimizing dependency on disposable plastic bottles.

3. **Water Quality and Conservation**

Water is a precious natural resource. This is especially true in Minnesota, a state known for an abundance of lakes and rivers, a critical component of what makes Minnesota's wilderness so special. The MAC has a long history of extensive programs to ensure that airport operations do not negatively impact this precious natural resource. Additionally, the MAC is continuing to evaluate and implement water saving projects and/or programs at its airports. The following provides some examples of the associated accomplishments in 2014.

a. *Stormwater Management Program*

The MAC has developed one of the most sophisticated and extensive airport stormwater monitoring and management programs in the country at MSP. Through investing more than $150 million in infrastructure (much of which targets the management of aircraft deicing fluid), and the development of extensive management and measurement programs to comply with permit requirements, the MAC has minimized possible impacts from its stormwater discharges and significantly reduced the risk of water pollution in the event of fuel spills.

The MAC/MSP maintains a National Pollutant Discharge Elimination System (NPDES) permit with the Minnesota Pollution Control Agency (MPCA) that regulates surface water discharge at MSP. This permit limits carbonaceous biological oxygen demand ($CBOD_5$) to 900 tons per year for airport stormwater discharge. The primary concern associated with elevated concentrations of $CBOD_5$ is the dissolved oxygen demand it has on the receiving waters, potentially impacting aquatic life in the Minnesota River.

The largest source of $CBOD_5$ is the glycol in aircraft anti-icing and deicing fluid (ADF). FAA regulations and airline safety policies determine the type, amount and frequency of the airlines' ADF application. The various designated containment locations at MSP help to manage impacts. However, permit compliance is most directly related to weather conditions. The following statistics characterize the weather during the 2013/2014 deicing season:

- total snowfall amount of 69.7" (average season is 55.9")
- the 2013/2014 winter season was in the top 10 for the longest amount of time the ground was covered with at least 2 inches of snow

1.50 million gallons of glycol were applied during the 2013/2014 deicing season, similar to the 2012/2013 deicing season when 1.54 million gallons of glycol were applied.

Most notably, 2014 marked the first full year of the reissued NPDES permit incorporating a co-permittee structure placing all airlines and operators conducting activities that have the potential to impact stormwater at MSP on the permit. Program management was enhanced in 2014 through staff's ongoing implementation and refinement of a coordinated structure for collaborating with co-permittees.

In 2014, MAC staff and co-permittees established a bi-annual meeting framework with monthly updates provided to all co-permittees on up-to-date discharge levels and other permit-related program management activities.

As a result of the co-permittee collaboration efforts in 2014, the MAC reconfigured the Runway 12L deicing pad to increase the pad's availability for usage and addressed airspace and coordination issues that were impacting the availability of the Runway 17 deicing pad, resulting in increased usage of the pad for deicing operations. These activities, coupled with airline efforts to increase usage of deicing locations that provide higher ADF collection rates, resulted in notable program improvements in 2014. Most notably, to date, the 2014/2015 deicing season has a higher deicing pad use than any other past season (about 6% above the long-term average).

In addition to these $CBOD_5$ reduction efforts, the MAC continues to use technologies and best management practices (BMPs), such as glycol-impacted snow melting, pavement brooming to reduce chemical application, and glycol containment/recycling. The airlines also continue to adhere to deicing in contained areas, and to using enhanced technology for the application and collection of applied glycol.

All of these efforts contribute to continual improvement of the program and ensured compliance with the 900 tons annual limit of $CBOD_5$; a total of 590 tons of $CBOD_5$ was discharged in 2014.

b. *Green Roof Design for Terminal 2-Humphrey Gate Expansion*

In 2014, the MAC completed design for the Terminal 2-Humphrey gate expansion incorporating a green roof on the expanded portion of terminal building needed to accommodate the additional gates. Project construction will begin in 2015. Following completion, the green roof's performance will be tracked in consideration of future green roof applications at the airport.

Green roofs help to reduce stormwater runoff/surge and can help with water quality by storing rainwater in the plants and growing media and supporting water evaporation into the atmosphere.

c. *New Parking Ramp Cleaning Equipment and Process*

MSP has six parking structures with 48 levels totaling 22,000 parking spaces. These parking structures are maintained by the MAC Field Maintenance staff. An annual cleaning schedule is required to maintain the integrity of the parking structures.

In the past, MAC Field Maintenance staff would use scrubbers and agitators to clean the pavement, then flush the surface with large quantities of water.

In 2014, as a result of collaboration between the MAC Field Maintenance, Environment, and Airport Development Departments, new equipment and processes were introduced to ensure ongoing compliance with MAC stormwater permits and provide resource conservation and efficiency gains.

Through the use of four new Municipal Cleaning Vehicles (MCV) with two support trailers and associated procedures, deposited vehicle fluids and salt are recovered in the ramp cleaning process. The MCV technology applies a high-pressure spray and collection design that completely recovers the wash water. The recovered wash water is filtered and then reused to clean an entire level of the parking ramp.

In addition to a number of efficiency and financial benefits from the new equipment/process, water is conserved. The previous cleaning process used 24,500 gallons per ramp quadrant totaling 612,500 gallons a year. Using the new system, MAC Field Maintenance staff uses approximately 1,300 gallons of water per ramp quadrant equaling 32,500 gallons per year – a savings of 580,000 gallons of water per year.

d. *Contributions to Industry Efforts Targeting Water Quality and Conservation*

MAC Environment Department staff plays an active role on the Airport Council International – North America (ACI-NA) Environmental Affairs Committee as a member of the Steering Committee and as chair of the Water Quality Working Group. Recent activities in this capacity have included efforts to develop an airport/airline industry Voluntary Pollution Reduction Program (VPRP), in coordination with the Environmental Protection Agency (EPA), to reduce water impacts from aircraft deicing operations at U.S. airports.

Additionally, MSP is participating as a case study airport in ACRP Project 02-59 "Water Efficiency Management Strategies for Airports." Specifically, MSP will be used to aid in the development of a water audit tool intended to help airports: (1) understand water uses and usage at airports; (2) generate a baseline water use profile specific to airport activities; (3) define appropriate water use targets; (4) evaluate appropriate water efficiency measures including direct and indirect costs and benefits; and (5) develop a water efficiency management action plan.

4. Noise

In 2014, a number of noise program initiatives were advanced consistent with the MAC's industry-leading approach to addressing airport noise issues. These efforts included activities required to implement the First Amendment to the Noise Consent Decree, development of a position/policy on the FAA's current and future PBN/RNAV implementation efforts at MSP, and addressing specific community concerns through analysis and collaboration.

a. *Annual Noise Contour Analysis Revision Implementing the First Amendment to the Noise Consent Decree*

On February 28, 2014 a revised version of the Annual Noise Contour Analysis was published by the MAC Noise Program Office. The updated report includes additional analyses and information, implementing the provisions of the First Amendment to the Noise Consent Decree

by providing a consecutive-year impact analysis as is required to determine mitigation eligibility under the terms of the amendment. The new report format is available at: http://www.macnoise.com/pdf/msp-2014-annual-noise-contour-report-for-web.pdf.

b. *NOC PBN/RNAV Resolution 01-2014*

On March 6, 2014 the MSP Noise Oversight Committee (NOC) adopted Resolution 01-2014 "Regarding Future FAA Performance-Based Navigation (PBN)/Area Navigation (RNAV) Standard Departure Procedure Design and Implementation Efforts at Minneapolis-St. Paul International Airport (MSP)." On March 17, 2014 the MAC Full Commission took unanimous action supporting NOC Resolution 01-2014 and forwarded it to the FAA. The resolution is available at: http://www.macnoise.com/pdf/noc-resolution-01-2014.pdf.

Given the contentious nature of the discussions leading up to this action, and the varying degree of stakeholder perspectives and positions on the issue, the NOC's PBN/RNAV Resolution ranks among one of the most significant accomplishments by the Committee in its existence. This accomplishment provides a position, supported by all stakeholders, detailing local expectations for the FAA in its future PBN/RNAV design and implementation efforts at MSP, while also providing a unanimous position by all stakeholders supporting the implementation of RNAV/RNP STARs at MSP. This was accomplished in a manner informed by past experiences and provides reassurance to stakeholders that circumstances like those currently unfolding at Phoenix Sky Harbor International Airport will not occur at MSP in the future.

c. *Edina and St. Louis Park Noise Monitoring Study*

In response to concerns from residents and elected officials, the NOC directed MAC staff to conduct a noise monitoring study in the cities of Edina and St. Louis Park in 2014. The goal of the study was to assess existing aircraft noise levels and provide a baseline for future reference in the event of future FAA PBN/RNAV Standard Instrument Departure (SID) procedure design and implementation at MSP. Monitoring was conducted for a two-week period in the fall of 2014 at two sites in Edina and one site in St. Louis Park. The final report was published in November 2014.

The study found that measured aircraft noise was at levels expected for the area. The measured levels correlated well with the modeled 2013 aircraft Day-Night Average Sound Levels (DNL). The total measured DNL levels corresponded with normal ranges for suburban and low-density urban areas. Moreover, the study concluded that the existing array of 39 permanent noise monitoring locations around MSP provide adequate noise monitoring coverage.

d. *Runway Use System (RUS) Evaluation and Collaboration*

At the May 8, 2014, NOC meeting an analysis of the FAA's utilization of the RUS at MSP was presented. In short, the analysis found that safety, traffic demand and wind speeds and direction play a significant role in FAA/Air Traffic Control's utilization of the RUS.

Following the May 2014 NOC meeting, MAC staff facilitated dialogues between City of Minneapolis representatives and the FAA to address community concerns related to the FAA's use of the RUS. The discussions were positive and contributed to progress relative to possible

options for enhanced RUS usage. Discussions on this topic continue in 2015 and will be addressed as part of the 2015 NOC Work Plan.

e. _Contributions to Industry Efforts Targeting NextGen and Airport Noise_

ACRP is conducting a number of projects related to the FAA's implementation of NextGen. Currently, MAC staff are participating on a number of these project panels.

MAC Executive Director/CEO Jeff Hamiel is a member of the ACRP Project 03-34 "NextGen – Understanding the Airport's Role in Performance-Based Navigation (PBN)" panel and Environment Department staff is participating on the ACRP Project 01-27 "NextGen – A Primer" panel. These projects are intended to bring further clarification to the role of airports in the FAA's implementation of NextGen and provide informational resources to airport executives, airport practitioners, and the general public on the details and impacts of the FAA's implementation of NextGen.

5. Environmental Program Management Systems

In 2014, the MAC Environment Department continued the development and implementation of an environmental management system framework targeting enhancement of the MAC's environmental compliance programs. This project was initiated in 2013 with the goal of providing immediate benefit to the organization by reducing risk, increasing efficiency, providing business continuity and a scalable management system and model. The result was the development of the MAC's Environmental Management Information System (EMIS).

The MAC EMIS is constructed around the tenets of a compliance-focused Environmental Management System (EMS): assisting in day-to-day environmental compliance job functions, effective management through efficient and thorough oversight, and providing a structure that supports continual improvement.

The EMIS consists of two components: (1) the Knowledge Base application and (2) a vendor-provided, MAC-customizable, software as a service data and process/program management solution.

The Knowledge Base application is a web-based document management solution that provides secure user access to relevant compliance activity documents, fact sheets, reference materials, and regulatory submittals. The final build-out of this project component in 2014 provides 30 process fact sheets covering 10 environmental compliance aspect areas including water, soil, air quality, tanks, waste, fuel, environmental compliance programs, emergency response, and EMS/EMIS management.

Each fact sheet provides detailed documentation on the respective activity including background/scope, purpose/driver, required data/submittals/limits, process and responsibility, records and data access, key tasks and compliance dates, additional reference materials, dashboard information suggestions, and EMIS tools suggested to increase value/efficiency.

The above information is the foundation of the Knowledge Base system and provides an extensive compliance manual/resource facilitating access to all process-relevant information with the click of a mouse. This EMIS component provides significant business continuity through extensive process documentation and a structure that facilitates a plan-do-check-act (PDCA) review and improvement loop to be performed annually on the MAC's and its consultants' compliance activities.

The data and process/program management component of the MAC's EMIS provides access to the Knowledge Base, centralized data storage, flexible data entry (including remote entry), real-time data analysis, automated custom report generation, task completion tracking, emailed task reminders with links to relevant documents and input forms, event logging, and dashboards.
In 2014 additional integration activities resulted in:

- full implementation of EMIS functionality within major environmental compliance program components;
- complete transition to EMIS compliance and task tracking modules by Environment Department compliance staff and consultants; and
- completion of the final population and operation of the Knowledge Base.

Some of the specific outcomes resulting from the above accomplishments in 2014 include:

- Monthly Discharge Monitoring Reports (DMRs) generated automatically via the EMIS, incorporating the new MCPA reporting format for sample values.
- Development and implementation of Reliever Airport Stormwater Pollution Prevention (SWPP) inspections using the new EMIS inspection application (including direct data input by Reliever Maintenance foremen).
- Development and incorporation of Oil Water Separator (OWS) monthly monitoring/inspection via the EMIS inspection application.
- Transfer of all Comprehensive Well Network (CWN) data into the EMIS.
- Transfer and centralization of air quality data into the EMIS.

6. Sustainability Program Development

In 2013, a scope and plan for the development of a comprehensive Sustainability Management Plan (SMP) for the MAC–MSP was developed by the MAC Environment Department. In an effort to secure the resources needed for this project, in April 2013 the MAC Environment Department submitted a Letter of Interest (LOI) to the FAA requesting funding via its pilot Sustainable Master/Management Planning Program.

As a result of these efforts, the MAC received an FAA grant supporting a $700,000 project budget for the development of the SMP and in August 2013 the Commission amended the 2013-2019 CIP, incorporating the SMP as a 2014 project. The project was awarded in January 2014 and is planned to be completed in late 2015/early 2016.

The SMP will provide a foundation for the formal integration of sustainability into the MAC's organizational culture, while providing a coordinated and accountable approach to establishing metrics, goals, strategies, and assessment and improvement frameworks that address long-term environmental, social, and economic needs.

The environmental element of sustainability remains an important component of the MAC's maturing sustainability strategy. However, moving forward, the MAC's environmental stewardship strategies and activities will be a component of a larger holistic approach to sustainability that focuses on social and economic elements as well.

In addition to the development of a formal sustainability program through the SMP project, in early second quarter 2014, the MAC hired its first Manager of Sustainability, Ms. Tiffany Finley. In her new role, Ms. Finley is managing the SMP project and is responsible for ongoing sustainability program implementation and improvement across the organization.