



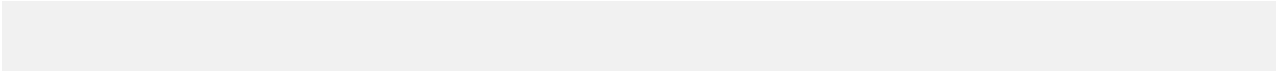
Minneapolis – St. Paul International Airport (MSP)

2030 Long Term Comprehensive Plan Update



July 26, 2010





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

July 26, 2010

Prepared by the Metropolitan Airports Commission
with assistance from HNTB Corporation

TABLE OF CONTENTS

TABLE OF CONTENTS

EXECUTIVE SUMMARY	E-1
E.1 PURPOSE.....	E-1
E.2 NEED	E-1
E.3 PROCESS AND CONTENT.....	E-1
E.4 INVENTORY	E-2
E.5 FORECAST	E-2
E.6 FACILITY REQUIREMENTS	E-4
E.7 CONCEPTS	E-4
E.8 FACILITY IMPLEMENTATION SCHEDULE AND COSTS	E-5
CHAPTER 1: INVENTORY.....	1
1.1 INTRODUCTION.....	1
1.2 NEED FOR LTCP UPDATE.....	1
1.3 AIRPORT HISTORY	3
1.4 INVENTORY OF EXISTING FACILITIES	4
1.4.1 OVERVIEW	4
1.4.2 AIRFIELD	4
Runways.....	4
Taxiways.....	4
Deicing Pads.....	4
Lindbergh Terminal.....	7
Humphrey Terminal	7
1.4.4 GROUND ACCESS AND PARKING	14
Highway Access	14
Transit.....	14
Parking	14
1.4.5 CARGO FACILITIES	14
1.4.6 GENERAL AVIATION FACILITIES	15
1.4.7 SUPPORT FACILITIES	15
1.5 AIRPORT ENVIRONMENT.....	15
1.5.1 WETLANDS	15
1.5.2 WATER QUALITY AND DRAINAGE.....	17
Water Quality.....	17
Drainage	17
1.6 SANITARY SEWER, WATER AND SOLID WASTE	20
1.6.1 SANITARY SEWER	20
1.6.2 WATER SUPPLY	20
1.6.3 SOLID WASTE.....	21

1.7	METEOROLOGICAL DATA	21
1.8	LAND USE, AIRSPACE AND ZONING.....	22
	CHAPTER 2: FORECASTS.....	23
2.1	INTRODUCTION AND PURPOSE	23
2.2	ECONOMIC TRENDS.....	23
	2.2.1 POPULATION.....	24
	2.2.2 EMPLOYMENT	26
	2.2.3 INCOME AND PER CAPITA INCOME.....	26
2.3	HISTORICAL AVIATION ACTIVITY AND CURRENT TRENDS	27
	2.3.1 PASSENGER ACTIVITY.....	27
	2.3.2 AIRCRAFT OPERATIONS	30
2.4	GENERAL BASE FORECAST ASSUMPTIONS.....	30
	2.4.1 UNCONSTRAINED FORECASTS.....	30
	2.4.2 REGULATORY ASSUMPTIONS.....	30
	2.4.3 ECONOMIC ASSUMPTIONS	30
	2.4.4 INTERNATIONAL POLITICAL ENVIRONMENT	32
	2.4.5 SECURITY ENVIRONMENT	32
	2.4.6 FUEL ASSUMPTIONS	32
	2.4.7 ENVIRONMENTAL FACTORS.....	32
	2.4.8 NATIONAL AIRSPACE SYSTEM	32
	2.4.9 AIRLINE CONSOLIDATION.....	32
	2.4.10 NEW ENTRANTS	32
	2.4.11 AIRLINE ALLIANCES	33
	2.4.12 AIRLINE STRATEGY	33
2.5	DOMESTIC PASSENGER FORECASTS.....	33
	2.5.1 METHODOLOGY, ASSUMPTIONS AND DATA SOURCES.....	33
	2.5.2 YIELD AND FARE PROJECTIONS	34
	2.5.3 PASSENGER ORIGINATION FORECAST	35
	2.5.4 DOMESTIC ENPLANEMENT FORECASTS	38
	2.5.5 DOMESTIC PROJECTIONS BY MARKET	39
	2.5.6 AIR SERVICE PROJECTIONS.....	42
	2.5.7 DOMESTIC PASSENGER FORECAST SUMMARY	44
2.6	INTERNATIONAL PASSENGER FORECASTS	44
	2.6.1 METHODOLOGY, ASSUMPTIONS, AND DATA SOURCES.....	44
	2.6.2 FORECASTS BY INTERNATIONAL REGION	47

2.6.3 MSP FORECASTS BY REGION	47
2.6.4 MSP INTERNATIONAL ENPLANEMENT FORECASTS	47
2.6.5 INTERNATIONAL PASSENGER PROJECTIONS BY MARKET	49
2.6.6 AIR SERVICE PROJECTIONS.....	50
2.6.7 SUMMARY	51
2.7 CHARTER ENPLANEMENTS AND AIRCRAFT OPERATIONS	51
2.7.1 CHARTER PASSENGERS.....	51
2.7.2 CHARTER AIRCRAFT OPERATIONS.....	53
2.8 SUMMARY OF PASSENGER FORECASTS	53
2.9 AIR CARGO TONNAGE AND AIRCRAFT OPERATIONS	55
2.9.1 AIR CARGO TONNAGE.....	55
2.9.2 ALL-CARGO AIRCRAFT OPERATIONS.....	56
2.10 GENERAL AVIATION AND MILITARY OPERATIONS	56
2.10.1 GENERAL AVIATION.....	56
2.10.2 MILITARY	59
2.11 SUMMARY OF ANNUAL FORECASTS.....	61
2.12 FORECAST SCENARIOS	61
2.13 GATE REQUIREMENTS	65
<i>CHAPTER 3: FACILITY REQUIREMENTS</i>	69
3.1 INTRODUCTION.....	69
3.1.1 GATE ALLOCATION AND THE TWO-TERMINAL SYSTEM.....	70
3.2 AIRFIELD CAPACITY ANALYSES	71
3.2.1 AIRFIELD CAPACITY AND DELAY	71
3.3 AIRSIDE REQUIREMENTS.....	72
3.3.1 RUNWAYS	72
3.3.2 TAXIWAYS AND CIRCULATION.....	72
3.4 GATE REQUIREMENTS	72
3.5 TERMINAL REQUIREMENTS.....	74
3.5.1 OVERVIEW	74
3.5.2 PASSENGER CHECK-IN AREA	76
3.5.3 SECURITY SCREENING CHECKPOINT	76
3.5.4 BAGGAGE CLAIM AREA.....	77
3.5.5 US CUSTOMS AND BORDER PROTECTION FACILITIES.....	78
Customs and Border Protection (CBP) Programming	78
3.6 LANDSIDE REQUIREMENTS	80

3.6.1 OVERVIEW	80
3.6.2 ROADWAY ACCESS AND CURB REQUIREMENTS	80
Traffic Volumes on Glumack Drive	80
Terminal Curb Roadways	80
3.6.3 PARKING REQUIREMENTS	82
On-Airport Public Parking Facilities	82
Private Parking Facilities	83
3.6.4 RENTAL CAR REQUIREMENTS	84
3.6.5 GROUND TRANSPORTATION CENTER REQUIREMENTS	85
3.7 LIGHTING AND NAVIGATION REQUIREMENTS	86
3.8 SECURITY REQUIREMENTS	86
3.9 UTILITY REQUIREMENTS	86
3.10 OBSTRUCTION-RELATED REQUIREMENTS	86
3.11 OTHER AIRPORT SERVICES REQUIREMENTS	86
CHAPTER 4: ALTERNATIVES	88
4.1 INTRODUCTION	88
4.2 AIRFIELD	90
4.3 TERMINAL	92
4.3.1 LINDBERGH TERMINAL	92
4.3.2 HUMPHREY TERMINAL	102
4.4 LANDSIDE AND GROUND TRANSPORTATION	102
4.4.1 LINDBERGH TERMINAL	102
4.4.2 HUMPHREY TERMINAL	108
4.5 PREFERRED ALTERNATIVES SUMMARY	108
4.5.1 LINDBERGH TERMINAL	108
4.5.2 HUMPHREY TERMINAL	109
CHAPTER 5: ENVIRONMENTAL CONSIDERATIONS	110
5.1 AIRPORT AND AIRCRAFT ENVIRONMENTAL CAPABILITY	110
5.2 AIRCRAFT NOISE	110
5.2.1 QUANTIFYING AIRCRAFT NOISE	110
5.3 MSP BASE CASE 2008 NOISE CONTOURS	112
5.3.1 2008 BASE CASE AIRCRAFT OPERATIONS AND FLEET MIX	112
5.3.2 2008 BASE CASE RUNWAY USE	116
5.3.3 2008 BASE CASE FLIGHT TRACKS	118
5.3.4 2008 BASE CASE ATMOSPHERIC CONDITIONS	118
5.3.5 2008 MODELED VERSUS MEASURED DNL LEVELS	118

5.3.6 2008 BASE CASE NOISE CONTOUR IMPACTS.....	128
5.4 2030 PREFERRED ALTERNATIVE FORECAST NOISE CONTOURS	130
5.4.1 2030 AIRCRAFT OPERATIONS AND FLEET MIX.....	130
5.4.2 2030 RUNWAY USE.....	133
5.4.3 2030 FLIGHT TRACKS	134
5.4.4 2030 ATMOSPHERIC CONDITIONS.....	134
5.4.5 2030 NOISE CONTOUR IMPACTS	134
5.5 AIR QUALITY	138
5.5.1 AIRCRAFT EMISSIONS.....	138
5.5.2 ROADWAY AND PARKING EMISSIONS – MSP 2008 AND 2030	144
5.6 SANITARY SEWER AND WATER.....	151
5.6.1 SANITARY SEWER	151
5.6.2 WATER SUPPLY	152
5.6.3 SOLID WASTE.....	153
5.7 WATER QUALITY	153
5.8 WETLANDS.....	154
CHAPTER 6: LAND USE COMPATIBILITY.....	155
6.1 INTRODUCTION.....	155
6.2 LAND USE COMPATIBILITY	155
6.2.1 FAA LAND USE COMPATIBILITY GUIDELINES.....	155
6.2.2 METROPOLITAN COUNCIL LAND USE COMPATIBILITY GUIDELINES.....	156
6.3 RUNWAY SAFETY ZONING CONSIDERATIONS.....	162
6.3.1 FEDERAL RUNWAY PROTECTION ZONES	162
6.3.2 FEDERAL AIRSPACE PROTECTION.....	162
6.3.3 STATE MODEL ZONING ORDINANCE	163
State Runway Safety Zones.....	164
State Model Zoning Ordinance Airspace Protection	164
6.4 MSP ZONING ORDINANCE.....	164
6.5 LAND USE COMPATIBILITY ANALYSIS	166
6.5.1 EXISTING CONDITION LAND USE COMPATIBILITY	166
6.5.2 PREFERRED ALTERNATIVE LAND USE COMPATIBILITY	171

CHAPTER 7: FACILITY IMPLEMENTATION SCHEDULE AND COST	173
7.1 IMPLEMENTATION STRATEGY	173
7.2 COST ESTIMATES.....	174
CHAPTER 8: PUBLIC INFORMATION PROCESS.....	175
8.1 PUBLIC INFORMATION PROCESS	175
8.2 LTCP APPROVAL PROCESS	176

FIGURES

FIGURE E-1: MSP 2030 CONCEPTUAL PLAN.....	E-7
FIGURE 1-1: MAC AIRPORTS IN THE SEVEN COUNTY METROPOLITAN AREA	2
FIGURE 1-2: EXISTING AIRPORT LAYOUT	6
FIGURE 1-3: LINDBERGH TERMINAL – LEVEL 1	8
FIGURE 1-4: LINDBERGH TERMINAL – LEVEL 2	9
FIGURE 1-5: LINDBERGH TERMINAL – LEVEL 3	10
FIGURE 1-6: HUMPHREY TERMINAL – LEVEL 1.....	11
FIGURE 1-7: HUMPHREY TERMINAL – LEVEL 2.....	12
FIGURE 1-8: HUMPHREY TERMINAL – LEVEL 3.....	13
FIGURE 1-9: NATIONAL WETLANDS INVENTORY	16
FIGURE 1-10: DRAINAGE AREA BOUNDARY MAP.....	18
FIGURE 4-1: MSP 2030 CONCEPTUAL PLAN	89
FIGURE 4-2: CROSSOVER TAXIWAY CONCEPT.....	91
FIGURE 4-3: LINDBERGH TERMINAL CONCEPT PHASE I (2015-2020)	94
FIGURE 4-4: LINDBERGH TERMINAL CONCEPT PHASE II (2020-2025)	95
FIGURE 4-5: LINDBERGH TERMINAL CONCEPT PHASE II (2025-2030)	96
FIGURE 4-6: NEW INT’L TERMINAL – DEPARTURES LEVEL.....	98
FIGURE 4-7: NEW INT’L TERMINAL – MEZZANINE LEVEL	99
FIGURE 4-8: NEW INT’L TERMINAL – GROUND LEVEL	100
FIGURE 4-9: NEW INT’L TERMINAL – SECTIONS	101
FIGURE 4-10: HUMPHREY TERMINAL CONCEPT PHASE I (2010-2015)	103
FIGURE 4-11: HUMPHREY TERMINAL CONCEPT PHASE II (2020-2025)	104
FIGURE 4-12: REALIGN GLUMACK DRIVE	106
FIGURE 4-13: LINDBERGH TERMINAL GROUND TRANSPORTATION CENTER.	107
FIGURE 5-1a: INM FLIGHT TRACKS RUNWAY 04	119

FIGURE 5-1b: INM FLIGHT TRACKS RUNWAY 12L.....	120
FIGURE 5-1c: INM FLIGHT TRACKS RUNWAY 12R	121
FIGURE 5-1d: INM FLIGHT TRACKS RUNWAY 17.....	122
FIGURE 5-1e: INM FLIGHT TRACKS RUNWAY 22	123
FIGURE 5-1f: INM FLIGHT TRACKS RUNWAY 30L.....	124
FIGURE 5-1g: INM FLIGHT TRACKS RUNWAY 30R	125
FIGURE 5-1h: INM FLIGHT TRACKS RUNWAY 35.....	126
FIGURE 5-2: 2008 BASECASE CONTOURS	129
FIGURE 5-3: 2030 PREFERRED ALTERNATIVE CONTOURS	135
FIGURE 5-4: 2008 BASECASE AND 2030 PREFERRED ALT CONTOURS	137
FIGURE 6-1: RPZs AND STATE ZONES	166
FIGURE 6-2: 2008 BASECASE CONTOURS/2005 LAND USE	168
FIGURE 6-3: RPZs AND STATE ZONES/2005 LAND USE	169
FIGURE 6-4: 2030 PREFERRED ALT CONTOUR/2005 LAND USE	172

TABLES

TABLE 1.1: EXISTING AIRPORT FACILITIES	5
TABLE 1.2: AIRFIELD WEATHER.....	21
TABLE 2.1: SUMMARY OF SOCIOECONOMIC DATA AND FORECASTS SEVEN-COUNTY METROPOLITAN COUNCIL AREA	25
TABLE 2.2: HISTORICAL ORIGINATING PASSENGERS.....	28
TABLE 2.3: HISTORIC PASSENGER ORIGINATIONS AND REVENUE ENPLANEMENTS.....	29
TABLE 2.4: HISTORICAL AIRCRAFT OPERATIONS	31
TABLE 2.5: BASE FORECAST OF ANNUAL DOMESTIC ORIGINATIONS	37
TABLE 2.6: BASE CASE FORECAST OF DOMESTIC ENPLANEMENTS	40
TABLE 2.7: FORECAST OF DOMESTIC SCHEDULED PASSENGER AIRCRAFT OPERATIONS AND SEAT DEPARTURES.....	45
TABLE 2.8: FORECAST OF INTERNATIONAL ENPLANEMENTS BASE CASE	48
TABLE 2.9: FORECAST OF INTERNATIONAL SCHEDULED PASSENGER AIRCRAFT OPERATIONS AND SEAT DEPARTURES	52
TABLE 2.10: FORECAST OF ANNUAL DOMESTIC AND INTERNATIONAL DEPARTURES	54
TABLE 2.11: ENPLANED AND DEPLANED AIR CARGO (SHORT TONS).....	57

TABLE 2.12: SUMMARY OF BASED AIRCRAFT FORECAST	58
TABLE 2.13: FORECAST OF ANNUAL GENERAL AVIATION OPERATIONS	60
TABLE 2.14: FORECAST OF ANNUAL MILITARY AIRCRAFT	62
TABLE 2.15: SUMMARY OF BASE CASE PASSENGER FORECAST	63
TABLE 2.16: SUMMARY OF FORECAST AIRCRAFT OPERATIONS	64
TABLE 2.17: SCENARIO SUMMARY	66
TABLE 2.18: SUMMARY OF FORECAST GATE REQUIREMENTS - TOTAL	67
TABLE 3.1: IATA SERVICE LEVELS	75
TABLE 3.2: CBP DESIGN GUIDELINES FOR LARGE AIRPORTS.....	79
TABLE 3.3: TRAFFIC VOLUMES ON GLUMACK DRIVE.....	80
TABLE 3.4: CURRENT CURB CONDITIONS AND FUTURE REQUIREMENTS	82
TABLE 3.5: FUTURE PARKING REQUIREMENTS	83
TABLE 3.6: OFF-AIRPORT PARKING	84
TABLE 3.7: RENTAL CAR REQUIREMENTS	85
TABLE 3.8: GROUND TRANSPORTATION CENTER (GTC) REQUIREMENTS	86
TABLE 5.1: 2008 TOTAL OPERATIONS NUMBERS.....	113
TABLE 5.2: 2008 AIRCRAFT FLEET MIX AVERAGE DAILY OPERATIONS	115
TABLE 5.3: 2008 RUNWAY USE.....	117
TABLE 5.4: 2008 ACTUAL FLIGHT TRACK USE.....	APPENDIX B
TABLE 5.5: 2008 MEASURED VERSUS INM DNL VALUES AT ANOMS RMT LOCATIONS	127
TABLE 5.6: SUMMARY OF 2008 ACTUAL DNL NOISE CONTOUR SINGLE-FAMILY AND MULTI-FAMILY UNIT COUNTS.....	128
TABLE 5.7: 2030 TOTAL OPERATIONS NUMBERS.....	130
TABLE 5.8: 2030 AIRCRAFT FLEET MIX AVERAGE DAILY OPERATIONS	131
TABLE 5.9: 2030 RUNWAY USE.....	133
TABLE 5.10: 2030 FORECAST FLIGHT TRACK USE.....	APPENDIX B
TABLE 5.11: SUMMARY OF 2030 FORECAST DNL NOISE CONTOUR SINGLE- FAMILY AND MULTI-FAMILY UNIT COUNTS	136
TABLE 5.12: FLEET MIX AND LTO ANNUAL OPERATIONS – 2008.....	139
TABLE 5.13: FLEET MIX AND LTO ANNUAL OPERATIONS – 2030	141
TABLE 5.14: TAXI TIMES (MINUTES).....	143
TABLE 5.15: 2008 EMISSIONS INVENTORY (TONS/YEAR)	143
TABLE 5.16: 2030 EMISSIONS INVENTORY (TONS/YEAR)	144

TABLE 5.17: ROADWAY CRITERIA POLLUTANTS EMISSIONS 2008 (SHORT TONS PER YEAR).....	146
TABLE 5.18: ROADWAY CRITERIA POLLUTANT EMISSIONS 2030 (SHORT TONS PER YEAR).....	147
TABLE 5.19: MAJOR MSP PARKING FACILITIES ANALYZED	148
TABLE 5.20: PARKING FACILITY PARAMETERS ASSUMED FOR THE EMISSIONS ANALYSIS	148
TABLE 5.21: ASSUMED ENTRY PLUS EXIT MOVEMENTS.....	149
TABLE 5.22: PARKING CARBON MONOXIDE EMISSIONS (SHORT TONS/YEAR)....	149
TABLE 5.23: COMBINED ROADWAY AND PARKING CARBON MONOXIDE EMISSIONS (TONS).....	150
TABLE 5.24: INFRASTRUCTURE EMISSIONS	151
TABLE 6.1: FAA AIRCRAFT NOISE AND LAND USE COMPATIBILITY GUIDELINES	157
TABLE 6.2: LAND USE COMPATIBILITY GUIDELINES	161
TABLE 6.3: STRUCTURE PERFORMANCE STANDARDS¹	162
TABLE 7.1: LTCP IMPLEMENTATION COSTS	174
TABLE 8.1: LTCP MEETING SCHEDULE.....	175

APPENDICES

APPENDIX A: ADDITIONAL FORECAST TABLES

APPENDIX B: ADDITIONAL ENVIRONMENTAL TABLES

APPENDIX C: COSTS BACK-UP

APPENDIX D: DRAFT MSP 2030 LTCP COMMENTS AND RESPONSES

Note

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